



- 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

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`

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

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)`

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

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

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]

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

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

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

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

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']

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]

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']

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"

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) ["-", "*", "*"]

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']

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']

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"

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]`

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"

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

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]

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

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']

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`

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

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

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

30. (1 point) Evaluate the following expression:

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

What value is produced?

(A) 1

(B) 3

(C) 4

(D) 5

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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`

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

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)`

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']

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"

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

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

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"

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

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`

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

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

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]

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

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']

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]

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) ["*", "-", "*"]

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]

19. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 4
- (B) 1
- (C) 2
- (D) 3

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

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]

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

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

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"

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

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

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

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]

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

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']

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- 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

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

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.

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"

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]

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

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

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']

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

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']

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.

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

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

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`

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`

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]`

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) ["-", "*", "-"]

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

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

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

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']

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]

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]`

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

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

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"

27. (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) None
- (B) ['O', 'R']
- (C) False
- (D) 'ORS'
- (E) ''

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

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

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.



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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. 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)`

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

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

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) ''

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']

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

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

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

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]

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]

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']`

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)`

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

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

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']

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)"

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']

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) ["*", "-", "*"]

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

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

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`

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]`

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

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

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

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

27. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 4
- (C) 5
- (D) 3

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"

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`

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

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- 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

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

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

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"

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

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

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) ["-", "*", "-", "*"]

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) "UTSP"
- (E) "PSTU"

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]

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]

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

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

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']

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

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

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

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

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']

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]

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']

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

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]`

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

24. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 5
- (C) 3
- (D) 4

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`

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

```
s=""
s=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]`

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)`

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.

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

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

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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. 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

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

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

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

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

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

7. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 2
- (B) 1
- (C) 4
- (D) 3

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) []

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)`

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

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`

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

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]`

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]`

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) ["*", "-", "*"]

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']

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]

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

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)`

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"

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) ''

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

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]

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"

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

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]

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

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

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']

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

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- 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. 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.

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"`

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]

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`

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

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

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`

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"

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.

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

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

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]

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

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']

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']

16. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 2
- (B) 1
- (C) 3
- (D) 4

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

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

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

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

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

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

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) ["*", "-", "*", "*"]

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]

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']

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]

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

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

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]

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

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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. 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)`

2. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 5
- (C) 4
- (D) 3

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

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]

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

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

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

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

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

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

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']

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) ["-", "*"]

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

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']

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"

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']

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]

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]

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

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`

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

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"

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

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"

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

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)`

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

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]

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]`

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

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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. 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

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

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.

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]

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`

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']

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`

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

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

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)

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]`

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

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.

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

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

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]

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

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

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']

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) None
- (B) ['O', 'R']
- (C) 'ORS'
- (D) ''
- (E) False

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

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]

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"

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

25. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 4
- (C) 2
- (D) 1

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

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

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.

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

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

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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. 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']

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

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

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]

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

6. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 4
- (C) 3
- (D) 5

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

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]

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']

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

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

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

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

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.

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

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.

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"

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

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

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"

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]`

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

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]

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]

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) ["-", "*"]

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`

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)"

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`

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']

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

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- 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']

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`

3. (1 point) Consider the following incomplete Python program.

```
s=""  
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]`

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

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

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']

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

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

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

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']

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) ["*", "-", "*"]

12. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 4
- (C) 1
- (D) 2

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"

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]

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

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

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"

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

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

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

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]`

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]`

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

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']

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

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'

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`

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

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

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

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- 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. 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"

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']

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

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`

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.

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']

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']

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']

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

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

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]`

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]`

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

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]

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

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

17. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 5
- (B) 1
- (C) 3
- (D) 4

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)`

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

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

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

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

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]

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

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

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']

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"

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

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`

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

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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. 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']

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

3. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 3
- (C) 5
- (D) 4

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

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]

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']

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

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

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

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`

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

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

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

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

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

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]

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"

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]

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']

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]`

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

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

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

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"

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

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) ["-", "*", "-"]

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`

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']

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

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)`

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- 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

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)`

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']

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

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

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]`

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

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']

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

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

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"

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]

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.

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

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

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

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

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']

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) ''
- (C) 'ORS'
- (D) None
- (E) ['0', 'R']

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

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.

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`

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]

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']

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]

26. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 1
- (C) 4
- (D) 2

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"

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

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

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

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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. 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"

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"

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

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

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`

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

7. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 5
- (B) 4
- (C) 3
- (D) 1

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]

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

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]

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

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

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

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]`

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) `["*", "-", "*", "*"]`

16. (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) `None`
- (B) `''`
- (C) `False`
- (D) `'ORS'`
- (E) `['O', 'R']`

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)`

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]`

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

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

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"]

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

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

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']

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']

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)`

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

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']

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.

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

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- 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']

2. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 2
- (B) 3
- (C) 4
- (D) 1

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

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

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.

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

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) ["-", "-", "*"]

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]`

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`

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`

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)`

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]`

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'

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']

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

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

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]

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]

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) []

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

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

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

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

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"

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

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

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

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

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]

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"

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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. 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

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

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

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']

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"

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]

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

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'

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]`

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']`

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']

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

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

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

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

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)`

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']

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

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) ["*", "-", "*"]

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

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

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

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

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"

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]

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)`

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

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

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]`

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`

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- 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

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]

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]

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

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

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)`

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']`

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']

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

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

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"]

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]`

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)`

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`

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]

16. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 5
- (B) 3
- (C) 4
- (D) 1

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

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

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

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

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

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.

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

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

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

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"

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"

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

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

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"

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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. 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]

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

3. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 2
- (B) 3
- (C) 4
- (D) 1

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

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']

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

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

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

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`

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) `'ORS'`
- (B) `False`
- (C) `''`
- (D) `None`
- (E) `['0', 'R']`

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']

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

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

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

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

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

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]

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]

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

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

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`

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

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

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.

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"]

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]`

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

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) ["-", "-", "*"]

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"

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"

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- 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

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

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

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

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

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) ["-", "*"]

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

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

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

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]

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]

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`

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)`

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`

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]`

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']`

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"

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

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

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"

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

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]

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']

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`

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

26. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 3
- (C) 5
- (D) 4

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

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

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]

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']

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- 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

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"

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

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.

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']

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]`

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

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]`

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]`

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

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`

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

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

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

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

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.

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

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

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)`

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']`

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']

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']

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

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

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) ["-", "*", "-", "-"]

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)

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

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']

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]

30. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 4
- (C) 5
- (D) 3

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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. 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"]

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"

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

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

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`

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]`

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']

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

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)`

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

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]

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

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

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

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

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

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

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

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']

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

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

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]`

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']

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

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"

26. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

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

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

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) ["*", "-", "*"]

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)`

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- 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

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

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

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

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"

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

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

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

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)`

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

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']

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) ''

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]

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) ["-", "-", "*"]

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

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`

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']`

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']

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

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']

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

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

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"]

24. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 5
- (C) 4
- (D) 3

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)`

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

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

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]`

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"

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]

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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. 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

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`

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

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

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.

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

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`

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

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']

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]`

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

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

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

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']

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']

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

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

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

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

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']

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]`

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.

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"

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]

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]

26. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 5
- (C) 1
- (D) 4

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

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) ["-", "*", "*"]

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

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"

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- 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]`

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

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

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

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

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

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

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

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]

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

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`

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

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]

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']

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`

16. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 4
- (B) 2
- (C) 1
- (D) 3

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]

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

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

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

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']

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) ["-", "*"]

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.

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"

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)

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"

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

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

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"

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]`

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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. 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

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

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

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

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

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]

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) ["*", "-", "*"]

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

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

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)`

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"

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

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]`

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']

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`

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

17. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 1
- (C) 4
- (D) 2

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]`

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

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

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

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)`

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"`

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]

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

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']

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']

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)"

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

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)`

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- 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. 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

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

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]

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

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']

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']

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) ["-", "*", "-"]

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'

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']

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

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

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]

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

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

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

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

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

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]

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.

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]`

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

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

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`

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]`

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`

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.

27. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 5
- (C) 1
- (D) 4

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"

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

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

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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. 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

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']

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]`

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]`

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) ["-", "*", "*"]

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)`

7. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 1
- (C) 2
- (D) 4

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]

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

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]

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

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']

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"

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

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

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

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]

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

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

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) ''
- (B) 'ORS'
- (C) None
- (D) ['O', 'R']
- (E) False

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)`

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`

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

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"

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

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

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

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']

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

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

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- 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

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

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]

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

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]

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.

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.

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]

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

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

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

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

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

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.

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

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`

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

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`

19. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 2
- (B) 3
- (C) 1
- (D) 4

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']

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

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']

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.

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]`

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.

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

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']

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

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"

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]`

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- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
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- 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

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']

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

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

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

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

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

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

9. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 4
- (C) 2
- (D) 3

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) ["-", "*"]

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']

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

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

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`

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

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"

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.

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

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

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]`

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

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]`

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

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]

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]

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"

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`

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]`

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']`

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

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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. 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"

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']

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`

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

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)`

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

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]

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`

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

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']

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

12. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 5
- (C) 4
- (D) 3

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

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) []

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]

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]

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

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

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

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

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]

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]`

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

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

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

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

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

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.

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.

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) ["-", "*", "*"]

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- 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

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']

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

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]`

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

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"

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

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

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`

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

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

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

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

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)`

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']

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]`

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]`

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

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

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]

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) ["*", "-", "*"]

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

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

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"

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

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]

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']

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`

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

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

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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. 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]`

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)`

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

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

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

6. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

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"

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

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

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

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]

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']

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) ["*", "-", "*"]

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

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`

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

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)`

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

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']

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"

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']

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

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

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

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

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]

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

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']

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.

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]`

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- 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]

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]

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

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

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.

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]

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

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)`

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

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

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]

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

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]`

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.

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

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`

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

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"

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) ["-", "-", "*"]

20. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 4
- (B) 3
- (C) 1
- (D) 2

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

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

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`

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

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

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

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']

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

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']

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']

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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. 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]`

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

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

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]

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"

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`

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) ["-", "*", "-"]

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

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]

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']

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']

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`

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

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

15. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 2
- (C) 4
- (D) 1

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

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

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) []

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

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']

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)

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"

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

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

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

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

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

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

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]`

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"`

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- 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.

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)`

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]`

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)`

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

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

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

8. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 4
- (C) 5
- (D) 1

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

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"

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']

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

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

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) ["-", "*", "-"]

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']

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

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`

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

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

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]

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

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]

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

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

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.

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

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]`

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']

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

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]

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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. 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

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

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

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]

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"

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

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]`

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

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']

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

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

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

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

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

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

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']`

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

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) ["-", "-", "*"]

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`

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)`

21. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 2
- (B) 1
- (C) 3
- (D) 4

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.

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

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]

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]

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"

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']

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

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']

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.

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- 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

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

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

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]`

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]`

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

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)`

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

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.

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`

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`

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

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"

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]

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]

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.

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

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

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]`

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

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)`

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"`

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

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

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']

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']

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"

28. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 4
- (B) 5
- (C) 1
- (D) 3

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']

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

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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. 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

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

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.

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

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']

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.

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]

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

9. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 3
- (C) 4
- (D) 5

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.

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"

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) []

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]

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) ['0', 'R']
- (C) False
- (D) None
- (E) 'ORS'

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]

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)`

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']`

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

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

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`

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

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

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

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]

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

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)`

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"

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

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

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

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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. 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.

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"

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

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) []

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

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

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

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)`

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`

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

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

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]

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"

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

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

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`

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]

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

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.

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]

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

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]`

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.

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

25. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 2
- (B) 1
- (C) 4
- (D) 3

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']

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]

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

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

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

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- 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

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

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

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]

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

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]

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.

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

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`

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]

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

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]`

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

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

15. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 4
- (C) 5
- (D) 1

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

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"

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) ["-", "*", "-"]

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

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

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`

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']

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]

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

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']

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

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

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']

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)`

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

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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. 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

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

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']

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

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

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"

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]`

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']`

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

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

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]

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"

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`

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

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

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`

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]`

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

19. (1 point) Evaluate the following expression:

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

What value is produced?

(A) 1

(B) 4

(C) 5

(D) 3

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]`

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.

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']

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

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

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

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']

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

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) ["-", "*", "-"]

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

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

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- 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

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

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"

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

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

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.

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']

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

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

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'

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)

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"

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

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]`

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

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"

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]

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) []

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']

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`

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

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

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

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

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) ["-", "-", "*"]

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

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]

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]

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)`

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

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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. 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)`

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`

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)`

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

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]`

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

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

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]

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"

10. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 3
- (C) 2
- (D) 4

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

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']

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

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

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

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

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']

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.

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

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']

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.

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

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']

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"

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]

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]`

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

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

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

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']

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- 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. 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

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

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]

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]

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`

6. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 4
- (B) 2
- (C) 3
- (D) 1

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)`

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'`

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) ["*", "-", "*"]

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"

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

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]`

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

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

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

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)"

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

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']

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

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

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']

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`

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.

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

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]

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

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) "UTSP"
- (E) "PSTU"

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']

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

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']

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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. 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

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']

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]`

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

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]

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]

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']

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

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

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)`

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.

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

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"

14. (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) ''
- (C) False
- (D) None
- (E) ['O', 'R']

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

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

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.

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.

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

20. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 1
- (B) 5
- (C) 3
- (D) 4

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`

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

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']

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

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

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

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']

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"

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`

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`

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- 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]`

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

3. (1 point) Evaluate the following expression:

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

What value is produced?

(A) 3

(B) 2

(C) 1

(D) 4

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']

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]`

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`

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

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

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]

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]

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"

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)

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`

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) `["-", "*", "-", "*"]`

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

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

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.

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']`

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

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

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.

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

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

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

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"

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"

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]

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

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']

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.

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- 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]

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

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

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

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)"

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']

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)`

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

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]`

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]`

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']

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

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

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

15. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 5
- (B) 3
- (C) 4
- (D) 1

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`

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

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]

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

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) ["*", "-", "*"]

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

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"

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']

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

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

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

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

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`

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]

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"

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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. 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

2. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 3
- (B) 4
- (C) 5
- (D) 1

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

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) ["-", "-", "*"]

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]

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']

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

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

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

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)

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']

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`

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']

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`

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

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) []

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

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

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.

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

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)`

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]

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

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

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]`

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.

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]

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"

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

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

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- 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`

2. (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) `''`
- (C) `'ORS'`
- (D) `None`
- (E) `False`

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

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

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]`

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

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)`

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']`

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]

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

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']

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"

13. (1 point) Evaluate the following expression:

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

What value is produced?

- (A) 2
- (B) 1
- (C) 3
- (D) 4

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]

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

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

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

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

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`

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"

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]`

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

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

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

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

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]

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

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']

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) ["-", "*", "-"]

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

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