



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. A

93. A

94. A

95. D

96. C

1. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) String

(C) ★

Integer

(D) None

(E) Float

---

**Solution.**

---

2. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+1`

(B) ★

`sum=sum+i+1`

(C) `sum+1=sum`

(D) `sum=sum+i`

---

**Solution.**

---

3. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 8, 1, 6
- (B) 2, 7, 4, 5, 6
- (C) 2, 3, 4, 1, 6
- (D) ★ 2, 3, 8, 5, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---

4. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) None of the other answers are correct.

(B) `a*sin(a^b - b)`

(C) `a sin(a**b - b)`

(D) ★

`a*sin(a**b - b)`

(E) `a*sin(b^a - b)`

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) 9

(B) ★

27

(C) None of the other answers are correct.

(D) 3

(E) 1

---

**Solution.**

---

6. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) ★

12

(C) 11

(D) 14

(E) 13

---

**Solution.**

---

7. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) ★

`[1,2,1]`

(B) `[1,2,"3"]`

(C) `[1,2,1,2,1,2]`

(D) `[1,2,3]`

---

**Solution.**

---



8. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 5
- (B) ★ None of the other answers are correct.
- (C) 2
- (D) 3

---

**Solution.**

---

9. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) 7
- (B) None of the other answers are correct.
- (C) 4
- (D) ★  
3
- (E) 5

---

**Solution.**

---

10. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

3

(B) 0

(C) 1

(D) 4

(E) 2

---

**Solution.**

---

11. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

(A) None

(B) ★

String

(C) Integer

(D) Boolean

(E) Float

---

**Solution.**

---

12. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (B) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ★  
['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) None
- (E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

13. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) None of the above.

(D) `[3.0, 6.0, 9.0]`

(E) `[3, 6, 9]`

---

**Solution.**

---

14. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) 'ORS'

(B) ''

(C) False

(D) None

(E) ★

['0', 'R']

---

**Solution.**

---

15. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) None

(B) 0

(C) "MERLINMERLIN"

(D) ★

"MERLIN2"

(E) "MERLIN%i"

---

**Solution.**

---



16. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

["-", "\*", "-"]

(B) None of the other answers are correct.

(C) ["-", "-", "\*"]

(D) ["-", "\*"]

(E) ["-", "\*", "\*"]

---

**Solution.**

---

17. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) [ ]
- (B) ['Sir Agravaine', 'King Pellinore']
- (C) ['King Pellinore', 'Sir Agravaine']
- (D) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

18. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) ★

[1, 2, 3, 4, '1234']

(B) [1, 2, 3, '123']

(C) [1, 2, 3, 10]

(D) [1, 2, 3]

(E) [1, 2, 3, '1234']

---

**Solution.**

---

19. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]  
a=a[0:4]  
a.sort()  
x=""  
for e in a:  
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) ★

"UTSP"

(C) "PSTU"

(D) "STUP"

(E) "PUST"

---

**Solution.**

---

20. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

- (A) `s[i:i-1]`
- (B) `s[i+1:i+2]`
- (C) `s[i:i+1]`
- (D) ★  
`s[i:i+2]`

---

**Solution.**

---

21. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) ★

"3str(3)"

(B) None of the other answers are correct.

(C) "33"

(D) 33

(E) "333"

---

**Solution.**

---

22. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 16

(B) 3

(C) 8

(D) 0

(E) ★

12

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

[3, 5, 6, 6, 7]

(B) [3, 5, 6, 6, 7, 8]

(C) [2, 4, 5, 6, 6, 7]

(D) [3, 5, 6, 6]

(E) [2, 4, 5, 5, 6, 7]

---

**Solution.**

---



24. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 13

(C) 12

(D) ★

10

(E) 11

---

**Solution.**

---

25. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve']
- (B) ['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ★  
['twelve', 'eleven', 'two', 'one']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

26. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n % m) == 0`

(C) `(n // m) == 0`

(D) ★

`(m % n) != 0`

---

**Solution.**

---

27. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) 4

(C) 2

(D) -1

(E) ★

3

---

**Solution.**

---

28. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) ★

4

(B) 5

(C) 14

(D) 3

(E) 30

---

**Solution.**

---

29. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) None

(C) Float

(D) ★

Integer

(E) String

---

**Solution.**

---

30. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) ★ 3
- (C) 4
- (D) 5

---

**Solution.**

---



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**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. B

93. A

94. A

95. E

96. D



1. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
sum=sum+i+1
```

(B) `sum=sum+i`

(C) `sum=sum+1`

(D) `sum+1=sum`

---

**Solution.**

---

2. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 5

(C) ★

4

(D) 14

(E) 30

---

**Solution.**

---

3. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(a^b - b)`

(B) None of the other answers are correct.

(C) `a sin(a**b - b)`

(D) `a*sin(b^a - b)`

(E) ★

`a*sin(a**b - b)`

---

**Solution.**

---

4. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['two', 'twelve', 'one', 'eleven', 'six']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ['one', 'two', 'eleven', 'twelve', 'six']
- (D) ★

['twelve', 'eleven', 'two', 'one']

- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

5. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) "33"

(B) 33

(C) ★

"3str(3)"

(D) None of the other answers are correct.

(E) "333"

---

**Solution.**

---

6. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) 7

(C) 5

(D) 3

(E) ★

4

---

**Solution.**

---

7. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) ★

11

(C) 13

(D) 12

(E) 10

---

**Solution.**

---

8. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) 12
- (B) "MERLIN"
- (C) None
- (D) ★

"MERLINMERLIN"

- (E) "MERLIN2"

---

**Solution.**

---



9. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 3
- (B) ★ None of the other answers are correct.
- (C) 5
- (D) 2

---

**Solution.**

---

10. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) `(m // n) != 0`

(C) ★

`(m % n) != 0`

(D) `(n % m) == 0`

---

**Solution.**

---

11. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Integer
- (B) None
- (C) Float
- (D) Boolean
- (E) String

---

**Solution.**

---

12. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 8

(B) ★

16

(C) 12

(D) 0

(E) 7

---

**Solution.**

---

13. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(B) `[3, 6, 9]`

(C) `(3, 6, 9)`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) `[3.0, 6.0, 9.0]`

---

**Solution.**

---

14. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) 1

(C) 3

(D) ★

27

(E) 9

---

**Solution.**

---

15. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (B) [ ]
- (C) ['King Pellinore', 'Sir Agravaine']
- (D) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine']
- (E) ['Sir Agravaine', 'King Pellinore']

---

**Solution.**

---

16. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i+1:i+2]`

(B) `s[i:i+1]`

(C) ★

`s[i:i+2]`

(D) `s[i:i-1]`

---

**Solution.**

---



17. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "\*"]

(B) None of the other answers are correct.

(C) ★

["-", "\*", "-", "\*"]

(D) ["\*", "-", "\*"]

(E) ["\*", "-", "\*"]

---

**Solution.**

---

18. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 5, 6, 6]

(B) ★

[3, 5, 6, 6, 7]

(C) [3, 5, 6, 6, 7, 8]

(D) [2, 4, 5, 6, 6, 7]

(E) [2, 4, 5, 5, 6, 7]

---

**Solution.**

---

19. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 4
- (B) 1
- (C) 2
- (D) ★ 3

---

**Solution.**

---

20. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) 2, 3, 4, 1, 6
- (C) ★ 2, 3, 8, 5, 6
- (D) 2, 3, 8, 1, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---

21. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) `[1,2,3]`

(C) ★

`[1,2]`

(D) `[1,2,1]`

---

**Solution.**

---

22. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 1

(C) 3

(D) 4

(E) ★

2

---

**Solution.**

---

23. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ★  
[ 'R', 'A' ]
- (B) None
- (C) 'RAI'
- (D) 3
- (E) False

---

**Solution.**

---

24. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) "ACCIA"
- (B) None of the other answers are correct.
- (C) ★  
"OCCIO"
- (D) "ICCOI"
- (E) "ACCOA"

---

**Solution.**

---



25. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) Boolean
- (B) None
- (C) Integer
- (D) Float
- (E) ★

String

---

**Solution.**

---

26. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) ★

3

(C) 2

(D) -1

(E) 4

---

**Solution.**

---

27. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) ★

Float

(C) None

(D) Integer

(E) String

---

**Solution.**

---

28. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '321']

(B) ★

[3, 2, 1, '321']

(C) [3, 2, 1]

(D) [1, 2, 3]

(E) [1, 2, 3, 6]

---

**Solution.**

---

29. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 13

(C) 12

(D) 11

(E) 14

---

**Solution.**

---

30. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ★
- None
- (D) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. C

93. A

94. A

95. A

96. E

1. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

(A) ★ 3

(B) 1

(C) 4

(D) 5

---

**Solution.**

---



2. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 2

(B) ★

3

(C) 0

(D) 4

(E) 1

---

**Solution.**

---

3. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) 5

(B) 3

(C) 7

(D) ★

4

(E) None of the other answers are correct.

---

**Solution.**

---

4. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) ★

"UTSP"

(B) None of the other answers are correct.

(C) "PUST"

(D) "STUP"

(E) "PSTU"

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 6, 7, 7]

(B) [3, 5, 7, 7]

(C) ★

[3, 5, 6, 7, 7]

(D) [3, 5, 6, 7, 7, 8]

(E) [2, 4, 5, 5, 7, 7]

---

**Solution.**

---

6. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) ★

12

(C) 8

(D) 16

(E) 3

---

**Solution.**

---

7. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) ★

14

(C) 3

(D) 4

(E) 30

---

**Solution.**

---

8. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ['Sir Agravaine', 'King Pellinore']

(B) ['King Pellinore', 'Sir Agravaine']

(C) ★

['Merlin', 'King Pellinore', 'Sir Agravaine']

(D) [ ]

(E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (E) ★

None

---

**Solution.**

---



10. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

- (A) [1, 2, 3, 6]
- (B) [1, 2, 3, '321']
- (C) [1, 2, 3]
- (D) [3, 2, 1]
- (E) ★  
[3, 2, 1, '321']

---

**Solution.**

---

11. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 2
- (B) 3
- (C) 5
- (D) ★ None of the other answers are correct.

---

**Solution.**

---

12. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Integer
- (B) Float
- (C) None
- (D) String
- (E) Boolean

---

**Solution.**

---

13. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) "3"

(B) None of the other answers are correct.

(C) 111

(D) ★

"111"

(E) 3

---

**Solution.**

---

14. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(m // n) != 0`

(C) `(n % m) == 0`

(D) `(n // m) == 0`

---

**Solution.**

---

15. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+1`

(B) ★

`sum=sum+i+1`

(C) `sum=sum+i`

(D) `sum+1=sum`

---

**Solution.**

---

16. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) None of the above.

(B) `[3.0, 6.0, 9.0]`

(C) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(D) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(E) `[3, 6, 9]`

---

**Solution.**

---

17. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["-", "\*", "\*"]
- (B) ["-", "-", "\*"]
- (C) ["-", "\*"]
- (D) None of the other answers are correct.
- (E) ★

["-", "\*", "-"]

---

**Solution.**

---



18. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 6

(B) ★

-1

(C) 5

(D) 3

(E) 0

---

**Solution.**

---

19. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) ★

10

(C) 11

(D) 12

(E) 14

---

**Solution.**

---

20. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) ★
- 3
- (B) 9
- (C) None of the other answers are correct.
- (D) 1
- (E) 7

---

**Solution.**

---

21. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

(A) ★

['eleven', 'one', 'twelve', 'two']

(B) ['one', 'two', 'eleven', 'twelve']

(C) ['one', 'two', 'eleven', 'twelve', 'six']

(D) ['two', 'twelve', 'one', 'eleven', 'six']

(E) ['twelve', 'eleven', 'two', 'one']

---

**Solution.**

---

22. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,3]`

(B) `[1,2,1]`

(C) ★

`[1,2]`

(D) `[1,2,1,2,1,2]`

---

**Solution.**

---

23. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

- (A) `s[i:i-1]`
- (B) `s[i+1:i+2]`
- (C) ★
- `s[i:i+2]`
- (D) `s[i:i+1]`

---

**Solution.**

---

24. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) Float

(C) None

(D) ★

Boolean

(E) String

---

**Solution.**

---

25. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Integer
- (C) Float
- (D) ★  
Boolean
- (E) String

---

**Solution.**

---



26. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) 12
- (B) "MERLIN2"
- (C) "MERLIN"
- (D) None
- (E) ★

"MERLINMERLIN"

---

**Solution.**

---

27. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) ★

['0', 'R']

(C) False

(D) 'ORS'

(E) ''

---

**Solution.**

---

28. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

12

(B) 14

(C) 10

(D) 13

(E) 11

---

**Solution.**

---

29. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) ★ 2, 3, 8, 5, 6
- (B) 3, 2, 8, 5, 9
- (C) 2, 3, 4, 1, 6
- (D) 2, 3, 8, 1, 6
- (E) 2, 7, 4, 5, 6

---

**Solution.**

---

30. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(a^b - b)`

(B) `a*sin(b^a - b)`

(C) `a sin(a**b - b)`

(D) ★

`a*sin(a**b - b)`

(E) None of the other answers are correct.

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
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- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
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- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. D

93. A

94. A

95. B

96. A

1. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `[3, 6, 9]`

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) `[3.0, 6.0, 9.0]`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) `(3, 6, 9)`

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) 3

(B) ★

27

(C) None of the other answers are correct.

(D) 9

(E) 1

---

**Solution.**

---



3. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

(A) None

(B) ★

Integer

(C) Boolean

(D) String

(E) Float

---

**Solution.**

---

4. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) False

(B) 'ORS'

(C) ★

['0', 'R']

(D) None

(E) ''

---

**Solution.**

---

5. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ★

`['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']`

(B) `['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']`

(C) `[ ]`

(D) `['Merlin', 'King Pellinore', 'Sir Agravaine']`

(E) `['King Pellinore', 'Sir Agravaine', 'Merlin']`

---

**Solution.**

---

6. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLIN"

(B) 12

(C) "MERLIN2"

(D) ★

"MERLINMERLIN"

(E) None

---

**Solution.**

---

7. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 16

(C) 8

(D) ★

12

(E) 3

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 3

(B) ★

-1

(C) 6

(D) 0

(E) 5

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [4, 6, 7]
- (B) [2, 4, 6, 6]
- (C) [4, 6, 7, 7]
- (D) [3, 4, 6, 7, 8]
- (E) ★

[4, 6, 7, 8]

---

**Solution.**

---

10. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1]`

(B) ★

`[1,2]`

(C) `[1,2,1,2,1,2]`

(D) `[1,2,3]`

---

**Solution.**

---



11. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) ★

[3, 2, 1, '321']

(B) [3, 2, 1]

(C) [1, 2, 3]

(D) [1, 2, 3, 6]

(E) [1, 2, 3, '321']

---

**Solution.**

---

12. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) None of the other answers are correct.

(B) `(b^a)cos(a-b)`

(C) ★

`(a**b)*cos(a-b)`

(D) `(a**b)cos(a-b)`

(E) `(a^b)*cos(a-b)`

---

**Solution.**

---

13. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 3
- (B) 5
- (C) ★ None of the other answers are correct.
- (D) 2

---

**Solution.**

---

14. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) ★  
String
- (C) Integer
- (D) Float
- (E) Boolean

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) None
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (E) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

---

**Solution.**

---

16. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "33"

(C) "333"

(D) 33

(E) ★

```
"3str(3)"
```

---

**Solution.**

---

17. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1==s2:  
    x.sort()  
elif s1<s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve']
- (B) ★  
['eleven', 'one', 'twelve', 'two']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['one', 'two', 'eleven', 'twelve', 'six']
- (E) ['twelve', 'eleven', 'two', 'one']

---

**Solution.**

---

18. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["\*", "-", "\*"]
- (B) ["-", "\*"]
- (C) None of the other answers are correct.
- (D) ★

["-", "\*", "-", "\*"]

- (E) ["\*", "-", "\*"]

---

**Solution.**

---



19. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 12

(C) ★

10

(D) 13

(E) 11

---

**Solution.**

---

20. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

- (A) String
- (B) Boolean
- (C) ★  
Integer
- (D) Float
- (E) None

---

**Solution.**

---

21. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum+1=sum`

(B) `sum=sum+i`

(C) ★

`sum=sum+i+1`

(D) `sum=sum+1`

---

**Solution.**

---

22. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) `s[i:i-1]`

(B) `s[i:i+1]`

(C) ★

`s[i:i+2]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) 10

(C) 14

(D) ★

12

(E) 11

---

**Solution.**

---

24. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 3, 2, 8, 5, 9
- (B) 2, 3, 8, 1, 6
- (C) ★ 2, 3, 8, 5, 6
- (D) 2, 7, 4, 5, 6
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

25. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) ★

14

(C) 30

(D) 3

(E) 4

---

**Solution.**

---

26. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 1

(C) 3

(D) 4

(E) ★

2

---

**Solution.**

---



27. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) 4
- (C) 5
- (D) ★ 3

---

**Solution.**

---

28. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) ★

"OCCIO"

(B) "ACCOA"

(C) "ACCIA"

(D) None of the other answers are correct.

(E) "ICCOI"

---

**Solution.**

---

29. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) ★

`(m % n) != 0`

(C) `(m // n) != 0`

(D) `(n % m) == 0`

---

**Solution.**

---

30. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) 5
- (B) ★
- 4
- (C) 3
- (D) None of the other answers are correct.
- (E) 7

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. E

93. A

94. A

95. C

96. B

1. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 4

(B) 2

(C) -1

(D) ★

3

(E) 5

---

**Solution.**

---

2. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ★  
[ 'R', 'A' ]
- (B) None
- (C) False
- (D) 'RAI'
- (E) 3

---

**Solution.**

---

3. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) 12

(B) "MERLIN"

(C) ★

"MERLINMERLIN"

(D) "MERLIN2"

(E) None

---

**Solution.**

---



4. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) ★

"1.21.2"

(C) 2.4

(D) "2.4"

(E) "1.2\*2"

---

**Solution.**

---

5. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 7

(B) ★

16

(C) 12

(D) 0

(E) 8

---

**Solution.**

---

6. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) String
- (C) None
- (D) ★
- Boolean
- (E) Integer

---

**Solution.**

---

7. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%3)==0:  
        x.append("-")  
    if (j%4)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["\*", "-", "\*"]
- (B) ["\*", "-", "\*"]
- (C) ["-", "\*"]
- (D) None of the other answers are correct.
- (E) ★

["-", "\*", "-", "\*"]

---

**Solution.**

---

8. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

- (A) "PUST"
- (B) None of the other answers are correct.
- (C) "STUP"
- (D) ★
- (E) "UTSP"
- (F) "PSTU"

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '321']

(B) [3, 2, 1]

(C) [1, 2, 3]

(D) ★

[3, 2, 1, '321']

(E) [1, 2, 3, 6]

---

**Solution.**

---

10. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,3]`

(B) `[1,2,"3"]`

(C) `[1,2,1,2,1,2]`

(D) ★

`[1,2,1]`

---

**Solution.**

---

11. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) 3

(B) ★

4

(C) 7

(D) None of the other answers are correct.

(E) 5

---

**Solution.**

---



12. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) ★

Integer

(C) None

(D) Float

(E) String

---

**Solution.**

---

13. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1>s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['twelve', 'eleven', 'two', 'one']
- (B) ['eleven', 'one', 'twelve', 'two']
- (C) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['one', 'two', 'eleven', 'twelve']

---

**Solution.**

---

14. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

(A) ★ 2, 3, 8, 5, 6

(B) 2, 7, 4, 5, 6

(C) 3, 2, 8, 5, 9

(D) 2, 3, 4, 1, 6

(E) 2, 3, 8, 1, 6

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

11

(B) 10

(C) 12

(D) 13

(E) 14

---

**Solution.**

---

16. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 1

(B) 0

(C) ★

3

(D) 2

(E) 4

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) 9

(C) 7

(D) ★

3

(E) 1

---

**Solution.**

---

18. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(1,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ['Merlin', 'King Pellinore', 'Sir Agravaine']

(B) [ ]

(C) ★

['King Pellinore', 'Sir Agravaine']

(D) ['Sir Agravaine', 'King Pellinore']

(E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

19. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 6, 7, 7]

(B) ★

[3, 5, 6, 7, 7]

(C) [3, 5, 7, 7]

(D) [2, 4, 5, 5, 7, 7]

(E) [3, 5, 6, 7, 7, 8]

---

**Solution.**

---



20. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (B) None
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (E) ★

['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

---

**Solution.**

---

21. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) ★

14

(B) 4

(C) 3

(D) 30

(E) 5

---

**Solution.**

---

22. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `(3, 6, 9)`

(B) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(C) `[3.0, 6.0, 9.0]`

(D) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(E) `[3, 6, 9]`

---

**Solution.**

---

23. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) 13

(C) 14

(D) 12

(E) ★

15

---

**Solution.**

---

24. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) 5
- (C) ★ 3
- (D) 4

---

**Solution.**

---

25. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(n // m) == 0`

(C) `(n % m) == 0`

(D) `(m // n) != 0`

---

**Solution.**

---

26. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i:i-1]`

(B) ★

`s[i:i+2]`

(C) `s[i+1:i+2]`

(D) `s[i:i+1]`

---

**Solution.**

---

27. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

- (A) `while i<=100`
- (B) `while i in range(100)`
- (C) `for i in range(0,100)`
- (D) ★  
`for i in range(1,101)`

---

**Solution.**

---



28. (1 point) How can the following mathematical equation be implemented as a Python expression?  
Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) ★

`(a**b)*cos(a-b)`

(B) `(a^b)*cos(a-b)`

(C) `(a**b)cos(a-b)`

(D) `(b^a)cos(a-b)`

(E) None of the other answers are correct.

---

**Solution.**

---

29. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Integer
- (B) String
- (C) Float
- (D) Boolean
- (E) None

---

**Solution.**

---

30. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 5
- (B) 2
- (C) ★ None of the other answers are correct.
- (D) 3

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. A

93. B

94. A

95. E

96. E

1. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 4

(C) 0

(D) ★

2

(E) 1

---

**Solution.**

---

2. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Boolean
- (C) None
- (D) Integer
- (E) Float

---

**Solution.**

---

3. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 3

(B) 0

(C) ★

-1

(D) 5

(E) 6

---

**Solution.**

---

4. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) 5

(B) 7

(C) ★

4

(D) None of the other answers are correct.

(E) 3

---

**Solution.**

---



5. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 2
- (B) ★ None of the other answers are correct.
- (C) 5
- (D) 3

---

**Solution.**

---

6. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) String

(C) None

(D) ★

Float

(E) Integer

---

**Solution.**

---

7. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 2
- (B) 1
- (C) 4
- (D) ★ 3

---

**Solution.**

---

8. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]
b=[ ]
for i in range(0,3):
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (B) ['King Pellinore', 'Sir Agravaine']
- (C) ['Sir Agravaine', 'King Pellinore']
- (D) ★

['Merlin', 'King Pellinore', 'Sir Agravaine']

- (E) [ ]

---

**Solution.**

---

9. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) `(a^b)*cos(a-b)`

(B) `(b^a)cos(a-b)`

(C) None of the other answers are correct.

(D) `(a**b)cos(a-b)`

(E) ★

`(a**b)*cos(a-b)`

---

**Solution.**

---

10. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) 12

(C) ★

11

(D) 14

(E) 10

---

**Solution.**

---

11. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(n // m) == 0`

(C) `(m // n) != 0`

(D) `(n % m) == 0`

---

**Solution.**

---

12. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 13

(C) ★

15

(D) 11

(E) 12

---

**Solution.**

---



13. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) `s[i:i-1]`

(B) ★

`s[i:i+2]`

(C) `s[i:i+1]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

14. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) ★

[1,2]

(B) [1,2,1,2,1,2]

(C) [1,2,1]

(D) [1,2,3]

---

**Solution.**

---

15. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%3)==0:  
        x.append("-")  
    if (j%4)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["\*", "-", "\*"]
- (B) ["-", "\*"]
- (C) None of the other answers are correct.
- (D) ★

["-", "\*", "-", "\*"]

- (E) ["\*", "-", "\*"]

---

**Solution.**

---

16. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(B) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

(D) None

(E) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, 6]

(B) [3, 2, 1]

(C) ★

[3, 2, 1, '321']

(D) [1, 2, 3, '321']

(E) [1, 2, 3]

---

**Solution.**

---

18. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 12

(B) 8

(C) 0

(D) ★

16

(E) 7

---

**Solution.**

---

19. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `while i<=100`

(B) `while i in range(100)`

(C) ★

`for i in range(1,101)`

(D) `for i in range(0,100)`

---

**Solution.**

---

20. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) "MERLIN"
- (B) "MERLIN2"
- (C) 12
- (D) None
- (E) ★

"MERLINMERLIN"

---

**Solution.**

---



21. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) 'ORS'

(C) ★

['0', 'R']

(D) False

(E) ''

---

**Solution.**

---

22. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) Integer
- (B) None
- (C) Boolean
- (D) Float
- (E) ★

String

---

**Solution.**

---

23. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) `(3, 6, 9)`

(D) `[3, 6, 9]`

(E) `[3.0, 6.0, 9.0]`

---

**Solution.**

---

24. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) "ICCOI"
- (B) None of the other answers are correct.
- (C) "ACCIA"
- (D) "ACCOA"
- (E) ★

"OCCIO"

---

**Solution.**

---

25. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) ★ 2, 3, 8, 5, 6
- (B) 2, 3, 8, 1, 6
- (C) 2, 7, 4, 5, 6
- (D) 3, 2, 8, 5, 9
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

26. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [4, 6, 7]

(B) ★

[4, 6, 7, 8]

(C) [3, 4, 6, 7, 8]

(D) [4, 6, 7, 7]

(E) [2, 4, 6, 6]

---

**Solution.**

---

27. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) 4

(C) ★

14

(D) 3

(E) 30

---

**Solution.**

---

28. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) 3

(B) ★

"111"

(C) "3"

(D) None of the other answers are correct.

(E) 111

---

**Solution.**

---



29. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve']
- (B) ['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['twelve', 'eleven', 'two', 'one']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ★

['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

30. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) ★  
3
- (B) 9
- (C) 1
- (D) None of the other answers are correct.
- (E) 7

---

**Solution.**

---



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- Each question has only **one** correct answer.
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- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. B

93. B

94. A

95. A

96. A

1. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a sin(a**b - b)`

(B) `a*sin(b^a - b)`

(C) ★

`a*sin(a**b - b)`

(D) `a*sin(a^b - b)`

(E) None of the other answers are correct.

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

- (A) "3"
  - (B) None of the other answers are correct.
  - (C) 3
  - (D) 111
  - (E) ★
- "111"

---

**Solution.**

---

3. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

- (A) [1, 2, 3]
- (B) [1, 2, 3, '321']
- (C) [3, 2, 1]
- (D) ★  
[3, 2, 1, '321']
- (E) [1, 2, 3, 6]

---

**Solution.**

---

4. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

- (A) `(n % m) == 0`
- (B) `(n // m) == 0`
- (C) `(m // n) != 0`
- (D) ★  
`(m % n) != 0`

---

**Solution.**

---

5. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 30

(B) 4

(C) 3

(D) ★

14

(E) 5

---

**Solution.**

---



6. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

3

(B) 2

(C) 4

(D) -1

(E) 5

---

**Solution.**

---

7. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+i`

(B) `sum+1=sum`

(C) ★

```
sum=sum+i+1
```

(D) `sum=sum+1`

---

**Solution.**

---

8. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]  
a=a[0:4]  
a.sort()  
x=""  
for e in a:  
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "STUP"

(C) ★

"UTSP"

(D) "PUST"

(E) "PSTU"

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) ★
- 2
- (B) 4
- (C) 8
- (D) 16
- (E) None of the other answers are correct.

---

**Solution.**

---

10. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) ★

12

(B) 3

(C) 0

(D) 16

(E) 8

---

**Solution.**

---

11. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 2

(B) ★

3

(C) 4

(D) 1

(E) 0

---

**Solution.**

---

12. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [4, 6, 7, 7]

(B) [4, 6, 7]

(C) ★

[4, 6, 7, 8]

(D) [2, 4, 6, 6]

(E) [3, 4, 6, 7, 8]

---

**Solution.**

---

13. (1 point) Consider the following program:

```
s="-B-O-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) False

(B) 'ORS'

(C) ''

(D) ★

['O', 'R']

(E) None

---

**Solution.**

---



14. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ★
- ['twelve', 'eleven', 'two', 'one']
- (B) ['eleven', 'one', 'twelve', 'two']
- (C) ['one', 'two', 'eleven', 'twelve', 'six']
- (D) ['one', 'two', 'eleven', 'twelve']
- (E) ['two', 'twelve', 'one', 'eleven', 'six']

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) ★
- None
- (E) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

---

**Solution.**

---

16. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 2
- (B) 1
- (C) ★ 3
- (D) 4

---

**Solution.**

---

17. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) None
  - (B) Float
  - (C) Integer
  - (D) String
  - (E) ★
- Boolean

---

**Solution.**

---

18. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) ★

12

(C) 10

(D) 13

(E) 14

---

**Solution.**

---

19. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) None
  - (B) Boolean
  - (C) String
  - (D) Float
  - (E) ★
- Integer

---

**Solution.**

---

20. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 3
- (B) 5
- (C) ★ None of the other answers are correct.
- (D) 2

---

**Solution.**

---

21. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) 5

(B) 7

(C) ★

4

(D) None of the other answers are correct.

(E) 3

---

**Solution.**

---



22. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) Integer
- (B) None
- (C) Boolean
- (D) ★  
Float
- (E) String

---

**Solution.**

---

23. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%2)==0:  
        x.append("-")  
    if (j%5)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) None of the other answers are correct.

(B) ["-", "-", "\*"]

(C) ["-", "\*", "-"]

(D) ★

["-", "\*", "-", "-"]

(E) ["\*", "-", "\*", "\*"]

---

**Solution.**

---

24. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(B) `(3, 6, 9)`

(C) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(D) `[3, 6, 9]`

(E) `[3.0, 6.0, 9.0]`

---

**Solution.**

---

25. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (B) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']
- (C) [ ]
- (D) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

26. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

- (A) `s[i:i-1]`
- (B) `s[i+1:i+2]`
- (C) ★
- `s[i:i+2]`
- (D) `s[i:i+1]`

---

**Solution.**

---

27. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLIN"

(B) ★

"MERLINMERLIN"

(C) 12

(D) "MERLIN2"

(E) None

---

**Solution.**

---

28. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 8, 1, 6
- (B) 2, 7, 4, 5, 6
- (C) ★ 2, 3, 8, 5, 6
- (D) 3, 2, 8, 5, 9
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

29. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) ★

[1,2]

(B) [1,2,1]

(C) [1,2,1,2,1,2]

(D) [1,2,3]

---

**Solution.**

---



30. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 12

(B) 11

(C) 13

(D) ★

15

(E) 14

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. C

93. B

94. A

95. B

96. B

1. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `while i<=100`

(B) ★

`for i in range(1,101)`

(C) `while i in range(100)`

(D) `for i in range(0,100)`

---

**Solution.**

---

2. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) 5
- (C) 4
- (D) ★ 3

---

**Solution.**

---

3. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) ★

12

(C) 13

(D) 14

(E) 10

---

**Solution.**

---

4. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) ★

`[1,2]`

(C) `[1,2,3]`

(D) `[1,2,1]`

---

**Solution.**

---

5. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) ★

16

(B) 7

(C) 8

(D) 0

(E) 12

---

**Solution.**

---

6. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 2
- (B) ★ None of the other answers are correct.
- (C) 5
- (D) 3

---

**Solution.**

---



7. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) ★

14

(C) 30

(D) 3

(E) 5

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ★  
[ 'R', 'A' ]
- (B) 3
- (C) 'RAI'
- (D) None
- (E) False

---

**Solution.**

---

9. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

3

(B) 2

(C) 4

(D) 0

(E) 1

---

**Solution.**

---

10. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) String
  - (B) Integer
  - (C) None
  - (D) Boolean
  - (E) ★
- Float

---

**Solution.**

---

11. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['two', 'twelve', 'one', 'eleven', 'six']
- (B) ★  
['eleven', 'one', 'twelve', 'two']
- (C) ['twelve', 'eleven', 'two', 'one']
- (D) ['one', 'two', 'eleven', 'twelve']
- (E) ['one', 'two', 'eleven', 'twelve', 'six']

---

**Solution.**

---

12. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%4)==0:  
        x.append("-")  
    if (j%5)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) None of the other answers are correct.

(B) ["-", "\*", "\*"]

(C) ["-", "-", "\*"]

(D) ★

["-", "\*", "-"]

(E) ["-", "\*"]

---

**Solution.**

---

13. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) Boolean
- (B) None
- (C) Float
- (D) String
- (E) ★

Integer

---

**Solution.**

---

14. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ★

['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']

(B) [ ]

(C) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']

(D) ['Merlin', 'King Pellinore', 'Sir Agravaine']

(E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---



15. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLIN%i"

(B) None

(C) ★

"MERLIN2"

(D) 0

(E) "MERLINMERLIN"

---

**Solution.**

---

16. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (B) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) ★
- None
- (E) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 6, 6]

(B) [4, 6, 7, 7]

(C) ★

[4, 6, 7, 8]

(D) [3, 4, 6, 7, 8]

(E) [4, 6, 7]

---

**Solution.**

---

18. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '321']

(B) [1, 2, 3, 6]

(C) ★

[3, 2, 1, '321']

(D) [3, 2, 1]

(E) [1, 2, 3]

---

**Solution.**

---

19. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) 3
  - (B) None of the other answers are correct.
  - (C) 5
  - (D) 7
  - (E) ★
- 4

---

**Solution.**

---

20. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

- (A) `(n % m) == 0`
- (B) `(m // n) != 0`
- (C) `(n // m) == 0`
- (D) ★  
`(m % n) != 0`

---

**Solution.**

---

21. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) ★ 2, 3, 8, 5, 6
- (C) 2, 3, 8, 1, 6
- (D) 3, 2, 8, 5, 9
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

22. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) "333"

(B) ★

"3str(3)"

(C) 33

(D) None of the other answers are correct.

(E) "33"

---

**Solution.**

---



23. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) ★  
Boolean
- (C) String
- (D) Integer
- (E) Float

---

**Solution.**

---

24. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

- (A) "PSTU"
- (B) "PUST"
- (C) None of the other answers are correct.
- (D) "STUP"
- (E) ★

"UTSP"

---

**Solution.**

---

25. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

-1

(B) 5

(C) 3

(D) 0

(E) 6

---

**Solution.**

---

26. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) None of the other answers are correct.

(B) `a*sin(a^b - b)`

(C) `a*sin(b^a - b)`

(D) `a sin(a**b - b)`

(E) ★

`a*sin(a**b - b)`

---

**Solution.**

---

27. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) 13

(C) 14

(D) 12

(E) ★

15

---

**Solution.**

---

28. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `[3, 6, 9]`

(B) `[3.0, 6.0, 9.0]`

(C) `(3, 6, 9)`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

29. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) ★

`s[i:i+2]`

(B) `s[i+1:i+2]`

(C) `s[i:i-1]`

(D) `s[i:i+1]`

---

**Solution.**

---

30. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) 9
  - (B) 1
  - (C) 7
  - (D) None of the other answers are correct.
  - (E) ★
- 3

---

**Solution.**

---





- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. D

93. B

94. A

95. C

96. C

1. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) 3

(C) ★

4

(D) 7

(E) 5

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) 4

(C) ★

2

(D) 8

(E) 16

---

**Solution.**

---

3. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%2)==0:  
        x.append("-")  
    if (j%5)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["-", "\*", "-"]
- (B) ["-", "-", "\*"]
- (C) ["\*", "-", "\*", "\*"]
- (D) ★

["-", "\*", "-", "-"]

- (E) None of the other answers are correct.

---

**Solution.**

---

4. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1]`

(B) `[1,2,1,2,1,2]`

(C) ★

`[1,2]`

(D) `[1,2,3]`

---

**Solution.**

---

5. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+1`

(B) `sum+1=sum`

(C) `sum=sum+i`

(D) ★

```
sum=sum+i+1
```

---

**Solution.**

---

6. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve']
- (B) ★  
['twelve', 'eleven', 'two', 'one']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['one', 'two', 'eleven', 'twelve', 'six']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

7. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n % m) == 0`

(C) ★

`(m % n) != 0`

(D) `(n // m) == 0`

---

**Solution.**

---



8. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) ★

12

(C) 13

(D) 11

(E) 14

---

**Solution.**

---

9. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) None

(B) "MERLIN%i"

(C) "MERLINMERLIN"

(D) ★

"MERLIN2"

(E) 0

---

**Solution.**

---

10. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) ★

`(a**b)*cos(a-b)`

(B) `(a**b)cos(a-b)`

(C) None of the other answers are correct.

(D) `(a^b)*cos(a-b)`

(E) `(b^a)cos(a-b)`

---

**Solution.**

---

11. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i:i+1]`

(B) ★

`s[i:i+2]`

(C) `s[i:i-1]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

12. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Boolean
- (B) String
- (C) Float
- (D) Integer
- (E) None

---

**Solution.**

---

13. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[3, 6, 9]`

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(D) `[3.0, 6.0, 9.0]`

(E) None of the above.

---

**Solution.**

---

14. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) ★

16

(B) 7

(C) 12

(D) 0

(E) 8

---

**Solution.**

---

15. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) 2, 3, 8, 1, 6
- (C) ★ 2, 3, 8, 5, 6
- (D) 3, 2, 8, 5, 9
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---



16. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '1234']

(B) [1, 2, 3, '123']

(C) ★

[1, 2, 3, 4, '1234']

(D) [1, 2, 3, 10]

(E) [1, 2, 3]

---

**Solution.**

---

17. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 13

(C) 12

(D) ★

10

(E) 11

---

**Solution.**

---

18. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 1

(C) ★

3

(D) 4

(E) 2

---

**Solution.**

---

19. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]
b=[ ]
for i in range(0,4):
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (B) [ ]
- (C) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (D) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (E) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

20. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) ★

['0', 'R']

(C) 'ORS'

(D) ''

(E) False

---

**Solution.**

---

21. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 2
- (B) ★ None of the other answers are correct.
- (C) 3
- (D) 5

---

**Solution.**

---

22. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 5, 7, 7]

(B) ★

[3, 5, 6, 7, 7]

(C) [3, 5, 7, 7]

(D) [3, 5, 6, 7, 7, 8]

(E) [2, 4, 5, 6, 7, 7]

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) "2.4"

(B) ★

"1.21.2"

(C) 2.4

(D) None of the other answers are correct.

(E) "1.2\*2"

---

**Solution.**

---



24. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 30

(C) 5

(D) ★

14

(E) 4

---

**Solution.**

---

25. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

(A) ★ 3

(B) 4

(C) 2

(D) 1

---

**Solution.**

---

26. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) 2

(C) ★

3

(D) 4

(E) -1

---

**Solution.**

---

27. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) ★

Float

(C) Integer

(D) None

(E) String

---

**Solution.**

---

28. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) "STUP"

(B) "PSTU"

(C) "PUST"

(D) ★

"UTSP"

(E) None of the other answers are correct.

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (B) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (D) ★  
['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (E) None

---

**Solution.**

---

30. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) Boolean
- (B) String
- (C) Float
- (D) None
- (E) ★

Integer

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. E

93. B

94. A

95. D

96. D



1. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

None

(B) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(D) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

2. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

- (A) None
- (B) 'ORS'
- (C) ★  
['0', 'R']
- (D) ''
- (E) False

---

**Solution.**

---

3. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) ★

10

(C) 13

(D) 11

(E) 12

---

**Solution.**

---

4. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(B) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(C) `[3.0, 6.0, 9.0]`

(D) None of the above.

(E) `[3, 6, 9]`

---

**Solution.**

---

5. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) None

(C) ★

String

(D) Float

(E) Boolean

---

**Solution.**

---

6. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) 4
- (C) ★ 3
- (D) 5

---

**Solution.**

---

7. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) Integer
- (B) None
- (C) Float
- (D) Boolean
- (E) ★

String

---

**Solution.**

---

8. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, 6]

(B) [3, 2, 1]

(C) ★

[3, 2, 1, '321']

(D) [1, 2, 3, '321']

(E) [1, 2, 3]

---

**Solution.**

---



9. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1>s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['eleven', 'one', 'twelve', 'two']
- (B) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['twelve', 'eleven', 'two', 'one']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['one', 'two', 'eleven', 'twelve']

---

**Solution.**

---

10. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) ★

14

(C) 4

(D) 30

(E) 3

---

**Solution.**

---

11. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) ★

12

(B) 0

(C) 8

(D) 3

(E) 16

---

**Solution.**

---

12. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) ★ None of the other answers are correct.
- (B) 2
- (C) 5
- (D) 3

---

**Solution.**

---

13. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 10

(C) ★

12

(D) 13

(E) 11

---

**Solution.**

---

14. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

(A) 7

(B) ★

3

(C) 1

(D) 9

(E) None of the other answers are correct.

---

**Solution.**

---

15. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) 6

(C) 3

(D) ★

-1

(E) 0

---

**Solution.**

---

16. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) `(b^a)cos(a-b)`

(B) `(a**b)cos(a-b)`

(C) ★

`(a**b)*cos(a-b)`

(D) `(a^b)*cos(a-b)`

(E) None of the other answers are correct.

---

**Solution.**

---



17. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) 0
- (B) "MERLINMERLIN"
- (C) "MERLIN%i"
- (D) None
- (E) ★

"MERLIN2"

---

**Solution.**

---

18. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Integer
- (B) Float
- (C) Boolean
- (D) String
- (E) None

---

**Solution.**

---

19. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) 3, 2, 8, 5, 9
- (C) ★ 2, 3, 8, 5, 6
- (D) 2, 3, 8, 1, 6
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

20. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

- (A) "PSTU"
- (B) None of the other answers are correct.
- (C) "STUP"
- (D) "PUST"
- (E) ★

"UTSP"

---

**Solution.**

---

21. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

- (A) `s[i:i+1]`
  - (B) `s[i+1:i+2]`
  - (C) `s[i:i-1]`
  - (D) ★
- `s[i:i+2]`

---

**Solution.**

---

22. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) 5

(C) 3

(D) 7

(E) ★

4

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 5, 6, 6, 7, 8]

(B) [2, 4, 5, 6, 6, 7]

(C) [3, 5, 6, 6]

(D) ★

[3, 5, 6, 6, 7]

(E) [2, 4, 5, 5, 6, 7]

---

**Solution.**

---

24. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) `[1,2,3]`

(C) ★

`[1,2]`

(D) `[1,2,1]`

---

**Solution.**

---



25. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) None of the other answers are correct.

(B) ["\*", "-", "\*"]

(C) ★

["-", "\*", "-", "\*"]

(D) ["\*", "-", "\*"]

(E) ["-", "\*"]

---

**Solution.**

---

26. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+i`

(B) ★

`sum=sum+i+1`

(C) `sum+1=sum`

(D) `sum=sum+1`

---

**Solution.**

---

27. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

- (A) "33"
- (B) 33
- (C) None of the other answers are correct.
- (D) "333"
- (E) ★

```
"3str(3)"
```

---

**Solution.**

---

28. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) ★

`(m % n) != 0`

(C) `(n // m) == 0`

(D) `(n % m) == 0`

---

**Solution.**

---

29. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ['Merlin', 'King Pellinore', 'Sir Agravaine']

(B) [ ]

(C) ★

['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']

(D) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']

(E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

30. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) ★

3

(C) 1

(D) 4

(E) 2

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. A

93. C

94. A

95. A

96. B

1. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['two', 'twelve', 'one', 'eleven', 'six']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ['one', 'two', 'eleven', 'twelve', 'six']
- (D) ['twelve', 'eleven', 'two', 'one']
- (E) ★  
['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---



2. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(m // n) != 0`

(C) `(n % m) == 0`

(D) `(n // m) == 0`

---

**Solution.**

---

3. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

- (A) `s[i:i-1]`
- (B) `s[i+1:i+2]`
- (C) `s[i:i+1]`
- (D) ★  
`s[i:i+2]`

---

**Solution.**

---

4. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

12

(B) 11

(C) 14

(D) 10

(E) 13

---

**Solution.**

---

5. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) ★

3

(C) 5

(D) 4

(E) 7

---

**Solution.**

---

6. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (B) ★
- None
- (C) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (E) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

---

**Solution.**

---

7. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 3

(C) 1

(D) 4

(E) ★

2

---

**Solution.**

---

8. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

- (A) 3
- (B) 14
- (C) 30
- (D) 5
- (E) ★

4

---

**Solution.**

---

9. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) ★  
Boolean
- (C) None
- (D) Integer
- (E) String

---

**Solution.**

---



10. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '321']

(B) [3, 2, 1]

(C) [1, 2, 3, 6]

(D) [1, 2, 3]

(E) ★

[3, 2, 1, '321']

---

**Solution.**

---

11. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["\*", "-", "\*"]

(B) ★

["-", "\*", "-", "\*"]

(C) ["-", "\*"]

(D) None of the other answers are correct.

(E) ["\*", "-", "\*"]

---

**Solution.**

---

12. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

(A) ★ 3

(B) 4

(C) 1

(D) 2

---

**Solution.**

---

13. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) None
- (B) "MERLIN2"
- (C) 12
- (D) "MERLIN"
- (E) ★

"MERLINMERLIN"

---

**Solution.**

---

14. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1]`

(B) `[1,2,3]`

(C) `[1,2,1,2,1,2]`

(D) ★

`[1,2]`

---

**Solution.**

---

15. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 5
- (B) 2
- (C) ★ None of the other answers are correct.
- (D) 3

---

**Solution.**

---

16. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) ★ 2, 3, 8, 5, 6
- (C) 2, 3, 4, 1, 6
- (D) 2, 3, 8, 1, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---

17. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "STUP"

(C) ★

"UTSP"

(D) "PUST"

(E) "PSTU"

---

**Solution.**

---



18. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) None of the other answers are correct.

(B) `(b^a)cos(a-b)`

(C) `(a**b)cos(a-b)`

(D) `(a^b)*cos(a-b)`

(E) ★

`(a**b)*cos(a-b)`

---

**Solution.**

---

19. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) Integer
- (C) ★  
Boolean
- (D) String
- (E) None

---

**Solution.**

---

20. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

- (A) 7
- (B) 12
- (C) 0
- (D) 8
- (E) ★

16

---

**Solution.**

---

21. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `[3.0, 6.0, 9.0]`

(B) `[3, 6, 9]`

(C) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(D) `(3, 6, 9)`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

22. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 6, 6, 7]

(B) [3, 5, 6, 6, 7, 8]

(C) [2, 4, 5, 5, 6, 7]

(D) ★

[3, 5, 6, 6, 7]

(E) [3, 5, 6, 6]

---

**Solution.**

---

23. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) -1

(B) 4

(C) 5

(D) 2

(E) ★

3

---

**Solution.**

---

24. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (B) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (C) [ ]
- (D) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

25. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 13

(C) 12

(D) 11

(E) 14

---

**Solution.**

---



26. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) ★

['R', 'A']

(C) False

(D) 3

(E) 'RAI'

---

**Solution.**

---

27. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+i`

(B) `sum=sum+1`

(C) `sum+1=sum`

(D) ★

```
sum=sum+i+1
```

---

**Solution.**

---

28. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Integer
- (B) Float
- (C) String
- (D) None
- (E) Boolean

---

**Solution.**

---

29. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) ★

"3str(3)"

(B) "33"

(C) None of the other answers are correct.

(D) "333"

(E) 33

---

**Solution.**

---

30. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) 8

(C) 16

(D) ★

2

(E) 4

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
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- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. B

93. C

94. A

95. B

96. C

1. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) ★  
"OCCIO"
- (B) "ACCOA"
- (C) None of the other answers are correct.
- (D) "ACCIA"
- (E) "ICCOI"

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")  
y=x  
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) ★
- None
- (E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---



3. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Boolean
- (B) String
- (C) Integer
- (D) Float
- (E) None

---

**Solution.**

---

4. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
sum=sum+i+1
```

(B) `sum=sum+i`

(C) `sum=sum+1`

(D) `sum+1=sum`

---

**Solution.**

---

5. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%2)==0:  
        x.append("-")  
    if (j%5)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

["-", "\*", "-", "-"]

(B) ["\*", "-", "\*", "\*"]

(C) ["-", "-", "\*"]

(D) ["-", "\*", "-"]

(E) None of the other answers are correct.

---

**Solution.**

---

6. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3]

(B) [1, 2, 3, '1234']

(C) ★

[1, 2, 3, 4, '1234']

(D) [1, 2, 3, 10]

(E) [1, 2, 3, '123']

---

**Solution.**

---

7. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(1,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ★

['King Pellinore', 'Sir Agravaine']

(B) ['Sir Agravaine', 'King Pellinore']

(C) [ ]

(D) ['Merlin', 'King Pellinore', 'Sir Agravaine']

(E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

8. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1==s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

(A) ★

['twelve', 'eleven', 'two', 'one']

(B) ['one', 'two', 'eleven', 'twelve']

(C) ['eleven', 'one', 'twelve', 'two']

(D) ['two', 'twelve', 'one', 'eleven', 'six']

(E) ['one', 'two', 'eleven', 'twelve', 'six']

---

**Solution.**

---

9. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) 7

(C) ★

4

(D) 3

(E) 5

---

**Solution.**

---

10. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) None

(C) ★

Boolean

(D) String

(E) Float

---

**Solution.**

---



11. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

(A) `s[i+1:i+2]`

(B) `s[i:i-1]`

(C) ★

`s[i:i+2]`

(D) `s[i:i+1]`

---

**Solution.**

---

12. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 6, 6]

(B) [4, 6, 7]

(C) ★

[4, 6, 7, 8]

(D) [4, 6, 7, 7]

(E) [3, 4, 6, 7, 8]

---

**Solution.**

---

13. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) ★

16

(B) 8

(C) 7

(D) 0

(E) 12

---

**Solution.**

---

14. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) `[3.0, 6.0, 9.0]`

(D) None of the above.

(E) `[3, 6, 9]`

---

**Solution.**

---

15. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) ★

-1

(C) 0

(D) 6

(E) 3

---

**Solution.**

---

16. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) ★ 2, 3, 8, 5, 6
- (C) 2, 3, 8, 1, 6
- (D) 2, 3, 4, 1, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---

17. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 5
- (B) 1
- (C) ★ 3
- (D) 4

---

**Solution.**

---

18. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(a^b - b)`

(B) `a sin(a**b - b)`

(C) ★

`a*sin(a**b - b)`

(D) None of the other answers are correct.

(E) `a*sin(b^a - b)`

---

**Solution.**

---



19. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Integer
- (B) Boolean
- (C) String
- (D) Float
- (E) None

---

**Solution.**

---

20. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) ★

27

(C) 1

(D) 3

(E) 9

---

**Solution.**

---

21. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) ★

14

(B) 5

(C) 4

(D) 3

(E) 30

---

**Solution.**

---

22. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 10

(C) ★

12

(D) 13

(E) 11

---

**Solution.**

---

23. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) `[1,2,"3"]`

(C) `[1,2,3]`

(D) ★

`[1,2,1]`

---

**Solution.**

---

24. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLINMERLIN"

(B) 0

(C) "MERLIN%i"

(D) ★

"MERLIN2"

(E) None

---

**Solution.**

---

25. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) 11

(C) 14

(D) ★

10

(E) 12

---

**Solution.**

---

26. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) 'RAI '

(B) 3

(C) False

(D) None

(E) ★

['R', 'A']

---

**Solution.**

---



27. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) ★

"111"

(B) 3

(C) 111

(D) None of the other answers are correct.

(E) "3"

---

**Solution.**

---

28. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 2
- (B) ★ None of the other answers are correct.
- (C) 3
- (D) 5

---

**Solution.**

---

29. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) `(m // n) != 0`

(C) `(n % m) == 0`

(D) ★

`(m % n) != 0`

---

**Solution.**

---

30. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 1

(C) 2

(D) ★

3

(E) 4

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. C

93. C

94. A

95. C

96. D

1. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

(B) ★

['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(C) None

(D) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(E) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

---

**Solution.**

---

2. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 3
- (B) ★ None of the other answers are correct.
- (C) 2
- (D) 5

---

**Solution.**

---

3. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) ★ 3
- (C) 5
- (D) 4

---

**Solution.**

---



4. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) "3"

(B) 3

(C) ★

"111"

(D) None of the other answers are correct.

(E) 111

---

**Solution.**

---

5. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) None of the above.

(B) `[3.0, 6.0, 9.0]`

(C) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(D) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(E) `[3, 6, 9]`

---

**Solution.**

---

6. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Sir Agravaine', 'King Pellinore']
- (B) ['King Pellinore', 'Sir Agravaine']
- (C) [ ]
- (D) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

7. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

11

(B) 10

(C) 12

(D) 14

(E) 13

---

**Solution.**

---

8. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 13

(C) 14

(D) 11

(E) 12

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) 4
- (B) None of the other answers are correct.
- (C) ★  
2
- (D) 8
- (E) 16

---

**Solution.**

---

10. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

- (A) `(n % m) == 0`
- (B) `(m // n) != 0`
- (C) `(n // m) == 0`
- (D) ★  
`(m % n) != 0`

---

**Solution.**

---

11. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Float
- (C) ★  
Boolean
- (D) Integer
- (E) String

---

**Solution.**

---



12. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) 'RAI'

(C) ★

['R', 'A']

(D) 3

(E) False

---

**Solution.**

---

13. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 8

(C) 16

(D) 0

(E) ★

12

---

**Solution.**

---

14. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 1

(B) 0

(C) 3

(D) ★

2

(E) 4

---

**Solution.**

---

15. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) 5

(B) ★

4

(C) None of the other answers are correct.

(D) 7

(E) 3

---

**Solution.**

---

16. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) `[1,2,"3"]`

(C) `[1,2,3]`

(D) ★

`[1,2,1]`

---

**Solution.**

---

17. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) ★

"UTSP"

(B) None of the other answers are correct.

(C) "STUP"

(D) "PSTU"

(E) "PUST"

---

**Solution.**

---

18. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 5, 6, 6, 7, 8]

(B) ★

[3, 5, 6, 6, 7]

(C) [2, 4, 5, 5, 6, 7]

(D) [2, 4, 5, 6, 6, 7]

(E) [3, 5, 6, 6]

---

**Solution.**

---

19. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1>s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['twelve', 'eleven', 'two', 'one']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---



20. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i+1:i+2]`

(B) `s[i:i+1]`

(C) `s[i:i-1]`

(D) ★

`s[i:i+2]`

---

**Solution.**

---

21. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) 30

(C) ★

14

(D) 4

(E) 3

---

**Solution.**

---

22. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) ★ 2, 3, 8, 5, 6
- (C) 3, 2, 8, 5, 9
- (D) 2, 3, 4, 1, 6
- (E) 2, 3, 8, 1, 6

---

**Solution.**

---

23. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 2

(B) ★

3

(C) 5

(D) 4

(E) -1

---

**Solution.**

---

24. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLINMERLIN"

(B) None

(C) 12

(D) "MERLIN2"

(E) "MERLIN"

---

**Solution.**

---

25. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Integer
- (C) Float
- (D) Boolean
- (E) ★  
String

---

**Solution.**

---

26. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%2)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) None of the other answers are correct.

(B) ★

["-", "\*", "-", "-"]

(C) ["\*", "-", "\*", "\*"]

(D) ["-", "-", "\*"]

(E) ["-", "\*", "-"]

---

**Solution.**

---

27. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
    for i in range(1,101)
```

(B) while i in range(100)

(C) for i in range(0,100)

(D) while i<=100

---

**Solution.**

---



28. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, 6]

(B) [1, 2, 3]

(C) [3, 2, 1]

(D) ★

[3, 2, 1, '321']

(E) [1, 2, 3, '321']

---

**Solution.**

---

29. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) String
- (B) None
- (C) Boolean
- (D) ★  
Integer
- (E) Float

---

**Solution.**

---

30. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) ★

`a*sin(a**b - b)`

(B) None of the other answers are correct.

(C) `a*sin(a^b - b)`

(D) `a sin(a**b - b)`

(E) `a*sin(b^a - b)`

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. D

93. C

94. A

95. D

96. E

1. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) "33"

(B) ★

"3str(3)"

(C) None of the other answers are correct.

(D) "333"

(E) 33

---

**Solution.**

---

2. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `for i in range(0,100)`

(B) `while i in range(100)`

(C) `while i<=100`

(D) ★

```
    for i in range(1,101)
```

---

**Solution.**

---

3. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1>s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

(A) ★

['one', 'two', 'eleven', 'twelve', 'six']

(B) ['eleven', 'one', 'twelve', 'two']

(C) ['one', 'two', 'eleven', 'twelve']

(D) ['twelve', 'eleven', 'two', 'one']

(E) ['two', 'twelve', 'one', 'eleven', 'six']

---

**Solution.**

---

4. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 16

(C) 8

(D) 3

(E) ★

12

---

**Solution.**

---



5. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 2
- (B) ★ None of the other answers are correct.
- (C) 3
- (D) 5

---

**Solution.**

---

6. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

(A) `s[i+1:i+2]`

(B) `s[i:i+1]`

(C) `s[i:i-1]`

(D) ★

`s[i:i+2]`

---

**Solution.**

---

7. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) ★  
3
- (B) 4
- (C) None of the other answers are correct.
- (D) 5
- (E) 7

---

**Solution.**

---

8. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]
b=[ ]
for i in range(1,3):
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ['King Pellinore', 'Sir Agravaine', 'Merlin']

(B) ['Merlin', 'King Pellinore', 'Sir Agravaine']

(C) ★

['King Pellinore', 'Sir Agravaine']

(D) [ ]

(E) ['Sir Agravaine', 'King Pellinore']

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) 1
- (B) 3
- (C) None of the other answers are correct.
- (D) 9
- (E) ★

27

---

**Solution.**

---

10. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

- (A) 5
- (B) 3
- (C) 30
- (D) 14
- (E) ★

4

---

**Solution.**

---

11. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLIN%i"

(B) None

(C) 0

(D) "MERLINMERLIN"

(E) ★

"MERLIN2"

---

**Solution.**

---

12. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) ★

[1,2]

(B) [1,2,3]

(C) [1,2,1]

(D) [1,2,1,2,1,2]

---

**Solution.**

---



13. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["\*", "-", "\*"]

(B) ["\*", "-", "\*"]

(C) ["-", "\*"]

(D) ★

["-", "\*", "-", "\*"]

(E) None of the other answers are correct.

---

**Solution.**

---

14. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Boolean
- (C) ★  
String
- (D) Integer
- (E) Float

---

**Solution.**

---

15. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 0

(C) 4

(D) 1

(E) ★

2

---

**Solution.**

---

16. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

(A) String

(B) None

(C) ★

Boolean

(D) Integer

(E) Float

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) 10

(C) ★

12

(D) 14

(E) 13

---

**Solution.**

---

18. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (B) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (D) None
- (E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

19. (1 point) Consider the following program:

```
s="-B-O-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) False

(B) ''

(C) 'ORS'

(D) None

(E) ★

['O', 'R']

---

**Solution.**

---

20. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 8, 1, 6
- (B) 2, 3, 4, 1, 6
- (C) 2, 7, 4, 5, 6
- (D) ★ 2, 3, 8, 5, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---



21. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) ★

`(a**b)*cos(a-b)`

(B) `(b^a)cos(a-b)`

(C) `(a^b)*cos(a-b)`

(D) `(a**b)cos(a-b)`

(E) None of the other answers are correct.

---

**Solution.**

---

22. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(n % m) == 0`

(B) `(m // n) != 0`

(C) ★

`(m % n) != 0`

(D) `(n // m) == 0`

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

[4, 6, 7, 8]

(B) [4, 6, 7]

(C) [3, 4, 6, 7, 8]

(D) [2, 4, 6, 6]

(E) [4, 6, 7, 7]

---

**Solution.**

---

24. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3]

(B) ★

[3, 2, 1, '321']

(C) [3, 2, 1]

(D) [1, 2, 3, 6]

(E) [1, 2, 3, '321']

---

**Solution.**

---

25. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

(A) ★

[1, 2, 3, 1, 2, 3, 1, 2, 3]

(B) (3, 6, 9)

(C) [3.0, 6.0, 9.0]

(D) [3, 6, 9]

(E) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]

---

**Solution.**

---

26. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

(A) ★ 3

(B) 1

(C) 4

(D) 2

---

**Solution.**

---

27. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) ★

"UTSP"

(C) "PSTU"

(D) "STUP"

(E) "PUST"

---

**Solution.**

---

28. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) None
- (C) Boolean
- (D) ★  
String
- (E) Integer

---

**Solution.**

---



29. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) 0

(C) 3

(D) ★

-1

(E) 6

---

**Solution.**

---

30. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 12

(B) 14

(C) 13

(D) 11

(E) ★

15

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. E

93. C

94. A

95. E

96. A

1. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "2.4"

(C) 2.4

(D) "1.2\*2"

(E) ★

"1.21.2"

---

**Solution.**

---

2. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) "ICCOI"
- (B) "ACCOA"
- (C) "ACCIA"
- (D) None of the other answers are correct.
- (E) ★

"OCCIO"

---

**Solution.**

---

3. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Float
- (C) None
- (D) Integer
- (E) Boolean

---

**Solution.**

---

4. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) ★

14

(B) 5

(C) 30

(D) 3

(E) 4

---

**Solution.**

---

5. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(n % m) == 0`

(C) `(m // n) != 0`

(D) `(n // m) == 0`

---

**Solution.**

---



6. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 8

(B) 3

(C) 0

(D) 16

(E) ★

12

---

**Solution.**

---

7. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 5
- (B) 4
- (C) ★ 3
- (D) 1

---

**Solution.**

---

8. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '1234']

(B) ★

[1, 2, 3, 4, '1234']

(C) [1, 2, 3]

(D) [1, 2, 3, '123']

(E) [1, 2, 3, 10]

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) ★

11

(C) 12

(D) 10

(E) 13

---

**Solution.**

---

10. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 4, 6, 7, 8]

(B) [2, 4, 6, 6]

(C) [4, 6, 7, 7]

(D) ★

[4, 6, 7, 8]

(E) [4, 6, 7]

---

**Solution.**

---

11. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) 3, 2, 8, 5, 9
- (C) 2, 3, 8, 1, 6
- (D) ★ 2, 3, 8, 5, 6
- (E) 2, 7, 4, 5, 6

---

**Solution.**

---

12. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) 5

(C) ★

3

(D) 7

(E) 4

---

**Solution.**

---

13. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) ★  
Boolean
- (C) Integer
- (D) String
- (E) None

---

**Solution.**

---



14. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

- (A) `s[i:i+1]`
- (B) `s[i:i-1]`
- (C) `s[i+1:i+2]`
- (D) ★  
`s[i:i+2]`

---

**Solution.**

---

15. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%2)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "\*", "-"]

(B) ★

["-", "\*", "-", "-"]

(C) ["-", "-", "\*"]

(D) None of the other answers are correct.

(E) ["\*", "-", "\*", "\*"]

---

**Solution.**

---

16. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

- (A) None
- (B) ''
- (C) False
- (D) 'ORS'
- (E) ★

['0', 'R']

---

**Solution.**

---

17. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
    for i in range(1,101)
```

(B) while i<=100

(C) while i in range(100)

(D) for i in range(0,100)

---

**Solution.**

---

18. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

(A) ★

[1, 2, 3, 1, 2, 3, 1, 2, 3]

(B) (3, 6, 9)

(C) [3.0, 6.0, 9.0]

(D) [3, 6, 9]

(E) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]

---

**Solution.**

---

19. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 0

(B) 5

(C) 6

(D) 3

(E) ★

-1

---

**Solution.**

---

20. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) 8

(C) 4

(D) ★

2

(E) 16

---

**Solution.**

---

21. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) `[1,2,3]`

(C) ★

`[1,2,1]`

(D) `[1,2,"3"]`

---

**Solution.**

---



22. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) 1

(C) 0

(D) 3

(E) ★

2

---

**Solution.**

---

23. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLIN2"

(B) 0

(C) "MERLIN%i"

(D) "MERLINMERLIN"

(E) None

---

**Solution.**

---

24. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ★
- ['twelve', 'eleven', 'two', 'one']
- (B) ['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['one', 'two', 'eleven', 'twelve']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

25. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (B) None
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (E) ★

['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

---

**Solution.**

---

26. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) None of the other answers are correct.

(B) ★

`a*sin(a**b - b)`

(C) `a*sin(b^a - b)`

(D) `a sin(a**b - b)`

(E) `a*sin(a^b - b)`

---

**Solution.**

---

27. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) 14

(C) 13

(D) 12

(E) ★

15

---

**Solution.**

---

28. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(1,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Sir Agravaine', 'King Pellinore']
- (B) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (C) [ ]
- (D) ★  
['King Pellinore', 'Sir Agravaine']
- (E) ['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

29. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 2
- (B) 3
- (C) 5
- (D) ★ None of the other answers are correct.

---

**Solution.**

---



30. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) ★

Boolean

(C) None

(D) Float

(E) String

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. A

93. D

94. A

95. B

96. D

1. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['twelve', 'eleven', 'two', 'one']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ★  
['eleven', 'one', 'twelve', 'two']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['one', 'two', 'eleven', 'twelve', 'six']

---

**Solution.**

---

2. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 2
- (B) ★ 3
- (C) 4
- (D) 1

---

**Solution.**

---

3. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 5
- (B) ★ None of the other answers are correct.
- (C) 3
- (D) 2

---

**Solution.**

---

4. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Float
- (B) Boolean
- (C) Integer
- (D) String
- (E) None

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) ★  
27
- (B) 1
- (C) 9
- (D) 3
- (E) None of the other answers are correct.

---

**Solution.**

---

6. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) 5
- (B) 3
- (C) 7
- (D) None of the other answers are correct.
- (E) ★

4

---

**Solution.**

---



7. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%2)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

["-", "\*", "-", "-"]

(B) None of the other answers are correct.

(C) ["\*", "-", "\*", "\*"]

(D) ["-", "\*", "-"]

(E) ["-", "-", "\*"]

---

**Solution.**

---

8. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) ★

`s[i:i+2]`

(B) `s[i:i+1]`

(C) `s[i:i-1]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

9. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

- (A) `(n % m) == 0`
- (B) `(m // n) != 0`
- (C) `(n // m) == 0`
- (D) ★  
`(m % n) != 0`

---

**Solution.**

---

10. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
sum=sum+i+1
```

(B) `sum=sum+i`

(C) `sum=sum+1`

(D) `sum+1=sum`

---

**Solution.**

---

11. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) `(a^b)*cos(a-b)`

(B) `(a**b)cos(a-b)`

(C) `(b^a)cos(a-b)`

(D) None of the other answers are correct.

(E) ★

`(a**b)*cos(a-b)`

---

**Solution.**

---

12. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) ★

[1, 2, 3, 4, '1234']

(B) [1, 2, 3, '1234']

(C) [1, 2, 3]

(D) [1, 2, 3, '123']

(E) [1, 2, 3, 10]

---

**Solution.**

---

13. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ★  
['0', 'R']
- (B) ''
- (C) False
- (D) None
- (E) 'ORS'

---

**Solution.**

---

14. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (B) ★
- None
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (E) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

---

**Solution.**

---



15. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

2

(B) 3

(C) 4

(D) 0

(E) 1

---

**Solution.**

---

16. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 12

(B) ★

16

(C) 0

(D) 7

(E) 8

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 5, 6, 7]

(B) ★

[3, 5, 6, 6, 7]

(C) [3, 5, 6, 6]

(D) [3, 5, 6, 6, 7, 8]

(E) [2, 4, 5, 6, 6, 7]

---

**Solution.**

---

18. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,3]`

(B) ★

`[1,2]`

(C) `[1,2,1]`

(D) `[1,2,1,2,1,2]`

---

**Solution.**

---

19. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine']
- (B) ★
- ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (C) ['Sir Agravaine', 'King Pellinore']
- (D) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) [ ]

---

**Solution.**

---

20. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) 14

(C) 12

(D) 13

(E) ★

11

---

**Solution.**

---

21. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Boolean
- (B) String
- (C) None
- (D) Float
- (E) Integer

---

**Solution.**

---

22. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 3, 2, 8, 5, 9
- (B) 2, 3, 8, 1, 6
- (C) 2, 7, 4, 5, 6
- (D) ★ 2, 3, 8, 5, 6
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---



23. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Integer
- (B) None
- (C) String
- (D) Boolean
- (E) Float

---

**Solution.**

---

24. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) "STUP"

(B) ★

"UTSP"

(C) "PUST"

(D) None of the other answers are correct.

(E) "PSTU"

---

**Solution.**

---

25. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

- (A) 12
- (B) 11
- (C) 13
- (D) 14
- (E) ★

15

---

**Solution.**

---

26. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLIN%i"

(B) "MERLINMERLIN"

(C) 0

(D) ★

"MERLIN2"

(E) None

---

**Solution.**

---

27. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) 4

(C) ★

14

(D) 30

(E) 3

---

**Solution.**

---

28. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 0

(B) 3

(C) ★

-1

(D) 6

(E) 5

---

**Solution.**

---

29. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `[3.0, 6.0, 9.0]`

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) `[3, 6, 9]`

(D) `(3, 6, 9)`

(E) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

---

**Solution.**

---

30. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

- (A) 111
- (B) None of the other answers are correct.
- (C) 3
- (D) "3"
- (E) ★

"111"

---

**Solution.**

---





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- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
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- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. B

93. D

94. A

95. C

96. E

1. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 4
- (B) 2
- (C) 1
- (D) ★ 3

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) 14

(C) ★

12

(D) 10

(E) 13

---

**Solution.**

---

3. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) Float
  - (B) None
  - (C) Integer
  - (D) Boolean
  - (E) ★
- String

---

**Solution.**

---

4. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [3, 2, 1]

(B) ★

[3, 2, 1, '321']

(C) [1, 2, 3, 6]

(D) [1, 2, 3]

(E) [1, 2, 3, '321']

---

**Solution.**

---

5. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) 0

(B) ★

"MERLIN2"

(C) "MERLINMERLIN"

(D) None

(E) "MERLIN%i"

---

**Solution.**

---

6. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 6, 7, 7]

(B) [3, 5, 6, 7, 7, 8]

(C) [2, 4, 5, 5, 7, 7]

(D) ★

[3, 5, 6, 7, 7]

(E) [3, 5, 7, 7]

---

**Solution.**

---

7. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) ★

2

(B) None of the other answers are correct.

(C) 8

(D) 16

(E) 4

---

**Solution.**

---



8. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) ★

['0', 'R']

(C) False

(D) ''

(E) 'ORS'

---

**Solution.**

---

9. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[3.0, 6.0, 9.0]`

(B) `[3, 6, 9]`

(C) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(D) None of the above.

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

10. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(B) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(C) ★

None

(D) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

11. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(1,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ★

['King Pellinore', 'Sir Agravaine']

(B) [ ]

(C) ['King Pellinore', 'Sir Agravaine', 'Merlin']

(D) ['Merlin', 'King Pellinore', 'Sir Agravaine']

(E) ['Sir Agravaine', 'King Pellinore']

---

**Solution.**

---

12. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) 4

(C) ★

14

(D) 30

(E) 3

---

**Solution.**

---

13. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

- (A) "1.2\*2"
- (B) "2.4"
- (C) None of the other answers are correct.
- (D) ★

"1.21.2"

- (E) 2.4

---

**Solution.**

---

14. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) ★
- Boolean
- (C) Float
- (D) String
- (E) Integer

---

**Solution.**

---

15. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 2

(B) 4

(C) 5

(D) ★

3

(E) -1

---

**Solution.**

---



16. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

- (A) `while i<=100`
- (B) `while i in range(100)`
- (C) `for i in range(0,100)`
- (D) ★  
`for i in range(1,101)`

---

**Solution.**

---

17. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve', 'six']
- (B) ['two', 'twelve', 'one', 'eleven', 'six']
- (C) ['one', 'two', 'eleven', 'twelve']
- (D) ['eleven', 'one', 'twelve', 'two']
- (E) ★

['twelve', 'eleven', 'two', 'one']

---

**Solution.**

---

18. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 3
- (B) ★ None of the other answers are correct.
- (C) 5
- (D) 2

---

**Solution.**

---

19. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

`["-", "*", "-", "*"]`

(B) `["-", "*"]`

(C) `["*", "-", "*"]`

(D) None of the other answers are correct.

(E) `["*", "-", "*"]`

---

**Solution.**

---

20. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 13

(C) ★

10

(D) 11

(E) 12

---

**Solution.**

---

21. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) 3

(C) ★

2

(D) 0

(E) 1

---

**Solution.**

---

22. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 16

(C) 3

(D) 8

(E) ★

12

---

**Solution.**

---

23. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) 2, 3, 8, 1, 6
- (C) 2, 3, 4, 1, 6
- (D) 3, 2, 8, 5, 9
- (E) ★ 2, 3, 8, 5, 6

---

**Solution.**

---



24. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

- (A) "PUST"
- (B) "STUP"
- (C) None of the other answers are correct.
- (D) ★

"UTSP"

- (E) "PSTU"

---

**Solution.**

---

25. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) ★

[1,2]

(B) [1,2,3]

(C) [1,2,1,2,1,2]

(D) [1,2,1]

---

**Solution.**

---

26. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(b^a - b)`

(B) `a*sin(a^b - b)`

(C) `a sin(a**b - b)`

(D) None of the other answers are correct.

(E) ★

`a*sin(a**b - b)`

---

**Solution.**

---

27. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) ★

4

(C) 5

(D) 3

(E) 7

---

**Solution.**

---

28. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) String
- (B) ★
- Float
- (C) None
- (D) Integer
- (E) Boolean

---

**Solution.**

---

29. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) ★

`s[i:i+2]`

(B) `s[i:i+1]`

(C) `s[i+1:i+2]`

(D) `s[i:i-1]`

---

**Solution.**

---

30. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n // m) == 0`

(C) `(n % m) == 0`

(D) ★

`(m % n) != 0`

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. C

93. D

94. A

95. D

96. A



1. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) 12

(C) 13

(D) 14

(E) ★

15

---

**Solution.**

---

2. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

(A) ★

[1, 2, 3, 1, 2, 3, 1, 2, 3]

(B) [3, 6, 9]

(C) (3, 6, 9)

(D) [3.0, 6.0, 9.0]

(E) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]

---

**Solution.**

---

3. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s

x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '321']

(B) [1, 2, 3]

(C) [3, 2, 1]

(D) ★

[3, 2, 1, '321']

(E) [1, 2, 3, 6]

---

**Solution.**

---

4. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) String
- (B) None
- (C) ★
- Float
- (D) Integer
- (E) Boolean

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(B) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

(E) None

---

**Solution.**

---

6. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(b^a - b)`

(B) `a*sin(a^b - b)`

(C) ★

`a*sin(a**b - b)`

(D) None of the other answers are correct.

(E) `a sin(a**b - b)`

---

**Solution.**

---

7. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ['King Pellinore', 'Sir Agravaine', 'Merlin']

(B) ★

['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']

(C) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']

(D) [ ]

(E) ['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

8. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve', 'six']
- (B) ['eleven', 'one', 'twelve', 'two']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['one', 'two', 'eleven', 'twelve']
- (E) ★

['twelve', 'eleven', 'two', 'one']

---

**Solution.**

---



9. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 0

(B) 6

(C) 3

(D) 5

(E) ★

-1

---

**Solution.**

---

10. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

2

(B) 1

(C) 3

(D) 4

(E) 0

---

**Solution.**

---

11. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) `[1,2,3]`

(C) ★

`[1,2,1]`

(D) `[1,2,"3"]`

---

**Solution.**

---

12. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) ★

`s[i:i+2]`

(B) `s[i+1:i+2]`

(C) `s[i:i+1]`

(D) `s[i:i-1]`

---

**Solution.**

---

13. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `for i in range(0,100)`

(B) `while i<=100`

(C) `while i in range(100)`

(D) ★

```
    for i in range(1,101)
```

---

**Solution.**

---

14. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

- (A) `(n % m) == 0`
- (B) `(m // n) != 0`
- (C) `(n // m) == 0`
- (D) ★  
`(m % n) != 0`

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 5, 7, 7]

(B) ★

[3, 5, 6, 7, 7]

(C) [3, 5, 6, 7, 7, 8]

(D) [2, 4, 5, 6, 7, 7]

(E) [3, 5, 7, 7]

---

**Solution.**

---

16. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 5
- (B) ★ 3
- (C) 4
- (D) 1

---

**Solution.**

---



17. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) ★ None of the other answers are correct.
- (B) 5
- (C) 3
- (D) 2

---

**Solution.**

---

18. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) 8

(C) 4

(D) ★

2

(E) 16

---

**Solution.**

---

19. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) ★

String

(C) None

(D) Float

(E) Boolean

---

**Solution.**

---

20. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) 14

(B) 3

(C) 5

(D) 30

(E) ★

4

---

**Solution.**

---

21. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Boolean
- (C) Float
- (D) Integer
- (E) None

---

**Solution.**

---

22. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "\*"]

(B) ["-", "-", "\*"]

(C) ★

["-", "\*", "-"]

(D) ["-", "\*", "\*"]

(E) None of the other answers are correct.

---

**Solution.**

---

23. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) ★ 2, 3, 8, 5, 6
- (B) 2, 3, 8, 1, 6
- (C) 3, 2, 8, 5, 9
- (D) 2, 3, 4, 1, 6
- (E) 2, 7, 4, 5, 6

---

**Solution.**

---

24. (1 point) Consider the following program:

```
s="-B-O-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ★  
['O', 'R']
- (B) False
- (C) 'ORS'
- (D) ''
- (E) None

---

**Solution.**

---



25. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) 14

(C) 10

(D) ★

12

(E) 11

---

**Solution.**

---

26. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) 33

(B) ★

"3str(3)"

(C) None of the other answers are correct.

(D) "33"

(E) "333"

---

**Solution.**

---

27. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) "ACCOA"

(B) ★

"OCCIO"

(C) "ACCIA"

(D) None of the other answers are correct.

(E) "ICCOI"

---

**Solution.**

---

28. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) ★  
3
- (B) 4
- (C) 5
- (D) None of the other answers are correct.
- (E) 7

---

**Solution.**

---

29. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 7

(C) ★

16

(D) 8

(E) 12

---

**Solution.**

---

30. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) 12
- (B) None
- (C) "MERLIN2"
- (D) ★

"MERLINMERLIN"

- (E) "MERLIN"

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. D

93. D

94. A

95. E

96. B

1. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [2, 4, 6, 6]
- (B) [3, 4, 6, 7, 8]
- (C) [4, 6, 7]
- (D) [4, 6, 7, 7]
- (E) ★

[4, 6, 7, 8]

---

**Solution.**

---



2. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) 3
- (B) None of the other answers are correct.
- (C) 5
- (D) ★
- 4
- (E) 7

---

**Solution.**

---

3. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 2
- (B) ★ 3
- (C) 4
- (D) 1

---

**Solution.**

---

4. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) ★ None of the other answers are correct.
- (B) 2
- (C) 3
- (D) 5

---

**Solution.**

---

5. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (B) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (C) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']
- (D) [ ]
- (E) ['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

6. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 2

(B) -1

(C) 5

(D) ★

3

(E) 4

---

**Solution.**

---

7. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

- (A) 13
- (B) 14
- (C) 12
- (D) 11
- (E) ★

15

---

**Solution.**

---

8. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) ★  
Boolean
- (C) None
- (D) Integer
- (E) String

---

**Solution.**

---

9. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum+1=sum`

(B) ★

`sum=sum+i+1`

(C) `sum=sum+1`

(D) `sum=sum+i`

---

**Solution.**

---



10. (1 point) Consider the following program:

```
s="-B-O-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) 'ORS'

(B) False

(C) ''

(D) None

(E) ★

['O', 'R']

---

**Solution.**

---

11. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1==s2:  
    x.sort()  
elif s1<s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve', 'six']
- (B) ['two', 'twelve', 'one', 'eleven', 'six']
- (C) ['one', 'two', 'eleven', 'twelve']
- (D) ★

['eleven', 'one', 'twelve', 'two']

- (E) ['twelve', 'eleven', 'two', 'one']

---

**Solution.**

---

12. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLINMERLIN"

(B) "MERLIN2"

(C) None

(D) "MERLIN"

(E) 12

---

**Solution.**

---

13. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Float
- (C) Integer
- (D) None
- (E) Boolean

---

**Solution.**

---

14. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

- (A) 14
  - (B) 13
  - (C) 10
  - (D) 11
  - (E) ★
- 12

---

**Solution.**

---

15. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Boolean
- (B) Float
- (C) String
- (D) None
- (E) Integer

---

**Solution.**

---

16. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 1

(B) 2

(C) ★

3

(D) 0

(E) 4

---

**Solution.**

---

17. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) None of the above.

(B) `[3.0, 6.0, 9.0]`

(C) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(D) `[3, 6, 9]`

(E) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

---

**Solution.**

---



18. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '321']

(B) [1, 2, 3]

(C) [3, 2, 1]

(D) ★

[3, 2, 1, '321']

(E) [1, 2, 3, 6]

---

**Solution.**

---

19. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 8, 1, 6
- (B) 2, 3, 4, 1, 6
- (C) 2, 7, 4, 5, 6
- (D) ★ 2, 3, 8, 5, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---

20. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

- (A) 8
- (B) 16
- (C) 3
- (D) ★  
12
- (E) 0

---

**Solution.**

---

21. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) ★

`(m % n) != 0`

(C) `(n // m) == 0`

(D) `(n % m) == 0`

---

**Solution.**

---

22. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) 14

(B) 5

(C) 3

(D) ★

4

(E) 30

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) 3

(B) ★

27

(C) None of the other answers are correct.

(D) 9

(E) 1

---

**Solution.**

---

24. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) `(a**b)cos(a-b)`

(B) ★

`(a**b)*cos(a-b)`

(C) `(b^a)cos(a-b)`

(D) `(a^b)*cos(a-b)`

(E) None of the other answers are correct.

---

**Solution.**

---

25. (1 point) Evaluate the following expression:

```
[1,2]+[len("3")]
```

What value is produced?

(A) [1,2,3]

(B) [1,2,1,2,1,2]

(C) ★

[1,2,1]

(D) [1,2,"3"]

---

**Solution.**

---



26. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) `s[i+1:i+2]`

(B) `s[i:i-1]`

(C) `s[i:i+1]`

(D) ★

`s[i:i+2]`

---

**Solution.**

---

27. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (B) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (E) None

---

**Solution.**

---

28. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["-", "\*", "\*"]
- (B) None of the other answers are correct.
- (C) ★  
["-", "\*", "-"]
- (D) ["-", "\*"]
- (E) ["-", "-", "\*"]

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

- (A) 111
  - (B) 3
  - (C) None of the other answers are correct.
  - (D) "3"
  - (E) ★
- "111"

---

**Solution.**

---

30. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]  
a=a[0:4]  
a.sort()  
x=""  
for e in a:  
    x=e+x
```

What is the **value** of **x** after this program is executed?

- (A) ★  
"UTSP"
- (B) "PSTU"
- (C) "PUST"
- (D) None of the other answers are correct.
- (E) "STUP"

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. E

93. D

94. A

95. A

96. C

1. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 0

(B) 5

(C) 3

(D) 6

(E) ★

-1

---

**Solution.**

---

2. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) None
- (C) Integer
- (D) Boolean
- (E) Float

---

**Solution.**

---



3. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) 4

(C) 3

(D) ★

14

(E) 30

---

**Solution.**

---

4. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) ★ None of the other answers are correct.
- (B) 3
- (C) 2
- (D) 5

---

**Solution.**

---

5. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 7

(B) 0

(C) 12

(D) 8

(E) ★

16

---

**Solution.**

---

6. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

["-", "\*", "-", "\*"]

(B) None of the other answers are correct.

(C) ["\*", "-", "\*"]

(D) ["\*", "-", "\*"]

(E) ["-", "\*"]

---

**Solution.**

---

7. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "2.4"

(C) "1.2\*2"

(D) ★

"1.21.2"

(E) 2.4

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) ★  
Integer
- (C) None
- (D) Boolean
- (E) String

---

**Solution.**

---

9. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) ★

10

(C) 13

(D) 14

(E) 12

---

**Solution.**

---

10. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(B) `[3.0, 6.0, 9.0]`

(C) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(D) None of the above.

(E) `[3, 6, 9]`

---

**Solution.**

---



11. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,3]`

(B) `[1,2,1]`

(C) `[1,2,1,2,1,2]`

(D) ★

`[1,2]`

---

**Solution.**

---

12. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n % m) == 0`

(C) `(n // m) == 0`

(D) ★

`(m % n) != 0`

---

**Solution.**

---

13. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) ★

`(a**b)*cos(a-b)`

(B) None of the other answers are correct.

(C) `(a**b)cos(a-b)`

(D) `(b^a)cos(a-b)`

(E) `(a^b)*cos(a-b)`

---

**Solution.**

---

14. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) False

(B) 'ORS'

(C) ★

['0', 'R']

(D) ''

(E) None

---

**Solution.**

---

15. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

- (A) `s[i:i-1]`
- (B) `s[i+1:i+2]`
- (C) `s[i:i+1]`
- (D) ★  
`s[i:i+2]`

---

**Solution.**

---

16. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(1,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) [ ]
- (B) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (C) ★  
['King Pellinore', 'Sir Agravaine']
- (D) ['Sir Agravaine', 'King Pellinore']
- (E) ['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

17. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) ★  
"OCCIO"
- (B) "ICCOI"
- (C) "ACCOA"
- (D) None of the other answers are correct.
- (E) "ACCIA"

---

**Solution.**

---

18. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) 5
  - (B) 4
  - (C) None of the other answers are correct.
  - (D) 7
  - (E) ★
- 3

---

**Solution.**

---



19. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

- (A) Integer
- (B) None
- (C) String
- (D) Float
- (E) ★

Boolean

---

**Solution.**

---

20. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) "MERLIN"
- (B) None
- (C) 12
- (D) "MERLIN2"
- (E) ★

"MERLINMERLIN"

---

**Solution.**

---

21. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

2

(B) 0

(C) 4

(D) 3

(E) 1

---

**Solution.**

---

22. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) ★

[1, 2, 3, 4, '1234']

(B) [1, 2, 3, '123']

(C) [1, 2, 3, '1234']

(D) [1, 2, 3]

(E) [1, 2, 3, 10]

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(B) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

(C) None

(D) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(E) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

---

**Solution.**

---

24. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum+1=sum`

(B) ★

`sum=sum+i+1`

(C) `sum=sum+i`

(D) `sum=sum+1`

---

**Solution.**

---

25. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 3, 2, 8, 5, 9
- (B) ★ 2, 3, 8, 5, 6
- (C) 2, 3, 8, 1, 6
- (D) 2, 7, 4, 5, 6
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

26. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) ★ 3
- (C) 5
- (D) 4

---

**Solution.**

---



27. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) 13

(C) 14

(D) ★

12

(E) 11

---

**Solution.**

---

28. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) 1
- (B) ★  
3
- (C) 7
- (D) None of the other answers are correct.
- (E) 9

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 6, 7, 7]

(B) [3, 5, 7, 7]

(C) [3, 5, 6, 7, 7, 8]

(D) ★

[3, 5, 6, 7, 7]

(E) [2, 4, 5, 5, 7, 7]

---

**Solution.**

---

30. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1==s2:  
    x.sort()  
elif s1<s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

(A) ★

['eleven', 'one', 'twelve', 'two']

(B) ['twelve', 'eleven', 'two', 'one']

(C) ['one', 'two', 'eleven', 'twelve']

(D) ['one', 'two', 'eleven', 'twelve', 'six']

(E) ['two', 'twelve', 'one', 'eleven', 'six']

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. A

93. E

94. A

95. C

96. A

1. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) 3, 2, 8, 5, 9
- (C) 2, 3, 4, 1, 6
- (D) ★ 2, 3, 8, 5, 6
- (E) 2, 3, 8, 1, 6

---

**Solution.**

---

2. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLIN2"

(B) None

(C) 0

(D) "MERLINMERLIN"

(E) "MERLIN%i"

---

**Solution.**

---

3. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) 1

(C) ★

2

(D) 0

(E) 3

---

**Solution.**

---



4. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]  
a.sort()  
a[0]=a[-1]  
x=""  
for e in a:  
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) "ACCOA"

(B) ★

"OCCIO"

(C) "ICCOI"

(D) "ACCIA"

(E) None of the other answers are correct.

---

**Solution.**

---

5. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ['Sir Agravaine', 'King Pellinore']

(B) [ ]

(C) ★

['Merlin', 'King Pellinore', 'Sir Agravaine']

(D) ['King Pellinore', 'Sir Agravaine', 'Merlin']

(E) ['King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

6. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,3]`

(B) `[1,2,"3"]`

(C) `[1,2,1,2,1,2]`

(D) ★

`[1,2,1]`

---

**Solution.**

---

7. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

- (A) 11
  - (B) 13
  - (C) 14
  - (D) 10
  - (E) ★
- 12

---

**Solution.**

---

8. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) ★

`s[i:i+2]`

(B) `s[i:i+1]`

(C) `s[i:i-1]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

9. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[3.0, 6.0, 9.0]`

(B) `[3, 6, 9]`

(C) `None of the above.`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

10. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) Boolean

(C) ★

Float

(D) None

(E) String

---

**Solution.**

---

11. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(m // n) != 0`

(C) `(n % m) == 0`

(D) `(n // m) == 0`

---

**Solution.**

---



12. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Boolean
- (B) Float
- (C) String
- (D) Integer
- (E) None

---

**Solution.**

---

13. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

3

(B) 4

(C) 2

(D) -1

(E) 5

---

**Solution.**

---

14. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) None
- (C) String
- (D) ★  
Integer
- (E) Boolean

---

**Solution.**

---

15. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) 5

(C) ★

14

(D) 30

(E) 3

---

**Solution.**

---

16. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 5
- (B) 3
- (C) 2
- (D) ★ None of the other answers are correct.

---

**Solution.**

---

17. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 8

(B) ★

16

(C) 12

(D) 0

(E) 7

---

**Solution.**

---

18. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 12

(B) 11

(C) ★

15

(D) 13

(E) 14

---

**Solution.**

---

19. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
    for i in range(1,101)
```

(B) `for i in range(0,100)`

(C) `while i<=100`

(D) `while i in range(100)`

---

**Solution.**

---



20. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")  
y=x  
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) None
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (E) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

---

**Solution.**

---

21. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ''
- (B) 'ORS'
- (C) None
- (D) False
- (E) ★

['0', 'R']

---

**Solution.**

---

22. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

- (A) [1, 2, 3, 6]
- (B) [3, 2, 1]
- (C) [1, 2, 3, '321']
- (D) [1, 2, 3]
- (E) ★  
[3, 2, 1, '321']

---

**Solution.**

---

23. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

- (A) "333"
- (B) None of the other answers are correct.
- (C) ★

```
"3str(3)"
```

- (D) "33"
- (E) 33

---

**Solution.**

---

24. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) 4
- (B) ★  
3
- (C) 5
- (D) None of the other answers are correct.
- (E) 7

---

**Solution.**

---

25. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%2)==0:  
        x.append("-")  
    if (j%5)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["\*", "-", "\*", "\*"]
- (B) None of the other answers are correct.
- (C) ["-", "-", "\*"]
- (D) ["-", "\*", "-"]
- (E) ★

["-", "\*", "-", "-"]

---

**Solution.**

---

26. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

- (A) `(a**b)cos(a-b)`
- (B) None of the other answers are correct.
- (C) `(a^b)*cos(a-b)`
- (D) ★

`(a**b)*cos(a-b)`

- (E) `(b^a)cos(a-b)`

---

**Solution.**

---

27. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) 9
- (B) None of the other answers are correct.
- (C) ★  
3
- (D) 7
- (E) 1

---

**Solution.**

---



28. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve', 'six']
- (B) ['two', 'twelve', 'one', 'eleven', 'six']
- (C) ['twelve', 'eleven', 'two', 'one']
- (D) ['one', 'two', 'eleven', 'twelve']
- (E) ★

['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [3, 5, 6, 6]
- (B) [2, 4, 5, 5, 6, 7]
- (C) [2, 4, 5, 6, 6, 7]
- (D) ★

[3, 5, 6, 6, 7]

- (E) [3, 5, 6, 6, 7, 8]

---

**Solution.**

---

30. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) 4
- (C) 5
- (D) ★ 3

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. B

93. E

94. A

95. D

96. B

1. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) ★

`[1,2,1]`

(B) `[1,2,3]`

(C) `[1,2,1,2,1,2]`

(D) `[1,2,"3"]`

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

- (A) 3
  - (B) None of the other answers are correct.
  - (C) "3"
  - (D) 111
  - (E) ★
- "111"

---

**Solution.**

---

3. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) 6

(C) ★

-1

(D) 3

(E) 0

---

**Solution.**

---

4. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) 16
- (B) 8
- (C) None of the other answers are correct.
- (D) ★  
2
- (E) 4

---

**Solution.**

---



5. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) ★

`(m % n) != 0`

(C) `(n % m) == 0`

(D) `(m // n) != 0`

---

**Solution.**

---

6. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) ★

`s[i:i+2]`

(B) `s[i:i-1]`

(C) `s[i+1:i+2]`

(D) `s[i:i+1]`

---

**Solution.**

---

7. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) [ ]

(B) ★

['Merlin', 'King Pellinore', 'Sir Agravaine']

(C) ['Sir Agravaine', 'King Pellinore']

(D) ['King Pellinore', 'Sir Agravaine']

(E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

8. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 16

(C) 8

(D) ★

12

(E) 3

---

**Solution.**

---

9. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) None of the other answers are correct.

(B) `(b^a)cos(a-b)`

(C) `(a**b)cos(a-b)`

(D) ★

`(a**b)*cos(a-b)`

(E) `(a^b)*cos(a-b)`

---

**Solution.**

---

10. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) ★

3

(C) 7

(D) 5

(E) 4

---

**Solution.**

---

11. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [4, 6, 7]
- (B) [2, 4, 6, 6]
- (C) [3, 4, 6, 7, 8]
- (D) ★

[4, 6, 7, 8]

- (E) [4, 6, 7, 7]

---

**Solution.**

---

12. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) 30

(B) 3

(C) 14

(D) 5

(E) ★

4

---

**Solution.**

---



13. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (B) ★  
['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (D) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (E) None

---

**Solution.**

---

14. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLINMERLIN"

(B) "MERLIN2"

(C) "MERLIN"

(D) None

(E) 12

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) ★

11

(C) 12

(D) 10

(E) 14

---

**Solution.**

---

16. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Boolean
- (B) None
- (C) Integer
- (D) Float
- (E) String

---

**Solution.**

---

17. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 13

(C) ★

10

(D) 11

(E) 12

---

**Solution.**

---

18. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) 2, 3, 8, 1, 6
- (C) 2, 7, 4, 5, 6
- (D) 3, 2, 8, 5, 9
- (E) ★ 2, 3, 8, 5, 6

---

**Solution.**

---

19. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, 10]

(B) [1, 2, 3]

(C) ★

[1, 2, 3, 4, '1234']

(D) [1, 2, 3, '1234']

(E) [1, 2, 3, '123']

---

**Solution.**

---

20. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Float
- (C) Boolean
- (D) Integer
- (E) None

---

**Solution.**

---



21. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) ★  
Boolean
- (C) Integer
- (D) Float
- (E) String

---

**Solution.**

---

22. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

(A) ★

[1, 2, 3, 1, 2, 3, 1, 2, 3]

(B) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]

(C) [3, 6, 9]

(D) (3, 6, 9)

(E) [3.0, 6.0, 9.0]

---

**Solution.**

---

23. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1>s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['twelve', 'eleven', 'two', 'one']
- (B) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['eleven', 'one', 'twelve', 'two']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['one', 'two', 'eleven', 'twelve']

---

**Solution.**

---

24. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) False

(C) 'RAI'

(D) ★

['R', 'A']

(E) 3

---

**Solution.**

---

25. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) "ICCOI"
- (B) None of the other answers are correct.
- (C) "ACCIA"
- (D) "ACCOA"
- (E) ★

"OCCIO"

---

**Solution.**

---

26. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 1
- (B) 2
- (C) ★ 3
- (D) 4

---

**Solution.**

---

27. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 3
- (B) ★ None of the other answers are correct.
- (C) 2
- (D) 5

---

**Solution.**

---

28. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 1

(C) 0

(D) ★

2

(E) 4

---

**Solution.**

---



29. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%3)==0:  
        x.append("-")  
    if (j%4)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["\*", "-", "\*"]
- (B) ["-", "\*"]
- (C) None of the other answers are correct.
- (D) ★

["-", "\*", "-", "\*"]

- (E) ["\*", "-", "\*"]

---

**Solution.**

---

30. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `while i in range(100)`

(B) ★

`for i in range(1,101)`

(C) `while i<=100`

(D) `for i in range(0,100)`

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. C

93. E

94. A

95. E

96. C

1. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) ★

Boolean

(C) None

(D) String

(E) Float

---

**Solution.**

---

2. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

- (A) None
  - (B) Integer
  - (C) String
  - (D) Float
  - (E) ★
- Boolean

---

**Solution.**

---

3. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) ★

4

(C) 5

(D) 30

(E) 14

---

**Solution.**

---

4. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) 12
- (B) "MERLIN2"
- (C) "MERLIN"
- (D) ★

"MERLINMERLIN"

- (E) None

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) 111

(B) 3

(C) ★

"111"

(D) None of the other answers are correct.

(E) "3"

---

**Solution.**

---



6. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

-1

(B) 5

(C) 0

(D) 6

(E) 3

---

**Solution.**

---

7. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) Boolean
- (B) Float
- (C) String
- (D) None
- (E) ★

Integer

---

**Solution.**

---

8. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) 3

(C) ★

4

(D) 5

(E) 7

---

**Solution.**

---

9. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

- (A) `(a^b)*cos(a-b)`
- (B) None of the other answers are correct.
- (C) ★

`(a**b)*cos(a-b)`

- (D) `(a**b)cos(a-b)`
- (E) `(b^a)cos(a-b)`

---

**Solution.**

---

10. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) 1
- (B) 9
- (C) None of the other answers are correct.
- (D) ★  
3
- (E) 7

---

**Solution.**

---

11. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '123']

(B) [1, 2, 3]

(C) [1, 2, 3, '1234']

(D) [1, 2, 3, 10]

(E) ★

[1, 2, 3, 4, '1234']

---

**Solution.**

---

12. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) 'ORS'

(C) ★

['0', 'R']

(D) False

(E) ''

---

**Solution.**

---

13. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

[3, 5, 6, 7, 7]

(B) [3, 5, 6, 7, 7, 8]

(C) [2, 4, 5, 6, 7, 7]

(D) [2, 4, 5, 5, 7, 7]

(E) [3, 5, 7, 7]

---

**Solution.**

---



14. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "\*", "\*"]

(B) None of the other answers are correct.

(C) ★

["-", "\*", "-"]

(D) ["-", "\*"]

(E) ["-", "-", "\*"]

---

**Solution.**

---

15. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) 2, 3, 8, 1, 6
- (C) 3, 2, 8, 5, 9
- (D) 2, 7, 4, 5, 6
- (E) ★ 2, 3, 8, 5, 6

---

**Solution.**

---

16. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n // m) == 0`

(C) ★

`(m % n) != 0`

(D) `(n % m) == 0`

---

**Solution.**

---

17. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) [ ]
- (B) ['Sir Agravaine', 'King Pellinore']
- (C) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (D) ['King Pellinore', 'Sir Agravaine']
- (E) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

18. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")  
y=x  
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

None

(B) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(D) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

19. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 14

(C) 12

(D) 11

(E) 13

---

**Solution.**

---

20. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['two', 'twelve', 'one', 'eleven', 'six']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ★  
['twelve', 'eleven', 'two', 'one']
- (D) ['one', 'two', 'eleven', 'twelve', 'six']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

21. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 4

(C) ★

2

(D) 1

(E) 0

---

**Solution.**

---



22. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) ★

12

(B) 0

(C) 8

(D) 16

(E) 3

---

**Solution.**

---

23. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,3]`

(B) `[1,2,1,2,1,2]`

(C) ★

`[1,2,1]`

(D) `[1,2,"3"]`

---

**Solution.**

---

24. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) 5
- (C) 4
- (D) ★ 3

---

**Solution.**

---

25. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `while i<=100`

(B) ★

`for i in range(1,101)`

(C) `while i in range(100)`

(D) `for i in range(0,100)`

---

**Solution.**

---

26. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 3
- (B) ★ None of the other answers are correct.
- (C) 5
- (D) 2

---

**Solution.**

---

27. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) ★

12

(C) 11

(D) 13

(E) 10

---

**Solution.**

---

28. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

- (A) `s[i:i-1]`
- (B) `s[i:i+1]`
- (C) `s[i+1:i+2]`
- (D) ★  
`s[i:i+2]`

---

**Solution.**

---

29. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "STUP"

(C) "PSTU"

(D) ★

"UTSP"

(E) "PUST"

---

**Solution.**

---



30. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[3, 6, 9]`

(B) None of the above.

(C) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) `[3.0, 6.0, 9.0]`

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. D

93. E

94. A

95. A

96. D

1. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) String
  - (B) None
  - (C) Integer
  - (D) Boolean
  - (E) ★
- Float

---

**Solution.**

---

2. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(m // n) != 0`

(C) `(n // m) == 0`

(D) `(n % m) == 0`

---

**Solution.**

---

3. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

(A) ★ 2, 3, 8, 5, 6

(B) 2, 3, 8, 1, 6

(C) 3, 2, 8, 5, 9

(D) 2, 7, 4, 5, 6

(E) 2, 3, 4, 1, 6

---

**Solution.**

---

4. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) ★

14

(C) 30

(D) 4

(E) 3

---

**Solution.**

---

5. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(b^a - b)`

(B) `a*sin(a^b - b)`

(C) `a sin(a**b - b)`

(D) ★

`a*sin(a**b - b)`

(E) None of the other answers are correct.

---

**Solution.**

---

6. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) ★  
String
- (C) Float
- (D) Integer
- (E) Boolean

---

**Solution.**

---



7. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
sum=sum+i+1
```

(B) `sum=sum+i`

(C) `sum+1=sum`

(D) `sum=sum+1`

---

**Solution.**

---

8. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) ★

4

(B) 7

(C) None of the other answers are correct.

(D) 3

(E) 5

---

**Solution.**

---

9. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ★
- ['eleven', 'one', 'twelve', 'two']
- (B) ['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['one', 'two', 'eleven', 'twelve']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['twelve', 'eleven', 'two', 'one']

---

**Solution.**

---

10. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(B) `[3, 6, 9]`

(C) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(D) `(3, 6, 9)`

(E) `[3.0, 6.0, 9.0]`

---

**Solution.**

---

11. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Boolean
- (B) Integer
- (C) None
- (D) String
- (E) Float

---

**Solution.**

---

12. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 14

(C) 11

(D) 13

(E) 12

---

**Solution.**

---

13. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) 9

(B) 3

(C) ★

27

(D) None of the other answers are correct.

(E) 1

---

**Solution.**

---

14. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

None

(B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

(D) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(E) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

---

**Solution.**

---



15. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

- (A) [1, 2, 3]
  - (B) [3, 2, 1]
  - (C) [1, 2, 3, '321']
  - (D) [1, 2, 3, 6]
  - (E) ★
- [3, 2, 1, '321']

---

**Solution.**

---

16. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

- (A) 10
- (B) 14
- (C) 12
- (D) 13
- (E) ★

11

---

**Solution.**

---

17. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ★  
[ 'R', 'A' ]
- (B) 3
- (C) False
- (D) 'RAI'
- (E) None

---

**Solution.**

---

18. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) 2

(C) 4

(D) -1

(E) ★

3

---

**Solution.**

---

19. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 5
- (B) ★ None of the other answers are correct.
- (C) 2
- (D) 3

---

**Solution.**

---

20. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]
b=[ ]
for i in range(1,3):
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (B) ['Sir Agravaine', 'King Pellinore']
- (C) [ ]
- (D) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) ★

['King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

21. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

(A) `s[i:i-1]`

(B) ★

`s[i:i+2]`

(C) `s[i+1:i+2]`

(D) `s[i:i+1]`

---

**Solution.**

---

22. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

- (A) ★  
"UTSP"
- (B) "PSTU"
- (C) "STUP"
- (D) "PUST"
- (E) None of the other answers are correct.

---

**Solution.**

---



23. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

- (A) "1.2\*2"
  - (B) None of the other answers are correct.
  - (C) 2.4
  - (D) "2.4"
  - (E) ★
- "1.21.2"

---

**Solution.**

---

24. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [3, 5, 7, 7]
- (B) [2, 4, 5, 6, 7, 7]
- (C) [3, 5, 6, 7, 7, 8]
- (D) ★

[3, 5, 6, 7, 7]

- (E) [2, 4, 5, 5, 7, 7]

---

**Solution.**

---

25. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1]`

(B) `[1,2,1,2,1,2]`

(C) ★

`[1,2]`

(D) `[1,2,3]`

---

**Solution.**

---

26. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

(A) ★ 3

(B) 5

(C) 1

(D) 4

---

**Solution.**

---

27. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 7

(B) ★

16

(C) 8

(D) 12

(E) 0

---

**Solution.**

---

28. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%4)==0:  
        x.append("-")  
    if (j%5)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) None of the other answers are correct.

(B) ["-", "\*"]

(C) ★

["-", "\*", "-"]

(D) ["-", "-", "\*"]

(E) ["-", "\*", "\*"]

---

**Solution.**

---

29. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

2

(B) 0

(C) 3

(D) 4

(E) 1

---

**Solution.**

---

30. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLINMERLIN"

(B) 0

(C) ★

"MERLIN2"

(D) None

(E) "MERLIN%i"

---

**Solution.**

---





- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. E

93. E

94. A

95. B

96. E

1. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

- (A) `s[i:i-1]`
- (B) `s[i+1:i+2]`
- (C) ★
- `s[i:i+2]`
- (D) `s[i:i+1]`

---

**Solution.**

---

2. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) None

(C) ★

Integer

(D) Float

(E) String

---

**Solution.**

---

3. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) 0

(C) 1

(D) ★

3

(E) 2

---

**Solution.**

---

4. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) 30

(C) 4

(D) 3

(E) ★

14

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (B) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (E) ★

None

---

**Solution.**

---

6. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) -1

(C) ★

3

(D) 4

(E) 2

---

**Solution.**

---

7. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 8, 1, 6
- (B) ★ 2, 3, 8, 5, 6
- (C) 2, 3, 4, 1, 6
- (D) 2, 7, 4, 5, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---



8. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) 'RAI'

(B) 3

(C) False

(D) ★

['R', 'A']

(E) None

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '123']

(B) ★

[1, 2, 3, 4, '1234']

(C) [1, 2, 3, 10]

(D) [1, 2, 3, '1234']

(E) [1, 2, 3]

---

**Solution.**

---

10. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) None

(C) ★

Boolean

(D) String

(E) Float

---

**Solution.**

---

11. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+1`

(B) `sum+1=sum`

(C) ★

`sum=sum+i+1`

(D) `sum=sum+i`

---

**Solution.**

---

12. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) ★  
27
- (B) 1
- (C) 3
- (D) None of the other answers are correct.
- (E) 9

---

**Solution.**

---

13. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

[3, 5, 6, 6, 7]

(B) [2, 4, 5, 5, 6, 7]

(C) [3, 5, 6, 6]

(D) [3, 5, 6, 6, 7, 8]

(E) [2, 4, 5, 6, 6, 7]

---

**Solution.**

---

14. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1>s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve']
- (B) ['eleven', 'one', 'twelve', 'two']
- (C) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['twelve', 'eleven', 'two', 'one']

---

**Solution.**

---

15. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

- (A) `(n % m) == 0`
- (B) `(m // n) != 0`
- (C) ★  
`(m % n) != 0`
- (D) `(n // m) == 0`

---

**Solution.**

---



16. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 4
- (B) 2
- (C) 1
- (D) ★ 3

---

**Solution.**

---

17. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) ★

[1,2]

(B) [1,2,1,2,1,2]

(C) [1,2,3]

(D) [1,2,1]

---

**Solution.**

---

18. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 11

(C) 14

(D) 12

(E) 13

---

**Solution.**

---

19. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) Float

(C) ★

String

(D) None

(E) Integer

---

**Solution.**

---

20. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) ★ None of the other answers are correct.
- (B) 3
- (C) 5
- (D) 2

---

**Solution.**

---

21. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]
b=[ ]
for i in range(1,3):
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ['Merlin', 'King Pellinore', 'Sir Agravaine']

(B) ['Sir Agravaine', 'King Pellinore']

(C) ★

['King Pellinore', 'Sir Agravaine']

(D) [ ]

(E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

22. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

["-", "\*", "-"]

(B) ["-", "\*", "\*"]

(C) None of the other answers are correct.

(D) ["-", "-", "\*"]

(E) ["-", "\*"]

---

**Solution.**

---

23. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) ★  
4
- (B) 3
- (C) 7
- (D) 5
- (E) None of the other answers are correct.

---

**Solution.**

---



24. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) 0

(B) ★

"MERLIN2"

(C) "MERLINMERLIN"

(D) None

(E) "MERLIN%i"

---

**Solution.**

---

25. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) `(a**b)cos(a-b)`

(B) ★

`(a**b)*cos(a-b)`

(C) None of the other answers are correct.

(D) `(b^a)cos(a-b)`

(E) `(a^b)*cos(a-b)`

---

**Solution.**

---

26. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) "ACCOA"
- (B) None of the other answers are correct.
- (C) ★  
"OCCIO"
- (D) "ICCOI"
- (E) "ACCIA"

---

**Solution.**

---

27. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) 13

(C) 11

(D) ★

12

(E) 14

---

**Solution.**

---

28. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 7

(B) 0

(C) 8

(D) ★

16

(E) 12

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "1.2\*2"

(C) "2.4"

(D) 2.4

(E) ★

"1.21.2"

---

**Solution.**

---

30. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `(3, 6, 9)`

(B) `[3.0, 6.0, 9.0]`

(C) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(D) `[3, 6, 9]`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. A

93. A

94. B

95. E

96. A



1. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 8

(B) 0

(C) ★

12

(D) 3

(E) 16

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

(A) 7

(B) ★

3

(C) 1

(D) None of the other answers are correct.

(E) 9

---

**Solution.**

---

3. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) ★  
Boolean
- (C) Integer
- (D) None
- (E) String

---

**Solution.**

---

4. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) 3
- (B) ★
- 4
- (C) 5
- (D) None of the other answers are correct.
- (E) 7

---

**Solution.**

---

5. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

15

(B) 14

(C) 12

(D) 11

(E) 13

---

**Solution.**

---

6. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [3, 2, 1]

(B) [1, 2, 3, 6]

(C) [1, 2, 3, '321']

(D) ★

[3, 2, 1, '321']

(E) [1, 2, 3]

---

**Solution.**

---

7. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%3)==0:  
        x.append("-")  
    if (j%4)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

["-", "\*", "-", "\*"]

(B) ["\*", "-", "\*"]

(C) ["-", "\*"]

(D) None of the other answers are correct.

(E) ["\*", "-", "\*"]

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) ★  
Boolean
- (C) Integer
- (D) String
- (E) None

---

**Solution.**

---



9. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Boolean
- (C) String
- (D) ★  
Integer
- (E) Float

---

**Solution.**

---

10. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
    for i in range(1,101)
```

(B) while i in range(100)

(C) while i<=100

(D) for i in range(0,100)

---

**Solution.**

---

11. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "ACCOA"

(C) ★

"OCCIO"

(D) "ACCIA"

(E) "ICCOI"

---

**Solution.**

---

12. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 2
- (B) ★ None of the other answers are correct.
- (C) 3
- (D) 5

---

**Solution.**

---

13. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

- (A) `s[i:i+1]`
- (B) `s[i+1:i+2]`
- (C) `s[i:i-1]`
- (D) ★  
`s[i:i+2]`

---

**Solution.**

---

14. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (B) ['Sir Agravaine', 'King Pellinore']
- (C) [ ]
- (D) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine']
- (E) ['King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

15. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) ★

`(m % n) != 0`

(C) `(n % m) == 0`

(D) `(n // m) == 0`

---

**Solution.**

---

16. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 30

(B) 4

(C) ★

14

(D) 3

(E) 5

---

**Solution.**

---



17. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

(A) ★ 3

(B) 1

(C) 4

(D) 2

---

**Solution.**

---

18. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1]`

(B) ★

`[1,2]`

(C) `[1,2,3]`

(D) `[1,2,1,2,1,2]`

---

**Solution.**

---

19. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 3, 2, 8, 5, 9
- (B) 2, 3, 4, 1, 6
- (C) 2, 7, 4, 5, 6
- (D) ★ 2, 3, 8, 5, 6
- (E) 2, 3, 8, 1, 6

---

**Solution.**

---

20. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) False

(B) 'RAI'

(C) ★

['R', 'A']

(D) None

(E) 3

---

**Solution.**

---

21. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 3

(B) 5

(C) 0

(D) 6

(E) ★

-1

---

**Solution.**

---

22. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

(A) [3, 6, 9]

(B) ★

[1, 2, 3, 1, 2, 3, 1, 2, 3]

(C) [3.0, 6.0, 9.0]

(D) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]

(E) (3, 6, 9)

---

**Solution.**

---

23. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLIN%i"

(B) 0

(C) None

(D) "MERLINMERLIN"

(E) ★

"MERLIN2"

---

**Solution.**

---

24. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 5, 7, 7]

(B) [3, 5, 7, 7]

(C) [3, 5, 6, 7, 7, 8]

(D) [2, 4, 5, 6, 7, 7]

(E) ★

[3, 5, 6, 7, 7]

---

**Solution.**

---



25. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 2

(B) 0

(C) 4

(D) ★

3

(E) 1

---

**Solution.**

---

26. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1==s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve']
- (B) ★  
['twelve', 'eleven', 'two', 'one']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['eleven', 'one', 'twelve', 'two']
- (E) ['one', 'two', 'eleven', 'twelve', 'six']

---

**Solution.**

---

27. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) None
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (E) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

---

**Solution.**

---

28. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

- (A) "33"
- (B) "333"
- (C) 33
- (D) None of the other answers are correct.
- (E) ★

```
"3str(3)"
```

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 10

(C) ★

12

(D) 13

(E) 11

---

**Solution.**

---

30. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) `(a^b)*cos(a-b)`

(B) `(a**b)cos(a-b)`

(C) None of the other answers are correct.

(D) `(b^a)cos(a-b)`

(E) ★

`(a**b)*cos(a-b)`

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
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- There are 30 questions, worth 1 point each.
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- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. B

93. A

94. B

95. A

96. B

1. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) ★ 2, 3, 8, 5, 6
- (C) 3, 2, 8, 5, 9
- (D) 2, 7, 4, 5, 6
- (E) 2, 3, 8, 1, 6

---

**Solution.**

---



2. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 8

(B) 7

(C) 0

(D) ★

16

(E) 12

---

**Solution.**

---

3. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

[3, 5, 6, 6, 7]

(B) [3, 5, 6, 6, 7, 8]

(C) [2, 4, 5, 5, 6, 7]

(D) [2, 4, 5, 6, 6, 7]

(E) [3, 5, 6, 6]

---

**Solution.**

---

4. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

3

(B) 0

(C) 4

(D) 1

(E) 2

---

**Solution.**

---

5. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) [ ]
- (B) ['Sir Agravaine', 'King Pellinore']
- (C) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (D) ★  
    ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (E) ['King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

6. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['two', 'twelve', 'one', 'eleven', 'six']
- (B) ['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['one', 'two', 'eleven', 'twelve']
- (D) ['twelve', 'eleven', 'two', 'one']
- (E) ★

['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

7. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["-", "-", "\*"]
- (B) ["-", "\*", "\*"]
- (C) None of the other answers are correct.
- (D) ["-", "\*"]
- (E) ★

["-", "\*", "-"]

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) ''

(C) ★

['0', 'R']

(D) False

(E) 'ORS'

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (B) None
- (C) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (D) ★  
['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---



10. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 11

(C) 13

(D) 12

(E) ★

15

---

**Solution.**

---

11. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) ★

Float

(C) String

(D) None

(E) Integer

---

**Solution.**

---

12. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) `[1,2,"3"]`

(C) `[1,2,3]`

(D) ★

`[1,2,1]`

---

**Solution.**

---

13. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

12

(B) 14

(C) 10

(D) 13

(E) 11

---

**Solution.**

---

14. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 5
- (B) 3
- (C) ★ None of the other answers are correct.
- (D) 2

---

**Solution.**

---

15. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) Float
  - (B) None
  - (C) String
  - (D) Boolean
  - (E) ★
- Integer

---

**Solution.**

---

16. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) ★

14

(B) 5

(C) 30

(D) 3

(E) 4

---

**Solution.**

---

17. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) 3

(C) ★

4

(D) 5

(E) 7

---

**Solution.**

---



18. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

- (A) [1, 2, 3, 10]
- (B) [1, 2, 3, '123']
- (C) [1, 2, 3, '1234']
- (D) ★  
[1, 2, 3, 4, '1234']
- (E) [1, 2, 3]

---

**Solution.**

---

19. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) `(a^b)*cos(a-b)`

(B) ★

`(a**b)*cos(a-b)`

(C) `(b^a)cos(a-b)`

(D) `(a**b)cos(a-b)`

(E) None of the other answers are correct.

---

**Solution.**

---

20. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) `[3.0, 6.0, 9.0]`

(D) None of the above.

(E) `[3, 6, 9]`

---

**Solution.**

---

21. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 3

(B) 5

(C) 6

(D) 0

(E) ★

-1

---

**Solution.**

---

22. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLINMERLIN"

(B) "MERLIN"

(C) "MERLIN2"

(D) 12

(E) None

---

**Solution.**

---

23. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) ★

`(m % n) != 0`

(C) `(n // m) == 0`

(D) `(n % m) == 0`

---

**Solution.**

---

24. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) ★

`s[i:i+2]`

(B) `s[i:i+1]`

(C) `s[i+1:i+2]`

(D) `s[i:i-1]`

---

**Solution.**

---

25. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum+1=sum`

(B) `sum=sum+i`

(C) `sum=sum+1`

(D) ★

```
sum=sum+i+1
```

---

**Solution.**

---



26. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) "33"

(B) "333"

(C) 33

(D) ★

"3str(3)"

(E) None of the other answers are correct.

---

**Solution.**

---

27. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

(A) ★ 3

(B) 5

(C) 1

(D) 4

---

**Solution.**

---

28. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) ★

"UTSP"

(B) None of the other answers are correct.

(C) "PUST"

(D) "STUP"

(E) "PSTU"

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) 1

(C) ★

3

(D) 7

(E) 9

---

**Solution.**

---

30. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

(A) Float

(B) None

(C) ★

String

(D) Boolean

(E) Integer

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. C

93. A

94. B

95. B

96. C

1. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) ★ 2, 3, 8, 5, 6
- (B) 2, 3, 8, 1, 6
- (C) 2, 3, 4, 1, 6
- (D) 2, 7, 4, 5, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---

2. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1==s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ★  
['twelve', 'eleven', 'two', 'one']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['one', 'two', 'eleven', 'twelve', 'six']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---



3. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) ★

`s[i:i+2]`

(B) `s[i+1:i+2]`

(C) `s[i:i+1]`

(D) `s[i:i-1]`

---

**Solution.**

---

4. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 5, 7, 7]

(B) ★

[3, 5, 6, 7, 7]

(C) [3, 5, 7, 7]

(D) [2, 4, 5, 6, 7, 7]

(E) [3, 5, 6, 7, 7, 8]

---

**Solution.**

---

5. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "\*"]

(B) None of the other answers are correct.

(C) ★

["-", "\*", "-"]

(D) ["-", "-", "\*"]

(E) ["-", "\*", "\*"]

---

**Solution.**

---

6. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(b^a - b)`

(B) `a*sin(a^b - b)`

(C) ★

`a*sin(a**b - b)`

(D) None of the other answers are correct.

(E) `a sin(a**b - b)`

---

**Solution.**

---

7. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

(A) ★ 3

(B) 1

(C) 2

(D) 4

---

**Solution.**

---

8. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) ★

[3, 2, 1, '321']

(B) [3, 2, 1]

(C) [1, 2, 3]

(D) [1, 2, 3, '321']

(E) [1, 2, 3, 6]

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) 7
- (B) None of the other answers are correct.
- (C) ★  
3
- (D) 1
- (E) 9

---

**Solution.**

---

10. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,"3"]`

(B) `[1,2,1,2,1,2]`

(C) `[1,2,3]`

(D) ★

`[1,2,1]`

---

**Solution.**

---



11. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 1

(B) 0

(C) ★

3

(D) 2

(E) 4

---

**Solution.**

---

12. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]
b=[ ]
for i in range(1,3):
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) [ ]
- (B) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (C) ['Sir Agravaine', 'King Pellinore']
- (D) ★  
['King Pellinore', 'Sir Agravaine']
- (E) ['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

13. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

- (A) "PUST"
- (B) None of the other answers are correct.
- (C) ★  
"UTSP"
- (D) "STUP"
- (E) "PSTU"

---

**Solution.**

---

14. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) ★ None of the other answers are correct.
- (B) 3
- (C) 5
- (D) 2

---

**Solution.**

---

15. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) None

(C) String

(D) ★

Integer

(E) Float

---

**Solution.**

---

16. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

(A) String

(B) Float

(C) ★

Boolean

(D) Integer

(E) None

---

**Solution.**

---

17. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) None of the above.

(B) `[3, 6, 9]`

(C) `[3.0, 6.0, 9.0]`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

18. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) ★

11

(C) 10

(D) 12

(E) 13

---

**Solution.**

---



19. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) ★

16

(B) 7

(C) 8

(D) 0

(E) 12

---

**Solution.**

---

20. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ''
- (B) 'ORS'
- (C) None
- (D) ★  
['0', 'R']
- (E) False

---

**Solution.**

---

21. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

- (A) `while i<=100`
- (B) `for i in range(0,100)`
- (C) `while i in range(100)`
- (D) ★  
`for i in range(1,101)`

---

**Solution.**

---

22. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n // m) == 0`

(C) `(n % m) == 0`

(D) ★

`(m % n) != 0`

---

**Solution.**

---

23. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

- (A) "33"
- (B) None of the other answers are correct.
- (C) "333"
- (D) ★

```
"3str(3)"
```

- (E) 33

---

**Solution.**

---

24. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLIN%i"

(B) None

(C) 0

(D) ★

"MERLIN2"

(E) "MERLINMERLIN"

---

**Solution.**

---

25. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) Integer
- (B) None
- (C) Float
- (D) Boolean
- (E) ★

String

---

**Solution.**

---

26. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 12

(B) 13

(C) ★

15

(D) 14

(E) 11

---

**Solution.**

---



27. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) 5
- (B) None of the other answers are correct.
- (C) ★  
4
- (D) 3
- (E) 7

---

**Solution.**

---

28. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) None
- (B) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (E) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

---

**Solution.**

---

29. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) ★

4

(B) 3

(C) 5

(D) 30

(E) 14

---

**Solution.**

---

30. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 0

(B) ★

-1

(C) 5

(D) 3

(E) 6

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. D

93. A

94. B

95. C

96. D

1. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Float
- (C) Integer
- (D) ★  
Boolean
- (E) String

---

**Solution.**

---

2. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) None
- (C) Integer
- (D) Boolean
- (E) Float

---

**Solution.**

---

3. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,3]`

(B) ★

`[1,2]`

(C) `[1,2,1]`

(D) `[1,2,1,2,1,2]`

---

**Solution.**

---



4. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 0

(B) 6

(C) ★

-1

(D) 3

(E) 5

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [4, 6, 7]

(B) [2, 4, 6, 6]

(C) [4, 6, 7, 7]

(D) ★

[4, 6, 7, 8]

(E) [3, 4, 6, 7, 8]

---

**Solution.**

---

6. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%2)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["-", "\*", "-"]
- (B) ["\*", "-", "\*", "\*"]
- (C) ★

["-", "\*", "-", "-"]

- (D) ["-", "-", "\*"]
- (E) None of the other answers are correct.

---

**Solution.**

---

7. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) "333"

(B) "33"

(C) ★

"3str(3)"

(D) 33

(E) None of the other answers are correct.

---

**Solution.**

---

8. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3]

(B) [3, 2, 1]

(C) ★

[3, 2, 1, '321']

(D) [1, 2, 3, '321']

(E) [1, 2, 3, 6]

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

11

(B) 13

(C) 10

(D) 12

(E) 14

---

**Solution.**

---

10. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 12

(B) 11

(C) ★

15

(D) 13

(E) 14

---

**Solution.**

---

11. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) ★

4

(B) 30

(C) 3

(D) 5

(E) 14

---

**Solution.**

---



12. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) 'ORS'

(B) ★

['0', 'R']

(C) False

(D) ''

(E) None

---

**Solution.**

---

13. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

3

(B) 1

(C) 2

(D) 4

(E) 0

---

**Solution.**

---

14. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 5
- (B) 3
- (C) 2
- (D) ★ None of the other answers are correct.

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) ★

27

(B) None of the other answers are correct.

(C) 1

(D) 9

(E) 3

---

**Solution.**

---

16. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) `(m // n) != 0`

(C) `(n % m) == 0`

(D) ★

`(m % n) != 0`

---

**Solution.**

---

17. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 7

(C) 12

(D) ★

16

(E) 8

---

**Solution.**

---

18. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
sum=sum+i+1
```

(B) `sum=sum+1`

(C) `sum+1=sum`

(D) `sum=sum+i`

---

**Solution.**

---

19. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 2
- (B) ★ 3
- (C) 1
- (D) 4

---

**Solution.**

---



20. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (B) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ★
- None
- (D) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (E) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

---

**Solution.**

---

21. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) ★  
4
- (B) 7
- (C) None of the other answers are correct.
- (D) 3
- (E) 5

---

**Solution.**

---

22. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ★

['Merlin', 'King Pellinore', 'Sir Agravaine']

(B) ['Sir Agravaine', 'King Pellinore']

(C) [ ]

(D) ['King Pellinore', 'Sir Agravaine', 'Merlin']

(E) ['King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

23. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) "ACCIA"

(B) "ICCOI"

(C) "ACCOA"

(D) ★

"OCCIO"

(E) None of the other answers are correct.

---

**Solution.**

---

24. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) `s[i+1:i+2]`

(B) ★

`s[i:i+2]`

(C) `s[i:i-1]`

(D) `s[i:i+1]`

---

**Solution.**

---

25. (1 point) How can the following mathematical equation be implemented as a Python expression?  
Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) `(a^b)*cos(a-b)`

(B) ★

`(a**b)*cos(a-b)`

(C) `(a**b)cos(a-b)`

(D) `(b^a)cos(a-b)`

(E) None of the other answers are correct.

---

**Solution.**

---

26. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

(A) ★ 2, 3, 8, 5, 6

(B) 2, 3, 4, 1, 6

(C) 2, 3, 8, 1, 6

(D) 2, 7, 4, 5, 6

(E) 3, 2, 8, 5, 9

---

**Solution.**

---

27. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['two', 'twelve', 'one', 'eleven', 'six']
- (B) ['twelve', 'eleven', 'two', 'one']
- (C) ['one', 'two', 'eleven', 'twelve', 'six']
- (D) ['one', 'two', 'eleven', 'twelve']
- (E) ★

['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---



28. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

(A) String

(B) ★

Boolean

(C) Integer

(D) None

(E) Float

---

**Solution.**

---

29. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLINMERLIN"

(B) "MERLIN2"

(C) None

(D) 12

(E) "MERLIN"

---

**Solution.**

---

30. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(B) `[3, 6, 9]`

(C) `[3.0, 6.0, 9.0]`

(D) `(3, 6, 9)`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. E

93. A

94. B

95. D

96. E

1. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) ★

"3str(3)"

(B) None of the other answers are correct.

(C) "33"

(D) "333"

(E) 33

---

**Solution.**

---

2. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (B) [ ]
- (C) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (D) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) ★

['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

3. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) -1

(B) ★

3

(C) 5

(D) 2

(E) 4

---

**Solution.**

---

4. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) 8
- (B) None of the other answers are correct.
- (C) 4
- (D) ★  
2
- (E) 16

---

**Solution.**

---



5. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 8

(B) 7

(C) ★

16

(D) 12

(E) 0

---

**Solution.**

---

6. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

3

(B) 4

(C) 0

(D) 1

(E) 2

---

**Solution.**

---

7. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) 13

(C) ★

10

(D) 12

(E) 14

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) None
  - (B) String
  - (C) Boolean
  - (D) Integer
  - (E) ★
- Float

---

**Solution.**

---

9. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 1
- (B) 4
- (C) 2
- (D) ★ 3

---

**Solution.**

---

10. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "\*", "\*"]

(B) None of the other answers are correct.

(C) ★

["-", "\*", "-"]

(D) ["-", "-", "\*"]

(E) ["-", "\*"]

---

**Solution.**

---

11. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1>s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve']
- (B) ['eleven', 'one', 'twelve', 'two']
- (C) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (D) ['twelve', 'eleven', 'two', 'one']
- (E) ['two', 'twelve', 'one', 'eleven', 'six']

---

**Solution.**

---

12. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) ★

14

(B) 3

(C) 5

(D) 30

(E) 4

---

**Solution.**

---



13. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) 'ORS'

(B) ''

(C) ★

['0', 'R']

(D) False

(E) None

---

**Solution.**

---

14. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum+1=sum`

(B) `sum=sum+1`

(C) `sum=sum+i`

(D) ★

```
sum=sum+i+1
```

---

**Solution.**

---

15. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) ★

4

(B) None of the other answers are correct.

(C) 5

(D) 3

(E) 7

---

**Solution.**

---

16. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) "ICCOI"

(B) "ACCIA"

(C) ★

"OCCIO"

(D) None of the other answers are correct.

(E) "ACCOA"

---

**Solution.**

---

17. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(a^b - b)`

(B) ★

`a*sin(a**b - b)`

(C) `a*sin(b^a - b)`

(D) `a sin(a**b - b)`

(E) None of the other answers are correct.

---

**Solution.**

---

18. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) ★ None of the other answers are correct.
- (B) 5
- (C) 2
- (D) 3

---

**Solution.**

---

19. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) Integer
- (B) None
- (C) Float
- (D) Boolean
- (E) ★

String

---

**Solution.**

---

20. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

- (A) `[1,2,3]`
- (B) `[1,2,1]`
- (C) `[1,2,1,2,1,2]`
- (D) ★  
`[1,2]`

---

**Solution.**

---



21. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) ★ 2, 3, 8, 5, 6
- (B) 2, 7, 4, 5, 6
- (C) 3, 2, 8, 5, 9
- (D) 2, 3, 8, 1, 6
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

22. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `[3.0, 6.0, 9.0]`

(B) `(3, 6, 9)`

(C) `[3, 6, 9]`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

12

(B) 13

(C) 10

(D) 11

(E) 14

---

**Solution.**

---

24. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [3, 5, 6, 6]
- (B) [2, 4, 5, 5, 6, 7]
- (C) ★  
[3, 5, 6, 6, 7]
- (D) [2, 4, 5, 6, 6, 7]
- (E) [3, 5, 6, 6, 7, 8]

---

**Solution.**

---

25. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '321']

(B) ★

[3, 2, 1, '321']

(C) [3, 2, 1]

(D) [1, 2, 3, 6]

(E) [1, 2, 3]

---

**Solution.**

---

26. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLIN2"

(B) None

(C) "MERLIN%i"

(D) 0

(E) "MERLINMERLIN"

---

**Solution.**

---

27. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(n % m) == 0`

(B) `(m // n) != 0`

(C) ★

`(m % n) != 0`

(D) `(n // m) == 0`

---

**Solution.**

---

28. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

(A) ★

`s[i:i+2]`

(B) `s[i:i-1]`

(C) `s[i+1:i+2]`

(D) `s[i:i+1]`

---

**Solution.**

---



29. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (B) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) None
- (E) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

---

**Solution.**

---

30. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) Float
  - (B) Boolean
  - (C) Integer
  - (D) None
  - (E) ★
- String

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. A

93. B

94. B

95. A

96. C

1. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) None

(B) ★

"MERLINMERLIN"

(C) 12

(D) "MERLIN2"

(E) "MERLIN"

---

**Solution.**

---

2. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ''
- (B) 'ORS'
- (C) False
- (D) None
- (E) ★

['0', 'R']

---

**Solution.**

---

3. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) ★

`(m % n) != 0`

(C) `(n % m) == 0`

(D) `(m // n) != 0`

---

**Solution.**

---

4. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) 4

(C) ★

2

(D) 16

(E) 8

---

**Solution.**

---

5. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) None of the other answers are correct.

(B) `(a**b)cos(a-b)`

(C) `(b^a)cos(a-b)`

(D) ★

`(a**b)*cos(a-b)`

(E) `(a^b)*cos(a-b)`

---

**Solution.**

---



6. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Integer
- (C) Float
- (D) ★  
String
- (E) Boolean

---

**Solution.**

---

7. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1]`

(B) `[1,2,3]`

(C) ★

`[1,2]`

(D) `[1,2,1,2,1,2]`

---

**Solution.**

---

8. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `for i in range(0,100)`

(B) `while i in range(100)`

(C) ★

`for i in range(1,101)`

(D) `while i<=100`

---

**Solution.**

---

9. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 12

(B) 14

(C) ★

10

(D) 11

(E) 13

---

**Solution.**

---

10. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve', 'six']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ['twelve', 'eleven', 'two', 'one']
- (D) ★  
['eleven', 'one', 'twelve', 'two']
- (E) ['two', 'twelve', 'one', 'eleven', 'six']

---

**Solution.**

---

11. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (B) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (E) ★

None

---

**Solution.**

---

12. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) 5
- (C) 4
- (D) ★ 3

---

**Solution.**

---

13. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) ★

12

(C) 8

(D) 16

(E) 0

---

**Solution.**

---



14. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (B) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']
- (C) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (D) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (E) [ ]

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '1234']

(B) [1, 2, 3, 10]

(C) ★

[1, 2, 3, 4, '1234']

(D) [1, 2, 3, '123']

(E) [1, 2, 3]

---

**Solution.**

---

16. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 6, 6, 7]

(B) [2, 4, 5, 5, 6, 7]

(C) ★

[3, 5, 6, 6, 7]

(D) [3, 5, 6, 6]

(E) [3, 5, 6, 6, 7, 8]

---

**Solution.**

---

17. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 0

(C) 1

(D) ★

2

(E) 4

---

**Solution.**

---

18. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) 2, 7, 4, 5, 6
- (C) ★ 2, 3, 8, 5, 6
- (D) 2, 3, 8, 1, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---

19. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) 3

(C) ★

4

(D) 7

(E) 5

---

**Solution.**

---

20. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 3

(B) ★

-1

(C) 0

(D) 6

(E) 5

---

**Solution.**

---

21. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

(A) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]

(B) ★

[1, 2, 3, 1, 2, 3, 1, 2, 3]

(C) [3.0, 6.0, 9.0]

(D) (3, 6, 9)

(E) [3, 6, 9]

---

**Solution.**

---



22. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

(A) ★

`s[i:i+2]`

(B) `s[i:i-1]`

(C) `s[i+1:i+2]`

(D) `s[i:i+1]`

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) ★

12

(C) 13

(D) 10

(E) 11

---

**Solution.**

---

24. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 5

(C) 4

(D) 30

(E) ★

14

---

**Solution.**

---

25. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) ★  
Boolean
- (C) None
- (D) String
- (E) Integer

---

**Solution.**

---

26. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) ★

Boolean

(C) Float

(D) None

(E) String

---

**Solution.**

---

27. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) ★ None of the other answers are correct.
- (B) 3
- (C) 2
- (D) 5

---

**Solution.**

---

28. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) ★

"OCCIO"

(B) "ICCOI"

(C) "ACCIA"

(D) "ACCOA"

(E) None of the other answers are correct.

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) 3

(B) ★

"111"

(C) 111

(D) "3"

(E) None of the other answers are correct.

---

**Solution.**

---



30. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%4)==0:  
        x.append("-")  
    if (j%5)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["-", "-", "\*"]
- (B) ["-", "\*"]
- (C) None of the other answers are correct.
- (D) ★

["-", "\*", "-"]

- (E) ["-", "\*", "\*"]

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. B

93. B

94. B

95. B

96. D

1. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

(A) ★ 3

(B) 4

(C) 1

(D) 2

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (B) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) None
- (E) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

---

**Solution.**

---

3. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 3

(C) 4

(D) 1

(E) ★

2

---

**Solution.**

---

4. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) `s[i+1:i+2]`

(B) `s[i:i+1]`

(C) ★

`s[i:i+2]`

(D) `s[i:i-1]`

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 10

(C) 13

(D) ★

12

(E) 11

---

**Solution.**

---

6. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "2.4"

(C) 2.4

(D) "1.2\*2"

(E) ★

"1.21.2"

---

**Solution.**

---



7. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4     if i > max_val:  
    5         max_val = my_list[i]  
    6     return max_val  
    7 for i in range(my_list):  
    8     if my_list[i] > max_val:  
    9         print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) 2, 3, 8, 1, 6
- (C) ★ 2, 3, 8, 5, 6
- (D) 3, 2, 8, 5, 9
- (E) 2, 7, 4, 5, 6

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) False

(B) ★

['R', 'A']

(C) 'RAI'

(D) 3

(E) None

---

**Solution.**

---

9. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum+1=sum`

(B) ★

`sum=sum+i+1`

(C) `sum=sum+1`

(D) `sum=sum+i`

---

**Solution.**

---

10. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) 9
- (B) 1
- (C) None of the other answers are correct.
- (D) 3
- (E) ★

27

---

**Solution.**

---

11. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) None
  - (B) Boolean
  - (C) String
  - (D) Float
  - (E) ★
- Integer

---

**Solution.**

---

12. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) String
  - (B) Float
  - (C) None
  - (D) Integer
  - (E) ★
- Boolean

---

**Solution.**

---

13. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 12

(C) ★

10

(D) 11

(E) 13

---

**Solution.**

---

14. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) None of the other answers are correct.

(B) `a*sin(a^b - b)`

(C) `a*sin(b^a - b)`

(D) `a sin(a**b - b)`

(E) ★

`a*sin(a**b - b)`

---

**Solution.**

---



15. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['eleven', 'one', 'twelve', 'two']
- (B) ['two', 'twelve', 'one', 'eleven', 'six']
- (C) ['one', 'two', 'eleven', 'twelve']
- (D) ['one', 'two', 'eleven', 'twelve', 'six']
- (E) ★

['twelve', 'eleven', 'two', 'one']

---

**Solution.**

---

16. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

(A) [3.0, 6.0, 9.0]

(B) (3, 6, 9)

(C) ★

[1, 2, 3, 1, 2, 3, 1, 2, 3]

(D) [3, 6, 9]

(E) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]

---

**Solution.**

---

17. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) ★

`[1,2,1]`

(B) `[1,2,3]`

(C) `[1,2,"3"]`

(D) `[1,2,1,2,1,2]`

---

**Solution.**

---

18. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) 14

(C) ★

4

(D) 3

(E) 30

---

**Solution.**

---

19. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLIN"

(B) "MERLIN2"

(C) 12

(D) ★

"MERLINMERLIN"

(E) None

---

**Solution.**

---

20. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 5, 6, 6, 7, 8]

(B) [3, 5, 6, 6]

(C) [2, 4, 5, 5, 6, 7]

(D) [2, 4, 5, 6, 6, 7]

(E) ★

[3, 5, 6, 6, 7]

---

**Solution.**

---

21. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "\*"]

(B) None of the other answers are correct.

(C) ★

["-", "\*", "-", "\*"]

(D) ["\*", "-", "\*"]

(E) ["\*", "-", "\*"]

---

**Solution.**

---

22. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) ★

12

(B) 8

(C) 16

(D) 3

(E) 0

---

**Solution.**

---



23. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) 7
  - (B) 5
  - (C) 4
  - (D) None of the other answers are correct.
  - (E) ★
- 3

---

**Solution.**

---

24. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]  
a=a[0:4]  
a.sort()  
x=""  
for e in a:  
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "PSTU"

(C) ★

"UTSP"

(D) "STUP"

(E) "PUST"

---

**Solution.**

---

25. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Float
- (B) Boolean
- (C) String
- (D) Integer
- (E) None

---

**Solution.**

---

26. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) ★

[1, 2, 3, 4, '1234']

(B) [1, 2, 3, '1234']

(C) [1, 2, 3, '123']

(D) [1, 2, 3, 10]

(E) [1, 2, 3]

---

**Solution.**

---

27. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
  - (B) ['King Pellinore', 'Sir Agravaine']
  - (C) ['Sir Agravaine', 'King Pellinore']
  - (D) [ ]
  - (E) ★
- ['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

28. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n // m) == 0`

(C) ★

`(m % n) != 0`

(D) `(n % m) == 0`

---

**Solution.**

---

29. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 5
- (B) 3
- (C) ★ None of the other answers are correct.
- (D) 2

---

**Solution.**

---

30. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 0

(B) 5

(C) 3

(D) ★

-1

(E) 6

---

**Solution.**

---





- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. C

93. B

94. B

95. C

96. E

1. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i+1:i+2]`

(B) `s[i:i+1]`

(C) `s[i:i-1]`

(D) ★

`s[i:i+2]`

---

**Solution.**

---

2. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) None of the other answers are correct.

(B) `a sin(a**b - b)`

(C) ★

`a*sin(a**b - b)`

(D) `a*sin(a^b - b)`

(E) `a*sin(b^a - b)`

---

**Solution.**

---

3. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) ★

12

(C) 13

(D) 11

(E) 14

---

**Solution.**

---

4. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 2

(B) ★

3

(C) -1

(D) 4

(E) 5

---

**Solution.**

---

5. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 16

(C) ★

12

(D) 3

(E) 8

---

**Solution.**

---

6. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 1
- (B) 2
- (C) ★ 3
- (D) 4

---

**Solution.**

---

7. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) 33

(B) ★

"3str(3)"

(C) "33"

(D) None of the other answers are correct.

(E) "333"

---

**Solution.**

---



8. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) ''

(C) ★

['0', 'R']

(D) 'ORS'

(E) False

---

**Solution.**

---

9. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 8, 1, 6
- (B) 3, 2, 8, 5, 9
- (C) ★ 2, 3, 8, 5, 6
- (D) 2, 3, 4, 1, 6
- (E) 2, 7, 4, 5, 6

---

**Solution.**

---

10. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) ★

Boolean

(C) Float

(D) String

(E) None

---

**Solution.**

---

11. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 4, 6, 7, 8]

(B) [2, 4, 6, 6]

(C) ★

[4, 6, 7, 8]

(D) [4, 6, 7]

(E) [4, 6, 7, 7]

---

**Solution.**

---

12. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1==s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

(A) ★

['twelve', 'eleven', 'two', 'one']

(B) ['one', 'two', 'eleven', 'twelve']

(C) ['eleven', 'one', 'twelve', 'two']

(D) ['two', 'twelve', 'one', 'eleven', 'six']

(E) ['one', 'two', 'eleven', 'twelve', 'six']

---

**Solution.**

---

13. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%3)==0:  
        x.append("-")  
    if (j%4)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

["-", "\*", "-", "\*"]

(B) None of the other answers are correct.

(C) ["\*", "-", "\*"]

(D) ["-", "\*"]

(E) ["\*", "-", "\*"]

---

**Solution.**

---

14. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) ★  
Integer
- (C) Float
- (D) Boolean
- (E) String

---

**Solution.**

---

15. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(n % m) == 0`

(C) `(m // n) != 0`

(D) `(n // m) == 0`

---

**Solution.**

---



16. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLINMERLIN"

(B) "MERLIN%i"

(C) 0

(D) ★

"MERLIN2"

(E) None

---

**Solution.**

---

17. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `while i<=100`

(B) `for i in range(0,100)`

(C) ★

`for i in range(1,101)`

(D) `while i in range(100)`

---

**Solution.**

---

18. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) 5
  - (B) None of the other answers are correct.
  - (C) 7
  - (D) 3
  - (E) ★
- 4

---

**Solution.**

---

19. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine']
- (B) ★
- ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (C) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (D) [ ]
- (E) ['Sir Agravaine', 'King Pellinore']

---

**Solution.**

---

20. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) "ICCOI"

(B) ★

"OCCIO"

(C) None of the other answers are correct.

(D) "ACCIA"

(E) "ACCOA"

---

**Solution.**

---

21. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

- (A) [1, 2, 3]
- (B) [1, 2, 3, '1234']
- (C) [1, 2, 3, 10]
- (D) ★  
[1, 2, 3, 4, '1234']
- (E) [1, 2, 3, '123']

---

**Solution.**

---

22. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) 2

(C) 1

(D) ★

3

(E) 0

---

**Solution.**

---

23. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 3
- (B) 5
- (C) ★ None of the other answers are correct.
- (D) 2

---

**Solution.**

---



24. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

- (A) 12
- (B) 13
- (C) 14
- (D) 11
- (E) ★

15

---

**Solution.**

---

25. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) Boolean
- (B) Float
- (C) Integer
- (D) ★  
String
- (E) None

---

**Solution.**

---

26. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1]`

(B) `[1,2,1,2,1,2]`

(C) ★

`[1,2]`

(D) `[1,2,3]`

---

**Solution.**

---

27. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

- (A) 3
- (B) 5
- (C) 14
- (D) 30
- (E) ★

4

---

**Solution.**

---

28. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(C) None

(D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

(E) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) ★
- 2
- (B) 8
- (C) 4
- (D) 16
- (E) None of the other answers are correct.

---

**Solution.**

---

30. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `(3, 6, 9)`

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) `[3.0, 6.0, 9.0]`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) `[3, 6, 9]`

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. D

93. B

94. B

95. D

96. A



1. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 5, 6, 7, 7, 8]

(B) ★

[3, 5, 6, 7, 7]

(C) [3, 5, 7, 7]

(D) [2, 4, 5, 5, 7, 7]

(E) [2, 4, 5, 6, 7, 7]

---

**Solution.**

---

2. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1]`

(B) `[1,2,1,2,1,2]`

(C) ★

`[1,2]`

(D) `[1,2,3]`

---

**Solution.**

---

3. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

2

(B) 1

(C) 0

(D) 3

(E) 4

---

**Solution.**

---

4. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) None

(C) Float

(D) ★

Integer

(E) String

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) "3"

(B) ★

"111"

(C) 111

(D) 3

(E) None of the other answers are correct.

---

**Solution.**

---

6. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) `s[i:i+1]`

(B) ★

`s[i:i+2]`

(C) `s[i:i-1]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

7. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 3, 2, 8, 5, 9
- (B) ★ 2, 3, 8, 5, 6
- (C) 2, 3, 8, 1, 6
- (D) 2, 7, 4, 5, 6
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

8. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) ★

`a*sin(a**b - b)`

(B) `a*sin(b^a - b)`

(C) `a*sin(a^b - b)`

(D) None of the other answers are correct.

(E) `a sin(a**b - b)`

---

**Solution.**

---



9. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 4

(C) 5

(D) 30

(E) ★

14

---

**Solution.**

---

10. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Float
- (C) Boolean
- (D) ★  
String
- (E) Integer

---

**Solution.**

---

11. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3]

(B) ★

[1, 2, 3, 4, '1234']

(C) [1, 2, 3, '1234']

(D) [1, 2, 3, '123']

(E) [1, 2, 3, 10]

---

**Solution.**

---

12. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) 'RAI'

(B) ★

['R','A']

(C) False

(D) None

(E) 3

---

**Solution.**

---

13. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `(3, 6, 9)`

(B) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(C) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(D) `[3.0, 6.0, 9.0]`

(E) `[3, 6, 9]`

---

**Solution.**

---

14. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) 3

(B) ★

4

(C) 7

(D) 5

(E) None of the other answers are correct.

---

**Solution.**

---

15. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) String
- (C) ★  
Boolean
- (D) Integer
- (E) Float

---

**Solution.**

---

16. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum+1=sum`

(B) ★

`sum=sum+i+1`

(C) `sum=sum+i`

(D) `sum=sum+1`

---

**Solution.**

---



17. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 12

(C) 14

(D) 13

(E) 11

---

**Solution.**

---

18. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "STUP"

(C) "PSTU"

(D) ★

"UTSP"

(E) "PUST"

---

**Solution.**

---

19. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%2)==0:  
        x.append("-")  
    if (j%5)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["\*", "-", "\*", "\*"]
- (B) ["-", "\*", "-"]
- (C) None of the other answers are correct.
- (D) ★

["-", "\*", "-", "-"]

- (E) ["-", "-", "\*"]

---

**Solution.**

---

20. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 4
- (B) ★ 3
- (C) 1
- (D) 2

---

**Solution.**

---

21. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) ★ None of the other answers are correct.
- (B) 3
- (C) 5
- (D) 2

---

**Solution.**

---

22. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) 4

(B) ★

2

(C) None of the other answers are correct.

(D) 8

(E) 16

---

**Solution.**

---

23. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(m // n) != 0`

(C) `(n % m) == 0`

(D) `(n // m) == 0`

---

**Solution.**

---

24. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

11

(B) 12

(C) 14

(D) 13

(E) 10

---

**Solution.**

---



25. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) None

(B) ★

"MERLINMERLIN"

(C) "MERLIN2"

(D) "MERLIN"

(E) 12

---

**Solution.**

---

26. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) ★

12

(B) 3

(C) 16

(D) 8

(E) 0

---

**Solution.**

---

27. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (B) None
- (C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (D) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

28. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 2

(B) 4

(C) -1

(D) ★

3

(E) 5

---

**Solution.**

---

29. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1>s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ★
- ['one', 'two', 'eleven', 'twelve', 'six']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ['eleven', 'one', 'twelve', 'two']
- (D) ['twelve', 'eleven', 'two', 'one']
- (E) ['two', 'twelve', 'one', 'eleven', 'six']

---

**Solution.**

---

30. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (B) ['King Pellinore', 'Sir Agravaine']
- (C) [ ]
- (D) ['Sir Agravaine', 'King Pellinore']
- (E) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. E

93. B

94. B

95. E

96. B

1. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `(3, 6, 9)`

(B) `[3.0, 6.0, 9.0]`

(C) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) `[3, 6, 9]`

---

**Solution.**

---



2. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) ★

16

(C) 8

(D) 7

(E) 12

---

**Solution.**

---

3. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (E) ★

None

---

**Solution.**

---

4. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,"3"]`

(B) `[1,2,3]`

(C) ★

`[1,2,1]`

(D) `[1,2,1,2,1,2]`

---

**Solution.**

---

5. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "ACCOA"

(C) "ICCOI"

(D) "ACCIA"

(E) ★

"OCCIO"

---

**Solution.**

---

6. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(n % m) == 0`

(C) `(m // n) != 0`

(D) `(n // m) == 0`

---

**Solution.**

---

7. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["-", "-", "\*"]
- (B) ["-", "\*"]
- (C) None of the other answers are correct.
- (D) ["-", "\*", "\*"]
- (E) ★

["-", "\*", "-"]

---

**Solution.**

---

8. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) 4
  - (B) 8
  - (C) None of the other answers are correct.
  - (D) 16
  - (E) ★
- 2

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 5, 6, 7, 7]

(B) ★

[3, 5, 6, 7, 7]

(C) [3, 5, 6, 7, 7, 8]

(D) [2, 4, 5, 5, 7, 7]

(E) [3, 5, 7, 7]

---

**Solution.**

---



10. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) ★

[1, 2, 3, 4, '1234']

(B) [1, 2, 3, 10]

(C) [1, 2, 3, '1234']

(D) [1, 2, 3]

(E) [1, 2, 3, '123']

---

**Solution.**

---

11. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve']
- (B) ['eleven', 'one', 'twelve', 'two']
- (C) ★  
['twelve', 'eleven', 'two', 'one']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['one', 'two', 'eleven', 'twelve', 'six']

---

**Solution.**

---

12. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+1`

(B) `sum+1=sum`

(C) `sum=sum+i`

(D) ★

```
sum=sum+i+1
```

---

**Solution.**

---

13. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 2

(B) 4

(C) 5

(D) -1

(E) ★

3

---

**Solution.**

---

14. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) ★ 2, 3, 8, 5, 6
- (B) 2, 3, 8, 1, 6
- (C) 2, 7, 4, 5, 6
- (D) 3, 2, 8, 5, 9
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

15. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

(A) ★ 3

(B) 2

(C) 4

(D) 1

---

**Solution.**

---

16. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) ★
- Boolean
- (C) Integer
- (D) String
- (E) Float

---

**Solution.**

---

17. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) 5
- (B) None of the other answers are correct.
- (C) 7
- (D) ★  
4
- (E) 3

---

**Solution.**

---



18. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(1,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Sir Agravaine', 'King Pellinore']
- (B) ★  
['King Pellinore', 'Sir Agravaine']
- (C) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (D) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) [ ]

---

**Solution.**

---

19. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) ★ None of the other answers are correct.
- (B) 2
- (C) 5
- (D) 3

---

**Solution.**

---

20. (1 point) Consider the following program:

```
s="-B-O-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) False

(B) None

(C) 'ORS'

(D) ''

(E) ★

['O', 'R']

---

**Solution.**

---

21. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) `(b^a)cos(a-b)`

(B) `(a**b)cos(a-b)`

(C) None of the other answers are correct.

(D) `(a^b)*cos(a-b)`

(E) ★

`(a**b)*cos(a-b)`

---

**Solution.**

---

22. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) ★

"1.21.2"

(B) 2.4

(C) None of the other answers are correct.

(D) "1.2\*2"

(E) "2.4"

---

**Solution.**

---

23. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) ★

10

(C) 11

(D) 13

(E) 12

---

**Solution.**

---

24. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) ★

3

(C) 1

(D) 2

(E) 4

---

**Solution.**

---

25. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) ★
- Integer
- (C) Float
- (D) Boolean
- (E) String

---

**Solution.**

---



26. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) ★

14

(C) 3

(D) 5

(E) 30

---

**Solution.**

---

27. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

12

(B) 11

(C) 13

(D) 14

(E) 10

---

**Solution.**

---

28. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) Float
  - (B) None
  - (C) String
  - (D) Integer
  - (E) ★
- Boolean

---

**Solution.**

---

29. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i+1:i+2]`

(B) `s[i:i-1]`

(C) `s[i:i+1]`

(D) ★

`s[i:i+2]`

---

**Solution.**

---

30. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) "MERLIN"

(B) 12

(C) ★

"MERLINMERLIN"

(D) None

(E) "MERLIN2"

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. A

93. C

94. B

95. B

96. E

1. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 3
- (B) 5
- (C) 2
- (D) ★ None of the other answers are correct.

---

**Solution.**

---

2. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `while i<=100`

(B) ★

`for i in range(1,101)`

(C) `while i in range(100)`

(D) `for i in range(0,100)`

---

**Solution.**

---



3. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[3, 6, 9]`

(B) `[3.0, 6.0, 9.0]`

(C) `None of the above.`

(D) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(E) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

---

**Solution.**

---

4. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) ★

`a*sin(a**b - b)`

(B) `a*sin(a^b - b)`

(C) None of the other answers are correct.

(D) `a sin(a**b - b)`

(E) `a*sin(b^a - b)`

---

**Solution.**

---

5. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) ★

Float

(C) String

(D) None

(E) Boolean

---

**Solution.**

---

6. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) 14

(C) 12

(D) 11

(E) ★

15

---

**Solution.**

---

7. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) ★

14

(B) 4

(C) 5

(D) 3

(E) 30

---

**Solution.**

---

8. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

(A) ★ 3

(B) 4

(C) 5

(D) 1

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) ★

3

(C) 1

(D) 9

(E) 7

---

**Solution.**

---

10. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) "ACCIA"
- (B) "ACCOA"
- (C) None of the other answers are correct.
- (D) ★

"OCCIO"

- (E) "ICCOI"

---

**Solution.**

---



11. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1>s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

(A) ★

['one', 'two', 'eleven', 'twelve', 'six']

(B) ['eleven', 'one', 'twelve', 'two']

(C) ['two', 'twelve', 'one', 'eleven', 'six']

(D) ['twelve', 'eleven', 'two', 'one']

(E) ['one', 'two', 'eleven', 'twelve']

---

**Solution.**

---

12. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) 12

(B) ★

"MERLINMERLIN"

(C) "MERLIN"

(D) "MERLIN2"

(E) None

---

**Solution.**

---

13. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) ★

12

(C) 13

(D) 14

(E) 10

---

**Solution.**

---

14. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%4)==0:  
        x.append("-")  
    if (j%5)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["-", "\*"]
- (B) None of the other answers are correct.
- (C) ["-", "-", "\*"]
- (D) ["-", "\*", "\*"]
- (E) ★

["-", "\*", "-"]

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (D) None
- (E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

16. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) ★  
String
- (C) Float
- (D) Integer
- (E) Boolean

---

**Solution.**

---

17. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n % m) == 0`

(C) ★

`(m % n) != 0`

(D) `(n // m) == 0`

---

**Solution.**

---

18. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

- (A) 3
- (B) False
- (C) 'RAI'
- (D) ★  
['R', 'A']
- (E) None

---

**Solution.**

---



19. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 2

(B) -1

(C) 5

(D) 4

(E) ★

3

---

**Solution.**

---

20. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '321']

(B) ★

[3, 2, 1, '321']

(C) [3, 2, 1]

(D) [1, 2, 3, 6]

(E) [1, 2, 3]

---

**Solution.**

---

21. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) String

(C) ★

Boolean

(D) Float

(E) None

---

**Solution.**

---

22. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) ★

`[1,2,1]`

(B) `[1,2,3]`

(C) `[1,2,"3"]`

(D) `[1,2,1,2,1,2]`

---

**Solution.**

---

23. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 8, 1, 6
- (B) 3, 2, 8, 5, 9
- (C) 2, 3, 4, 1, 6
- (D) ★ 2, 3, 8, 5, 6
- (E) 2, 7, 4, 5, 6

---

**Solution.**

---

24. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

- (A) 7
- (B) 8
- (C) 12
- (D) ★
- 16
- (E) 0

---

**Solution.**

---

25. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) "1.2\*2"

(B) "2.4"

(C) 2.4

(D) ★

"1.21.2"

(E) None of the other answers are correct.

---

**Solution.**

---

26. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) 5
  - (B) 7
  - (C) 4
  - (D) None of the other answers are correct.
  - (E) ★
- 3

---

**Solution.**

---



27. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i:i-1]`

(B) `s[i:i+1]`

(C) ★

`s[i:i+2]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

28. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(1,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) [ ]
- (B) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (C) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (D) ['Sir Agravaine', 'King Pellinore']
- (E) ★  
['King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

29. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 1

(B) 4

(C) ★

2

(D) 3

(E) 0

---

**Solution.**

---

30. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [3, 5, 6, 6]
- (B) [2, 4, 5, 6, 6, 7]
- (C) ★  
[3, 5, 6, 6, 7]
- (D) [3, 5, 6, 6, 7, 8]
- (E) [2, 4, 5, 5, 6, 7]

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. B

93. C

94. B

95. C

96. A

1. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

(A) 16

(B) 8

(C) ★

2

(D) None of the other answers are correct.

(E) 4

---

**Solution.**

---

2. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) String
- (B) ★
- Integer
- (C) Float
- (D) None
- (E) Boolean

---

**Solution.**

---

3. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 3, 2, 8, 5, 9
- (B) 2, 3, 8, 1, 6
- (C) 2, 7, 4, 5, 6
- (D) 2, 3, 4, 1, 6
- (E) ★ 2, 3, 8, 5, 6

---

**Solution.**

---



4. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 4, 6, 7, 8]

(B) ★

[4, 6, 7, 8]

(C) [4, 6, 7, 7]

(D) [2, 4, 6, 6]

(E) [4, 6, 7]

---

**Solution.**

---

5. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) 12
- (B) "MERLIN2"
- (C) "MERLIN"
- (D) None
- (E) ★

"MERLINMERLIN"

---

**Solution.**

---

6. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 13

(C) 11

(D) 14

(E) 12

---

**Solution.**

---

7. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i:i+1]`

(B) `s[i:i-1]`

(C) ★

`s[i:i+2]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) ★  
Integer
- (C) Boolean
- (D) None
- (E) String

---

**Solution.**

---

9. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['two', 'twelve', 'one', 'eleven', 'six']
- (B) ['one', 'two', 'eleven', 'twelve', 'six']
- (C) ★  
['twelve', 'eleven', 'two', 'one']
- (D) ['one', 'two', 'eleven', 'twelve']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

10. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 3
- (B) 5
- (C) ★ None of the other answers are correct.
- (D) 2

---

**Solution.**

---

11. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

(A) String

(B) ★

Boolean

(C) Integer

(D) None

(E) Float

---

**Solution.**

---



12. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 16

(B) ★

12

(C) 0

(D) 8

(E) 3

---

**Solution.**

---

13. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) ★  
4
- (B) 5
- (C) None of the other answers are correct.
- (D) 7
- (E) 3

---

**Solution.**

---

14. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 6

(B) 3

(C) 5

(D) 0

(E) ★

-1

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (D) ★  
['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (E) None

---

**Solution.**

---

16. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

- (A) None
- (B) 'ORS'
- (C) False
- (D) ''
- (E) ★

['0', 'R']

---

**Solution.**

---

17. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

2

(B) 0

(C) 3

(D) 1

(E) 4

---

**Solution.**

---

18. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "\*", "\*"]

(B) None of the other answers are correct.

(C) ★

["-", "\*", "-"]

(D) ["-", "\*"]

(E) ["-", "-", "\*"]

---

**Solution.**

---

19. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) `(n % m) == 0`

(C) ★

`(m % n) != 0`

(D) `(m // n) != 0`

---

**Solution.**

---



20. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `for i in range(0,100)`

(B) `while i in range(100)`

(C) `while i<=100`

(D) ★

```
    for i in range(1,101)
```

---

**Solution.**

---

21. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 2
- (B) 1
- (C) ★ 3
- (D) 4

---

**Solution.**

---

22. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(b^a - b)`

(B) `a sin(a**b - b)`

(C) ★

`a*sin(a**b - b)`

(D) `a*sin(a^b - b)`

(E) None of the other answers are correct.

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) 14

(C) ★

12

(D) 11

(E) 13

---

**Solution.**

---

24. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) `[1,2,3]`

(C) ★

`[1,2]`

(D) `[1,2,1]`

---

**Solution.**

---

25. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[3.0, 6.0, 9.0]`

(B) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(C) None of the above.

(D) `[3, 6, 9]`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

26. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) ★

"UTSP"

(C) "STUP"

(D) "PSTU"

(E) "PUST"

---

**Solution.**

---

27. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) [ ]
- (B) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (C) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (D) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']

---

**Solution.**

---



28. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) ★

14

(C) 30

(D) 5

(E) 4

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

- (A) [1, 2, 3]
- (B) [1, 2, 3, '321']
- (C) [3, 2, 1]
- (D) [1, 2, 3, 6]
- (E) ★  
[3, 2, 1, '321']

---

**Solution.**

---

30. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

(A) 33

(B) ★

"3str(3)"

(C) "33"

(D) "333"

(E) None of the other answers are correct.

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. C

93. C

94. B

95. D

96. B

1. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) 0

(C) ★

2

(D) 1

(E) 3

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) 14

(C) ★

12

(D) 11

(E) 13

---

**Solution.**

---

3. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) 2, 7, 4, 5, 6
- (C) 3, 2, 8, 5, 9
- (D) 2, 3, 8, 1, 6
- (E) ★ 2, 3, 8, 5, 6

---

**Solution.**

---

4. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

(A) ★

`s[i:i+2]`

(B) `s[i+1:i+2]`

(C) `s[i:i+1]`

(D) `s[i:i-1]`

---

**Solution.**

---



5. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '321']

(B) [3, 2, 1]

(C) ★

[3, 2, 1, '321']

(D) [1, 2, 3, 6]

(E) [1, 2, 3]

---

**Solution.**

---

6. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) 5
- (B) 4
- (C) None of the other answers are correct.
- (D) ★  
3
- (E) 7

---

**Solution.**

---

7. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(a^b - b)`

(B) `a*sin(b^a - b)`

(C) `a sin(a**b - b)`

(D) None of the other answers are correct.

(E) ★

`a*sin(a**b - b)`

---

**Solution.**

---

8. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 30

(C) 4

(D) ★

14

(E) 5

---

**Solution.**

---

9. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%2)==0:  
        x.append("-")  
    if (j%5)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "-", "\*"]

(B) ["-", "\*", "-"]

(C) ★

["-", "\*", "-", "-"]

(D) ["\*", "-", "\*", "\*"]

(E) None of the other answers are correct.

---

**Solution.**

---

10. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) 'ORS'

(C) ''

(D) ★

['0', 'R']

(E) False

---

**Solution.**

---

11. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

- (A) `(n % m) == 0`
- (B) `(n // m) == 0`
- (C) ★  
`(m % n) != 0`
- (D) `(m // n) != 0`

---

**Solution.**

---

12. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) ★

3

(C) 2

(D) 4

(E) -1

---

**Solution.**

---



13. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

- (A) ★  
"UTSP"
- (B) "PSTU"
- (C) None of the other answers are correct.
- (D) "PUST"
- (E) "STUP"

---

**Solution.**

---

14. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) ★

`[1,2]`

(C) `[1,2,3]`

(D) `[1,2,1]`

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 5, 6, 6, 7, 8]

(B) [3, 5, 6, 6]

(C) [2, 4, 5, 6, 6, 7]

(D) [2, 4, 5, 5, 6, 7]

(E) ★

[3, 5, 6, 6, 7]

---

**Solution.**

---

16. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 5
- (B) 2
- (C) 3
- (D) ★ None of the other answers are correct.

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) 7
- (B) None of the other answers are correct.
- (C) 9
- (D) ★
- 3
- (E) 1

---

**Solution.**

---

18. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) String
  - (B) None
  - (C) Boolean
  - (D) Float
  - (E) ★
- Integer

---

**Solution.**

---

19. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `(3, 6, 9)`

(B) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(C) `[3, 6, 9]`

(D) `[3.0, 6.0, 9.0]`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

20. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 11

(C) 13

(D) 12

(E) ★

10

---

**Solution.**

---



21. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `while i<=100`

(B) `for i in range(0,100)`

(C) ★

`for i in range(1,101)`

(D) `while i in range(100)`

---

**Solution.**

---

22. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) ★

"111"

(B) None of the other answers are correct.

(C) 111

(D) 3

(E) "3"

---

**Solution.**

---

23. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) ★

12

(B) 0

(C) 3

(D) 8

(E) 16

---

**Solution.**

---

24. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) None

(C) String

(D) ★

Float

(E) Integer

---

**Solution.**

---

25. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1>s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve']
- (B) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['twelve', 'eleven', 'two', 'one']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

26. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (B) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (C) [ ]
- (D) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) ['Merlin', 'King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

27. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) 0
- (B) "MERLINMERLIN"
- (C) None
- (D) ★  
"MERLIN2"
- (E) "MERLIN%i"

---

**Solution.**

---

28. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 4
- (B) 5
- (C) 1
- (D) ★ 3

---

**Solution.**

---



29. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(B) ★

['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(C) None

(D) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

30. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Boolean
- (C) Float
- (D) Integer
- (E) ★  
String

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. D

93. C

94. B

95. E

96. C

1. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) 13

(C) 14

(D) 12

(E) ★

11

---

**Solution.**

---

2. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 1

(B) 4

(C) ★

2

(D) 0

(E) 3

---

**Solution.**

---

3. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(B) `[3.0, 6.0, 9.0]`

(C) `[3, 6, 9]`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) None of the above.

---

**Solution.**

---

4. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) 9
  - (B) 7
  - (C) 1
  - (D) None of the other answers are correct.
  - (E) ★
- 3

---

**Solution.**

---

5. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1>s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['eleven', 'one', 'twelve', 'two']
- (B) ['twelve', 'eleven', 'two', 'one']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['one', 'two', 'eleven', 'twelve']
- (E) ★  
['one', 'two', 'eleven', 'twelve', 'six']

---

**Solution.**

---



6. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "\*", "\*"]

(B) ["-", "-", "\*"]

(C) ★

["-", "\*", "-"]

(D) ["-", "\*"]

(E) None of the other answers are correct.

---

**Solution.**

---

7. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

[3, 5, 6, 6, 7]

(B) [3, 5, 6, 6]

(C) [2, 4, 5, 6, 6, 7]

(D) [3, 5, 6, 6, 7, 8]

(E) [2, 4, 5, 5, 6, 7]

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 4

(B) 5

(C) ★

3

(D) -1

(E) 2

---

**Solution.**

---

9. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) ★ 3
- (C) 4
- (D) 5

---

**Solution.**

---

10. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 3
- (B) 2
- (C) 5
- (D) ★ None of the other answers are correct.

---

**Solution.**

---

11. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) ★

"1.21.2"

(B) None of the other answers are correct.

(C) "1.2\*2"

(D) 2.4

(E) "2.4"

---

**Solution.**

---

12. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Sir Agravaine', 'King Pellinore']
- (B) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (C) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine']
- (D) ['King Pellinore', 'Sir Agravaine']
- (E) [ ]

---

**Solution.**

---

13. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) `s[i+1:i+2]`

(B) `s[i:i-1]`

(C) ★

`s[i:i+2]`

(D) `s[i:i+1]`

---

**Solution.**

---



14. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ''
- (B) ★
- (C) ['0', 'R']
- (D) False
- (E) None
- (F) 'ORS'

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '123']

(B) ★

[1, 2, 3, 4, '1234']

(C) [1, 2, 3, '1234']

(D) [1, 2, 3]

(E) [1, 2, 3, 10]

---

**Solution.**

---

16. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a*sin(b^a - b)`

(B) ★

`a*sin(a**b - b)`

(C) `a sin(a**b - b)`

(D) None of the other answers are correct.

(E) `a*sin(a^b - b)`

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")  
y=x[:]  
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

(B) ★

['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(C) None

(D) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(E) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

---

**Solution.**

---

18. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Integer
- (C) None
- (D) Float
- (E) Boolean

---

**Solution.**

---

19. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) 30

(C) 3

(D) 4

(E) ★

14

---

**Solution.**

---

20. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(n % m) == 0`

(B) ★

`(m % n) != 0`

(C) `(n // m) == 0`

(D) `(m // n) != 0`

---

**Solution.**

---

21. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) 5
  - (B) None of the other answers are correct.
  - (C) 4
  - (D) 7
  - (E) ★
- 3

---

**Solution.**

---



22. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLINMERLIN"

(B) "MERLIN2"

(C) 12

(D) "MERLIN"

(E) None

---

**Solution.**

---

23. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) 2, 3, 8, 1, 6
- (C) ★ 2, 3, 8, 5, 6
- (D) 3, 2, 8, 5, 9
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

24. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,"3"]`

(B) `[1,2,1,2,1,2]`

(C) ★

`[1,2,1]`

(D) `[1,2,3]`

---

**Solution.**

---

25. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) 14

(C) 11

(D) ★

10

(E) 12

---

**Solution.**

---

26. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
    for i in range(1,101)
```

(B) while i<=100

(C) while i in range(100)

(D) for i in range(0,100)

---

**Solution.**

---

27. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) "ICCOI"

(B) ★

"OCCIO"

(C) None of the other answers are correct.

(D) "ACCOA"

(E) "ACCIA"

---

**Solution.**

---

28. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 16

(B) ★

12

(C) 3

(D) 0

(E) 8

---

**Solution.**

---

29. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) Float

(C) ★

String

(D) None

(E) Integer

---

**Solution.**

---



30. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

(A) Boolean

(B) String

(C) None

(D) ★

Integer

(E) Float

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. E

93. C

94. B

95. A

96. D

1. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]  
a=a[0:4]  
a.sort()  
x=""  
for e in a:  
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) "PUST"

(B) ★

"UTSP"

(C) "PSTU"

(D) "STUP"

(E) None of the other answers are correct.

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

- (A) "2.4"
  - (B) 2.4
  - (C) None of the other answers are correct.
  - (D) "1.2\*2"
  - (E) ★
- "1.21.2"

---

**Solution.**

---

3. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) None
  - (B) Boolean
  - (C) String
  - (D) Float
  - (E) ★
- Integer

---

**Solution.**

---

4. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (B) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (C) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (D) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) [ ]

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) 10

(C) ★

12

(D) 14

(E) 11

---

**Solution.**

---

6. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (B) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (E) ★

None

---

**Solution.**

---



7. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

- (A) 3
- (B) False
- (C) 'RAI'
- (D) ★  
['R', 'A']
- (E) None

---

**Solution.**

---

8. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

- (A) `a*sin(a^b - b)`
- (B) None of the other answers are correct.
- (C) `a sin(a**b - b)`
- (D) `a*sin(b^a - b)`
- (E) ★

`a*sin(a**b - b)`

---

**Solution.**

---

9. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) `(n % m) == 0`

(C) ★

`(m % n) != 0`

(D) `(m // n) != 0`

---

**Solution.**

---

10. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) ★

12

(B) 0

(C) 16

(D) 8

(E) 3

---

**Solution.**

---

11. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) 30

(B) ★

4

(C) 3

(D) 14

(E) 5

---

**Solution.**

---

12. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '1234']

(B) [1, 2, 3, '123']

(C) [1, 2, 3, 10]

(D) ★

[1, 2, 3, 4, '1234']

(E) [1, 2, 3]

---

**Solution.**

---

13. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) 0
- (B) None
- (C) "MERLIN%i"
- (D) ★  
"MERLIN2"
- (E) "MERLINMERLIN"

---

**Solution.**

---

14. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 3, 2, 8, 5, 9
- (B) 2, 3, 8, 1, 6
- (C) 2, 3, 4, 1, 6
- (D) 2, 7, 4, 5, 6
- (E) ★ 2, 3, 8, 5, 6

---

**Solution.**

---



15. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) 1

(C) 3

(D) ★

2

(E) 0

---

**Solution.**

---

16. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+i`

(B) ★

`sum=sum+i+1`

(C) `sum=sum+1`

(D) `sum+1=sum`

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [4, 6, 7]

(B) [2, 4, 6, 6]

(C) [4, 6, 7, 7]

(D) ★

[4, 6, 7, 8]

(E) [3, 4, 6, 7, 8]

---

**Solution.**

---

18. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) Integer
- (C) String
- (D) None
- (E) ★  
Boolean

---

**Solution.**

---

19. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%2)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["-", "\*", "-"]
- (B) ["\*", "-", "\*", "\*"]
- (C) ★

["-", "\*", "-", "-"]

- (D) ["-", "-", "\*"]
- (E) None of the other answers are correct.

---

**Solution.**

---

20. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

- (A) `[1,2,3]`
- (B) `[1,2,1]`
- (C) `[1,2,1,2,1,2]`
- (D) ★  
`[1,2]`

---

**Solution.**

---

21. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 5

(B) 6

(C) ★

-1

(D) 0

(E) 3

---

**Solution.**

---

22. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

- (A) `s[i:i-1]`
- (B) `s[i+1:i+2]`
- (C) ★
- `s[i:i+2]`
- (D) `s[i:i+1]`

---

**Solution.**

---



23. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) 3

(B) 5

(C) 7

(D) ★

4

(E) None of the other answers are correct.

---

**Solution.**

---

24. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 12

(C) 14

(D) 11

(E) 13

---

**Solution.**

---

25. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 2
- (B) 1
- (C) 4
- (D) ★ 3

---

**Solution.**

---

26. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1>s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['eleven', 'one', 'twelve', 'two']
- (B) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['twelve', 'eleven', 'two', 'one']
- (E) ['one', 'two', 'eleven', 'twelve']

---

**Solution.**

---

27. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(B) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(C) `[3.0, 6.0, 9.0]`

(D) None of the above.

(E) `[3, 6, 9]`

---

**Solution.**

---

28. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) ★ None of the other answers are correct.
- (B) 5
- (C) 3
- (D) 2

---

**Solution.**

---

29. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) Boolean
- (B) Integer
- (C) String
- (D) ★  
Float
- (E) None

---

**Solution.**

---

30. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) 16
  - (B) None of the other answers are correct.
  - (C) 8
  - (D) 4
  - (E) ★
- 2

---

**Solution.**

---





- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. A

93. D

94. B

95. C

96. B

1. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) ★

16

(B) 0

(C) 7

(D) 12

(E) 8

---

**Solution.**

---

2. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) ★
- String
- (C) Integer
- (D) Float
- (E) Boolean

---

**Solution.**

---

3. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 12

(B) ★

15

(C) 11

(D) 14

(E) 13

---

**Solution.**

---

4. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,3]`

(B) `[1,2,1,2,1,2]`

(C) `[1,2,"3"]`

(D) ★

`[1,2,1]`

---

**Solution.**

---

5. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)+len(t)) < 4 and s in t
```

What is the **type** of **x** after this program is executed?

- (A) ★
- Boolean
- (B) Float
- (C) String
- (D) None
- (E) Integer

---

**Solution.**

---

6. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

(A) (3, 6, 9)

(B) [3, 6, 9]

(C) [3.0, 6.0, 9.0]

(D) ★

[1, 2, 3, 1, 2, 3, 1, 2, 3]

(E) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]

---

**Solution.**

---

7. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]  
a=a[0:4]  
a.sort()  
x=""  
for e in a:  
    x=e+x
```

What is the **value** of **x** after this program is executed?

(A) "PSTU"

(B) "PUST"

(C) "STUP"

(D) ★

"UTSP"

(E) None of the other answers are correct.

---

**Solution.**

---



8. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) False

(B) 3

(C) 'RAI'

(D) ★

['R', 'A']

(E) None

---

**Solution.**

---

9. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
sum=sum+i+1
```

(B) `sum+1=sum`

(C) `sum=sum+i`

(D) `sum=sum+1`

---

**Solution.**

---

10. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [3, 2, 1]

(B) [1, 2, 3, 6]

(C) [1, 2, 3, '321']

(D) ★

[3, 2, 1, '321']

(E) [1, 2, 3]

---

**Solution.**

---

11. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) -1

(B) 2

(C) 4

(D) ★

3

(E) 5

---

**Solution.**

---

12. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) ★

`s[i:i+2]`

(B) `s[i:i+1]`

(C) `s[i:i-1]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

13. (1 point) Consider the following program:

```
x=2
a=6
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) ★
- 2
- (B) 4
- (C) None of the other answers are correct.
- (D) 16
- (E) 8

---

**Solution.**

---

14. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) 2

(C) 1

(D) 0

(E) ★

3

---

**Solution.**

---

15. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

(A) ★ 3

(B) 4

(C) 5

(D) 1

---

**Solution.**

---



16. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

11

(B) 13

(C) 10

(D) 14

(E) 12

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) 2.4

(C) "1.2\*2"

(D) "2.4"

(E) ★

"1.21.2"

---

**Solution.**

---

18. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) None of the other answers are correct.

(B) ["-", "\*"]

(C) ["-", "-", "\*"]

(D) ["-", "\*", "\*"]

(E) ★

["-", "\*", "-"]

---

**Solution.**

---

19. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) 5
  - (B) 7
  - (C) 4
  - (D) None of the other answers are correct.
  - (E) ★
- 3

---

**Solution.**

---

20. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLINMERLIN"

(B) "MERLIN2"

(C) 12

(D) "MERLIN"

(E) None

---

**Solution.**

---

21. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n // m) == 0`

(C) ★

`(m % n) != 0`

(D) `(n % m) == 0`

---

**Solution.**

---

22. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(C) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(D) None

(E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [4, 6, 7]

(B) [2, 4, 6, 6]

(C) [4, 6, 7, 7]

(D) ★

[4, 6, 7, 8]

(E) [3, 4, 6, 7, 8]

---

**Solution.**

---



24. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) ★

4

(C) 5

(D) 30

(E) 14

---

**Solution.**

---

25. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve', 'six']
- (B) ['twelve', 'eleven', 'two', 'one']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ★

['eleven', 'one', 'twelve', 'two']

- (E) ['one', 'two', 'eleven', 'twelve']

---

**Solution.**

---

26. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) 2, 7, 4, 5, 6
- (C) 2, 3, 8, 1, 6
- (D) ★ 2, 3, 8, 5, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---

27. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) ★ None of the other answers are correct.
- (B) 2
- (C) 5
- (D) 3

---

**Solution.**

---

28. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (B) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (C) [ ]
- (D) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']
- (E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

29. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) None of the other answers are correct.

(B) `(a^b)*cos(a-b)`

(C) `(a**b)cos(a-b)`

(D) ★

`(a**b)*cos(a-b)`

(E) `(b^a)cos(a-b)`

---

**Solution.**

---

30. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Boolean
- (B) Integer
- (C) None
- (D) String
- (E) Float

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. B

93. D

94. B

95. D

96. C



1. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Float
- (B) Boolean
- (C) Integer
- (D) String
- (E) None

---

**Solution.**

---

2. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 10

(C) ★

11

(D) 13

(E) 12

---

**Solution.**

---

3. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ★

['Merlin', 'King Pellinore', 'Sir Agravaine']

(B) ['King Pellinore', 'Sir Agravaine', 'Merlin']

(C) ['Sir Agravaine', 'King Pellinore']

(D) [ ]

(E) ['King Pellinore', 'Sir Agravaine']

---

**Solution.**

---

4. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 8, 1, 6
- (B) 2, 3, 4, 1, 6
- (C) ★ 2, 3, 8, 5, 6
- (D) 2, 7, 4, 5, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---

5. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) 12

(C) 14

(D) ★

15

(E) 11

---

**Solution.**

---

6. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "3"

(C) 111

(D) 3

(E) ★

"111"

---

**Solution.**

---

7. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) None of the above.

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) `[3.0, 6.0, 9.0]`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) `[3, 6, 9]`

---

**Solution.**

---

8. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, 6]

(B) [1, 2, 3]

(C) [3, 2, 1]

(D) ★

[3, 2, 1, '321']

(E) [1, 2, 3, '321']

---

**Solution.**

---



9. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 3

(C) 1

(D) 4

(E) ★

2

---

**Solution.**

---

10. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) Float
  - (B) None
  - (C) String
  - (D) Boolean
  - (E) ★
- Integer

---

**Solution.**

---

11. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 5, 6, 7, 7, 8]

(B) [2, 4, 5, 5, 7, 7]

(C) ★

[3, 5, 6, 7, 7]

(D) [3, 5, 7, 7]

(E) [2, 4, 5, 6, 7, 7]

---

**Solution.**

---

12. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) "ICCOI"
- (B) None of the other answers are correct.
- (C) "ACCIA"
- (D) "ACCOA"
- (E) ★

"OCCIO"

---

**Solution.**

---

13. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+i`

(B) ★

`sum=sum+i+1`

(C) `sum+1=sum`

(D) `sum=sum+1`

---

**Solution.**

---

14. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 14

(C) ★

4

(D) 30

(E) 5

---

**Solution.**

---

15. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) String

(C) None

(D) ★

Boolean

(E) Float

---

**Solution.**

---

16. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(n // m) == 0`

(C) `(n % m) == 0`

(D) `(m // n) != 0`

---

**Solution.**

---



17. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) `s[i:i-1]`

(B) `s[i:i+1]`

(C) ★

`s[i:i+2]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

18. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

3

(B) -1

(C) 2

(D) 4

(E) 5

---

**Solution.**

---

19. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) 4
- (C) 5
- (D) ★ 3

---

**Solution.**

---

20. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,1,2,1,2]`

(B) `[1,2,"3"]`

(C) `[1,2,3]`

(D) ★

`[1,2,1]`

---

**Solution.**

---

21. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) ★

`a*sin(a**b - b)`

(B) `a sin(a**b - b)`

(C) `a*sin(b^a - b)`

(D) `a*sin(a^b - b)`

(E) None of the other answers are correct.

---

**Solution.**

---

22. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1>s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['eleven', 'one', 'twelve', 'two']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['twelve', 'eleven', 'two', 'one']

---

**Solution.**

---

23. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 5
- (B) 2
- (C) ★ None of the other answers are correct.
- (D) 3

---

**Solution.**

---

24. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) ★

"MERLIN2"

(B) "MERLIN%i"

(C) "MERLINMERLIN"

(D) 0

(E) None

---

**Solution.**

---



25. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) 7

(C) ★

3

(D) 1

(E) 9

---

**Solution.**

---

26. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) ★
- None
- (E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

27. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) 3

(C) ★

4

(D) 5

(E) 7

---

**Solution.**

---

28. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%2)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["\*", "-", "\*", "\*"]

(B) ★

["-", "\*", "-", "-"]

(C) ["-", "-", "\*"]

(D) None of the other answers are correct.

(E) ["-", "\*", "-"]

---

**Solution.**

---

29. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) 'RAI'

(B) ★

['R','A']

(C) None

(D) 3

(E) False

---

**Solution.**

---

30. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

- (A) 0
- (B) 16
- (C) 3
- (D) 8
- (E) ★

12

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. C

93. D

94. B

95. E

96. D

1. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 5
- (B) ★ 3
- (C) 1
- (D) 4

---

**Solution.**

---



2. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

(A) ★

3

(B) None of the other answers are correct.

(C) 7

(D) 4

(E) 5

---

**Solution.**

---

3. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

- (A) 3
  - (B) "3"
  - (C) None of the other answers are correct.
  - (D) 111
  - (E) ★
- "111"

---

**Solution.**

---

4. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) ★

11

(C) 13

(D) 14

(E) 12

---

**Solution.**

---

5. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 1

(C) 4

(D) 3

(E) ★

2

---

**Solution.**

---

6. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 5
- (B) 3
- (C) 2
- (D) ★ None of the other answers are correct.

---

**Solution.**

---

7. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1>s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['twelve', 'eleven', 'two', 'one']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) String
- (C) Boolean
- (D) ★
- Float
- (E) Integer

---

**Solution.**

---

9. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 12

(C) 14

(D) 11

(E) 13

---

**Solution.**

---



10. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ★  
[ 'R', 'A' ]
- (B) False
- (C) None
- (D) 3
- (E) 'RAI'

---

**Solution.**

---

11. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) ★

`a*sin(a**b - b)`

(B) `a*sin(a^b - b)`

(C) None of the other answers are correct.

(D) `a sin(a**b - b)`

(E) `a*sin(b^a - b)`

---

**Solution.**

---

12. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) None

(B) 0

(C) "MERLIN%i"

(D) ★

"MERLIN2"

(E) "MERLINMERLIN"

---

**Solution.**

---

13. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) String
- (C) None
- (D) ★  
Integer
- (E) Boolean

---

**Solution.**

---

14. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i+1:i+2]`

(B) `s[i:i+1]`

(C) ★

`s[i:i+2]`

(D) `s[i:i-1]`

---

**Solution.**

---

15. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) -1

(B) 5

(C) 2

(D) ★

3

(E) 4

---

**Solution.**

---

16. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]  
a.sort()  
a[0]=a[-1]  
x=""  
for e in a:  
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) "ACCOA"
- (B) "ACCIA"
- (C) "ICCOI"
- (D) None of the other answers are correct.
- (E) ★

"OCCIO"

---

**Solution.**

---

17. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,"3"]`

(B) `[1,2,1,2,1,2]`

(C) `[1,2,3]`

(D) ★

`[1,2,1]`

---

**Solution.**

---



18. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (B) ['Sir Agravaine', 'King Pellinore']
- (C) ['King Pellinore', 'Sir Agravaine']
- (D) ★

['Merlin', 'King Pellinore', 'Sir Agravaine']

- (E) [ ]

---

**Solution.**

---

19. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '1234']

(B) ★

[1, 2, 3, 4, '1234']

(C) [1, 2, 3]

(D) [1, 2, 3, 10]

(E) [1, 2, 3, '123']

---

**Solution.**

---

20. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) ★

`(m % n) != 0`

(B) `(n // m) == 0`

(C) `(n % m) == 0`

(D) `(m // n) != 0`

---

**Solution.**

---

21. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) ★

16

(B) 7

(C) 0

(D) 12

(E) 8

---

**Solution.**

---

22. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) 2, 3, 8, 1, 6
- (C) ★ 2, 3, 8, 5, 6
- (D) 2, 7, 4, 5, 6
- (E) 3, 2, 8, 5, 9

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (B) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (E) None

---

**Solution.**

---

24. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) ★

14

(B) 30

(C) 3

(D) 5

(E) 4

---

**Solution.**

---

25. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%2)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["\*", "-", "\*", "\*"]

(B) ["-", "\*", "-"]

(C) ★

["-", "\*", "-", "-"]

(D) None of the other answers are correct.

(E) ["-", "-", "\*"]

---

**Solution.**

---



26. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) 7
- (B) None of the other answers are correct.
- (C) 9
- (D) ★
- 3
- (E) 1

---

**Solution.**

---

27. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) `[3, 6, 9]`

(D) `(3, 6, 9)`

(E) `[3.0, 6.0, 9.0]`

---

**Solution.**

---

28. (1 point) Consider the following program:

```
x=[2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [2, 4, 6, 6]

(B) ★

[4, 6, 7, 8]

(C) [3, 4, 6, 7, 8]

(D) [4, 6, 7, 7]

(E) [4, 6, 7]

---

**Solution.**

---

29. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
    for i in range(1,101)
```

(B) while i<=100

(C) for i in range(0,100)

(D) while i in range(100)

---

**Solution.**

---

30. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Boolean
- (B) None
- (C) String
- (D) Float
- (E) Integer

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. D

93. D

94. B

95. A

96. E

1. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `while i<=100`

(B) `while i in range(100)`

(C) ★

`for i in range(1,101)`

(D) `for i in range(0,100)`

---

**Solution.**

---

2. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) `(n % m) == 0`

(C) ★

`(m % n) != 0`

(D) `(m // n) != 0`

---

**Solution.**

---



3. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) ★

`a*sin(a**b - b)`

(B) `a sin(a**b - b)`

(C) `a*sin(a^b - b)`

(D) None of the other answers are correct.

(E) `a*sin(b^a - b)`

---

**Solution.**

---

4. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

12

(B) 13

(C) 11

(D) 14

(E) 10

---

**Solution.**

---

5. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(B) `[3, 6, 9]`

(C) `None of the above.`

(D) `[3.0, 6.0, 9.0]`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

6. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) ★

10

(B) 14

(C) 11

(D) 13

(E) 12

---

**Solution.**

---

7. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) ★

4

(B) 30

(C) 14

(D) 5

(E) 3

---

**Solution.**

---

8. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [3, 5, 6, 6]
- (B) [2, 4, 5, 6, 6, 7]
- (C) [2, 4, 5, 5, 6, 7]
- (D) ★

[3, 5, 6, 6, 7]

- (E) [3, 5, 6, 6, 7, 8]

---

**Solution.**

---

9. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) ★

"OCCIO"

(B) None of the other answers are correct.

(C) "ACCIA"

(D) "ACCOA"

(E) "ICCOI"

---

**Solution.**

---

10. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 1
- (B) ★ 3
- (C) 2
- (D) 4

---

**Solution.**

---



11. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Float
- (C) Boolean
- (D) None
- (E) Integer

---

**Solution.**

---

12. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['twelve', 'eleven', 'two', 'one']
- (B) ['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['one', 'two', 'eleven', 'twelve']
- (D) ★  
['eleven', 'one', 'twelve', 'two']
- (E) ['two', 'twelve', 'one', 'eleven', 'six']

---

**Solution.**

---

13. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) ★

2

(C) 3

(D) 4

(E) 1

---

**Solution.**

---

14. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

- (A) ★  
Float
- (B) Integer
- (C) String
- (D) None
- (E) Boolean

---

**Solution.**

---

15. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 2

(B) ★

3

(C) 5

(D) 4

(E) -1

---

**Solution.**

---

16. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

(A) 9

(B) 1

(C) ★

3

(D) None of the other answers are correct.

(E) 7

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3]

(B) ★

[1, 2, 3, 4, '1234']

(C) [1, 2, 3, 10]

(D) [1, 2, 3, '1234']

(E) [1, 2, 3, '123']

---

**Solution.**

---

18. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 5
- (B) 2
- (C) 3
- (D) ★ None of the other answers are correct.

---

**Solution.**

---



19. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) 7

(C) 3

(D) ★

4

(E) 5

---

**Solution.**

---

20. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

- (A) 3
- (B) 'RAI'
- (C) None
- (D) False
- (E) ★

`['R', 'A']`

---

**Solution.**

---

21. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

["-", "\*", "-", "\*"]

(B) ["\*", "-", "\*"]

(C) ["-", "\*"]

(D) ["\*", "-", "\*"]

(E) None of the other answers are correct.

---

**Solution.**

---

22. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

- (A) 8
- (B) 7
- (C) 12
- (D) 0
- (E) ★

16

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (B) ★  
['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) None
- (E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

24. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) ★

"1.21.2"

(B) None of the other answers are correct.

(C) 2.4

(D) "2.4"

(E) "1.2\*2"

---

**Solution.**

---

25. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,3]`

(B) ★

`[1,2]`

(C) `[1,2,1,2,1,2]`

(D) `[1,2,1]`

---

**Solution.**

---

26. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) `s[i:i-1]`

(B) ★

`s[i:i+2]`

(C) `s[i:i+1]`

(D) `s[i+1:i+2]`

---

**Solution.**

---



27. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) Float
  - (B) None
  - (C) Boolean
  - (D) Integer
  - (E) ★
- String

---

**Solution.**

---

28. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) None

(B) "MERLIN"

(C) "MERLIN2"

(D) ★

"MERLINMERLIN"

(E) 12

---

**Solution.**

---

29. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) 3, 2, 8, 5, 9
- (C) 2, 3, 8, 1, 6
- (D) 2, 7, 4, 5, 6
- (E) ★ 2, 3, 8, 5, 6

---

**Solution.**

---

30. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ★

['Merlin', 'King Pellinore', 'Sir Agravaine']

(B) [ ]

(C) ['King Pellinore', 'Sir Agravaine', 'Merlin']

(D) ['King Pellinore', 'Sir Agravaine']

(E) ['Sir Agravaine', 'King Pellinore']

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
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- There are 30 questions, worth 1 point each.
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- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. E

93. D

94. B

95. B

96. A

1. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Integer
- (C) ★  
Boolean
- (D) String
- (E) Float

---

**Solution.**

---

2. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) ★

2

(B) 4

(C) 3

(D) 0

(E) 1

---

**Solution.**

---

3. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 5, 6, 6, 7, 8]

(B) [2, 4, 5, 6, 6, 7]

(C) ★

[3, 5, 6, 6, 7]

(D) [3, 5, 6, 6]

(E) [2, 4, 5, 5, 6, 7]

---

**Solution.**

---



4. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,3]`

(B) ★

`[1,2]`

(C) `[1,2,1]`

(D) `[1,2,1,2,1,2]`

---

**Solution.**

---

5. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) `(m // n) != 0`

(C) `(n % m) == 0`

(D) ★

`(m % n) != 0`

---

**Solution.**

---

6. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 4
- (B) 2
- (C) ★ 3
- (D) 1

---

**Solution.**

---

7. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a sin(a**b - b)`

(B) `a*sin(a^b - b)`

(C) `a*sin(b^a - b)`

(D) None of the other answers are correct.

(E) ★

`a*sin(a**b - b)`

---

**Solution.**

---

8. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) None

(B) False

(C) ★

['0', 'R']

(D) ''

(E) 'ORS'

---

**Solution.**

---

9. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

["-", "\*", "-", "\*"]

(B) ["-", "\*"]

(C) ["\*", "-", "\*"]

(D) None of the other answers are correct.

(E) ["\*", "-", "\*"]

---

**Solution.**

---

10. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) 12

(B) ★

"MERLINMERLIN"

(C) None

(D) "MERLIN"

(E) "MERLIN2"

---

**Solution.**

---

11. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 12

(B) ★

15

(C) 11

(D) 13

(E) 14

---

**Solution.**

---



12. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i+1:i+2]`

(B) `s[i:i-1]`

(C) ★

`s[i:i+2]`

(D) `s[i:i+1]`

---

**Solution.**

---

13. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) String
- (C) ★  
Integer
- (D) Boolean
- (E) None

---

**Solution.**

---

14. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Boolean
- (C) Integer
- (D) None
- (E) Float

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

12

(B) 10

(C) 13

(D) 14

(E) 11

---

**Solution.**

---

16. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

- (A) "333"
- (B) None of the other answers are correct.
- (C) "33"
- (D) 33
- (E) ★

```
"3str(3)"
```

---

**Solution.**

---

17. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) ★

12

(C) 8

(D) 16

(E) 3

---

**Solution.**

---

18. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (B) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (C) [ ]
- (D) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (E) ★  
['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

19. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

- (A) 5
- (B) 3
- (C) 30
- (D) 14
- (E) ★

4

---

**Solution.**

---



20. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 2
- (B) 3
- (C) ★ None of the other answers are correct.
- (D) 5

---

**Solution.**

---

21. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of **x** after this program is executed?

- (A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (B) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (D) None
- (E) ★

['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

---

**Solution.**

---

22. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+1`

(B) `sum+1=sum`

(C) `sum=sum+i`

(D) ★

```
sum=sum+i+1
```

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

(A) 7

(B) ★

3

(C) 1

(D) 9

(E) None of the other answers are correct.

---

**Solution.**

---

24. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) 5
  - (B) 3
  - (C) None of the other answers are correct.
  - (D) 7
  - (E) ★
- 4

---

**Solution.**

---

25. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `[3, 6, 9]`

(B) `[3.0, 6.0, 9.0]`

(C) `(3, 6, 9)`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

26. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 8, 1, 6
- (B) 3, 2, 8, 5, 9
- (C) ★ 2, 3, 8, 5, 6
- (D) 2, 7, 4, 5, 6
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

27. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of **x** after this program is executed?

- (A) "STUP"
- (B) None of the other answers are correct.
- (C) "PUST"
- (D) ★
- (E) "PSTU"

---

**Solution.**

---



28. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

- (A) [1, 2, 3, 10]
- (B) [1, 2, 3, '123']
- (C) [1, 2, 3]
- (D) [1, 2, 3, '1234']
- (E) ★  
[1, 2, 3, 4, '1234']

---

**Solution.**

---

29. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) -1

(B) 4

(C) 5

(D) 2

(E) ★

3

---

**Solution.**

---

30. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1==s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ★
- ['twelve', 'eleven', 'two', 'one']
- (B) ['two', 'twelve', 'one', 'eleven', 'six']
- (C) ['one', 'two', 'eleven', 'twelve']
- (D) ['eleven', 'one', 'twelve', 'two']
- (E) ['one', 'two', 'eleven', 'twelve', 'six']

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. A

93. E

94. B

95. D

96. D

1. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) ★ None of the other answers are correct.
- (B) 2
- (C) 3
- (D) 5

---

**Solution.**

---

2. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) [ ]

(B) ['King Pellinore', 'Sir Agravaine']

(C) ★

['Merlin', 'King Pellinore', 'Sir Agravaine']

(D) ['Sir Agravaine', 'King Pellinore']

(E) ['King Pellinore', 'Sir Agravaine', 'Merlin']

---

**Solution.**

---

3. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

(A) `s[i:i+1]`

(B) `s[i:i-1]`

(C) ★

`s[i:i+2]`

(D) `s[i+1:i+2]`

---

**Solution.**

---

4. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 10

(C) 12

(D) 13

(E) ★

11

---

**Solution.**

---



5. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [2, 4, 5, 5, 6, 7]
- (B) [3, 5, 6, 6, 7, 8]
- (C) [3, 5, 6, 6]
- (D) [2, 4, 5, 6, 6, 7]
- (E) ★

[3, 5, 6, 6, 7]

---

**Solution.**

---

6. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,1]`

(B) ★

`[1,2]`

(C) `[1,2,1,2,1,2]`

(D) `[1,2,3]`

---

**Solution.**

---

7. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1>s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ['twelve', 'eleven', 'two', 'one']
- (D) ['two', 'twelve', 'one', 'eleven', 'six']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

8. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 12

(B) 13

(C) 11

(D) ★

10

(E) 14

---

**Solution.**

---

9. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) None

(C) ★

Float

(D) Boolean

(E) String

---

**Solution.**

---

10. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) ★

`(a**b)*cos(a-b)`

(B) `(a^b)*cos(a-b)`

(C) None of the other answers are correct.

(D) `(a**b)cos(a-b)`

(E) `(b^a)cos(a-b)`

---

**Solution.**

---

11. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) 5

(B) ★

4

(C) 3

(D) 7

(E) None of the other answers are correct.

---

**Solution.**

---

12. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 3, 2, 8, 5, 9
- (B) ★ 2, 3, 8, 5, 6
- (C) 2, 3, 4, 1, 6
- (D) 2, 3, 8, 1, 6
- (E) 2, 7, 4, 5, 6

---

**Solution.**

---



13. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) ★

"OCCIO"

(C) "ACCOA"

(D) "ICCOI"

(E) "ACCIA"

---

**Solution.**

---

14. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) 'ORS'

(B) ''

(C) False

(D) None

(E) ★

['0', 'R']

---

**Solution.**

---

15. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

(A) ★

3

(B) 9

(C) None of the other answers are correct.

(D) 1

(E) 7

---

**Solution.**

---

16. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) ★

"111"

(B) None of the other answers are correct.

(C) "3"

(D) 111

(E) 3

---

**Solution.**

---

17. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(B) `[3, 6, 9]`

(C) `[3.0, 6.0, 9.0]`

(D) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(E) None of the above.

---

**Solution.**

---

18. (1 point) Consider the following program.

```
x=[]  
for j in range(0,5):  
    if (j%3)==0:  
        x.append("-")  
    if (j%4)==0:  
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["\*", "-", "\*"]

(B) ★

["-", "\*", "-", "\*"]

(C) ["-", "\*"]

(D) ["\*", "-", "\*"]

(E) None of the other answers are correct.

---

**Solution.**

---

19. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) 30

(C) 4

(D) ★

14

(E) 3

---

**Solution.**

---

20. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 1
- (B) 5
- (C) ★ 3
- (D) 4

---

**Solution.**

---



21. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

- (A) `(n % m) == 0`
- (B) `(n // m) == 0`
- (C) `(m // n) != 0`
- (D) ★  
`(m % n) != 0`

---

**Solution.**

---

22. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Integer
- (C) String
- (D) ★  
Boolean
- (E) Float

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '123']

(B) [1, 2, 3, 10]

(C) ★

[1, 2, 3, 4, '1234']

(D) [1, 2, 3]

(E) [1, 2, 3, '1234']

---

**Solution.**

---

24. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) -1

(B) ★

3

(C) 4

(D) 2

(E) 5

---

**Solution.**

---

25. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 12

(B) 8

(C) 0

(D) 7

(E) ★

16

---

**Solution.**

---

26. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 0

(C) 4

(D) ★

2

(E) 1

---

**Solution.**

---

27. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")  
y=x  
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(C) None

(D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

(E) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

---

**Solution.**

---

28. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) 0

(B) ★

"MERLIN2"

(C) None

(D) "MERLINMERLIN"

(E) "MERLIN%i"

---

**Solution.**

---



29. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `while i in range(100)`

(B) `for i in range(0,100)`

(C) ★

`for i in range(1,101)`

(D) `while i<=100`

---

**Solution.**

---

30. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Float
- (C) Boolean
- (D) ★  
String
- (E) Integer

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. B

93. E

94. B

95. E

96. E

1. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[3, 6, 9]`

(B) `None of the above.`

(C) `[3.0, 6.0, 9.0]`

(D) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(E) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

---

**Solution.**

---

2. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) 3

(B) ★

4

(C) None of the other answers are correct.

(D) 7

(E) 5

---

**Solution.**

---

3. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

(A) ★ 3

(B) 2

(C) 1

(D) 4

---

**Solution.**

---

4. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1>s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['twelve', 'eleven', 'two', 'one']
- (B) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['one', 'two', 'eleven', 'twelve']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

5. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

(A) ★

`s[i:i+2]`

(B) `s[i:i+1]`

(C) `s[i+1:i+2]`

(D) `s[i:i-1]`

---

**Solution.**

---



6. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

- (A) None
- (B) Boolean
- (C) Float
- (D) ★  
Integer
- (E) String

---

**Solution.**

---

7. (1 point) Consider the following program:

```
s="Hobbes"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 4

(B) ★

3

(C) -1

(D) 2

(E) 5

---

**Solution.**

---

8. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 14

(B) 11

(C) 13

(D) ★

10

(E) 12

---

**Solution.**

---

9. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) ★

[1,2]

(B) [1,2,1,2,1,2]

(C) [1,2,3]

(D) [1,2,1]

---

**Solution.**

---

10. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) [3, 5, 7, 7]

(B) ★

[3, 5, 6, 7, 7]

(C) [2, 4, 5, 6, 7, 7]

(D) [2, 4, 5, 5, 7, 7]

(E) [3, 5, 6, 7, 7, 8]

---

**Solution.**

---

11. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) None

(B) ★

"MERLIN2"

(C) "MERLIN%i"

(D) 0

(E) "MERLINMERLIN"

---

**Solution.**

---

12. (1 point) Consider the following incomplete program.

```
sum=0
???:
    sum=sum+i
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
    for i in range(1,101)
```

(B) `for i in range(0,100)`

(C) `while i<=100`

(D) `while i in range(100)`

---

**Solution.**

---

13. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

- (A) `(n % m) == 0`
- (B) `(m // n) != 0`
- (C) ★  
`(m % n) != 0`
- (D) `(n // m) == 0`

---

**Solution.**

---



14. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

- (A) ["\*", "-", "\*"]
- (B) ["\*", "-", "\*"]
- (C) None of the other answers are correct.
- (D) ["-", "\*"]
- (E) ★

["-", "\*", "-", "\*"]

---

**Solution.**

---

15. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) None
  - (B) Boolean
  - (C) Float
  - (D) Integer
  - (E) ★
- String

---

**Solution.**

---

16. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

- (A) 3
- (B) 16
- (C) 8
- (D) 0
- (E) ★

12

---

**Solution.**

---

17. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) ★

`a*sin(a**b - b)`

(B) `a sin(a**b - b)`

(C) `a*sin(b^a - b)`

(D) `a*sin(a^b - b)`

(E) None of the other answers are correct.

---

**Solution.**

---

18. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(1,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (B) [ ]
- (C) ★  
['King Pellinore', 'Sir Agravaine']
- (D) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (E) ['Sir Agravaine', 'King Pellinore']

---

**Solution.**

---

19. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) 'ORS'

(B) ★

['0', 'R']

(C) None

(D) ''

(E) False

---

**Solution.**

---

20. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=(float(e)**float(pi)-float(pi)) == 20
```

What is the **type** of **x** after this program is executed?

- (A) String
- (B) ★  
Boolean
- (C) Float
- (D) None
- (E) Integer

---

**Solution.**

---

21. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 3
- (B) 2
- (C) 5
- (D) ★ None of the other answers are correct.

---

**Solution.**

---



22. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 8, 1, 6
- (B) ★ 2, 3, 8, 5, 6
- (C) 2, 3, 4, 1, 6
- (D) 3, 2, 8, 5, 9
- (E) 2, 7, 4, 5, 6

---

**Solution.**

---

23. (1 point) Consider the following program:

```
x=0
for i in range(2,8):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 10

(B) 14

(C) ★

12

(D) 13

(E) 11

---

**Solution.**

---

24. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) ★

14

(C) 5

(D) 30

(E) 3

---

**Solution.**

---

25. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) ★

"1.21.2"

(B) "2.4"

(C) None of the other answers are correct.

(D) 2.4

(E) "1.2\*2"

---

**Solution.**

---

26. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) "ICCOI"
- (B) None of the other answers are correct.
- (C) ★  
"OCCIO"
- (D) "ACCOA"
- (E) "ACCIA"

---

**Solution.**

---

27. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '123']

(B) ★

[1, 2, 3, 4, '1234']

(C) [1, 2, 3, 10]

(D) [1, 2, 3, '1234']

(E) [1, 2, 3]

---

**Solution.**

---

28. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 4

(B) 0

(C) 1

(D) 2

(E) ★

3

---

**Solution.**

---

29. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(D) None

(E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---



30. (1 point) Consider the following program:

```
x=3
a=7
if (a%3)==2:
    x=x**2
elif(a%3)==1:
    x=x**1
else:
    x=x**0
```

What is the **value** of **x** after this program is executed?

- (A) ★  
3
- (B) 7
- (C) 9
- (D) 1
- (E) None of the other answers are correct.

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. C

93. E

94. B

95. A

96. A

1. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) ★

[3, 2, 1, '321']

(B) [3, 2, 1]

(C) [1, 2, 3]

(D) [1, 2, 3, '321']

(E) [1, 2, 3, 6]

---

**Solution.**

---

2. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 3

(B) 4

(C) 0

(D) 1

(E) ★

2

---

**Solution.**

---

3. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Boolean
- (C) Float
- (D) Integer
- (E) None

---

**Solution.**

---

4. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Boolean
- (C) None
- (D) Float
- (E) Integer

---

**Solution.**

---

5. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of **x** after this program is executed?

- (A) 33
- (B) None of the other answers are correct.
- (C) "333"
- (D) "33"
- (E) ★

```
"3str(3)"
```

---

**Solution.**

---

6. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1>s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve']
- (B) ['two', 'twelve', 'one', 'eleven', 'six']
- (C) ★  
['one', 'two', 'eleven', 'twelve', 'six']
- (D) ['twelve', 'eleven', 'two', 'one']
- (E) ['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---



7. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `cos` have already been defined.

$$a^b \cos(a - b)$$

(A) `(b^a)cos(a-b)`

(B) ★

`(a**b)*cos(a-b)`

(C) None of the other answers are correct.

(D) `(a**b)cos(a-b)`

(E) `(a^b)*cos(a-b)`

---

**Solution.**

---

8. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) 3

(C) ★

14

(D) 30

(E) 4

---

**Solution.**

---

9. (1 point) Consider the following incomplete Python program.

```
s="".join(["0","1","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 34?

(A) `s[i:i-1]`

(B) ★

`s[i:i+2]`

(C) `s[i+1:i+2]`

(D) `s[i:i+1]`

---

**Solution.**

---

10. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i <= 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [3, 5, 7, 7]
- (B) [3, 5, 6, 7, 7, 8]
- (C) [2, 4, 5, 6, 7, 7]
- (D) ★

[3, 5, 6, 7, 7]

- (E) [2, 4, 5, 5, 7, 7]

---

**Solution.**

---

11. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) ['King Pellinore', 'Sir Agravaine', 'Merlin']

(B) ['Merlin', 'King Pellinore', 'Sir Agravaine']

(C) [ ]

(D) ★

['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']

(E) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']

---

**Solution.**

---

12. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=(len(s)/(len(t)-1))+1
```

What is the **type** of **x** after this program is executed?

(A) Integer

(B) ★

Float

(C) String

(D) None

(E) Boolean

---

**Solution.**

---

13. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) 16

(B) 0

(C) 3

(D) 8

(E) ★

12

---

**Solution.**

---

14. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 0

(B) 5

(C) ★

-1

(D) 3

(E) 6

---

**Solution.**

---



15. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

- (A) 5
- (B) ★ 3
- (C) 4
- (D) 1

---

**Solution.**

---

16. (1 point) Consider the following incomplete function.

```
def isdivisible(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is evenly divisible by the parameter n and False otherwise. For example, `isdivisible(4,2)` should return `True`, but `isdivisible(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(n // m) == 0`

(B) `(m // n) != 0`

(C) `(n % m) == 0`

(D) ★

`(m % n) != 0`

---

**Solution.**

---

17. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

11

(B) 14

(C) 12

(D) 10

(E) 13

---

**Solution.**

---

18. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3.0`

(A) `[3, 6, 9]`

(B) `None of the above.`

(C) `[3.0, 6.0, 9.0]`

(D) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(E) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

---

**Solution.**

---

19. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

(A) False

(B) ★

['0', 'R']

(C) ''

(D) 'ORS'

(E) None

---

**Solution.**

---

20. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%3)==0:
        x.append("-")
    if (j%4)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ★

["-", "\*", "-", "\*"]

(B) None of the other answers are correct.

(C) ["\*", "-", "\*"]

(D) ["-", "\*"]

(E) ["\*", "-", "\*"]

---

**Solution.**

---

21. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

- (A) 13
- (B) 11
- (C) 12
- (D) 14
- (E) ★

10

---

**Solution.**

---

22. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) 0
- (B) None
- (C) "MERLINMERLIN"
- (D) "MERLIN%i"
- (E) ★

"MERLIN2"

---

**Solution.**

---



23. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")  
y=x  
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) None

(B) ★

['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

(E) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

---

**Solution.**

---

24. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 7, 4, 5, 6
- (B) 2, 3, 8, 1, 6
- (C) 3, 2, 8, 5, 9
- (D) ★ 2, 3, 8, 5, 6
- (E) 2, 3, 4, 1, 6

---

**Solution.**

---

25. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) 9
- (B) 3
- (C) None of the other answers are correct.
- (D) ★

27

- (E) 1

---

**Solution.**

---

26. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of **wart**?

- (A) 2
- (B) 5
- (C) ★ None of the other answers are correct.
- (D) 3

---

**Solution.**

---

27. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

(A) None of the other answers are correct.

(B) ★

4

(C) 3

(D) 7

(E) 5

---

**Solution.**

---

28. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+i`

(B) `sum=sum+1`

(C) ★

`sum=sum+i+1`

(D) `sum+1=sum`

---

**Solution.**

---

29. (1 point) Evaluate the following expression:

`[1,2]+[len("3")]`

What value is produced?

(A) `[1,2,"3"]`

(B) `[1,2,1,2,1,2]`

(C) ★

`[1,2,1]`

(D) `[1,2,3]`

---

**Solution.**

---

30. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

- (A) "ACCOA"
- (B) None of the other answers are correct.
- (C) "ACCIA"
- (D) "ICCOI"
- (E) ★

"OCCIO"

---

**Solution.**

---





- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. D

93. E

94. B

95. B

96. B

1. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) 2, 3, 4, 1, 6
- (B) ★ 2, 3, 8, 5, 6
- (C) 2, 3, 8, 1, 6
- (D) 3, 2, 8, 5, 9
- (E) 2, 7, 4, 5, 6

---

**Solution.**

---

2. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

(A) ★ 3

(B) 4

(C) 5

(D) 1

---

**Solution.**

---

3. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) 1
- (B) 3
- (C) None of the other answers are correct.
- (D) 9
- (E) ★

27

---

**Solution.**

---

4. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["-", "\*"]

(B) ★

["-", "\*", "-"]

(C) None of the other answers are correct.

(D) ["-", "\*", "\*"]

(E) ["-", "-", "\*"]

---

**Solution.**

---

5. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, '321']

(B) [1, 2, 3]

(C) ★

[3, 2, 1, '321']

(D) [1, 2, 3, 6]

(E) [3, 2, 1]

---

**Solution.**

---

6. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of x after this program is executed?

- (A) ['one', 'two', 'eleven', 'twelve', 'six']
- (B) ['one', 'two', 'eleven', 'twelve']
- (C) ['two', 'twelve', 'one', 'eleven', 'six']
- (D) ['twelve', 'eleven', 'two', 'one']
- (E) ★  
['eleven', 'one', 'twelve', 'two']

---

**Solution.**

---

7. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

- (A) 12
- (B) 11
- (C) 13
- (D) 14
- (E) ★

10

---

**Solution.**

---



8. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of **x**?

(A) ★

12

(B) 16

(C) 8

(D) 3

(E) 0

---

**Solution.**

---

9. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) 11

(B) ★

12

(C) 13

(D) 14

(E) 10

---

**Solution.**

---

10. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

(A) [3, 6, 9]

(B) [3.0, 6.0, 9.0]

(C) ★

[1, 2, 3, 1, 2, 3, 1, 2, 3]

(D) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]

(E) (3, 6, 9)

---

**Solution.**

---

11. (1 point) Consider the following program:

```
s="G+R+A+I+L"  
x=s.split("+")[1:-2]
```

What is the **value** of **x** after this program is executed?

(A) False

(B) None

(C) 'RAI'

(D) 3

(E) ★

['R', 'A']

---

**Solution.**

---

12. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) ★

`(m % n) != 0`

(C) `(n % m) == 0`

(D) `(n // m) == 0`

---

**Solution.**

---

13. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")  
y=x  
x=y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

(B) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(C) ★

None

(D) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(E) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

---

**Solution.**

---

14. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+i`

(B) `sum=sum+1`

(C) ★

`sum=sum+i+1`

(D) `sum+1=sum`

---

**Solution.**

---

15. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

- (A) Float
  - (B) String
  - (C) None
  - (D) Boolean
  - (E) ★
- Integer

---

**Solution.**

---



16. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(0,4):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
- (B) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (C) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (D) ★

['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']

- (E) [ ]

---

**Solution.**

---

17. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=len(s) % len(t[2:-1])
```

What is the **type** of **x** after this program is executed?

- (A) String
- (B) Float
- (C) ★  
Integer
- (D) None
- (E) Boolean

---

**Solution.**

---

18. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

-1

(B) 5

(C) 0

(D) 6

(E) 3

---

**Solution.**

---

19. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) "ACCOA"

(B) ★

"OCCIO"

(C) "ICCOI"

(D) "ACCIA"

(E) None of the other answers are correct.

---

**Solution.**

---

20. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

- (A) 5
- (B) None of the other answers are correct.
- (C) ★  
3
- (D) 4
- (E) 7

---

**Solution.**

---

21. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

- (A) `a sin(a**b - b)`
- (B) None of the other answers are correct.
- (C) `a*sin(a^b - b)`
- (D) `a*sin(b^a - b)`
- (E) ★

`a*sin(a**b - b)`

---

**Solution.**

---

22. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) ★

[1,2]

(B) [1,2,1]

(C) [1,2,3]

(D) [1,2,1,2,1,2]

---

**Solution.**

---

23. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) ★ None of the other answers are correct.
- (B) 5
- (C) 2
- (D) 3

---

**Solution.**

---



24. (1 point) Consider the following program.

```
x=0
i=1
while(i*i)<=9:
    x=x+(i*i)
    i=i+1
```

After it is run, what is the final **value** of **x**?

(A) 5

(B) ★

14

(C) 3

(D) 4

(E) 30

---

**Solution.**

---

25. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) `s[i+1:i+2]`

(B) ★

`s[i:i+2]`

(C) `s[i:i-1]`

(D) `s[i:i+1]`

---

**Solution.**

---

26. (1 point) Consider the following program:

```
x=str(1.2)*2
```

What is the **value** of **x** after this program is executed?

(A) "1.2\*2"

(B) "2.4"

(C) ★

"1.21.2"

(D) 2.4

(E) None of the other answers are correct.

---

**Solution.**

---

27. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

[3, 5, 6, 6, 7]

(B) [3, 5, 6, 6]

(C) [3, 5, 6, 6, 7, 8]

(D) [2, 4, 5, 5, 6, 7]

(E) [2, 4, 5, 6, 6, 7]

---

**Solution.**

---

28. (1 point) Consider the following program.

```
def artificing(s):  
    return s+"%i" % 2  
    return s*2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) 0

(B) ★

"MERLIN2"

(C) None

(D) "MERLINMERLIN"

(E) "MERLIN%i"

---

**Solution.**

---

29. (1 point) Consider the following program.

```
s="ABCBA"  
x=0  
y=len(s)-1  
while s[x]==s[y] and x<=y:  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) ★

3

(C) 2

(D) 1

(E) 4

---

**Solution.**

---

30. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi in pi*len(e)
```

What is the **type** of **x** after this program is executed?

- (A) None
  - (B) Integer
  - (C) Float
  - (D) String
  - (E) ★
- Boolean

---

**Solution.**

---



- Be sure to enter your NetID and the code below on your Scantron.
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- There are several different versions of this exam.

**1. Fill in your information:**

**Full Name:** \_\_\_\_\_

**UIN (Student Number):** \_\_\_\_\_

**NetID:** \_\_\_\_\_

**2. Fill in the following answers on the Scantron form:**

92. E

93. E

94. B

95. C

96. C



1. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) ★

```
sum=sum+i+1
```

(B) `sum=sum+i`

(C) `sum=sum+1`

(D) `sum+1=sum`

---

**Solution.**

---

2. (1 point) Consider the following program:

```
s="-B-0-R-S-"  
x=s.split("-")[2:-2]
```

What is the **value** of **x** after this program is executed?

- (A) ★  
    ['0', 'R']
- (B) ''
- (C) 'ORS'
- (D) None
- (E) False

---

**Solution.**

---

3. (1 point) Consider the following program:

```
pi="3.14159"  
e="2.71828"  
x=pi*len(e)+pi
```

What is the **type** of **x** after this program is executed?

- (A) Float
- (B) ★  
String
- (C) Boolean
- (D) None
- (E) Integer

---

**Solution.**

---

4. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[2]
```

After it is run, what is the final **value** of **x**?

(A) 12

(B) 8

(C) ★

16

(D) 7

(E) 0

---

**Solution.**

---

5. (1 point) What is the result of the following expression?

`[ 1, 2, 3 ] * 3`

(A) `(3, 6, 9)`

(B) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(C) `[3, 6, 9]`

(D) `[3.0, 6.0, 9.0]`

(E) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

---

**Solution.**

---

6. (1 point) Consider the following program:

```
i=2
x=3
while i < 7:
    x+=i
    i+=2
```

What is the **value** of **x** after this program is executed?

(A) 13

(B) 11

(C) 12

(D) ★

15

(E) 14

---

**Solution.**

---

7. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) `a sin(a**b - b)`

(B) None of the other answers are correct.

(C) ★

`a*sin(a**b - b)`

(D) `a*sin(b^a - b)`

(E) `a*sin(a^b - b)`

---

**Solution.**

---

8. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")  
y=x[:]  
y.reverse()
```

What is the **value** of **x** after this program is executed?

(A) ★

['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

(B) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

(C) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

(D) None

(E) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

---

**Solution.**

---



9. (1 point) Evaluate the following expression:

`[1,2]*len("3")`

What value is produced?

(A) `[1,2,3]`

(B) ★

`[1,2]`

(C) `[1,2,1]`

(D) `[1,2,1,2,1,2]`

---

**Solution.**

---

10. (1 point) Consider the following program:

```
s="ECTOR"  
t="GAWAIN"  
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of **x** after this program is executed?

- (A) String
- (B) Boolean
- (C) ★  
Integer
- (D) None
- (E) Float

---

**Solution.**

---

11. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]  
b=[ ]  
for i in range(1,3):  
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

- (A) [ ]
- (B) ['King Pellinore', 'Sir Agravaine', 'Merlin']
- (C) ★  
['King Pellinore', 'Sir Agravaine']
- (D) ['Merlin', 'King Pellinore', 'Sir Agravaine']
- (E) ['Sir Agravaine', 'King Pellinore']

---

**Solution.**

---

12. (1 point) Consider the following program:

```
x=str("1"*3)
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) "3"

(C) 111

(D) 3

(E) ★

"111"

---

**Solution.**

---

13. (1 point) Evaluate the following expression:

```
len("ABCD"[0:3])
```

What value is produced?

- (A) 2
- (B) 1
- (C) ★ 3
- (D) 4

---

**Solution.**

---

14. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.reverse()
    for i in a:
        s+=str(i)
    return s
```

```
x.append(f(x))
```

What is the **value** of **x** after this program is executed?

(A) [1, 2, 3, 6]

(B) ★

[3, 2, 1, '321']

(C) [3, 2, 1]

(D) [1, 2, 3, '321']

(E) [1, 2, 3]

---

**Solution.**

---

15. (1 point) Consider the following program.

```
s="BBCAA"  
x=0  
y=len(s)-1  
while s[x]!=s[y] and x<len(s):  
    x+=1  
    y-=1
```

After it is run, what is the final **value** of **x**?

(A) 0

(B) 1

(C) ★

2

(D) 4

(E) 3

---

**Solution.**

---

16. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of **x** after this program is executed?

- (A) 1
- (B) 9
- (C) 3
- (D) None of the other answers are correct.
- (E) ★

27

---

**Solution.**

---



17. (1 point) Consider the following program.

```
def artificing(s):  
    return s*2  
    return s+"%i" % 2  
    return s
```

```
s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

- (A) 12
- (B) "MERLIN"
- (C) "MERLIN2"
- (D) ★

"MERLINMERLIN"

- (E) None

---

**Solution.**

---

18. (1 point) Consider the following program:

```
x=0
for i in range(2,7):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of **x** after this program is executed?

(A) ★

11

(B) 12

(C) 14

(D) 10

(E) 13

---

**Solution.**

---

19. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):  
    if ???:  
        return False  
    else:  
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return True, but `ismultiple(5,3)` should return False. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n % m) == 0`

(C) `(n // m) == 0`

(D) ★

`(m % n) != 0`

---

**Solution.**

---

20. (1 point) Consider the following program:

```
a=["A","C","C","I","O"]
a.sort()
a[0]=a[-1]
x=""
for e in a:
    x=x+e
```

What is the **value** of **x** after this program is executed?

(A) None of the other answers are correct.

(B) ★

"OCCIO"

(C) "ACCIA"

(D) "ACCOA"

(E) "ICCOI"

---

**Solution.**

---

21. (1 point) Consider the following incomplete Python program.

```
s="".join(["1","0","2","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 33?

(A) ★

`s[i:i+2]`

(B) `s[i:i+1]`

(C) `s[i+1:i+2]`

(D) `s[i:i-1]`

---

**Solution.**

---

22. (1 point) Consider the following program:

```
a=3
b=4
if a!=b:
    a=b
elif a==4:
    a=5
else:
    b=a
```

What is the **value** of a after this program is executed?

- (A) 7
- (B) 5
- (C) None of the other answers are correct.
- (D) ★  
4
- (E) 3

---

**Solution.**

---

23. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of **x**?

(A) 30

(B) 3

(C) 14

(D) 5

(E) ★

4

---

**Solution.**

---

24. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):  
  
    1 max_val = i  
    2 max_val = None  
    3 for i in range(len(my_list)):  
    4 if i > max_val:  
    5 max_val = my_list[i]  
    6 return max_val  
  
    7 for i in range(my_list):  
    8 if my_list[i] > max_val:  
    9 print(max_val)
```

- (A) ★ 2, 3, 8, 5, 6
- (B) 3, 2, 8, 5, 9
- (C) 2, 7, 4, 5, 6
- (D) 2, 3, 4, 1, 6
- (E) 2, 3, 8, 1, 6

---

**Solution.**

---



25. (1 point) Consider the following program:

```
s="Calvin"  
i=0  
x=-1  
while i<len(s):  
    if s[i]=='b':  
        x=i  
    i+=1
```

What is the **value** of **x** after this program is executed?

(A) 0

(B) 6

(C) 5

(D) 3

(E) ★

-1

---

**Solution.**

---

26. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of **x** after this program is executed?

- (A) [3, 5, 6, 6]
- (B) [2, 4, 5, 6, 6, 7]
- (C) [2, 4, 5, 5, 6, 7]
- (D) ★

[3, 5, 6, 6, 7]

- (E) [3, 5, 6, 6, 7, 8]

---

**Solution.**

---

27. (1 point) Consider the following program:

```
s="TRIS %i"  
t="ISEU"  
x=s % len(t)
```

What is the **type** of **x** after this program is executed?

- (A) ★  
String
- (B) Float
- (C) Boolean
- (D) None
- (E) Integer

---

**Solution.**

---

28. (1 point) Consider the following program:

```
def fix(s):  
    a=list(s)  
    a.sort()  
    return ''.join(a)  
  
x=["one","two","eleven","twelve"]  
s1=fix(x[0]+x[-1])  
s2=fix(x[1]+x[-2])  
  
if s1<s2:  
    x.sort()  
elif s1==s2:  
    x.reverse()  
else:  
    x.append("six")
```

What is the **value** of **x** after this program is executed?

- (A) ['two', 'twelve', 'one', 'eleven', 'six']
- (B) ['eleven', 'one', 'twelve', 'two']
- (C) ['one', 'two', 'eleven', 'twelve', 'six']
- (D) ★

['twelve', 'eleven', 'two', 'one']

- (E) ['one', 'two', 'eleven', 'twelve']

---

**Solution.**

---

29. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%2)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of **x**?

(A) ["\*", "-", "\*", "\*"]

(B) ★

["-", "\*", "-", "-"]

(C) None of the other answers are correct.

(D) ["-", "-", "\*"]

(E) ["-", "\*", "-"]

---

**Solution.**

---

30. (1 point) Consider the following program.

```
kay = 2  
wart = 3
```

```
def knight(kay, wart):  
    wart += 2  
    kay += 3  
    return wart + kay
```

```
kay = knight(wart, kay) + knight(kay, wart)
```

After it is run, what is the final **value** of **kay**?

- (A) 2
- (B) 5
- (C) ★ None of the other answers are correct.
- (D) 3

---

**Solution.**

---