

- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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:
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Boolean
(B) String
(C) ★
Integer
$(\mathrm{D})$ None
(E) Float
Solution.

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

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

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

- (A) sum=sum+1
- (B) **★**

sum=sum+i+1

- (C) sum+1=sum
- (D) sum=sum+i

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 poin	t) How	can	the following	mathematical	equation	be	implemented	as a	Python	expressi	ion?
Ass	sume 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) **★**

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

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 <b>value</b> of $x$ after this program is executed?
(A) 9
(B) ★
27
(C) None of the other answers are correct.
(D) 3
(E) 1
Solution.

```
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:
• • •	-	Politica	,	0110	10110 11 1110	CIPI COOTCII.

[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]

```
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)  $\bigstar$  None of the other answers are correct.
- (C) 2
- (D) 3

<pre>a=3 b=4 if a==3:     b=a elif a==4:     a=5 else:     a=b</pre>
What is the <b>value</b> of a after this program is executed?
(A) 7
(B) None of the other answers are correct.
(C) 4
(D) ★
3
(E) 5
Solution.

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

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

(A) **★** 

3

- (B) 0
- (C) 1
- (D) 4
- (E) 2

pi="3.14159" e="2.71828" x=pi*len(e)+pi
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) None
(B) ★
String
(C) Integer
(D) Boolean
(E) Float
Solution.

```
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']
- $(\mathrm{B})$  ['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]

 ${\bf Solution.}$ 

s="-B-0-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 'ORS'
(B) ''
$(\mathrm{C})$ False
$(\mathrm{D})$ None
(E) ★
['O', 'R']
Solution.

15. (1 point) Consider the following program.

def artificing(s):
 return s+"%1" % 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) ★
 "MERLIN%1"

(E) "MERLIN%1"

```
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']
```

```
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) **★** 

- (B) [1, 2, 3, '123']
- (C) [1, 2, 3, 10]
- (D) [1, 2, 3]
- (E) [1, 2, 3, '1234']

```
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 <b>value</b> of <b>x</b> after this program is executed?
(A) ★
"3str(3)"
(B) None of the other answers are correct.
(C) "33"
(D) 33
(E) "333"
Solution.

```
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

```
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) **★** 

- (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]

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 14
(B) 13
(C) 12
(D) ★
10
(E) 11
Solution.

 $24.\ (1\ \mathrm{point})$  Consider the following program:

```
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) **★**

$$(m \% n) != 0$$

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

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

- (A) 5
- (B) 4
- (C) 2
- (D) -1
- (E) **★**

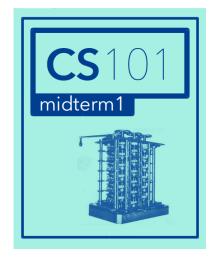
3

28. (1 point) Consider the following program.
<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) ★
4
(B) 5
(C) 14
(D) 3
(E) 30
Solution.

29. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
$(\mathrm{A})$ Boolean
(B) None
(C) Float
(D) ★
Integer
(E) String
Solution.

len("ABCDE"[1:4])		
What value is produced?		
(A) 1		
(B) ★ 3		
(C) 4		
(D) 5		
Solution.		

30. (1 point) Evaluate the following expression:



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L.	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

<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 3
(B) 5
(C) ★
4
(D) 14
(E) 30
Solution.

3.	(1 point)	How	can	the following	mathematical	equation	be i	mplemented	as a	Python	expression	on?
As	sume a, b	o, 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) **★**

```
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 <b>value</b> of $x$ after this program is executed?
(A) "33"
(B) <b>33</b>
(C) ★
"3str(3)"
(D) None of the other answers are correct.
(E) "333"
Solution.

a=3				
b=4 if a!=b:				
elif a==4: a=5				
else:				
b=a				
What is the <b>value</b> of a after this program is executed?				
(A) None of the other answers are correct.				
(B) 7				
(C) 5 (D) 3				
4				
Solution.				

```
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.		
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>		
s=artificing("MERLIN")		
After it is run, what is the final <b>value</b> of s?		
(A) 12		
(B) "MERLIN"		
$(\mathrm{C})$ None		
(D) ★		
"MERLINMERLIN"		
(E) "MERLIN2"		
Solution.		

```
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)  $\bigstar$  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:			
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>			
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?			
(A) ★			
Integer			
(B) None			
(C) Float			
(D) Boolean			
$(\mathrm{E})$ String			
Solution.			

```
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]

Solu	tion.					
(E)	9					
	27					
(D)	(D) <b>★</b>					
(C) 3						
(B) 1						
(A)	(A) None of the other answers are correct.					
What	t is the <b>value</b> of x after this program is executed?					
else: x=x**1						
elif(a%3)==1: x=x**2						
	x=x**3					
	a=5 if (a%3)==2:					
x=3						

```
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)  $\bigstar$

s[i:i+2]

(D) s[i:i-1]

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

```
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) **★**

- (C) [3, 5, 6, 6, 7, 8]
- (D) [2, 4, 5, 6, 6, 7]
- (E) [2, 4, 5, 5, 6, 7]

len("ABCD"[0:3])
What value is produced?
(A) 4
(B) 1
(C) 2
(D) ★ 3
Solution.

19. (1 point) Evaluate the following expression:

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
```

What value is produced?		
(A) [1,2,1,2,1,2]		
(B) [1,2,3]		
(C) ★		
[1,2]		
(D) [1,2,1]		
Solution.		

21. (1 point) Evaluate the following expression:

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

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

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

- (A) 0
- (B) 1
- (C) 3
- (D) 4
- (E) **★**

2

s="G+R+A+I+L" x=s.split("+")[1:-2]		
What is the <b>value</b> of <b>x</b> after this program is executed?		
(A) ★		
['R','A']		
$(\mathrm{B})$ None		
(C) 'RAI'		
(D) 3		
(E) False		
Solution.		

 $23.\ (1\ \mathrm{point})$  Consider the following program:

```
a=["A","C","C","I","0"]
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"

<pre>pi="3.14159" e="2.71828" x=pi*len(e)+pi</pre>		
What is the <b>type</b> of <b>x</b> after this program is executed?		
(A) Boolean		
(B) None		
$(\mathrm{C})$ Integer		
$(\mathrm{D})$ Float		
(E) <b>★</b>		
String		
Solution.		

 $25.\ (1\ \mathrm{point})$  Consider the following program:

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

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:		
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>		
What is the <b>type</b> of $x$ after this program is executed?		
(A) Boolean		
(B) ★		
Float		
(C) None		
(D) Integer		
$(\mathrm{E})$ String		
Solution.		

```
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]

=3 =2 nile i < 7: x+=i i+=2				
What is the <b>value</b> of $x$ after this program is executed?				
(A) ★				
10				
(B) 13				
(C) 12				
(D) 11				
(E) 14				
olution.				

 $29.\ (1\ \mathrm{point})$  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']
- $(\mathrm{B})$  ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) **★**

None

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



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.
- $\bullet$  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

len("ABCDE"[1:4])			
What value is produced?			
(A) ★ 3			
(B) 1			
(C) 4			
(D) 5			
Solution.			

1. (1 point) Evaluate the following expression:

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

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

- (A) 2
- (B) **★**

3

- (C) 0
- (D) 4
- (E) 1

a=3
b=4
if a==3:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) 5
(B) 3
(C) 7
(D) ★
4
(E) None of the other answers are correct.
Solution.

```
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"

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 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]

```
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

<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>	
After it is run, what is the final <b>value</b> of x?	
(A) 5	
(B) ★	
14	
(C) 3	
(D) 4	
(E) 30	
Solution.	

```
8. (1 point) Consider the following program:
a=["merlin", "sir agravaine", "king pellinore"]
b=[ ]
for i in range(0,3):
    b.append(a[0-i].title())
What is the value of b after this program is executed?
(A) ['Sir Agravaine', 'King Pellinore']
(B) ['King Pellinore', 'Sir Agravaine']
(C) ★
['Merlin', 'King Pellinore', 'Sir Agravaine']
```

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

9. (1 point) Consider the following program:
<pre>x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-") y=x x=y.reverse()</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
(B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
(C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
(D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
(E) ★
None
Solution.

```
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 = 2wart = 3def knight(kay,wart): wart += 2 kay += 3return 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)  $\bigstar$  None of the other answers are correct.

12. (1 point) Consider the following program:							
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>							
What is the $\mathbf{type}$ of $x$ after this program is executed?							
(A) ★							
Integer							
(B) Float							
(C) None							
$(\mathrm{D})$ String							
(E) Boolean							
Solution.							

x=str("1"*3)										
What is the <b>value</b> of <b>x</b> after this program is executed?										
(A) "3"										
(B) None of the other answers are correct.										
(C) 111										
(D) ★										
"111"										
(E) 3										
Solution.										

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

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

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

(A) **★** 

$$(m \% n) != 0$$

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

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]

```
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) **★**

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

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

- (A) 6
- (B) **★**

-1

- (C) 5
- (D) 3
- (E) 0

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>												
What is the <b>value</b> of <b>x</b> after this program is executed?												
(A) 13												
(B) ★												
10												
(C) 11												
(D) 12												
(E) 14												
Solution.												

x=3 a=7 if (a%3)==2: x=x\*\*2elif(a%3)==1: x = x \* \* 1else: x = x \* \* 0What is the **value** of x after this program is executed? (A) **★** 3 (B) 9 (C) None of the other answers are correct. (D) 1 (E) 7 Solution.

20. (1 point) Consider the following program:

```
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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ Integer
(B) Float
(C) None
(D) ★
Boolean
(E) String
Solution.

<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>									
What is the $\mathbf{type}$ of x after this program is executed?									
$(\mathrm{A})$ None									
$(\mathrm{B})$ Integer									
(C) Float									
(D) ★									
Boolean									
$(\mathrm{E})$ String									
Solution.									

 $25.\ (1\ \mathrm{point})$  Consider the following program:

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"

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) None
(B) <b>★</b>
['O', 'R']
$(\mathrm{C})$ False
(D) 'ORS'
(E) ''

 $27.\ (1\ \mathrm{point})$  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
```

Solution.

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

30.	(1)	point)	How	$\operatorname{can}$	the	following	g mat	hematical	l equation	be	implemented	as a	Python	express	ion?
Ass	ume	e a, b,	and a	sin l	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) **★**

(E) None of the other answers are correct.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- This is a 60-minute exam.
- There are several different versions of this exam.

L.	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)

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 <b>value</b> of $x$ after this program is executed?									
(A) 3									
(B) ★									
27									
(C) None of the other answers are correct.									
(D) 9									
(E) 1									
Solution.									

3. (1 point) Consider the following program:									
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>									
What is the <b>type</b> of $x$ after this program is executed?									
(A) None									
(B) ★									
Integer									
(C) Boolean									
(D) String									
(E) Float									
Solution.									

s="-B-O-R-S-" k=s.split("-")[2:-2]	
What is the <b>value</b> of <b>x</b> after this program is executed?	
(A) False	
(B) 'ORS'	
(C) ★	
['O', 'R']	
(D) None	
(E) ''	
Solution.	

```
5. (1 point) Consider the following program:
a=["merlin","sir agravaine","king pellinore"]
b=[ ]
for i in range(0,4):
    b.append(a[0-i].title())
What is the value of b after this program is executed?
(A) ★
```

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

- $(\mathrm{B})$  ['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.
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) "MERLIN"
(B) 12
(C) "MERLIN2"
(D) ★
"MERLINMERLIN"
$(\mathrm{E})$ None
Solution.

7. (1 point) Consider the following Python program.
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
 d[i%3]+=e[i]
x=d[1]
After it is run, what is the final value of x?

- (A) 0
- (B) 16
- (C) 8
- (D) **★** 
  - 12
- (E) 3

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

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

- (A) 3
- (B) **★**

-1

- (C) 6
- (D) 0
- (E) 5

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

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]

```
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 pe	oint) How	can the	following	mathematical	${\it equation}$	be in	mplemented	as a	Python	expressi	ion?
Assume	a, b, and	cos have	e already l	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)  $\bigstar$  None of the other answers are correct.
- (D) 2

pi="3.14159" e="2.71828" x=pi*len(e)+pi
What is the <b>type</b> of $x$ after this program is executed?
(A) None
(B) ★
String
$(\mathrm{C})$ Integer
(D) Float
(E) Boolean
Solution.

15. (1 point) Consider the following program:
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()

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

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

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

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

16. (1 point)
x=str(3)+"str(3)"
What is the <b>value</b> of $x$ after this program is executed?
(A) None of the other answers are correct.
(B) "33"
(C) "333"
(D) 33
(E) ★
"3str(3)"
Solution.

```
17. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['one', 'two', 'eleven', 'twelve']
 (B) ★
     ['eleven', 'one', 'twelve', 'two']
 (C) ['two', 'twelve', 'one', 'eleven', 'six']
 (D) ['one', 'two', 'eleven', 'twelve', 'six']
 (E) ['twelve', 'eleven', 'two', 'one']
```

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

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>						
What is the <b>value</b> of <b>x</b> after this program is executed?						
(A) 14						
(B) 12						
(C) ★						
10						
(D) 13						
(E) 11						
Solution.						

20. (1 point) Consider the following program:					
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>					
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?					
(A) String					
(B) Boolean					
(C) ★					
Integer					
(D) Float					
(E) None					
Solution.					

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

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

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

- (A) sum+1=sum
- (B) sum=sum+i
- (C) ★

sum=sum+i+1

(D) sum=sum+1

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]

```
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.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) 5
(B) ★
14
(C) 30
(D) 3
(E) 4
Solution.

len("ABCDE"[1:4])
What value is produced?
(A) 1
(B) 4
(C) 5
(D) ★ 3
Solution.

27. (1 point) Evaluate the following expression:

```
a=["A","C","C","I","0"]
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"

- $(\mathrm{B})$  "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

<pre>a=3 b=4 if a!=b:     a=b elif a==4:     a=5 else:     b=a</pre>							
What is the <b>value</b> of a after this program is executed?							
(A) 5							
(B) ★							
4							
(C) 3							
(D) None of the other answers are correct.							
(E) 7							
Solution.							



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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

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

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

- (A) 4
- (B) 2
- (C) -1
- (D) **★**

3

(E) 5

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
['R','A']
$(\mathrm{B})$ None
(C) False
(D) 'RAI'
(E) 3
Solution.

3. (1 point) Consider the following program.				
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>				
s=artificing("MERLIN")				
After it is run, what is the final <b>value</b> of s?				
(A) 12				
(B) "MERLIN"				
(C) ★				
"MERLINMERLIN"				
(D) "MERLIN2"				
$(\mathrm{E})$ None				
Solution.				

	"1.21.2"		
(	C) 2.4		
(	D) "2.4"		
(	E) "1.2*2"		

(A) None of the other answers are correct.

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

x=str(1.2)\*2

 $5.\ (1\ \mathrm{point})$  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:					
<pre>pi="3.14159" e="2.71828" x=pi in pi*len(e)</pre>					
What is the $\mathbf{type}$ of $x$ after this program is executed?					
(A) Float					
$(\mathrm{B})$ String					
(C) None					
(D) ★					
Boolean					
$(\mathrm{E})$ Integer					
Solution.					

```
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) **★**

```
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"

```
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:
-0. (	_	Politic	, =	0110	10110 1116	orrer coordin

What value is produced?

- (A) [1,2,3]
- (B) [1,2,"3"]
- (C) [1,2,1,2,1,2]
- (D) **★**

[1,2,1]

a=3
b=4
if a==3:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) 3
(B) ★
4
(C) 7
(D) None of the other answers are correct.
(E) 5
Solution.

12. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $x$ after this program is executed?
(A) Boolean
(B) <b>★</b>
Integer
(C) None
(D) Float
$(\mathrm{E})$ String
Solution.

```
13. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1<s2:
    x.sort()
elif s1>s2:
   x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['twelve', 'eleven', 'two', 'one']
 (B) ['eleven', 'one', 'twelve', 'two']
 (C) ★
     ['one', 'two', 'eleven', 'twelve', 'six']
 (D) ['two', 'twelve', 'one', 'eleven', 'six']
 (E) ['one', 'two', 'eleven', 'twelve']
```

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
```

```
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</pre>

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

- (A) 1
- (B) 0
- (C) **★**

3

- (D) 2
- (E) 4

x=3 a=7 if (a%3)==2: x=x\*\*2 elif(a%3)==1: x = x \* \* 1else: x = x \* \* 0What is the  ${\bf value}$  of  ${\bf x}$  after this program is executed? (A) None of the other answers are correct. (B) 9 (C) 7 (D) **★** 3 (E) 1 Solution.

17. (1 point) Consider the following program:

```
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']
```

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 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) **★**

- (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']

<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) ★
14
(B) 4
(C) 3
(D) 30
(E) 5
Solution.

 $21.\ (1\ \mathrm{point})$  Consider the following program.

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]

 ${\bf Solution.}$ 

=2
=3
hile i < 7:
x+=i
i+=2
What is the <b>value</b> of $x$ after this program is executed?
(A) 11
(B) 13
(C) 14
(D) 12
(E) ★
15
folution.
ordinori.

 $23.\ (1\ \mathrm{point})$  Consider the following program:

len("ABCDE"[1:4])			
What value is produced?			
(A) 1			
(B) 5			
(C) ★ 3			
(D) 4			
Solution.			

 $24.\ (1\ \mathrm{point})$  Evaluate the following expression:

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="".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	$\operatorname{can}$	the	following	g mat	thematical	l equation	be	implemented	as a	Python	expressi	ion?
Ass	sum	e a, b,	and	cos l	have	already	been	defined.							

h		/		1 \
$a^{\circ}$	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:
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) ★
Integer
(B) String
(C) Float
(D) Boolean
(E) None
Solution.

```
30. (1 point) Consider the following program.
kay = 2
wart = 3

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

wart = knight(kay, kay) + knight(wart, wart)
After it is run, what is the final value of wart?

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

## Solution.

(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

2. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
String
(B) Boolean
(C) None
(D) Integer
(E) Float
Solution.

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

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

- (A) 3
- (B) 0
- (C) **★**

-1

- (D) 5
- (E) 6

<pre>a=3 b=4 if a==3:     a=b elif a==4:</pre>
a=5 else: b=a
What is the <b>value</b> of a after this program is executed?  (A) 5
(B) 7
(C) ★ 4
(D) None of the other answers are correct.
(E) 3
Solution.

5. (1 point) Consider the following program.kay = 2wart = 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)  $\bigstar$  None of the other answers are correct.
- (C) 5
- (D) 3

6. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Boolean
(B) String
(C) None
(D) ★
Float
$(\mathrm{E})$ Integer
Solution.

7. (1 point) Evaluate the following expression:

```
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) Ho	ow can the	following	mathematical	equation 1	oe implemented	as a Pythor	expression?
Assume a, b, and	nd cos hav	e 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)

```
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

=2 :=3 :hile i < 7: x+=i i+=2
What is the <b>value</b> of $x$ after this program is executed?
(A) 14
(B) 13
(C) ★
15
(D) 11
(E) 12
Solution.

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

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

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

- (A) s[i:i-1]
- (B)  $\bigstar$

s[i:i+2]

- (C) s[i:i+1]
- (D) s[i+1:i+2]

14. (1 point) Evaluate the following expression	n
[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]

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

```
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']

- $(\mathrm{B})$  ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) None
- (E) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']

```
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
- $(\mathrm{B})$  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.
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) "MERLIN"
(B) "MERLIN2"
(C) 12
$(\mathrm{D})$ None
(E) ★
"MERLINMERLIN"
Solution.

s="-B-0-R-S-" x=s.split("-")[2:-2]	
What is the <b>value</b> of <b>x</b> after this program is executed?	
$(\mathrm{A})$ None	
(B) 'ORS'	
(C) ★	
['O', 'R']	
$(\mathrm{D})$ False	
(E) ''	
Solution	

pi="3.14159" e="2.71828" x=pi*len(e)+pi
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Integer
(B) None
(C) Boolean
(D) Float
(E) ★
String
Solution.

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

[ 1, 2, 3 ] \* 3

- (A) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- (B) **★**

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

- (C) (3, 6, 9)
- (D) [3, 6, 9]
- (E) [3.0, 6.0, 9.0]

```
a=["A","C","C","I","0"]
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
```

Solution.

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

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

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.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 5
(B) 4
(C) ★
14
(D) 3
(E) 30
Solution.

x=str("1"*3)							
What is the <b>value</b> of $x$ after this program is executed?							
(A) 3							
(B) ★							
"111"							
(C) "3"							
(D) None of the other answers are correct.							
(E) 111							
Solution.							

 $28.\ (1\ \mathrm{point})$  Consider the following program:

```
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:
<pre>x=3 a=7 if (a%3)==2:     x=x**2 elif(a%3)==1:     x=x**1 else:     x=x**0</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) ★
3
(B) 9
(C) 1
(D) None of the other answers are correct.
(E) 7
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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 f	following	mathematica	l equation	be	implemented	as a	Python	express	ion?
As	ssui	me <b>a</b> , 1	o, 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.

x=str("1"*3)							
What is the <b>value</b> of $x$ after this program is executed?							
(A) "3"							
(B) None of the other answers are correct.							
(C) 3							
(D) 111							
(E) ★							
"111"							
Solution.							

```
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.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 30
(B) 4
(C) 3
(D) ★
14
(E) 5
Solution.

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

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

```
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"

x=2
a=6
if (a%3)==2:
x=x**3
elif(a%3)==1: x=x**2
x=x**2 else:
x=x**1
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
2
(B) 4
(C) 8
(D) 16
(E) None of the other answers are correct.
Solution.

```
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

 $11.\ (1\ \mathrm{point})$  Consider the following program.

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

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

- (A) 2
- (B) **★**

3

- (C) 4
- (D) 1
- (E) 0

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

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]

s="-B-0-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of x after this program is executed?
$(\mathrm{A})$ False
(B) 'ORS'
(C) ''
(D) ★
['O', 'R']
$(\mathrm{E})$ None
Solution.

```
14. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1<s2:
    x.sort()
elif s1==s2:
   x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ★
     ['twelve', 'eleven', 'two', 'one']
 (B) ['eleven', 'one', 'twelve', 'two']
 (C) ['one', 'two', 'eleven', 'twelve', 'six']
 (D) ['one', 'two', 'eleven', 'twelve']
 (E) ['two', 'twelve', 'one', 'eleven', 'six']
```

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']
- $(\mathrm{B})$  ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- (D) **★**

None

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

len("ABCD"[0:3])
What value is produced?
(A) 2
(B) 1
(C) ★ 3
(D) 4
Solution.

16. (1 point) Evaluate the following expression:

<pre>pi="3.14159" e="2.71828" x=pi in pi*len(e) What is the type of x after this program is executed?</pre>
(A) None
(B) Float
(C) Integer
$(\mathrm{D})$ String
(E) ★
Boolean
Solution.

```
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:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) None
(B) Boolean
(C) String
(D) Float
(E) ★
Integer
Solution.

```
20. (1 point) Consider the following program.
kay = 2
wart = 3

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

wart = knight(kay, kay) + knight(wart, wart)
After it is run, what is the final value of wart?

(A) 3
(B) 5
```

- (C)  $\bigstar$  None of the other answers are correct.
- (D) 2

<pre>a=3 b=4 if a!=b:     a=b elif a==4:     a=5</pre>
else: b=a
What is the <b>value</b> of a after this program is executed?
(A) 5
(B) 7
(C) ★
4
(D) None of the other answers are correct.
(E) 3
Solution.

22. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Integer
(B) None
(C) Boolean
(D) ★
Float
$(\mathrm{E})$ String
Solution.
Solution.

```
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.
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) "MERLIN"
(B) ★
"MERLINMERLIN"
(C) 12
(D) "MERLIN2"
$(\mathrm{E})$ None
Solution.

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

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

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

29. (1 point) Evaluate the following expression	:
[1,2]*len("3")	

(A) **★** 

[1,2]

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

What value is produced?

(D) [1,2,3]

30. (1 point) Consider the following program:
<pre>i=2 x=3 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 12
(B) 11
(C) 13
(D) ★
15
(E) 14
Solution.



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- $\bullet$  There are several different versions of this exam.

L.	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)

- $(\mathrm{C})$  while i in range(100)
- (D) for i in range(0,100)

 $2.\ (1\ \mathrm{point})$  Evaluate the following expression:

```
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 th	e 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]

```
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

 $6.\ (1\ \mathrm{point})$  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)  $\bigstar$  None of the other answers are correct.
- (C) 5
- (D) 3

x=0 t=1 vhile(i*i)<=9: x=x+(i*i) i=i+1
After it is run, what is the final <b>value</b> of x?
(A) 4
(B) ★
14
(C) 30
(D) 3
(E) 5
Solution.

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of x after this program is executed?
(A) ★
['R','A']
(B) 3
(C) 'RAI'
(D) None
$(\mathrm{E})$ False
Solution.

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

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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the $\mathbf{type}$ of $x$ after this program is executed?
(A) String
$(\mathrm{B})$ Integer
(C) None
(D) Boolean
(E) ★
Float
Solution.

```
11. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['two', 'twelve', 'one', 'eleven', 'six']
 (B) ★
     ['eleven', 'one', 'twelve', 'two']
 (C) ['twelve', 'eleven', 'two', 'one']
 (D) ['one', 'two', 'eleven', 'twelve']
 (E) ['one', 'two', 'eleven', 'twelve', 'six']
```

```
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:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Boolean
(B) None
(C) Float
(D) String
(E) ★
Integer
Solution.

```
14. (1 point) Consider the following program:
a=["merlin","sir agravaine","king pellinore"]
b=[]
for i in range(0,4):
    b.append(a[0-i].title())

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

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

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

15. (1 point) Consider the following program.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) "MERLIN%i"
$(\mathrm{B})$ None
(C) ★
"MERLIN2"
(D) 0
(E) "MERLINMERLIN"
Solution.

16. (1 point) Consider the following program:

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

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

- (A) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- $(\mathrm{B})$  ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) **★**

None

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

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

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]

```
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]

	4
(E)	*
(D)	7
(C)	5
(B)	None of the other answers are correct.
(A)	3
What	is the value of a after this program is executed?
	p=a
else:	a=5 :
elif	a==4:
if a!	!=b: a=b
b=4	
a=3	

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 <b>value</b> of $x$ after this program is executed?
(A) "333"
(B) ★
"3str(3)"
(C) 33
(D) None of the other answers are correct.
(E) "33"
Solution.

23. (1 point) Consider the following program:
<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
$(\mathrm{A})$ None
(B) ★
Boolean
$(\mathrm{C})$ String
(D) Integer
(E) Float
Solution.

```
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"

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

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

(A) **★** 

-1

- (B) 5
- (C) 3
- (D) 0
- (E) 6

26.	(1 poi	nt) Ho	w car	n the	following	math	ematical	equation	be	implemented	as a	Python	expressi	ion?
Ass	ume a	, b, an	d sin	have	e already	been d	lefined.							

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

- (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)

=2 =3 nile i < 7: x+=i i+=2
That is the <b>value</b> of <b>x</b> after this program is executed?
A) 11
(B) 13
(C) 14
(D) 12
(E) ★
15
olution.

 $27.\ (1\ \mathrm{point})$  Consider the following program:

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(???)
```

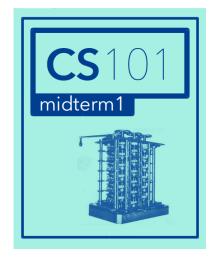
What should replace the three question marks so the resulting value of x is 43?

(A) **★** 

s[i:i+2]

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

x=3 a=7 if (a%3)==2: x=x\*\*2elif(a%3)==1: x = x \* \* 1else: x = x \* \* 0What is the **value** of x after this program is executed? (A) 9 (B) 1 (C) 7 (D) None of the other answers are correct. (E) **★** 3 Solution.



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

1.	Fill in your information:	
	Full Name:	
	UIN (Student Number):	
	NetID:	

- 2. Fill in the following answers on the Scantron form:
  - 92. D
  - 93. B
  - 94. A
  - 95. C
  - 96. C

a=3
b=4
if a!=b:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.
(B) 3
(C) ★
4
(D) 7
(E) 5
Solution.

<pre>x=2 a=6 if (a%3)==2:     x=x**3 elif(a%3)==1:</pre>
<pre>x=x**2 else:     x=x**1</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) None of the other answers are correct.
(B) 4
(C) ★
2
(D) 8
(E) 16
Solution.

```
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.

What value is produced?		
(A) [1,2,1]		
(B) [1,2,1,2,1,2]		
(C) <b>★</b>		
[1,2]		
(D) [1,2,3]		
Calution		

4. (1 point) Evaluate the following expression:

[1,2]\*len("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) 
$$(n // m) == 0$$

```
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.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
$(\mathrm{A})$ None
(B) "MERLIN%i"
(C) "MERLINMERLIN"
(D) ★
"MERLIN2"
(E) 0
Solution.

10.	(1 point)	How	can tl	he following	mathematical	equation	be i	mplemented	as a	Python	expressi	ion?
Ass	ume a, b,	and o	cos ha	ave 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]

<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>
What is the <b>type</b> of x after this program is executed?
(A) ★
Boolean
$(\mathrm{B})$ String
(C) Float
(D) Integer
$(\mathrm{E})$ None
Solution.

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

[ 1, 2, 3 ] \* 3.0

- (A) [3, 6, 9]
- (B) **★**

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

- (C) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- (D) [3.0, 6.0, 9.0]
- $\left( \mathrm{E}\right)$  None of the above.

 ${\bf Solution.}$ 

```
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
```

```
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) ★

- (D) [1, 2, 3, 10]
- (E) [1, 2, 3]

17. (1 point) Consider the following program:					
<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>					
What is the <b>value</b> of $x$ after this program is executed?					
(A) 14					
(B) 13					
(C) 12					
(D) ★					
10					
(E) 11					
Solution.					

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

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']
```

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ None
(B) ★
['O', 'R']
(C) 'ORS'
(D) '''
$(\mathrm{E})$ False
Solution.

 $20.\ (1\ \mathrm{point})$  Consider the following program:

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)  $\bigstar$  None of the other answers are correct.
- (C) 3
- (D) 5

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 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) **★**

- (C) [3, 5, 7, 7]
- (D) [3, 5, 6, 7, 7, 8]
- (E) [2, 4, 5, 6, 7, 7]

2"			
the other answer	s are correct.		
1			
	the other answer	the other answers are correct.	

 $23.\ (1\ \mathrm{point})$  Consider the following program:

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

x=str(1.2)\*2

24. (1 point) Consider the following program.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) 3
(B) 30
(C) 5
(D) ★
14
(E) 4
Solution.

Len("ABCD"[0:3])	
What value is produced?	
$(A) \star 3$	
(B) 4	
(C) 2	
(D) 1	
	_
Solution.	

 $25.\ (1\ \mathrm{point})$  Evaluate the following expression:

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

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

- (A) 5
- (B) 2
- (C) **★**

3

- (D) 4
- (E) -1

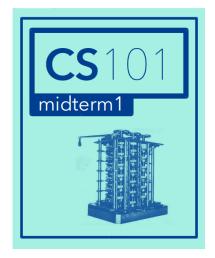
27. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the $\mathbf{type}$ of $x$ after this program is executed?
(A) Boolean
(B) ★
Float
(C) Integer
(D) None
$(\mathrm{E})$ String
Solution.

29. (1 point) Consider the following program:
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
What is the value of x after this program is executed?

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

Solution.

30. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $x$ after this program is executed?
$(\mathrm{A})$ Boolean
(B) String
(C) Float
(D) None
(E) ★
Integer
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- There are 30 questions, worth 1 point each.
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- $\bullet$  There are several different versions of this exam.

L.	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

```
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']

	="-B-O-R-S-" =s.split("-")[2:-2]
W	That is the <b>value</b> of <b>x</b> after this program is executed?
(	A) None
(	B) 'ORS'
(	(C) *
	['O', 'R']
(	D) ''
(	(E) False
Se	olution.

i=3
x=2
while i < 7:
x+=i
i+=2
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 14
(B) <b>★</b>
10
(C) 13
(D) 11
(E) 12
Solution.

4. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3.0

(A) **★** 

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

- (B) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- (C) [3.0, 6.0, 9.0]
- $(\mathrm{D})$  None of the above.
- (E) [3, 6, 9]

<pre>pi="3.14159" e="2.71828" x=pi*len(e)+pi</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Integer
(B) None
(C) ★
String
$(\mathrm{D})$ Float
(E) Boolean
Solution.

	len("ABCDE"[1:4])
	What value is produced?
	(A) 1
	(B) 4
	(C) ★ 3
	(D) 5
Solution.	

6. (1 point) Evaluate the following expression:

7. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the $\mathbf{type}$ of $x$ after this program is executed?
(A) Integer
(B) None
(C) Float
(D) Boolean
(E) ★
String
Solution.

```
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.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 5
(B) ★
14
(C) 4
(D) 30
(E) 3
Solution.

```
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

```
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)  $\bigstar$  None of the other answers are correct.
- (B) 2
- (C) 5
- (D) 3

```
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

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 <b>value</b> of x after this program is executed?
(A) 7
(B) ★
3
(C) 1
(D) 9
(E) None of the other answers are correct.
Solution.

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

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 t	the f	ollowing	mat	hematica	ıl equati	on be	$e^{imp}$	lemented	as a	Python	expre	ssion
Assur	ne a, b,	and o	cos h	ave	already	been	$\ defined.$								

h		/		7 \
$a^{\circ}$	cos	a	_	<i>b</i> )

- (A) (b^a)cos(a-b)
- (B) (a\*\*b)cos(a-b)
- (C) **★**

- (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:
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
Integer
(B) Float
(C) Boolean
$(\mathrm{D})$ String
(E) None
Solution.

19. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. We ignore indentation for this problem.

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

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

```
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]

a=3
b=4
if a==3:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.
(B) 5
(C) 3
(D) 7
(E) ★
4
Solution.

```
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]

What value is produced?			
(A) [1,2,1,2,1,2]			
(B) [1,2,3]			
(C) <b>*</b>			
[1,2]			
(D) [1,2,1]			

 $24.\ (1\ \mathrm{point})$  Evaluate the following expression:

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

```
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 <b>value</b> 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']
```

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

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

- (A) 0
- (B) **★**

3

- (C) 1
- (D) 4
- (E) 2



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.
- $\bullet$  There are several different versions of this exam.

L.	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="".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]

```
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 <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.
(B) ★
3
(C) 5
(D) 4
(E) 7
Solution.

```
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']

<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 3
(B) 14
(C) 30
(D) 5
(E) <b>★</b>
4
Solution.

9. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
(B) ★
Boolean
(C) None
(D) Integer
(E) String
Solution.

```
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']

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

len("ABCD"[0:3])	
What value is produced?	
$(A) \star 3$	
(B) 4	
(C) 1	
(D) 2	
	_
Solution.	

12. (1 point) Evaluate the following expression:

13. (1 point) Consider the following program.
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
$(\mathrm{A})$ None
(B) "MERLIN2"
(C) 12
(D) "MERLIN"
(E) ★
"MERLINMERLIN"
Solution.

[1,2]*len("3")		
What value is produced?		
(A) [1,2,1]		
(B) [1,2,3]		
(C) [1,2,1,2,1,2]		
(D) <b>★</b>		
[1,2]		
Solution.		

14. (1 point) Evaluate the following expression:

```
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.
```

## Solution.

(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
```

```
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) Ho	w can the fol	flowing math	nematical	${\it equation}$	be im	nplemented	as a	Python	expression	n?
Assume a, b, and	d cos have al	ready 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)

<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
(B) Integer
(C) ★
Boolean
$(\mathrm{D})$ String
(E) None
Solution.

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

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

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

(A) 7

(B) 12

(C) 0

(D) 8

(E) ★

16

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]

```
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]

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

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']
```

=3 =2 hile i < 7: x+=i i+=2
That is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
10
(B) 13
(C) 12
(D) 11
(E) 14
olution.

 $25.\ (1\ \mathrm{point})$  Consider the following program:

	="G+R+A+I+L" =s.split("+")[1:-2]
W	That is the <b>value</b> of <b>x</b> after this program is executed?
(	(A) None
(	(B) ★
	['R','A']
(	(C) False
(	(D) 3
(	(E) 'RAI'
Se	olution.

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:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) ★
Integer
(B) Float
(C) String
(D) None
(E) Boolean
Solution.

29. (1 point)
x=str(3)+"str(3)"
What is the <b>value</b> of $x$ after this program is executed?
(A) ★
"3str(3)"
(B) "33"
(C) None of the other answers are correct.
(D) "333"
(E) 33
Solution.

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 <b>value</b> of <b>x</b> after this program is executed?
(A) None of the other answers are correct.
(B) 8
(C) 16
(D) ★
2
(E) 4
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- $\bullet$  There are several different versions of this exam.

L.	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

```
a=["A","C","C","I","0"]
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("-")

x=y.reverse()

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

- (A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- $(\mathrm{B})$  ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) **★**

None

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

<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
Boolean
$(\mathrm{B})$ String
(C) Integer
(D) Float
$(\mathrm{E})$ None
Solution.

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

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

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

(A) **★** 

sum=sum+i+1

- (B) sum=sum+i
- (C) sum=sum+1
- (D) sum+1=sum

```
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.

```
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) ★

- (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']
- $(\mathrm{B})$  ['Sir Agravaine', 'King Pellinore']
- (C) []
- $(\mathrm{D})$  ['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 <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.
(B) 7
(C) ★
4
(D) 3
(E) 5
Solution.

10. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Integer
$(\mathrm{B})$ None
(C) ★
Boolean
$(\mathrm{D})$ String
(E) Float
Solution.

11. (1 point) Consider the following incomplete Python program.

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

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

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

s[i:i+2]

(D) s[i:i+1]

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

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]

```
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]
- $(\mathrm{D})$  None of the above.
- (E) [3, 6, 9]

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

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
```

len("ABCDE"[1:4])
What value is produced?
(A) 5
(B) 1
(C) $\star$ 3
(D) 4
Solution.

17. (1 point) Evaluate the following expression:

18. (1)	point)	$\operatorname{How}$	can tl	he fol	llowing	mathem	atical	equation	be	implemented	as a	Python	express	sion
Assume	e <b>a</b> , <b>b</b> ,	and a	sin ha	ave al	lready l	oeen defi	ned.							

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

- (A) a\*sin(a^b b)
- (B) a sin(a\*\*b b)
- (C) ★

- (D) None of the other answers are correct.
- (E) a\*sin(b^a b)

19. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
Integer
(B) Boolean
(C) String
(D) Float
(E) None
Solution.

20. (1 point) Consider the following program:
<pre>x=3 a=5 if (a%3)==2:     x=x**3 elif(a%3)==1:     x=x**2 else:     x=x**1</pre>
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) None of the other answers are correct.
(B) ★
27
(C) 1
(D) 3
(E) 9
Solution.

<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>	
After it is run, what is the final <b>value</b> of <b>x</b> ?	
(A) ★	
14	
(B) 5	
(C) 4	
(D) 3	
(E) 30	
Solution.	

 $21.\ (1\ \mathrm{point})$  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	noint)	Frelucto	+ho	following	expression:
∠o. (	L	pomi	Lvaiuate	une	lollowing	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.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) "MERLINMERLIN"
(B) 0
(C) "MERLIN%i"
(D) ★
"MERLIN2"
(E) None
Solution.

=3 =2 nile i < 7: x+=i i+=2	
That is the <b>value</b> of <b>x</b> after this program is executed?	
A) 13	
B) 11	
C) 14	
D) ★	
10	
E) 12	
olution.	

 $25.\ (1\ \mathrm{point})$  Consider the following program:

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 'RAI'
(B) 3
(C) False
$(\mathrm{D})$ None
(E) ★
['R','A']
Solution.

x=str("1"*3)
What is the <b>value</b> of $x$ after this program is executed?
(A) ★
"111"
(B) 3
(C) 111
(D) None of the other answers are correct.
(E) "3"
Solution.

 $27.\ (1\ \mathrm{point})$  Consider the following program:

```
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



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

1.	Fill in your information:	
	Full Name:	
	UIN (Student Number):	
	NetID:	

- 2. Fill in the following answers on the Scantron form:
  - 92. C
  - 93. C
  - 94. A
  - 95. C
  - 96. D

```
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']
- $(\mathrm{E})$  ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

```
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)  $\bigstar$  None of the other answers are correct.
- (C) 2
- (D) 5

len("ABCDE"[1:4])		
What value is produced?		
(A) 1		
(B) ★ 3		
(C) 5		
(D) 4		
Solution.		

3. (1 point) Evaluate the following expression:

x=str("1"*3)
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) "3"
(B) 3
(C) ★
"111"
(D) None of the other answers are correct.
(E) 111
Solution.

5. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3.0

- (A) None of the above.
- (B) [3.0, 6.0, 9.0]
- (C) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- (D) **★**

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

(E) [3, 6, 9]

```
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']
```

```
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

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
10
(B) 13
(C) 14
(D) 11
(E) 12
Solution.

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 <b>value</b> of $x$ after this program is executed?					
(A) 4					
(B) None of the other answers are correct.					
(C) ★					
2					
(D) 8					
(E) 16					
Solution.					

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

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

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

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

$$(m \% n) != 0$$

11. (1 point) Consider the following program:					
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>					
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?					
$(\mathrm{A})$ None					
(B) Float					
(C) ★					
Boolean					
(D) Integer					
$(\mathrm{E})$ String					
Solution.					

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) None
(B) 'RAI'
(C) ★
['R','A']
(D) 3
(E) False
Solution.

13. (1 point) Consider the following Python program.
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
 d[i%3]+=e[i]
x=d[1]

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

- (A) 3
- (B) 8
- (C) 16
- (D) 0
- (E) **★**

12

a=3
b=4
if a==3:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) 5
(B) ★
4
(C) None of the other answers are correct.
(D) 7
(E) 3
Solution.

16 (	1	point	) Evaluate	the	following	expression:
10. (	Τ.	pom.	) Dvaruate	0110	Tonowing	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]

```
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"

```
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) **★**

- (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.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 5
(B) 30
(C) ★
14
(D) 4
(E) 3
Solution.

22. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. We ignore indentation for this problem.

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

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

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

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"

<pre>pi="3.14159" e="2.71828" x=pi*len(e)+pi What is the type of x after this program is executed?</pre>
what is the <b>type</b> of x after this program is executed:
(A) None
$(\mathrm{B})$ Integer
(C) Float
(D) Boolean
(E) ★
String
Solution.

 $25.\ (1\ \mathrm{point})$  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

```
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:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ String
(B) None
(C) Boolean
(D) ★
Integer
(E) Float
Solution.

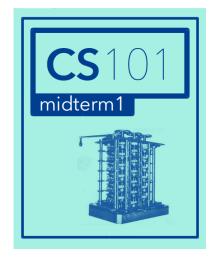
30. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume a, b, and sin have already been defined.

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

(A) **★** 

$$a*sin(a**b - b)$$

- (B) None of the other answers are correct.
- (C) a\*sin(a^b b)
- (D) a sin(a\*\*b b)
- (E) a\*sin(b^a b)



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- There are 30 questions, worth 1 point each.
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- There are several different versions of this exam.

L.	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 <b>value</b> of $x$ after this program is executed?
(A) "33"
(B) ★
"3str(3)"
(C) None of the other answers are correct.
(D) "333"
(E) 33
Solution.

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

sum=0
???:

sum=sum+i

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

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

for i in range(1,101)

```
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)  $\bigstar$  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]

<pre>a=3 b=4 if a==3:     b=a elif a==4:     a=5 else:</pre>
a=b
What is the <b>value</b> of a after this program is executed?
(A) ★
3
(B) 4
(C) None of the other answers are correct.
(D) 5
(E) 7
Solution.

```
8. (1 point) Consider the following program:
a=["merlin","sir agravaine","king pellinore"]
b=[ ]
for i in range(1,3):
    b.append(a[0-i].title())
What is the value of b after this program is executed?
(A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
(B) ['Merlin', 'King Pellinore', 'Sir Agravaine']
(C) ★
    ['King Pellinore', 'Sir Agravaine']
(D) [ ]
(E) ['Sir Agravaine', 'King Pellinore']
```

9. (1 point) Consider the following program: x=3 a=5 if (a%3)==2: x=x\*\*3 elif(a%3)==1: x = x \* \* 2else: x = x \* \* 1What is the  ${\bf value}$  of  ${\bf x}$  after this program is executed? (A) 1 (B) 3 (C) None of the other answers are correct. (D) 9 (E) **★** 27 Solution.

<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 5
(B) 3
(C) 30
(D) 14
(E) ★
4
Solution.

11. (1 point) Consider the following program.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) "MERLIN%i"
(B) None
(C) 0
(D) "MERLINMERLIN"
(E) ★
"MERLIN2"
Solution.

12. $(1 \text{ point})$ Evaluate the following expression	1:
[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]

```
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.

pi="3.14159" e="2.71828" x=pi*len(e)+pi
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ None
(B) Boolean
(C) ★
String
(D) Integer
(E) Float
Solution.

15. (1 point) Consider the following program.

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

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

(A) 3
(B) 0
(C) 4
(D) 1
(E) ★
2

16. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) String
$(\mathrm{B})$ None
(C) ★
Boolean
$(\mathrm{D})$ Integer
(E) Float
Solution.

```
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.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']

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of $x$ after this program is executed?
$(\mathrm{A})$ False
(B) ''
(C) 'ORS'
$(\mathrm{D})$ None
(E) ★
['O', 'R']
Solution.

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

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

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

21.	(1 point)	How	can th	ne following	mathematical	equation	be i	implemented	as a	Python	expressi	on?
Ass	ume a, b,	and o	cos ha	ve already l	peen defined.							

h		/		7 \	
$a^{\circ}$	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) 
$$(n // m) == 0$$

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

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

(A) **★** 

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

```
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]

len("ABCD"[0:3]	)		
What value is pro	duced?		
(A) ★ 3			
(B) 1			
(C) 4			
(D) 2			
Solution.			

26. (1 point) Evaluate the following expression:

```
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:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
(B) None
(C) Boolean
(D) ★
String
$(\mathrm{E})$ Integer
Solution.

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

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

- (A) 5
- (B) 0
- (C) 3
- (D) **★** 
  - -1
- (E) 6

<pre>i=2 x=3 while i &lt; 7:     x+=i     i+=2</pre>	
What is the <b>value</b> of <b>x</b> after this program is executed?	
(A) 12	
(B) 14	
(C) 13	
(D) 11	
(E) <b>★</b>	
15	
Solution.	



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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

What	What is the <b>value</b> of $x$ after this program is executed?		
(A)	None of the other answers are correct.		
(B)	"2.4"		
(C)	2.4		
(D)	"1.2*2"		
(E)	*		
	"1.21.2"		

Solution.

x=str(1.2)\*2

1. (1 point) Consider the following program:

```
a=["A","C","C","I","0"]
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:		
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>		
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?		
(A) ★		
String		
(B) Float		
$(\mathrm{C})$ None		
$(\mathrm{D})$ Integer		
$(\mathrm{E})$ Boolean		
Solution.		

<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) ★
14
(B) 5
(C) 30
(D) 3
(E) 4
Solution.

5. (1 point) Consider the following incomplete function.

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

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

(A) **★** 

$$(m \% n) != 0$$

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

6. (1 point) Consider the following Python program.
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
 d[i%3]+=e[i]
x=d[1]

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

(A) 8
(B) 3
(C) 0
(D) 16
(E) ★
12
Solution.

len("ABCDE"[1:4])
What value is produced?
(A) 5
(B) 4
(C) $\star$ 3
(D) 1
Solution.

7. (1 point) Evaluate the following expression:

```
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) **★**

- (C) [1, 2, 3]
- (D) [1, 2, 3, '123']
- (E) [1, 2, 3, 10]

```
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

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

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
```

a=3 b=4 if a==3:
b=a elif a==4:     a=5 else:     a=b
What is the <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.
(B) 5
(C) ★
3
(D) 7
(E) 4
Solution.

13. (1 point) Consider the following program:		
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>		
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?		
(A) Float		
(B) ★		
Boolean		
(C) Integer		
$(\mathrm{D})$ String		
$(\mathrm{E})$ None		
Solution.		

14. (1 point) Consider the following incomplete Python program.

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

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

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

s[i:i+2]

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

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ None
(B) ''
(C) False
(D) 'ORS'
(E) ★
['O', 'R']
Solution.

17. (1 point) Consider the following incomplete program.

sum=0

???:

sum=sum+i

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

(A) **★** 

for i in range(1,101)

- (B) while i<=100
- $(\mathrm{C})$  while i in range(100)
- $(\mathrm{D})$  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]

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

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

- (A) 0
- (B) 5
- (C) 6
- (D) 3
- (E) **★**

-1

<pre>x=2 a=6 if (a%3)==2:     x=x**3 elif(a%3)==1:</pre>
x=x**2 else:     x=x**1
What is the <b>value</b> of $x$ after this program is executed?
(A) None of the other answers are correct.
(B) 8
(C) 4
(D) <b>★</b>
2
(E) 16
Solution.

 $20.\ (1\ \mathrm{point})$  Consider the following program:

21.	(1	point)	Evaluate	the	following	expression:
	( <del>-</del>	Politi	_ raraacc	OIIC	101101111115	cripi obbion.

[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"]

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

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.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) ★
"MERLIN2"
(B) 0
(C) "MERLIN%i"
(D) "MERLINMERLIN"
$(\mathrm{E})$ None
Solution.

```
24. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1<s2:
    x.sort()
elif s1==s2:
   x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ★
     ['twelve', 'eleven', 'two', 'one']
 (B) ['one', 'two', 'eleven', 'twelve', 'six']
 (C) ['two', 'twelve', 'one', 'eleven', 'six']
 (D) ['one', 'two', 'eleven', 'twelve']
 (E) ['eleven', 'one', 'twelve', 'two']
```

25. (1 point) Consider the following program:
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x
y.reverse()
What is the value of x after this program is executed?

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

26. (1 point)	How car	n the following	g mathematical	equation	be impleme	nted as a	a Python	expression
Assume a, b,	and sir	have already	been defined.					

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

- (A) None of the other answers are correct.
- (B) **★**

- (C) a\*sin(b^a b)
- (D) a sin(a\*\*b b)
- (E) a\*sin(a^b b)

1=2	
x=3 while i < 7:	
x+=i	
i+=2	
What is the <b>value</b> of <b>x</b> after this program is executed?	
(A) 11	
(B) 14	
(C) 13	
(D) 12	
(E) ★	
15	
Solution.	

 $27.\ (1\ \mathrm{point})$  Consider the following program:

```
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 = 2wart = 3def knight(kay,wart): wart += 2 kay += 3return 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)  $\bigstar$  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 $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Integer
(B) ★
Boolean
$(\mathrm{C})$ None
$(\mathrm{D})$ Float
(E) String
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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']
```

len("ABCD"[0:3])			
What value is produced?			
(A) 2			
(B) ★ 3			
(C) 4			
(D) 1			
Solution.			

 $2.\ (1\ \mathrm{point})$  Evaluate the following expression:

```
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)  $\bigstar$  None of the other answers are correct.
- (C) 3
- (D) 2

4. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
Float
(B) Boolean
(C) Integer
$(\mathrm{D})$ String
(E) None
Solution.

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 <b>value</b> of x after this program is executed?
(A) ★
27
(B) 1
(C) 9
(D) 3
(E) None of the other answers are correct.
Solution.

a=3
b=4
if a!=b:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) 5
(B) 3
(C) 7
(D) None of the other answers are correct.
(E) ★
4
Solution.

```
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 equ	nation be implemented as a Python expression?
Assume a, b, and cos have already been defined.	

h		/		7 \
$a^{\circ}$	cos	a	_	<i>b</i> )

- (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) **★**

```
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) **★** 

- (B) [1, 2, 3, '1234']
- (C) [1, 2, 3]
- (D) [1, 2, 3, '123']
- (E) [1, 2, 3, 10]

s="-B-0-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
['O', 'R']
(B) ''
(C) False
(D) None
(E) 'ORS'

```
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

- $(\mathrm{C})$  ['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:</pre>

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

```
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

```
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) **★**

- (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	owing 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) []
```

```
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

pi="3.14159" e="2.71828" x=pi in pi*len(e)	
What is the <b>type</b> of <b>x</b> after this program is executed?	
(A) ★	
Boolean	
(B) String	
(C) None	
(D) Float	
(E) Integer	
Solution.	

22. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. We ignore indentation for this problem.

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

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

23. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) ★
Integer
(B) None
(C) String
(D) Boolean
(E) Float
Solution.

```
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)  $\bigstar$

"UTSP"

- (C) "PUST"
- (D) None of the other answers are correct.
- (E) "PSTU"

=2 x=3 vhile i < 7: x+=i i+=2
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 12
(B) 11
(C) 13
(D) 14
(E) ★
15
Solution.

 $25.\ (1\ \mathrm{point})$  Consider the following program:

26. (1 point) Consider the following program.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) "MERLIN%i"
(B) "MERLINMERLIN"
(C) 0
(D) ★
"MERLIN2"
(E) None
Solution.

27. (1 point) Consider the following program.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) 5
(B) 4
(C) ★
14
(D) 30
(E) 3
Solution.

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

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)
- $(\mathrm{E}) \ \texttt{[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]}$

x=str("1"*3)
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 111
(B) None of the other answers are correct.
(C) 3
(D) "3"
(E) ★
"111"
Solution.



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L.	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

len("ABCD"[0:3])			
What value is produced?			
(A) 4			
(B) 2			
(C) 1			
(D) ★ 3			
Solution.			

1. (1 point) Evaluate the following expression:

```
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:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Float
(B) None
(C) Integer
(D) Boolean
(E) ★
String
Solution.

```
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.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) 0
(B) ★
"MERLIN2"
(C) "MERLINMERLIN"
(D) None
(E) "MERLIN%i"
Solution.

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 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]

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 <b>value</b> of <b>x</b> after this program is executed?
(A) ★
2
(B) None of the other answers are correct.
(C) 8
(D) 16
(E) 4
Solution.

s="-B-O-R-S-" x=s.split("-")[2:-2]							
What is the <b>value</b> of <b>x</b> after this program is executed?							
(A) None							
(B) <b>★</b>							
['O', 'R']							
$(\mathrm{C})$ False							
(D) ''							
(E) 'ORS'							
Solution							

9. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3.0

- (A) [3.0, 6.0, 9.0]
- (B) [3, 6, 9]
- (C) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- (D) None of the above.
- (E) **★**

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

```
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']
- $(\mathrm{B})$  ['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.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) 5
(B) 4
(C) ★
14
(D) 30
(E) 3
Solution.

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

x=str(1.2)\*2

14. (1 point) Consider the following program:						
<pre>pi="3.14159" e="2.71828" x=pi in pi*len(e)</pre>						
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?						
(A) None						
(B) ★						
Boolean						
$(\mathrm{C})$ Float						
$(\mathrm{D})$ String						
$(\mathrm{E})$ Integer						
Solution.						

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

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

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

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 14
(B) 13
(C) ★
10
(D) 11
(E) 12
Solution.

 $20.\ (1\ \mathrm{point})$  Consider the following program:

 $21.\ (1\ \mathrm{point})$  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</pre>
```

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

- (A) 4
- (B) 3
- (C) **★**

2

- (D) 0
- (E) 1

```
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
```

```
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"

2	5. (1 point) Evaluate the following expression
[	[1,2]*len("3")
7	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 th	e following	mathematical	equation	be in	mplemented	as a	Python	express	ion?
Ass	sume a, b,	and a	sin hav	ve already l	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=3
b=4
if a!=b:
a=b
elif a==4:
a=5
else: b=a
What is the <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.
(B) ★
4
(C) 5
(D) 3
(E) 7
Solution.

 $27.\ (1\ \mathrm{point})$  Consider the following program:

28. (1 point) Consider the following program:						
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>						
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?						
$(\mathrm{A})$ String						
(B) ★						
Float						
(C) None						
(D) Integer						
(E) Boolean						
Solution.						

29. (1 point) Consider the following incomplete Python program.

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

What should replace the three question marks so the resulting value of  ${\tt x}$  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



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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

<pre>i=2 x=3 while i &lt; 7:     x+=i     i+=2</pre>	
What is the <b>value</b> of <b>x</b> after this program is executed?	
(A) 11	
(B) 12	
(C) 13	
(D) 14	
(E) ★	
15	
Solution.	

2. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

(A) **★** 

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

- (B) [3, 6, 9]
- (C) (3, 6, 9)
- (D) [3.0, 6.0, 9.0]
- $(\mathrm{E}) \ \texttt{[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]}$

```
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:						
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>						
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?						
(A) String						
(B) None						
(C) ★						
Float						
(D) Integer						
(E) Boolean						
Solution.						

```
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']

- $(\mathrm{B})$  ['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	g ma	thematical	equation	be	implemented	as a	a Python	express	sion?
As	sur	ne a, l	o, and	sin	have	e already	bee	n defined.							

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

- (A) a\*sin(b^a b)
- (B) a\*sin(a^b b)
- (C) **★**

- (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']
```

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

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</pre>

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:
11.	( τ	Pom()	Livaruate	UIIC	ionowing	cxpression.

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
- $(\mathrm{C})$  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) **★**

$$(m \% n) != 0$$

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 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) **★**

- (C) [3, 5, 6, 7, 7, 8]
- (D) [2, 4, 5, 6, 7, 7]
- (E) [3, 5, 7, 7]

len("ABCDE"[1:4])				
What value is produced?				
(A) 5				
(B) ★ 3				
(C) 4				
(D) 1				
Solution.				

16. (1 point) Evaluate the following expression:

```
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)  $\bigstar$  None of the other answers are correct.
- (B) 5
- (C) 3
- (D) 2

<pre>x=2 a=6 if (a%3)==2:     x=x**3 elif(a%3)==1:     x=x**2 else:</pre>			
x=x**1			
What is the <b>value</b> of <b>x</b> after this program is executed?			
(A) None of the other answers are correct.			
(B) 8			
(C) 4			
(D) ★			
2			
(E) 16			
Solution.			

19. (1 point) Consider the following program:			
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>			
What is the <b>type</b> of $x$ after this program is executed?			
(A) Integer			
(B) ★			
String			
(C) None			
(D) Float			
(E) Boolean			
Solution.			

<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>			
After it is run, what is the final <b>value</b> of $x$ ?			
(A) 14			
(B) 3			
(C) 5			
(D) 30			
(E) ★			
4			
Solution.			

 $20.\ (1\ \mathrm{point})$  Consider the following program.

pi="3.14159" e="2.71828" x=pi*len(e)+pi			
What is the <b>type</b> of <b>x</b> after this program is executed?			
(A) ★			
String			
$(\mathrm{B})$ Boolean			
(C) Float			
$(\mathrm{D})$ Integer			
$(\mathrm{E})$ None			
Solution.			

```
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
```

s="-B-0-R-S-" x=s.split("-")[2:-2]			
What is the <b>value</b> of $x$ after this program is executed?			
(A) ★			
['O', 'R']			
$(\mathrm{B})$ False			
(C) 'ORS'			
(D) ''			
$(\mathrm{E})$ None			

 $24.\ (1\ \mathrm{point})$  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 <b>value</b> of $x$ after this program is executed?				
(A) 33				
(B) ★				
"3str(3)"				
(C) None of the other answers are correct.				
(D) "33"				
(E) "333"				
Solution.				

```
a=["A","C","C","I","0"]
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)  $\bigstar$

"OCCIO"

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

a=3				
b=4				
if a==3:				
b=a				
elif a==4:				
a=5				
else:				
a=b				
What is the <b>value</b> of a after this program is executed?				
(A) ★				
3				
(B) 4				
(C) 5				
(D) None of the other answers are correct.				
(E) 7				
Solution.				

 $28.\ (1\ \mathrm{point})$  Consider the following 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"



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
- 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.

L.	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

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

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]

a=3
b=4
if a==3:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) 3
(B) None of the other answers are correct.
(C) 5
(D) ★
4
(E) 7
Solution.

len("ABCD"[0:3])		
What value is produced?		
(A) 2		
(B) ★ 3		
(C) 4		
(D) 1		
Solution.		

3. (1 point) Evaluate the following expression:

```
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)  $\bigstar$  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']
```

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

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

- (A) 2
- (B) -1
- (C) 5
- (D) **★**

3

(E) 4

<pre>i=2 x=3 while i &lt; 7:</pre>			
x+=i i+=2			
What is the <b>value</b> of $x$ after this program is executed?			
(A) 13			
(B) 14			
(C) 12			
(D) 11			
(E) ★			
15			
Solution.			

8. (1 point) Consider the following program:
<pre>pi="3.14159" e="2.71828" x=pi in pi*len(e)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
(B) ★
Boolean
(C) None
(D) Integer
$(\mathrm{E})$ String
Solution.

9. (1 point) Consider the following incomplete program.

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

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

- (A) sum+1=sum
- (B) **★**

sum=sum+i+1

- (C) sum=sum+1
- (D) sum=sum+i

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 'ORS'
$(\mathrm{B})$ False
(C) ''
(D) None
(E) ★
['O', 'R']
Solution.

```
11. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['one', 'two', 'eleven', 'twelve', 'six']
 (B) ['two', 'twelve', 'one', 'eleven', 'six']
 (C) ['one', 'two', 'eleven', 'twelve']
 (D) ★
     ['eleven', 'one', 'twelve', 'two']
 (E) ['twelve', 'eleven', 'two', 'one']
```

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:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
String
(B) Float
(C) Integer
$(\mathrm{D})$ None
(E) Boolean
Solution.

```
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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) ★
Boolean
(B) Float
(C) String
$(\mathrm{D})$ None
$(\mathrm{E})$ Integer
Solution.

16. (1 point) Consider the following program.
s="ABCBA"
x=0
y=len(s)-1
while s[x]==s[y] and x<=y:
 x+=1
 y-=1</pre>

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]
- $(\mathrm{E}) \ \texttt{[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]}$

```
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
```

```
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)  $\bigstar$ 
  - 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.
<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) 14
(B) 5
(C) 3
(D) ★
4
(E) 30
Solution.

<pre>x=3 a=5 if (a%3)==2:     x=x**3 elif(a%3)==1:     x=x**2 else:     x=x**1</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 3
(B) ★
27
(C) None of the other answers are correct.
(D) 9
(E) 1
Solution.

 $23.\ (1\ \mathrm{point})$  Consider the following program:

24.	(1 point)	How	can t	the f	following	math	nematical	equation	be	implemented	as a	Python	express	ion?
Ass	ume a, b	and	cos h	ave	already	oeen	defined.							

h		/		7 \	
$a^{\circ}$	cos	(a)	_	b)	

- (A) (a\*\*b)cos(a-b)
- (B) **★**

- (C) (b^a)cos(a-b)
- (D) (a^b)\*cos(a-b)
- (E) None of the other answers are correct.

~ F	/ -1	•		. 1	C 11 .	
25. (		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

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

x=str("1"*3)
What is the <b>value</b> of $x$ after this program is executed?
(A) 111
(B) 3
(C) None of the other answers are correct.
(D) "3"
(E) ★
"111"
Solution.

 $29.\ (1\ \mathrm{point})$  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"



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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

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

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

- (A) 0
- (B) 5
- (C) 3
- (D) 6
- (E) **★**

-1

pi="3.14159" e="2.71828" x=pi*len(e)+pi	
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?	
(A) ★	
String	
(B) None	
(C) Integer	
(D) Boolean	
(E) Float	
Solution.	

x=0 i=1 while(i*i)<=9: x=x+(i*i) i=i+1
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 5
(B) 4
(C) 3
(D) ★
14
(E) 30
Solution.

```
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)  $\bigstar$  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
Solution.

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

What is the **value** of  ${\tt x}$  after this program is executed?

x=str(1.2)\*2

8. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Float
(B) ★
Integer
$(\mathrm{C})$ None
(D) Boolean
$(\mathrm{E})$ String
Solution.

=3 =2 nile i < 7: x+=i i+=2
That is the <b>value</b> of <b>x</b> after this program is executed?
(A) 11
(B) ★
10
(C) 13
(D) 14
(E) 12
olution.

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]
- $(\mathrm{D})$  None of the above.
- (E) [3, 6, 9]

[1,2]*len("3")			
What value is produced?			
(A) [1,2,3]			
(B) [1,2,1]			
(C) [1,2,1,2,1,2]			
(D) <b>★</b>			
[1,2]			
-			
Solution.			

11. (1 point) Evaluate the following expression:

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 o	can the	following	mathematical	equation	be i	implemented	as a	Python	expressi	on?
Assume a, b	, and c	os have	already l	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)

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']
```

```
a=["A","C","C","I","0"]
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"

	a==4: a=5
else	:
	a=b
Wha	t is the <b>value</b> 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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Integer
(B) None
(C) String
(D) Float
(E) ★
Boolean
Solution.

20. (1 point) Consider the following program.

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

s=artificing("MERLIN")

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

(A) "MERLIN"

(B) None

(C) 12

(D) "MERLIN2"

(E) ★

"MERLINMERLIN"

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</pre>

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

(A) **★** 

2

- (B) 0
- (C) 4
- (D) 3
- (E) 1

```
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) **★** 

- (B) [1, 2, 3, '123']
- (C) [1, 2, 3, '1234']
- (D) [1, 2, 3]
- (E) [1, 2, 3, 10]

```
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
```

len("ABCDE"[1:4])	
What value is produced?	
(A) 1	
(B) ★ 3	
(C) 5	
(D) 4	
	_
Solution.	

26. (1 point) Evaluate the following expression:

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

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

- (A) 10
- (B) 13
- (C) 14
- (D) **★**

12

(E) 11

Solution.
(E) 9
(D) None of the other answers are correct.
(C) 7
3
(B) ★
(A) 1
What is the <b>value</b> of x after this program is executed?
x=x**1 else:     x=x**0
x=x**2 elif(a%3)==1:
if (a%3)==2:
x=3 a=7

 $28.\ (1\ \mathrm{point})$  Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 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']
```



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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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. 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"
Solution.

 $3.\ (1\ \mathrm{point})$  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</pre>
```

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

- (A) 4
- (B) 1
- (C) **★**

2

- (D) 0
- (E) 3

```
a=["A","C","C","I","0"]
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']
- $(E) \hbox{ ['King Pellinore', 'Sir Agravaine']}\\$

[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]

```
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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Integer
(B) Boolean
(C) ★
Float
(D) None
$(\mathrm{E})$ String
Solution.

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

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

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

(A) **★** 

$$(m \% n) != 0$$

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

<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
Boolean
$(\mathrm{B})$ Float
(C) String
(D) Integer
$(\mathrm{E})$ None
Solution.

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

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:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
$(\mathrm{B})$ None
(C) String
(D) ★
Integer
(E) Boolean
Solution.

15. (1 point) Consider the following program.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) 4
(B) 5
(C) ★
14
(D) 30
(E) 3
Solution.

```
16. (1 point) Consider the following program.
kay = 2
wart = 3

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

wart = knight(kay, kay) + knight(wart, wart)
After it is run, what is the final value of wart?

(A) 5
(B) 3
(C) 2
```

(D)  $\bigstar$  None of the other answers are correct.

```
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

<pre>i=2 x=3 while i &lt; 7:     x+=i     i+=2</pre>	
What is the <b>value</b> of <b>x</b> after this program is executed?	
(A) 12	
(B) 11	
(C) ★	
15	
(D) 13	
(E) 14	
Solution.	

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

sum=0

???:

sum=sum+i

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

(A) **★** 

for i in range(1,101)

- $(\mathrm{B})$  for i in range(0,100)
- (C) while i<=100
- $(\mathrm{D})$  while i in range(100)

```
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
- $(\mathrm{B})$  ['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']

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ''
(B) 'ORS'
(C) None
$(\mathrm{D})$ False
(E) ★
['O', 'R']
Solution.

```
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 <b>value</b> of $x$ after this program is executed?
(A) "333"
(B) None of the other answers are correct.
(C) ★
"3str(3)"
(D) "33"
(E) 33
Solution.

<pre>a=3 b=4 if a==3:     b=a elif a==4:     a=5 else:</pre>
a=b
What is the <b>value</b> of a after this program is executed?
(A) 4
(B) ★
3
(C) 5
(D) None of the other answers are correct.
(E) 7
Solution.

 $24.\ (1\ \mathrm{point})$  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)  $\bigstar$

26.	(1 poin	t) How	can th	ne following	mathematical	equation	be	implemented	as a	Python	expressi	on i
Ass	sume a,	b, and	cos ha	ve already l	been defined.							

h		/		7 \	
$a^{\circ}$	cos	(a)	_	b)	

- (A) (a\*\*b)cos(a-b)
- (B) None of the other answers are correct.
- (C) (a^b)\*cos(a-b)
- (D) **★**

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

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 <b>value</b> of $x$ after this program is executed?						
(A) 9						
(B) None of the other answers are correct.						
(C) ★						
3						
(D) 7						
(E) 1						
Solution.						

 $27.\ (1\ \mathrm{point})$  Consider the following program:

```
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']
```

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i < 3:

x[i]+=1

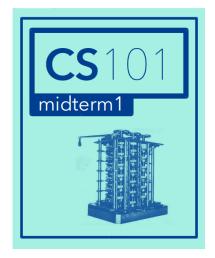
i+=1
```

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]

len("ABCDE"[1:4])		
What value is produced?		
(A) 1		
(B) 4		
(C) 5		
(D) ★ 3		
Solution.		

30. (1 point) Evaluate the following expression:



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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"]

x=str("1"*3)
What is the value of $x$ after this program is executed?
(A) 3
(B) None of the other answers are correct.
(C) "3"
(D) 111
(E) ★
"111"
Solution.

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

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

- (A) 5
- (B) 6
- (C) **★** 
  - -1
- (D) 3
- (E) 0

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 <b>value</b> of <b>x</b> after this program is executed?
(A) 16
(B) 8
(C) None of the other answers are correct.
(D) ★
2
(E) 4
Calution
Solution.

5. (1 point) Consider the following incomplete function.

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

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

- (A) (n // m) == 0
- (B) **★**

$$(m \% n) != 0$$

- (C) (n % m) == 0
- (D) (m // n) != 0

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']

```
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)	$\operatorname{How}$	can	the	following	mathemat	ical	equation	be	implemented	as a	Python	expres	ssion
Assur	me a, b	, and	cos	have	e already	been define	ed.							

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

- (A) None of the other answers are correct.
- (B) (b^a)cos(a-b)
- (C) (a\*\*b)cos(a-b)
- (D) **★**

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

a=3
b=4
if a==3:
b=a
elif a==4:
a=5
else:
a=b
What is the <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.
(B) ★
3
(C) 7
(D) 5
(D) 3
(E) 4
Solution.

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

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]

<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of $x$ ?
(A) 30
(B) 3
(C) 14
(D) 5
(E) ★
4
Solution.

```
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

```
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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) ★
Boolean
$(\mathrm{B})$ None
(C) Integer
(D) Float
$(\mathrm{E})$ String
Solution.

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 14
(B) 13
(C) ★
10
(D) 11
(E) 12
Solution.

18. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. We ignore indentation for this problem.

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

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

```
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) **★**

- (D) [1, 2, 3, '1234']
- (E) [1, 2, 3, '123']

20. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
String
(B) Float
(C) Boolean
(D) Integer
$(\mathrm{E})$ None
Solution.

21. (1 point) Consider the following program:							
<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>							
What is the <b>type</b> of x after this program is executed?							
$(\mathrm{A})$ None							
(B) ★							
Boolean							
(C) Integer							
(D) Float							
(E) String							
Solution.							

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

[ 1, 2, 3 ] \* 3

(A) **★** 

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

- (B) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- (C) [3, 6, 9]
- (D) (3, 6, 9)
- (E) [3.0, 6.0, 9.0]

```
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']
```

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) None
$(\mathrm{B})$ False
(C) 'RAI'
(D) ★
['R','A']
(E) 3
Solution.

 $24.\ (1\ \mathrm{point})$  Consider the following program:

```
a=["A","C","C","I","0"]
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"

len("ABCD"[0:3])
What value is produced?
(A) 1
(B) 2
(C) ★ 3
(D) 4
Solution.

26. (1 point) Evaluate the following expression:

```
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
```

Solution.

(D) 5

28. (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
- $(\mathrm{D})$  for i in range(0,100)



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- There are 30 questions, worth 1 point each.
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- This is a 60-minute exam.
- $\bullet$  There are several different versions of this exam.

L.	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:				
<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>				
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?				
(A) Integer				
(B) ★				
Boolean				
(C) None				
(D) String				
(E) Float				
Solution.				

2. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
$(\mathrm{A})$ None
$(\mathrm{B})$ Integer
$(\mathrm{C})$ String
(D) Float
(E) ★
Boolean
Solution.

3. (1 point) Consider the following program.							
<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>							
After it is run, what is the final <b>value</b> of <b>x</b> ?							
(A) 3							
(B) ★							
4							
(C) 5							
(D) 30							
(E) 14							
Solution.							

4. (1 point) Consider the following program.							
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>							
s=artificing("MERLIN")							
After it is run, what is the final <b>value</b> of s?							
(A) 12							
(B) "MERLIN2"							
(C) "MERLIN"							
(D) ★							
"MERLINMERLIN"							
$(\mathrm{E})$ None							
Solution.							

x=str("1"*3)									
What is the <b>value</b> of <b>x</b> after this program is executed?									
(A) 111									
(B) 3									
(C) ★									
"111"									
(D) None of the other answers are correct.									
(E) "3"									
Solution.									

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

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:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Boolean
(B) Float
(C) String
(D) None
(E) ★
Integer
Solution.

n=2										
a=3 b=4										
p-4 if a==3:										
a=b										
elif a==4:										
a=5										
else:										
b=a										
What is the <b>value</b> of a after this program is executed?										
(A) None of the other answers are correct.										
(B) 3										
(C) ★										
4										
(D) 5										
(E) 7										
Solution.										

9. (	(1 point)	How	can	the t	following	matl	hematical	equation	${\rm be}$	implemented	as a	Python	express	sion
Ass	ume 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) **★**

- (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 <b>value</b> of $x$ after this program is executed?
(A) 1
(B) 9
(C) None of the other answers are correct.
(D) ★
3
(E) 7
Solution.

```
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']

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ None
(B) 'ORS'
(C) ★
['O', 'R']
(D) False
(E) ''
Solution.
DOI WILDIN

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 3:

x[i]+=1

i+=1
```

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

(A) **★** 

- (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]

```
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']
```

```
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

- $(\mathrm{B})$  ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
- (D) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- $(\mathrm{E})$  ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of x after this program is executed?
(A) ★
10
(B) 14
(C) 12
(D) 11
(E) 13
Solution.

```
20. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1<s2:
    x.sort()
elif s1==s2:
   x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['two', 'twelve', 'one', 'eleven', 'six']
 (B) ['one', 'two', 'eleven', 'twelve']
 (C) ★
     ['twelve', 'eleven', 'two', 'one']
 (D) ['one', 'two', 'eleven', 'twelve', 'six']
 (E) ['eleven', 'one', 'twelve', 'two']
```

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</pre>

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

- (A) 3
- (B) 4
- (C) **★**

2

- (D) 1
- (E) 0

```
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	noint)	Frelucto	+ho	following	expression:
∠o. (	L	pomi	Lvaiuate	une	lollowing	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"]

len("ABCDE"[1:4])		
What value is produced?		
(A) 1		
(B) 5		
(C) 4		
(D) <b>★</b> 3		
Solution.		

 $24.\ (1\ \mathrm{point})$  Evaluate the following expression:

 $25.\ (1\ \mathrm{point})$  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)

- $(\mathrm{C})$  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
```

## Solution.

(D) 2

```
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  ${\tt x}$  is 33?

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

s[i:i+2]

```
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]
- $(\mathrm{B})$  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]

 ${\bf Solution.}$ 



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

1.	Fill in your information:	
	Full Name:	
	UIN (Student Number):	
	NetID:	

- 2. Fill in the following answers on the Scantron form:
  - 92. D
  - 93. E
  - 94. A
  - 95. A
  - 96. D

1. (1 point) Consider the following program:									
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>									
What is the <b>type</b> of $x$ after this program is executed?									
(A) String									
(B) None									
(C) Integer									
(D) Boolean									
(E) ★									
Float									
Solution.									

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

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

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

(A) **★** 

$$(m \% n) != 0$$

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

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
```

Solution.

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

=0 =1 hile(i*i)<=9: x=x+(i*i) i=i+1
fter it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 5
(B) ★
14
(C) 30
(D) 4
(E) 3
olution.

5.	(1	point)	) How	can	the	following	ma ma	thematical	equation	be	implemented	as a	a Python	express	sion?
As	ssur	ne a, l	o, and	sin	have	e already	beer	n 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)  $\bigstar$

(E) None of the other answers are correct.

6. (1 point) Consider the following program:							
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>							
What is the <b>type</b> of $x$ after this program is executed?							
$(\mathrm{A})$ None							
(B) ★							
String							
(C) Float							
(D) Integer							
(E) Boolean							
Solution.							

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

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

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

(A) **★** 

sum=sum+i+1

- (B) sum=sum+i
- (C) sum+1=sum
- (D) sum=sum+1

a=3 b=4 if a==3: a=b
elif a==4:     a=5 else:     b=a
What is the <b>value</b> of a after this program is executed?
(A) ★
4
(B) 7
(C) None of the other answers are correct.
(D) 3
(E) 5
Solution.

```
9. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ★
     ['eleven', 'one', 'twelve', 'two']
 (B) ['one', 'two', 'eleven', 'twelve', 'six']
 (C) ['one', 'two', 'eleven', 'twelve']
 (D) ['two', 'twelve', 'one', 'eleven', 'six']
 (E) ['twelve', 'eleven', 'two', 'one']
```

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]

<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
Boolean
$(\mathrm{B})$ Integer
(C) None
$(\mathrm{D})$ String
(E) Float
Solution.

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
10
(B) 14
(C) 11
(D) 13
(E) 12
Solution.

<pre>x=3 a=5 if (a%3)==2:     x=x**3 elif(a%3)==1:     x=x**2 else:     x=x**1</pre>
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 9
(B) 3
(C) ★
27
(D) None of the other answers are correct.
(E) 1
Solution.

```
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']
- $(\mathrm{E})$  ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']

```
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']

```
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

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
['R','A']
(B) 3
(C) False
(D) 'RAI'
(E) None
Solution.

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

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 = 2wart = 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)  $\bigstar$  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]

```
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)	${\bf Consider}$	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"

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 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]

What value is produced?		
(A) [1,2,1]		
(B) [1,2,1,2,1,2]		
(C) ★		
[1,2]		
(D) [1,2,3]		

 $25.\ (1\ \mathrm{point})$  Evaluate the following expression:

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

len("ABCDE"[1:4])
What value is produced?
(A) ★ 3
(B) 5
(C) 1
(D) 4
Solution.

26. (1 point) Evaluate the following expression:

```
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

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

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

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"



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- No books, notes, or electronic devices are permitted.
- This is a 60-minute exam.
- $\bullet$  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:
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Boolean
(B) None
(C) ★
Integer
(D) Float
(E) String
Solution.

x=0 i=1 while(i*i)<=9: x=x+(i*i) i=i+1
After it is run, what is the final <b>value</b> of $x$ ?
(A) 5
(B) 30
(C) 4
(D) 3
(E) ★
14
Solution.

5. (1 point) Consider the following program:
<pre>x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-") y=x x=y.reverse()</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
(B) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
(C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
(D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
(E) ★
None
Solution.

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

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
```

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of $x$ after this program is executed?
(A) 'RAI'
(B) 3
(C) False
(D) ★
['R','A']
(E) None
Solution.

```
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) **★**

- (C) [1, 2, 3, 10]
- (D) [1, 2, 3, '1234']
- (E) [1, 2, 3]

10. (1 point) Consider the following program:
<pre>pi="3.14159" e="2.71828" x=pi in pi*len(e)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Integer
(B) None
(C) ★
Boolean
$(\mathrm{D})$ String
(E) Float
Solution.

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

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

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

- (A) sum=sum+1
- (B) sum+1=sum
- (C) ★

sum=sum+i+1

(D) sum=sum+i

2
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 <b>value</b> of $x$ after this program is executed?
(A) ★
27
(B) 1
(C) 3
(D) None of the other answers are correct.
(E) 9
Solution.

```
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) **★** 

- (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

len("ABCD"[0:3])	
What value is produced?	
(A) 4	
(B) 2	
(C) 1	
(D) ★ 3	
Solution.	

16. (1 point) Evaluate the following expression:

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]

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) ★
10
(B) 11
(C) 14
(D) 12
(E) 13
Solution.

19. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Boolean
(B) Float
(C) ★
String
(D) None
(E) Integer
Solution.

```
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)  $\bigstar$  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']
```

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

<pre>a=3 b=4 if a!=b:     a=b elif a==4:     a=5 else:</pre>
b=a
What is the <b>value</b> of a after this program is executed?
(A) ★
4
(B) 3
(C) 7
(D) 5
(E) None of the other answers are correct.
Solution.

 $23.\ (1\ \mathrm{point})$  Consider the following program:

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	$\operatorname{can}$	the	follow	ing	mat	hema	atical	equa	tion	be	imp	lemen	ted	as a	Pyt	thon	expr	essio	n'
Ass	sum	e a, b,	and	cos l	have	alread	dy t	oeen	defii	ned.												

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

- (A) (a\*\*b)cos(a-b)
- (B) **★**

- (C) None of the other answers are correct.
- (D) (b^a)cos(a-b)
- (E) (a^b)\*cos(a-b)

```
a=["A","C","C","I","0"]
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)  $\bigstar$

"OCCIO"

- (D) "ICCOI"
- (E) "ACCIA"

```
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

```
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)	${\bf Consider}$	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]



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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

```
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

<pre>x=3 a=7 if (a%3)==2:     x=x**2 elif(a%3)==1:     x=x**1</pre>
else: x=x**0
What is the <b>value</b> of x after this program is executed?
(A) 7
(B) ★
3
(C) 1
(D) None of the other answers are correct.
(E) 9
Solution.

3. (1 point) Consider the following program:
<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
(B) ★
Boolean
$(\mathrm{C})$ Integer
$(\mathrm{D})$ None
(E) String
Solution.

a=3
b=4
if a!=b:
a=b
elif a==4:
a=5
else: b=a
D-a
What is the <b>value</b> of a after this program is executed?
(A) 3
(B) ★
4
<b>4</b>
(C) 5
(D) None of the other answers are correct.
(E) 7
Solution.

i=2 x=3 while i < 7: x+=i i+=2
What is the <b>value</b> of $x$ after this program is executed?
(A) ★
15
(B) 14
(C) 12
(D) 11
(E) 13
Solution.

```
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]

```
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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the $\mathbf{type}$ of $x$ after this program is executed?
$(\mathrm{A})$ Float
(B) ★
Boolean
(C) Integer
$(\mathrm{D})$ String
$(\mathrm{E})$ None
Solution.

9. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ None
(B) Boolean
$(\mathrm{C})$ String
(D) ★
Integer
(E) Float
Solution.
501001011.

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
- $(\mathrm{D})$  for i in range(0,100)

```
a=["A","C","C","I","0"]
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)  $\bigstar$  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.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 30
(B) 4
(C) ★
14
(D) 3
(E) 5
Solution.

len("ABCD"[0:3])	
What value is produced?	
$(A) \star 3$	
(B) 1	
(C) 4	
(D) 2	
	_
Solution.	

17. (1 point) Evaluate the following expression:

18. (1 point) Evaluate the following expression:
[1,2]*len("3")

(4) 5: - :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
```

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ False
(B) 'RAI'
(C) ★
['R','A']
$(\mathrm{D})$ None
(E) 3
Solution.

 $20.\ (1\ \mathrm{point})$  Consider the following program:

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

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.								
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>								
s=artificing("MERLIN")								
After it is run, what is the final <b>value</b> of s?								
(A) "MERLIN%i"								
(B) 0								
(C) None								
(D) "MERLINMERLIN"								
(E) ★								
"MERLIN2"								
Solution.								

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 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.

```
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']

x=str(3)+"str(3)"								
What is the <b>value</b> of x after this program is executed?								
(A) "33"								
(B) "333"								
(C) 33								
(D) None of the other answers are correct.								
(E) ★								
"3str(3)"								
Solution.								

28. (1 point)

```
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) I	How can th	e following	mathematical	equation	be implem	ented as	a Python	expression?
Assume a, b, a	and cos hav	ve already b	peen defined.					

h		/		7 \
$a^{\circ}$	cos	a	_	<i>b</i> )

- (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)



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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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.

L.	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
```

 $2.\ (1\ \mathrm{point})$  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

```
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) **★** 

- (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]

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

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']
```

```
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) **★**

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ None
(B) ''
(C) ★
['O', 'R']
(D) False
(E) 'ORS'
Solution.

```
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']

<pre>1=2 x=3 while i &lt; 7:     x+=i     i+=2</pre>	
What is the <b>value</b> of <b>x</b> after this program is executed?	
(A) 14	
(B) 11	
(C) 13	
(D) 12	
(E) ★	
15	
Solution.	

11. (1 point) Consider the following program:					
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>					
What is the $\mathbf{type}$ of $x$ after this program is executed?					
(A) Boolean					
(B) ★					
Float					
$(\mathrm{C})$ String					
(D) None					
$(\mathrm{E})$ Integer					
Solution.					

12	(1	point	Evaluate	the	following	expression:
14.	\	POILIO.	Dvaruacc	UIIC	ionowing	CAPI Coololl.

What value is produced?

- (A) [1,2,1,2,1,2]
- (B) [1,2,"3"]
- (C) [1,2,3]
- (D) **★**

[1,2,1]

```
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.
```

## Solution.

(D) 2

15. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
$(\mathrm{B})$ None
(C) String
(D) Boolean
(E) ★
Integer
Solution.

16. (1 point) Consider the following program.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) ★
14
(B) 5
(C) 30
(D) 3
(E) 4
Solution.

a=3
b=4
if a!=b:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.
(B) 3
(C) ★
4
(D) 5
(E) 7
Solution.

```
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) **★**

(E) [1, 2, 3]

19. (1 point)	) How	can the	following	mathematical	equation	be:	implemented	as a	Python	express	ion i
Assume a, b	, and c	os have	already l	been defined.							

h		/		7 \
$a^{\circ}$	cos	(a)	_	b

- (A) (a^b)\*cos(a-b)
- (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]
- $(\mathrm{D})$  None of the above.
- (E) [3, 6, 9]

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

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.						
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>						
s=artificing("MERLIN")						
After it is run, what is the final <b>value</b> of s?						
(A) ★						
"MERLINMERLIN"						
(B) "MERLIN"						
(C) "MERLIN2"						
(D) 12						
$(\mathrm{E})$ None						
Solution.						

23. (1 point) Consider the following incomplete function.

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

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

- (A) (m // n) != 0
- (B) **★**

$$(m \% n) != 0$$

- (C) (n // m) == 0
- (D) (n % m) == 0

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  ${\tt x}$  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 <b>value</b> of $x$ after this program is executed?
(A) "33"
(B) "333"
(C) 33
(D) ★
"3str(3)"
(E) None of the other answers are correct.
Solution.

Len("ABCDE"[1:4])
What value is produced?
$(A) \bigstar 3$
(B) 5
(C) 1
(D) 4
Solution.

27. (1 point) Evaluate the following expression:

```
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"

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 <b>value</b> of x after this program is executed?
(A) None of the other answers are correct.
(B) 1
(C) ★
3
(D) 7
(E) 9
Solution.

 $29.\ (1\ \mathrm{point})$  Consider the following program:

pi="3.14159" e="2.71828" x=pi*len(e)+pi
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
(B) None
(C) ★
String
$(\mathrm{D})$ Boolean
$(\mathrm{E})$ Integer
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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
```

Solution.

(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]

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

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

- (A) [2, 4, 5, 5, 7, 7]
- (B) **★**

- (C) [3, 5, 7, 7]
- (D) [2, 4, 5, 6, 7, 7]
- (E) [3, 5, 6, 7, 7, 8]

```
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	g ma	the matical	equation	be	implemented	as a	a Python	express	sion?
As	sur	ne a, l	o, and	sin	have	e already	bee	n defined.							

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

- (A) a\*sin(b^a b)
- (B) a\*sin(a^b b)
- (C) **★**

- (D) None of the other answers are correct.
- (E) a sin(a\*\*b b)

len("ABCD"[0:3]	)		
What value is pro-	duced?		
(A) ★ 3			
(B) 1			
(C) 2			
(D) 4			

7. (1 point) Evaluate the following expression:

```
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]

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 <b>value</b> of <b>x</b> after this program is executed?
(A) 7
(B) None of the other answers are correct.
(C) ★
3
(D) 1
(E) 9
Solution

10 (	1	point	) Evaluate	the	following	expression:
10. (	Τ.	pom.	) Evaluate	0110	ionowing	expression.

What value is produced?

- (A) [1,2,"3"]
- (B) [1,2,1,2,1,2]
- (C) [1,2,3]
- (D) **★**

[1,2,1]

 $11.\ (1\ \mathrm{point})$  Consider the following program.

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

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']
```

```
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)  $\bigstar$  None of the other answers are correct.
- (B) 3
- (C) 5
- (D) 2

15. (1 point) Consider the following program:								
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>								
What is the <b>type</b> of <b>x</b> after this program is executed?								
(A) Boolean								
(B) None								
(C) String								
(D) ★								
Integer								
(E) Float								
Solution.								

16. (1 point) Consider the following program:								
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>								
What is the <b>type</b> of <b>x</b> after this program is executed?								
(A) String								
(B) Float								
(C) ★								
Boolean								
$(\mathrm{D})$ Integer								
(E) None								
Solution.								

17. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3.0

- (A) None of the above.
- (B) [3, 6, 9]
- (C) [3.0, 6.0, 9.0]
- (D) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- (E) **★**

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

```
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

```
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

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ''
(B) 'ORS'
(C) None
(D) ★
['O', 'R']
(E) False
Solution.

 $20.\ (1\ \mathrm{point})$  Consider the following program:

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
- $(\mathrm{B})$  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 <b>value</b> of $x$ after this program is executed?		
(A) "33"		
(B) None of the other answers are correct.		
(C) "333"		
(D) ★		
"3str(3)"		
(E) 33		
Solution.		

24. (1 point) Consider the following program.		
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>		
s=artificing("MERLIN")		
After it is run, what is the final <b>value</b> of s?		
(A) "MERLIN%i"		
(B) None		
(C) 0		
(D) ★		
"MERLIN2"		
(E) "MERLINMERLIN"		
Solution.		

pi="3.14159" e="2.71828" x=pi*len(e)+pi	
What is the <b>type</b> of $x$ after this program is executed?	
(A) Integer	
(B) None	
(C) Float	
$(\mathrm{D})$ Boolean	
(E) ★	
String	
Solution.	

 $25.\ (1\ \mathrm{point})$  Consider the following program:

=2 =3 nile i < 7: x+=i i+=2
That is the <b>value</b> of <b>x</b> after this program is executed?
A) 12
B) 13
C) ★
15
D) 14
E) 11
olution.

a=3							
b=4 if a!=b:							
							a=b elif a==4:
a=5							
else:							
b=a							
What is the <b>value</b> of a after this program is executed?							
(A) 5							
(B) None of the other answers are correct.							
(C) ★							
4							
(D) 3							
(E) 7							
Solution.							

 $27.\ (1\ \mathrm{point})$  Consider the following program:

 $28.\ (1\ \mathrm{point})$  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.
<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) ★
4
(B) 3
(C) 5
(D) 30
(E) 14
Solution.

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

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

- (A) 0
- (B) **★**

-1

- (C) 5
- (D) 3
- (E) 6



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- There are several different versions of this exam.

L.	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:				
<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>				
What is the $\mathbf{type}$ of x after this program is executed?				
(A) None				
(B) Float				
(C) Integer				
(D) ★				
Boolean				
$(\mathrm{E})$ String				
Solution.				

2. (1 point) Consider the following program:				
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>				
What is the <b>type</b> of $x$ after this program is executed?				
(A) ★				
String				
(B) None				
(C) Integer				
$(\mathrm{D})$ Boolean				
(E) Float				
Solution.				

3. (1 point) Evaluate the following expression
[1,2]*len("3")
What value is produced?

- (A) [1,2,3]
- (B) **★**

[1,2]

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

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

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

- (A) 0
- (B) 6
- (C) **★** 
  - -1
- (D) 3
- (E) 5

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

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]

```
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 <b>value</b> of <b>x</b> after this program is executed?
(A) "333"
(B) "33"
(C) ★
"3str(3)"
(D) 33
(E) None of the other answers are correct.
Solution.

```
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]

```
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

<pre>i=2 x=3 while i &lt; 7:     x+=i     i+=2</pre>							
What is the val	What is the <b>value</b> of <b>x</b> after this program is executed?						
(A) 12							
(B) 11							
(C) <b>★</b>							
15							
(D) 13							
(E) 14							
Solution.							

11. (1 point) Consider the following program.
<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) ★
4
(B) 30
(C) 3
(D) 5
(E) 14
Solution.

s="-B-0-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of x after this program is executed?
(A) 'ORS'
(B) <b>★</b>
['O', 'R']
(C) False
(D) ''
(E) None
Solution.

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

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)  $\bigstar$  None of the other answers are correct.

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 <b>value</b> of <b>x</b> after this program is executed?
(A) ★
27
(B) None of the other answers are correct.
(C) 1
(D) 9
(E) 3
Solution.

16. (1 point) Consider the following incomplete function.

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

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

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

(m % n) != 0

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  ${\bf value}$  of  ${\tt x}?$ 

- (A) 0
- (B) 7
- (C) 12
- (D)  $\bigstar$

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

len("ABCD"[0:3])				
What value is produced?				
(A) 2				
(B) ★ 3				
(C) 1				
(D) 4				
Solution.				

19. (1 point) Evaluate the following expression:

```
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']
- $(\mathrm{B})$  ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
- (C) ★

None

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

<pre>a=3 b=4 if a!=b:     a=b elif a==4:     a=5 else:     b=a</pre>
What is the <b>value</b> of a after this program is executed?
(A) ★
4
(B) 7
(C) None of the other answers are correct.
(D) 3
(E) 5
Solution.

```
22. (1 point) Consider the following program:
a=["merlin", "sir agravaine", "king pellinore"]
b=[ ]
for i in range(0,3):
    b.append(a[0-i].title())
What is the value of b after this program is executed?
(A) ★
    ['Merlin', 'King Pellinore', 'Sir Agravaine']
(B) ['Sir Agravaine', 'King Pellinore']
(C) [ ]
```

 $(\mathrm{D})$  ['King Pellinore', 'Sir Agravaine', 'Merlin']

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

```
a=["A","C","C","I","0"]
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  ${\tt x}$  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 i	mplemented	as a	Python	expressi	on?
Assume a, b	o, and	cos have	e already l	been defined.							

h		/		7 \	
$a^{\circ}$	cos	(a)	_	b)	

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

Solution.

(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']
 (\mathrm{D}) ['one', 'two', 'eleven', 'twelve']
 (E) ★
     ['eleven', 'one', 'twelve', 'two']
```

28. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) String
(B) ★
Boolean
$(\mathrm{C})$ Integer
$(\mathrm{D})$ None
(E) Float
Solution.

29. (1 point) Consider the following program.

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

s=artificing("MERLIN")

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

(A) \*

 "MERLINMERLIN"

(B) "MERLIN2"

(C) None

(D) 12

(E) "MERLIN"

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]



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.
- $\bullet$  There are several different versions of this exam.

L.	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 <b>value</b> of $x$ after this program is executed?
(A) ★
"3str(3)"
(B) None of the other answers are correct.
(C) "33"
(D) "333"
(E) 33
Solution.

```
2. (1 point) Consider the following program:
a=["merlin","sir agravaine","king pellinore"]
b=[]
for i in range(0,4):
    b.append(a[0-i].title())
What is the value of b after this program is executed?

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

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

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

- (A) -1
- (B) **★**

3

- (C) 5
- (D) 2
- (E) 4

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 <b>value</b> of $x$ after this program is executed?
(A) 8
(B) None of the other answers are correct.
(C) 4
(D) ★
2
(E) 16
Solution.

5. (1 point) Consider the following Python program.
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
 d[i%3]+=e[i]
x=d[2]
After it is run, what is the final value of x?

- (A) 8
- (B) 7
- (C) **★**

16

- (D) 12
- (E) 0

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

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

(A) **★** 

3

- (B) 4
- (C) 0
- (D) 1
- (E) 2

=3 t=2 thile i < 7: x+=i i+=2
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 11
(B) 13
(C) ★
10
(D) 12
(E) 14
Solution.

8. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
$(\mathrm{A})$ None
(B) String
(C) Boolean
(D) Integer
(E) ★
Float
Solution.

len("ABCD"[0:3])		
What value is produced?		
(A) 1		
(B) 4		
(C) 2		
(D) $\bigstar$ 3		
Solution.		

9. (1 point) Evaluate the following expression:

```
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.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) ★
14
(B) 3
(C) 5
(D) 30
(E) 4
Solution.

s="-B-O-R-S-" x=s.split("-")[2:-2]	
What is the <b>value</b> of <b>x</b> after this program is executed?	
(A) 'ORS'	
(B) ''	
(C) ★	
['O', 'R']	
$(\mathrm{D})$ False	
(E) None	
Solution.	

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

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

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

- (A) sum+1=sum
- (B) sum=sum+1
- (C) sum=sum+i
- (D) **★**

sum=sum+i+1

a=3
b=4
if a==3:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) ★
4
(B) None of the other answers are correct.
(C) 5
(D) 3
(E) 7
Solution.

```
a=["A","C","C","I","0"]
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 car	n the followir	g mathematical	equation	be implemented	l 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) **★**

- (C) a\*sin(b^a b)
- (D) a sin(a\*\*b b)
- (E) None of the other answers are correct.

Solution	

```
18. (1 point) Consider the following program.
kay = 2
wart = 3

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

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

After it is run, what is the final  ${\bf value}$  of  ${\bf kay}$ ?

- (A)  $\bigstar$  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 <b>type</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ Integer
(B) None
$(\mathrm{C})$ Float
$(\mathrm{D})$ Boolean
(E) ★
String
Solution.

What value is produced?		
(A) [1,2,3]		
(B) [1,2,1]		
(C) [1,2,1,2,1,2]		
(D) <b>★</b>		
[1,2]		
Solution.		

20. (1 point) Evaluate the following expression:

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

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]

```
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

```
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]

```
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.								
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>								
s=artificing("MERLIN")								
After it is run, what is the final <b>value</b> of s?								
(A) ★								
"MERLIN2"								
(B) None								
(C) "MERLIN%i"								
(D) 0								
(E) "MERLINMERLIN"								
Solution.								

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

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

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

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

$$(m \% n) != 0$$

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

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]

```
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:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
(B) Boolean
(C) Integer
$(\mathrm{D})$ None
(E) ★
String
Solution.



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

1.	Fill in your information:	
	Full Name:	
	UIN (Student Number):	
	NetID:	

- 2. Fill in the following answers on the Scantron form:
  - 92. A
  - 93. B
  - 94. B
  - 95. A
  - 96. C

1. (1 point) Consider the following program.
def artificing(s):
 return s\*2
 return s+"%i" % 2
 return s
s=artificing("MERLIN")
After it is run, what is the final value of s?
(A) None
(B) ★
 "MERLINMERLIN"
(C) 12
(D) "MERLIN2"
(E) "MERLIN"
Solution.

s="-B-O-R-S-" x=s.split("-")[2:-2]	
What is the <b>value</b> of <b>x</b> after this program is executed?	
(A) ''	
(B) 'ORS'	
(C) False	
$(\mathrm{D})$ None	
(E) ★	
['O', 'R']	
Solution.	

3. (1 point) Consider the following incomplete function.

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

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

- (A) (n // m) == 0
- (B) **★**

$$(m \% n) != 0$$

- (C) (n % m) == 0
- (D) (m // n) != 0

<pre>x=2 a=6 if (a%3)==2:     x=x**3 elif(a%3)==1:     x=x**2</pre>								
else: x=x**1								
What is the <b>value</b> of <b>x</b> after this program is executed?								
(A) None of the other answers are correct.								
(B) 4								
(C) ★								
2								
(D) 16								
(E) 8								
Solution.								

5.	(1 point)	How	can	the following	mathematical	equation	be i	implemented	as a	Python	expression	m?
As	ssume a, b	o, 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) **★**

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

6. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ None
(B) Integer
(C) Float
(D) ★
String
(E) Boolean
Solution.

7. (1 point) Evaluate t	the following expression
[1,2]*len("3")	
What value is produce	d?

- (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)
- $(\mathrm{B})$  while i in range(100)
- (C) **★**

for i in range(1,101)

(D) while i<=100

=3 x=2 xhile i < 7:     x+=i     i+=2	
What is the <b>value</b> of $x$ after this program is executed?	
(A) 12	
(B) 14	
(C) ★	
10	
(D) 11	
(E) 13	
Solution.	

```
10. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['one', 'two', 'eleven', 'twelve', 'six']
 (B) ['one', 'two', 'eleven', 'twelve']
 (C) ['twelve', 'eleven', 'two', 'one']
 (D) ★
     ['eleven', 'one', 'twelve', 'two']
 (E) ['two', 'twelve', 'one', 'eleven', 'six']
```

11. (1 point) Consider the following program:
<pre>x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-") y=x x=y.reverse()</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
(B) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
(C) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
(D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
(E) ★
None
Solution.

len("ABCDE"[1:4])		
What value is produced?		
(A) 1		
(B) 5		
(C) 4		
(D) ★ 3		
Solution		

12. (1 point) Evaluate the following expression:

```
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) []
```

```
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) ★

- (D) [1, 2, 3, '123']
- (E) [1, 2, 3]

```
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]

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
```

<pre>a=3 b=4 if a!=b:     a=b elif a==4:     a=5 else:     b=a</pre>
What is the <b>value</b> of a after this program is executed?
<ul> <li>(A) None of the other answers are correct.</li> <li>(B) 3</li> <li>(C) ★</li> <li>4</li> <li>(D) 7</li> <li>(E) 5</li> </ul>
Solution.

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

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]

```
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

=0 =1
nile(i*i)<=9: x=x+(i*i)
i=i+1
fter it is run, what is the final <b>value</b> of x?
A) 3
(B) 5
C) 4
D) 30
(E) ★
14
olution.

 $24.\ (1\ \mathrm{point})$  Consider the following program.

25. (1 point) Consider the following program:
pi="3.14159" e="2.71828" x=pi in pi*len(e)
What is the <b>type</b> of <b>x</b> after this program is executed?
(A) Float
(B) ★
Boolean
$(\mathrm{C})$ None
$(\mathrm{D})$ String
$(\mathrm{E})$ Integer
Solution.

26. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
$(\mathrm{A})$ Integer
(B) <b>★</b>
Boolean
(C) Float
$(\mathrm{D})$ None
$(\mathrm{E})$ String
Solution.

27. (1 point) Consider the following program.
kay = 2
wart = 3

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

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

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

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

```
a=["A","C","C","I","0"]
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.

x=str("1"*3)
What is the <b>value</b> of $x$ after this program is executed?
(A) 3
(B) ★
"111"
(C) 111
(D) "3"
(E) None of the other answers are correct.
Solution.

 $29.\ (1\ \mathrm{point})$  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) ["-","\*","\*"]



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- This is a 60-minute exam.
- There are several different versions of this exam.

L.	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:

```
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']

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]

```
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 <b>value</b> of <b>x</b> 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
```

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ False
(B) ★
['R','A']
(C) 'RAI'
(D) 3
$(\mathrm{E})$ None
Solution.

9. (1 point) Consider the following incomplete program.

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

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

- (A) sum+1=sum
- (B) **★**

sum=sum+i+1

- (C) sum=sum+1
- (D) sum=sum+i

10. (1 point) Consider the following program: x=3 a=5 if (a%3)==2: x=x\*\*3 elif(a%3)==1: x = x \* \* 2else: x = x \* \* 1What is the  ${\bf value}$  of  ${\bf x}$  after this program is executed? (A) 9 (B) 1 (C) None of the other answers are correct. (D) 3 (E) **★** 27 Solution.

11. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ None
(B) Boolean
$(\mathrm{C})$ String
(D) Float
(E) ★
Integer
Solution.

<pre>pi="3.14159" e="2.71828" x=pi in pi*len(e) What is the type of x after this program is executed?</pre>
$(\mathrm{A})$ String
(B) Float
(C) None
(D) Integer
(E) ★
Boolean
Solution.

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 14
(B) 12
(C) ★
10
(D) 11
(E) 13
Solution.

14.	(1 point)	How	can th	ne following	mathematical	equation	be:	implemented	as a	Python	expression	on?
Ass	ume a, b,	and s	sin ha	ve already l	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]

1 - /	4	• , )	T 1	. 1	C 11 .	
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.
<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 5
(B) 14
(C) ★
4
(D) 3
(E) 30
Solution.

19. (1 point) Consider the following program.
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) "MERLIN"
(B) "MERLIN2"
(C) 12
(D) ★
"MERLINMERLIN"
(E) None
Solution.

```
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]

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

```
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

a=3
b=4
if a==3:
b=a
elif a==4:
a=5 else:
a=b
What is the <b>value</b> of a after this program is executed?
(A) 7
(B) 5
(C) 4
(D) None of the other answers are correct.
(E) ★
3
Solution.

 $23.\ (1\ \mathrm{point})$  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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
Float
(B) Boolean
$(\mathrm{C})$ String
(D) Integer
$(\mathrm{E})$ None
Solution.

```
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) **★** 

- (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)  $\bigstar$  None of the other answers are correct.

# Solution.

(D) 2

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

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

- (A) 0
- (B) 5
- (C) 3
- (D) **★**

-1

(E) 6



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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	g ma	the matical	equation	be	implemented	as a	a Python	expres	sion?
A	ssui	ne a, t	o, and	sin	have	e already	bee	n 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)

```
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

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

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

- (A) 2
- (B) **★**

3

- (C) -1
- (D) 4
- (E) 5

```
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

len("ABCD"[0:3])
What value is produced?
(A) 1
(B) 2
(C) ★ 3
(D) 4
Solution.

6. (1 point) Evaluate the following expression:

7. (1 point)		
x=str(3)+"str(3)"		
What is the <b>value</b> of $x$ after this program is executed?		
(A) 33		
(B) ★		
"3str(3)"		
(C) "33"		
(D) None of the other answers are correct.		
(E) "333"		
Solution.		

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ None
(B) ''
(C) ★
['O', 'R']
(D) 'ORS'
$(\mathrm{E})$ False
Solution.

9. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. We ignore indentation for this problem.

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

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

10. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Integer
(B) ★
Boolean
$(\mathrm{C})$ Float
$(\mathrm{D})$ String
$(\mathrm{E})$ None
Solution.

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

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']
```

```
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:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $x$ after this program is executed?
$(\mathrm{A})$ None
(B) <b>★</b>
Integer
$(\mathrm{C})$ Float
(D) Boolean
$(\mathrm{E})$ String
Solution.

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

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

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

(A) **★** 

$$(m \% n) != 0$$

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

16. (1 point) Consider the following program.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) "MERLINMERLIN"
(B) "MERLIN%i"
(C) 0
(D) ★
"MERLIN2"
(E) None
Solution.

17. (1 point) Consider the following incomplete program.

sum=0
???:

sum=sum+i

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

- (A) while i<=100
- $(\mathrm{B})$  for i in range(0,100)
- (C) ★

for i in range(1,101)

(D) while i in range(100)

a=3
b=4
if a==3:
a=b
elif a==4:
a=5 else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) 5
(B) None of the other answers are correct.
(C) 7
(D) 3
(E) ★
4
Solution.

```
19. (1 point) Consider the following program:
a=["merlin","sir agravaine","king pellinore"]
b=[]
for i in range(0,3):
    b.append(a[0-i].title())

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

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

```
a=["A","C","C","I","0"]
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"

```
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) **★**

(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</pre>

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

- (A) 4
- (B) 2
- (C) 1
- (D) **★**

3

(E) 0

```
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)  $\bigstar$  None of the other answers are correct.
- (D) 2

i=2	
x=3	
while i < 7:	
x+=i i+=2	
What is the <b>value</b> of x after this program is executed?	
(A) 12	
(B) 13	
(C) 14	
(D) 11	
(E) ★	
15	
Solution.	
Columbia.	

 $24.\ (1\ \mathrm{point})$  Consider the following program:

pi="3.14159" e="2.71828" x=pi*len(e)+pi									
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?									
$(\mathrm{A})$ Boolean									
(B) Float									
(C) Integer									
(D) ★									
String									
$(\mathrm{E})$ None									
Solution.									

 $25.\ (1\ \mathrm{point})$  Consider the following program:

What value is produced?	
(A) [1,2,1]	
(B) [1,2,1,2,1,2]	
(C) ★	
[1,2]	
(D) [1,2,3]	

 $26.\ (1\ \mathrm{point})$  Evaluate the following expression:

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

=1 =0 nile(x*x)<=9: i=i+(x*x) x=x+1
fter it is run, what is the final <b>value</b> of x?
(A) 3
(B) 5
(C) 14
(D) 30
(E) ★
4
olution.

 $27.\ (1\ \mathrm{point})$  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']

- $(\mathrm{B})$  ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
- (C) None
- (D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
- $(\mathrm{E})$  ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']

a=6
if (a%3)==2: x=x**3
elif(a%3)==1:
x=x**2
else: x=x**1
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
2
(B) 8
(C) 4
(D) 16
(E) None of the other answers are correct.
Solution.

 $29.\ (1\ \mathrm{point})$  Consider the following program:

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]



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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L.	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

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

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

- (A) [3, 5, 6, 7, 7, 8]
- (B) **★**

- (C) [3, 5, 7, 7]
- (D) [2, 4, 5, 5, 7, 7]
- (E) [2, 4, 5, 6, 7, 7]

What value is produced?			
(A) [1,2,1]			
(B) [1,2,1,2,1,2]			
(C) ★			
[1,2]			
(D) [1,2,3]			
			_
Solution.			

 $2.\ (1\ \mathrm{point})$  Evaluate the following expression:

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

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

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:
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Boolean
(B) None
(C) Float
(D) ★
Integer
(E) String
Solution.

x=str("1"*3)
What is the <b>value</b> of $x$ after this program is executed?
(A) "3"
(B) ★
"111"
(C) 111
(D) 3
(E) None of the other answers are correct.
Solution.

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

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

What should replace the three question marks so the resulting value of  ${\tt x}$  is 33?

- (A) s[i:i+1]
- (B)  $\bigstar$

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	mathe	$_{ m matical}$	equation	be	implemented	as a	Python	expres	sion?
As	sur	ne a, i	b, and	sin	have	e already	been d	efined.							

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

(A) **★** 

- (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)

<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>	
After it is run, what is the final <b>value</b> of x?	
(A) 3	
(B) 4	
(C) 5	
(D) 30	
(E) ★	
14	
Solution.	

10. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ None
(B) Float
(C) Boolean
(D) ★
String
(E) Integer
Solution.

```
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) **★**

- (C) [1, 2, 3, '1234']
- (D) [1, 2, 3, '123']
- (E) [1, 2, 3, 10]

s="G+R+A+I+L" x=s.split("+")[1:-2]	
What is the <b>value</b> of <b>x</b> after this program is executed?	
(A) 'RAI'	
(B) ★	
['R','A']	
(C) False	
$(\mathrm{D})$ None	
(E) 3	
Solution.	

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

[1, 2, 3] \* 3

- (A) (3, 6, 9)
- (B) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- (C) **★**

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

- (D) [3.0, 6.0, 9.0]
- (E) [3, 6, 9]

a=3
b=4
if a==3:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) 3
(B) ★
4
(C) 7
(D) 5
(E) None of the other answers are correct.
Solution.

pi="3.14159" e="2.71828" x=pi in pi*len(e)
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ None
(B) String
(C) ★
Boolean
$(\mathrm{D})$ Integer
(E) Float
Solution.

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

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

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

- (A) sum+1=sum
- (B) **★**

sum=sum+i+1

- (C) sum=sum+i
- (D) sum=sum+1

=3 x=2 while i < 7:     x+=i     i+=2
What is the <b>value</b> of $x$ after this program is executed?
(A) ★
10
(B) 12
(C) 14
(D) 13
(E) 11
Solution.

```
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"

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

len("ABCD"[0:3])
What value is produced?
(A) 4
(B) ★ 3
(C) 1
(D) 2
Solution.

20. (1 point) Evaluate the following expression:

```
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)  $\bigstar$  None of the other answers are correct.
- (B) 3
- (C) 5
- (D) 2

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 <b>value</b> of <b>x</b> after this program is executed?
(A) 4
(B) <b>★</b>
2
(C) None of the other answers are correct.
(D) 8
(E) 16
Solution.

23. (1 point) Consider the following incomplete function.

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

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

(A) **★** 

$$(m \% n) != 0$$

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

```
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

```
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

 $27.\ (1\ \mathrm{point})$  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']

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

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']
```



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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]

```
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:				
<pre>x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-") y=x x=y.reverse()</pre>				
What is the <b>value</b> of <b>x</b> after this program is executed?				
(A) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']				
(B) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']				
(C) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']				
(D) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']				
(E) ★				
None				
Solution.				

4.	(1	point)	Evaluate	the	following	expression:
	\ <del>-</del>	Pomi	- varaacc	OIIO	10110 111116	carpi obbion.

What value is produced?

- (A) [1,2,"3"]
- (B) [1,2,3]
- (C) **★**

[1,2,1]

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

```
a=["A","C","C","I","0"]
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

```
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) **★**

x=2 a=6 if (a%3)==2: x=x\*\*3 elif(a%3)==1: x = x \* \* 2else: x = x \* \* 1What is the **value** of x after this program is executed? (A) 4 (B) 8 (C) None of the other answers are correct. (D) 16 (E) **★** 2 Solution.

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 \le 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) **★**

- (C) [3, 5, 6, 7, 7, 8]
- (D) [2, 4, 5, 5, 7, 7]
- (E) [3, 5, 7, 7]

```
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) ★

- (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

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

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
```

Solution.

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

Len("ABCD"[0:3])	
What value is produced?	
$(A) \bigstar 3$	
(B) 2	
(C) 4	
(D) 1	
Solution.	

15. (1 point) Evaluate the following expression:

16. (1 point) Consider the following program:		
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>		
What is the <b>type</b> of $x$ after this program is executed?		
$(\mathrm{A})$ None		
(B) ★		
Boolean		
(C) Integer		
$(\mathrm{D})$ String		
(E) Float		
Solution.		

```
18. (1 point) Consider the following program:
a=["merlin","sir agravaine","king pellinore"]
b=[]
for i in range(1,3):
    b.append(a[0-i].title())
What is the value of b after this program is executed?
(A) ['Sir Agravaine', 'King Pellinore']
(B) ★
    ['King Pellinore', 'Sir Agravaine']
(C) ['Merlin', 'King Pellinore', 'Sir Agravaine']
(D) ['King Pellinore', 'Sir Agravaine', 'Merlin']
(E) []
```

```
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)  $\bigstar$  None of the other answers are correct.
- (B) 2
- (C) 5
- (D) 3

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of $x$ after this program is executed?
$(\mathrm{A})$ False
(B) None
(C) 'ORS'
(D) ''
(E) ★
['O', 'R']
Solution.

 $20.\ (1\ \mathrm{point})$  Consider the following program:

21. (1 point) How can the following mathematical	l equation be implemented as a Python expression	n?
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)

(A)	*
	"1.21.2"
(B)	2.4
(C)	None of the other answers are correct.
(D)	"1.2*2"
(E)	"2.4"

What is the **value** of  ${\tt x}$  after this program is executed?

x=str(1.2)\*2

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 14
(B) ★
10
(C) 11
(D) 13
(E) 12
Solution.

 $23.\ (1\ \mathrm{point})$  Consider the following program:

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

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:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $x$ after this program is executed?
(A) None
(B) <b>★</b>
Integer
(C) Float
(D) Boolean
$(\mathrm{E})$ String
Solution.

26. (1 point) Consider the following program.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 4
(B) ★
14
(C) 3
(D) 5
(E) 30
Solution.

```
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

<pre>pi="3.14159" e="2.71828" x=pi in pi*len(e) What is the type of x after this program is executed?</pre>
$(\mathrm{A})$ Float
(B) None
$(\mathrm{C})$ String
(D) Integer
(E) ★
Boolean
Solution.

 $28.\ (1\ \mathrm{point})$  Consider the following program:

29. (1 point) Consider the following incomplete Python program.

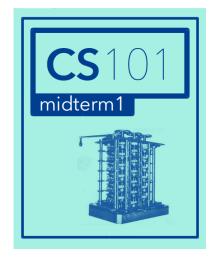
```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

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.
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final value of s?
(A) "MERLIN"
(B) 12
(C) ★
"MERLINMERLIN"
(D) None
(E) "MERLIN2"
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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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. C
  - 94. B
  - 95. B
  - 96. E

```
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  ${\bf value}$  of  ${\bf wart}?$
- (A) 3
- (B) 5
- (C) 2
- (D)  $\bigstar$  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)

- $(\mathrm{C})$  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 b	be implemented	as a Python	expression?
Assume a, b, and	d sin have already	been defined.				

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

(A) **★** 

- (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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Integer
(B) ★
Float
(C) String
$(\mathrm{D})$ None
(E) Boolean
Solution.

i=2
x=3
while i < 7:
x+=i
i+=2
What is the <b>value</b> of $x$ after this program is executed?
(A) 13
(B) 14
(C) 12
(D) 11
(E) ★
15
Solution.

<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) ★
14
(B) 4
(C) 5
(D) 3
(E) 30
Solution.

What value is produced?	
$(A) \bigstar 3$	
(B) 4	
(C) 5	
(D) 1	
Solution.	

8. (1 point) Evaluate the following expression:

9. (1 point) Consider the following program:
<pre>x=3 a=7 if (a%3)==2:     x=x**2 elif(a%3)==1:     x=x**1 else:     x=x**0</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) None of the other answers are correct.
(B) ★
3
(C) 1
(D) 9
(E) 7
Solution.

```
a=["A","C","C","I","0"]
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

```
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

```
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.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:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
$(\mathrm{A})$ None
(B) ★
String
(C) Float
(D) Integer
(E) Boolean
Solution.

17. (1 point) Consider the following incomplete function.

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

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

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

$$(m \% n) != 0$$

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

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of $x$ after this program is executed?
(A) 3
$(\mathrm{B})$ False
(C) 'RAI'
(D) ★
['R','A']
$(\mathrm{E})$ None
Solution.

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

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

- (A) 2
- (B) -1
- (C) 5
- (D) 4
- (E)  $\bigstar$

3

```
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]

<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Integer
$(\mathrm{B})$ String
(C) ★
Boolean
$(\mathrm{D})$ Float
$(\mathrm{E})$ None
Solution.

00	/-	•		. 1	C 11 .	
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
```

 $24.\ (1\ \mathrm{point})$  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

(A)	"1.2*2"
(B)	"2.4"
(C)	2.4
(D)	*
	"1.21.2"
(E)	None of the other answers are correct.
Solu	ation.

 $25.\ (1\ \mathrm{point})$  Consider the following program:

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

x=str(1.2)\*2

a=3
b=4
if a==3:
b=a
elif a==4: a=5
else:
a=b
What is the <b>value</b> of a after this program is executed?
(A) 5
(B) 7
(C) 4
(D) None of the other answers are correct.
(E) ★
3
Solution.

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

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

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

- (A) s[i:i-1]
- (B) s[i:i+1]
- (C) **★**

s[i:i+2]

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

```
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']
```

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

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

- (A) 1
- (B) 4
- (C) **★**

2

- (D) 3
- (E) 0

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

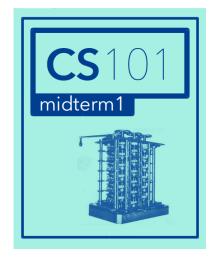
while i < 3:

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]



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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

<pre>x=2 a=6 if (a%3)==2:     x=x**3 elif(a%3)==1:     x=x**2 else:     x=x**1</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 16
(B) 8
(C) ★
2
(D) None of the other answers are correct.
(E) 4
Solution.

2. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) String
(B) ★
Integer
(C) Float
$(\mathrm{D})$ None
(E) Boolean
Solution.

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

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

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

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

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.
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) 12
(B) "MERLIN2"
(C) "MERLIN"
(D) None
(E) ★
"MERLINMERLIN"
Solution.

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
10
(B) 13
(C) 11
(D) 14
(E) 12
Solution.

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

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

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

- (A) s[i:i+1]
- (B) s[i:i-1]
- (C)  $\bigstar$

s[i:i+2]

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

8. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Float
(B) ★
Integer
(C) Boolean
$(\mathrm{D})$ None
(E) String
Solution.

```
9. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1<s2:
    x.sort()
elif s1==s2:
   x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['two', 'twelve', 'one', 'eleven', 'six']
 (B) ['one', 'two', 'eleven', 'twelve', 'six']
 (C) ★
     ['twelve', 'eleven', 'two', 'one']
 (D) ['one', 'two', 'eleven', 'twelve']
 (E) ['eleven', 'one', 'twelve', 'two']
```

```
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.
```

## Solution.

(D) 2

11. (1 point) Consider the following program:
pi="3.14159" e="2.71828" x=pi in pi*len(e)
What is the <b>type</b> of $x$ after this program is executed?
(A) String
(B) <b>★</b>
Boolean
$(\mathrm{C})$ Integer
$(\mathrm{D})$ None
(E) Float
Solution.

```
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

a=3
b=4
if a==3:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) ★
4
(B) 5
(C) None of the other answers are correct.
(D) 7
(E) 3
Solution.

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

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
Solution.

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of $\mathbf{x}$ after this program is executed?
(A) None
(B) 'ORS'
$(\mathrm{C})$ False
(D) ''
(E) ★
['O', 'R']
Solution.

17. (1 point) Consider the following program.

s="ABCBA"

x=0

y=len(s)-1

while s[x]==s[y] and x<y:
 x+=1
 y-=1</pre>

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

- (A) **★** 
  - 2
- (B) 0
- (C) 3
- (D) 1
- (E) 4

```
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)

len("ABCD"[0:3])
What value is produced?
(A) 2
(B) 1
(C) ★ 3
(D) 4
Solution.

21. (1 point) Evaluate the following expression:

22.	(1 point)	) How	can th	ne following	mathematical	equation	be i	implemented	as a	Python	expressi	on?
Ass	sume a, b	, and	sin ha	we already b	peen defined.							

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

- (A) a\*sin(b^a b)
- (B) a sin(a\*\*b b)
- (C) **★**

- (D) a\*sin(a^b b)
- (E) None of the other answers are correct.

```
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

What value is produced?			
(A) [1,2,1,2,1,2]			
(B) [1,2,3]			
(C) <b>*</b>			
[1,2]			
(D) [1,2,1]			

 $24.\ (1\ \mathrm{point})$  Evaluate the following expression:

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

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]

```
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.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 3
(B) ★
14
(C) 30
(D) 5
(E) 4
Solution.

```
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 <b>value</b> of $\mathbf{x}$ after this program is executed?				
(A) 33				
(B) ★				
"3str(3)"				
(C) "33"				
(D) "333"				
(E) None of the other answers are correct.				
Solution.				



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- There are several different versions of this exam.

L.	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

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

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

- (A) 4
- (B) 0
- (C) **★**

2

- (D) 1
- (E) 3

```
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]

```
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]

a=3
b=4
if a==3:
b=a
elif a==4:
a=5
else:
a=b
What is the <b>value</b> of a after this program is executed?
(A) 5
(B) 4
(C) None of the other answers are correct.
(D) ★
3
(E) 7
Solution.

7. (1 point) Ho	w can the following	mathematical	equation	be implemented	as a Python	expression?
Assume a, b, an	nd 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) **★**

8. (1 point) Consider the following program.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 3
(B) 30
(C) 4
(D) ★
14
(E) 5
Solution.

```
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.

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of $x$ after this program is executed?
(A) None
(B) 'ORS'
(C) ''
(D) ★
['O', 'R']
$(\mathrm{E})$ False
Solution.

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

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

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

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

$$(m \% n) != 0$$

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

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

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

- (A) 5
- (B) **★**

3

- (C) 2
- (D) 4
- (E) -1

```
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"

# [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]

```
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)  $\bigstar$  None of the other answers are correct.

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 <b>value</b> of <b>x</b> after this program is executed?
(A) 7
(B) None of the other answers are correct.
(C) 9
(D) ★
3
(E) 1
Solution

18. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) String
(B) None
(C) Boolean
(D) Float
(E) ★
Integer
Solution.

19. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

- (A) (3, 6, 9)
- (B) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- (C) [3, 6, 9]
- (D) [3.0, 6.0, 9.0]
- (E) **★**

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

<pre>x=2 while i &lt; 7:     x+=i     i+=2 What is the value of x after this program is executed?</pre>
That is the value of it alter this program is executed.
(A) 14
(B) 11
(C) 13
(D) 12
(E) ★
10
Solution.

 $20.\ (1\ \mathrm{point})$  Consider the following program:

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
- $(\mathrm{B})$  for i in range(0,100)
- (C) ★

for i in range(1,101)

(D) while i in range(100)

x=str("1"*3)
What is the <b>value</b> of $x$ after this program is executed?
(A) ★
"111"
(B) None of the other answers are correct.
(C) 111
(D) 3
(E) "3"
Solution.

```
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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Boolean
$(\mathrm{B})$ None
(C) String
(D) ★
Float
$(\mathrm{E})$ Integer
Solution.

```
25. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1<s2:
    x.sort()
elif s1>s2:
   x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['one', 'two', 'eleven', 'twelve']
 (B) ★
     ['one', 'two', 'eleven', 'twelve', 'six']
 (C) ['two', 'twelve', 'one', 'eleven', 'six']
 (D) ['twelve', 'eleven', 'two', 'one']
 (E) ['eleven', 'one', 'twelve', 'two']
```

```
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+"%1" % 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) ★
 "MERLIN%i"

Solution.

len("ABCDE"[1:4])
What value is produced?
(A) 4
(B) 5
(C) 1
(D) $\star$ 3
Solution.

 $28.\ (1\ \mathrm{point})$  Evaluate the following expression:

```
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 <b>type</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ None
(B) Boolean
(C) Float
$(\mathrm{D})$ Integer
(E) ★
String
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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

```
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

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

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]
- $\left( \mathrm{E}\right)$  None of the above.

x=3 a=7 if (a%3)==2: x=x\*\*2elif(a%3)==1: x = x \* \* 1else: x = x \* \* 0What is the  ${\bf value}$  of  ${\bf x}$  after this program is executed? (A) 9 (B) 7 (C) 1 (D) None of the other answers are correct. (E) **★** 3 Solution.

4. (1 point) Consider the following program:

```
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']
```

```
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.

```
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]

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

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

- (A) 4
- (B) 5
- (C) **★**

3

- (D) -1
- (E) 2

len("ABCDE"[1:4])			
What value is produced?			
(A) 1			
(B) ★ 3			
(C) 4			
(D) 5			
Solution.			

9. (1 point) Evaluate the following expression:

```
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)  $\bigstar$  None of the other answers are correct.

(A)	*
	"1.21.2"
(B)	None of the other answers are correct.
(C)	"1.2*2"
(D)	2.4
(E)	"2.4"

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

x=str(1.2)\*2

```
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  ${\tt x}$  is 33?

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

s[i:i+2]

(D) s[i:i+1]

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ''
(B) ★
['O', 'R']
$(\mathrm{C})$ False
$(\mathrm{D})$ None
(E) 'ORS'
Solution.

```
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) **★**

- (C) [1, 2, 3, '1234']
- (D) [1, 2, 3]
- (E) [1, 2, 3, 10]

16.	(1 poin	t) How	can the	e following	mathematical	equation	be	implemented	as a	Python	expressi	ion i
Ass	ume a,	b, and	sin hav	e already l	been defined.							

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

- (A) a\*sin(b^a b)
- (B) **★**

- (C) a sin(a\*\*b b)
- (D) None of the other answers are correct.
- (E) a\*sin(a^b b)

```
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']

pi="3.14159" e="2.71828" x=pi*len(e)+pi
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) ★
String
$(\mathrm{B})$ Integer
(C) None
(D) Float
(E) Boolean
Solution.

<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>	
After it is run, what is the final <b>value</b> of $x$ ?	
(A) 5	
(B) 30	
(C) 3	
(D) 4	
(E) ★	
14	
Solution.	

20. (1 point) Consider the following incomplete function.

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

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

- (A) (n % m) == 0
- (B) **★**

$$(m \% n) != 0$$

- (C) (n // m) == 0
- (D) (m // n) != 0

a=3
b=4
if a==3:
b=a
elif a==4:
a=5
else: a=b
What is the <b>value</b> of a after this program is executed?
(A) 5
(B) None of the other answers are correct.
(C) 4
(D) 7
(E) ★
3
Solution.

22. (1 point) Consider the following program.

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

s=artificing("MERLIN")

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

(A) \*

 "MERLINMERLIN"

(B) "MERLIN2"

(C) 12

(D) "MERLIN"

(E) None

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 poir	t) Evaluate	the follor	wing ext	oression:

[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:
<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 13
(B) 14
(C) 11
(D) ★
10
(E) 12
Solution.

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

sum=0

???:

sum=sum+i

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

(A) **★** 

for i in range(1,101)

- (B) while i<=100
- $(\mathrm{C})$  while i in range(100)
- (D) for i in range(0,100)

```
a=["A","C","C","I","0"]
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.
- $(\mathrm{D})$  "ACCOA"
- (E) "ACCIA"

```
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:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Boolean
(B) Float
(C) ★
String
(D) None
(E) Integer
Solution.

30. (1 point) Consider the following program:					
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>					
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?					
(A) Boolean					
(B) String					
(C) None					
(D) ★					
Integer					
(E) Float					
Solution.					



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- There are several different versions of this exam.

L.	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

```
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)  $\bigstar$

"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:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ None
(B) Boolean
(C) String
(D) Float
(E) ★
Integer
Solution.

```
4. (1 point) Consider the following program:
a=["merlin","sir agravaine","king pellinore"]
b=[]
for i in range(0,4):
    b.append(a[0-i].title())
What is the value of b after this program is executed?
(A) ['King Pellinore', 'Sir Agravaine', 'Merlin']
(B) ['Merlin', 'King Pellinore', 'Sir Agravaine']
(C) ['Merlin', 'Sir Agravaine', 'King Pellinore', 'Merlin']
(D) ★
    ['Merlin', 'King Pellinore', 'Sir Agravaine', 'Merlin']
(E) []
```

```
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:
<pre>x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-") y=x x=y.reverse()</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) ['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']
(B) ['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']
(C) ['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']
(D) ['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']
(E) ★
None
Solution.

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 3
$(\mathrm{B})$ False
(C) 'RAI'
(D) ★
['R','A']
(E) None
Solution.

8. (1 point) How can the following mathematical	equation be implemented as a Python expression?
Assume a, b, and sin have already been defined.	

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

- (A) a\*sin(a^b b)
- (B) None of the other answers are correct.
- (C) a sin(a\*\*b b)
- (D) a\*sin(b^a b)
- (E) **★**

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) 
$$(m // n) != 0$$

```
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

<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>	
After it is run, what is the final <b>value</b> of $x$ ?	
(A) 30	
(B) ★	
4	
(C) 3	
(D) 14	
(E) 5	
Solution.	

```
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) **★**

(E) [1, 2, 3]

13. (1 point) Consider the following program.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) 0
(B) None
(C) "MERLIN%i"
(D) ★
"MERLIN2"
(E) "MERLINMERLIN"
Solution.
Solution.

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

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

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

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

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

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:
<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
$(\mathrm{B})$ Integer
(C) String
$(\mathrm{D})$ None
(E) ★
Boolean
Solution.

```
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.

What value is produced?		
(A) [1,2,3]		
(B) [1,2,1]		
(C) [1,2,1,2,1,2]		
(D) <b>★</b>		
[1,2]		
Solution.		

20. (1 point) Evaluate the following expression:

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

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

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]

a=3
b=4
if a!=b:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) 3
(B) 5
(C) 7
(D) ★
4
(E) None of the other answers are correct.
Solution.

 $23.\ (1\ \mathrm{point})$  Consider the following program:

=3 =2 hile i < 7:
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
10
(B) 12
(C) 14
(D) 11
(E) 13
olution.

 $24.\ (1\ \mathrm{point})$  Consider the following program:

len("ABCD"[0:3])
What value is produced?
(A) 2
(B) 1
(C) 4
(D) ★ 3
Solution.

 $25.\ (1\ \mathrm{point})$  Evaluate the following expression:

```
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]
- $(\mathrm{D})$  None of the above.
- (E) [3, 6, 9]

```
28.\ (1\ \mathrm{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)  $\bigstar$  None of the other answers are correct.
- (B) 5
- (C) 3
- (D) 2

29. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Boolean
$(\mathrm{B})$ Integer
(C) String
(D) ★
Float
(E) None
Solution.

30. (1 point) Consider the following program:



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.
- $\bullet$  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

```
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:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
$(\mathrm{A})$ None
(B) ★
String
(C) Integer
(D) Float
(E) Boolean
Solution.

=2 x=3 while i < 7: x+=i i+=2
What is the <b>value</b> of $x$ after this program is executed?
(A) 12
(B) ★
15
(C) 11
(D) 14
(E) 13
Solution.

4. (1 point) Evaluate the following expression	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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)+len(t)) &lt; 4 and s in t</pre>
What is the <b>type</b> of <b>x</b> after this program is executed?
(A) ★
Boolean
(B) Float
(C) String
$(\mathrm{D})$ None
(E) Integer
Solution.

6. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3

- (A) (3, 6, 9)
- (B) [3, 6, 9]
- (C) [3.0, 6.0, 9.0]
- (D) **★**

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

 $(\mathrm{E}) \ \texttt{[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]}$ 

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ False
(B) 3
(C) 'RAI'
(D) ★
['R','A']
(E) None
Solution.

9. (1 point) Consider the following incomplete program.

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

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

(A) **★** 

sum=sum+i+1

- (B) sum+1=sum
- (C) sum=sum+i
- (D) sum=sum+1

```
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]

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

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]

<pre>x=2 a=6 if (a%3)==2:     x=x**3 elif(a%3)==1:</pre>		
x=x**2 else:		
x=x**1		
What is the <b>value</b> of $x$ after this program is executed?		
(A) ★		
2		
(B) 4		
(C) None of the other answers are correct.		
(D) 16		
(E) 8		
Solution.		

14. (1 point) Consider the following program.

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

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

(A) 4
(B) 2
(C) 1
(D) 0
(E) ★
3

len("ABCDE"[1:4])
What value is produced?
$(A) \bigstar 3$
(B) 4
(C) 5
(D) 1
Solution.

15. (1 point) Evaluate the following expression:

```
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 <b>value</b> of <b>x</b> 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"

```
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) **★**

a=3		
b=4		
if a==3:		
b=a		
elif a==4:		
a=5		
else:		
a=b		
What is the <b>value</b> of a after this program is executed?		
(A) 5		
(B) 7		
(C) 4		
(D) None of the other answers are correct.		
(E) ★		
3		
Solution.		

20. (1 point) Consider the following program.

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

s=artificing("MERLIN")

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

(A) ★
 "MERLINMERLIN"

(B) "MERLIN2"

(C) 12

(D) "MERLIN"

(E) None

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

```
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']

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

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.
<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) 3
(B) ★
4
(C) 5
(D) 30
(E) 14
Solution.

```
25. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1==s2:
    x.sort()
elif s1<s2:
    x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['one', 'two', 'eleven', 'twelve', 'six']
 (B) ['twelve', 'eleven', 'two', 'one']
 (C) ['two', 'twelve', 'one', 'eleven', 'six']
 (D) ★
     ['eleven', 'one', 'twelve', 'two']
 (E) ['one', 'two', 'eleven', 'twelve']
```

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)  $\bigstar$  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 p	oint)	How	can	the	following	matl	hematical	equation	be	implemented	as a	Python	express	sion?
Ass	ume	a, b,	and	cos l	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) **★**

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

pi="3.14159" e="2.71828" x=pi in pi*len(e)
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
Boolean
$(\mathrm{B})$ Integer
$(\mathrm{C})$ None
$(\mathrm{D})$ String
(E) Float
Solution.



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

1.	Fill in your information:	
	Full Name:	
	UIN (Student Number):	
	NetID:	

- 2. Fill in the following answers on the Scantron form:
  - 92. B
  - 93. D
  - 94. B
  - 95. D
  - 96. C

1. (1 point) Consider the following program:							
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>							
What is the <b>type</b> of $x$ after this program is executed?							
(A) ★							
Float							
(B) Boolean							
(C) Integer							
(D) String							
(E) None							
Solution.							

```
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']

- ${\rm (B)} \ \hbox{\tt ['King Pellinore', 'Sir Agravaine', 'Merlin']}$
- (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:
<pre>i=2 x=3 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 13
(B) 12
(C) 14
(D) ★
15
(E) 11
Solution.

x=str("1"*3)									
What is the <b>value</b> of <b>x</b> after this program is executed?									
(A) None of the other answers are correct.									
(B) "3"									
(C) 111									
(D) 3									
(E) ★									
"111"									
Solution.									

7. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3.0

- (A) None of the above.
- (B) **★**

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

- (C) [3.0, 6.0, 9.0]
- (D) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- (E) [3, 6, 9]

```
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</pre>

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

(A) 0

y-=1

- (B) 3
- (C) 1
- (D) 4
- (E) **★**

2

10. (1 point) Consider the following program:								
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>								
What is the <b>type</b> of $x$ after this program is executed?								
(A) Float								
(B) None								
(C) String								
(D) Boolean								
(E) ★								
Integer								
Solution.								

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 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]

```
a=["A","C","C","I","0"]
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.
<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) 3
(B) 14
(C) ★
4
(D) 30
(E) 5
Solution.

<pre>pi="3.14159" e="2.71828" x=pi in pi*len(e)</pre>							
What is the <b>type</b> of $x$ after this program is executed?							
(A) Integer							
(B) String							
(C) None							
(D) ★							
Boolean							
(E) Float							
Solution.							

16. (1 point) Consider the following incomplete function.

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

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

(A) **★** 

$$(m \% n) != 0$$

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

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  ${\tt x}$  is 33?

- (A) s[i:i-1]
- (B) s[i:i+1]
- (C) **★**

s[i:i+2]

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

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

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

(A) **★** 

3

- (B) -1
- (C) 2
- (D) 4
- (E) 5

len("ABCDE"[1:4]	)		
What value is prod	uced?		
(A) 1			
(B) 4			
(C) 5			
(D) <b>★</b> 3			
Solution.			

19. (1 point) Evaluate the following expression:

20	(1	noint)	Evaluate	the	following	expression:
40.	( I	pomi	Evaluate	une	IOHOWHIG	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)	$\operatorname{How}$	can th	ne following	mathematical	equation	be i	implemented	as a	Python	expressi	on?
Ass	ume a, b,	and s	sin ha	ve already	been defined.							

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

(A) **★** 

- (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']
```

 $23.\ (1\ \mathrm{point})$  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)  $\bigstar$  None of the other answers are correct.
- (D) 3

24. (1 point) Consider the following program.							
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>							
s=artificing("MERLIN")							
After it is run, what is the final <b>value</b> of s?							
(A) ★							
"MERLIN2"							
(B) "MERLIN%i"							
(C) "MERLINMERLIN"							
(D) 0							
$(\mathrm{E})$ None							
Solution.							

x=3 a=7 if (a%3)==2: x=x\*\*2 elif(a%3)==1: x = x \* \* 1else: x = x \* \* 0What is the  ${\bf value}$  of  ${\bf x}$  after this program is executed? (A) None of the other answers are correct. (B) 7 (C) ★ 3 (D) 1 (E) 9 Solution.

25. (1 point) Consider the following program:

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']

<pre>a=3 b=4 if a!=b:     a=b elif a==4:     a=5 else:     b=a</pre>
What is the <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.  (B) 3  (C) ★  4  (D) 5  (E) 7
Solution.

 $27.\ (1\ \mathrm{point})$  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) ["-","\*","-"]

="G+R+A+I+L" =s.split("+")[1:-2]	
That is the <b>value</b> of x after this program is executed?	
A) 'RAI'	
(B) ★	
['R','A']	
(C) None	
D) 3	
(E) False	
olution.	

 $29.\ (1\ \mathrm{point})$  Consider the following program:

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



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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

len("ABCDE"[1:4])	
What value is produced?	
(A) 5	
(B) ★ 3	
(C) 1	
(D) 4	
	_
Solution.	

1. (1 point) Evaluate the following expression:

<pre>a=3 b=4 if a==3:     b=a elif a==4:     a=5 else:     a=b</pre>
What is the <b>value</b> of a after this program is executed?
(A) ★
3
(B) None of the other answers are correct.
(C) 7
(D) 4
(E) 5
Solution.

x=str("1"*3)
What is the <b>value</b> of $x$ after this program is executed?
(A) 3
(B) "3"
(C) None of the other answers are correct.
(D) 111
(E) ★
"111"
Solution.

```
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

```
kay = 2
wart = 3

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

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

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

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

```
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:							
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>							
What is the <b>type</b> of $x$ after this program is executed?							
$(\mathrm{A})$ None							
$(\mathrm{B})$ String							
$(\mathrm{C})$ Boolean							
(D) ★							
Float							
$(\mathrm{E})$ Integer							
Solution.							

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
10
(B) 12
(C) 14
(D) 11
(E) 13
Solution.

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
['R','A']
$(\mathrm{B})$ False
$(\mathrm{C})$ None
(D) 3
(E) 'RAI'
Solution.

11. (1	point)	$\operatorname{How}$	can t	he f	following	math	ematical	equation	be	implemented	as a	Python	express	sion?
Assun	ne a, b,	and a	sin ha	ave	already l	been d	efined.							

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

(A) **★** 

- (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.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) None
(B) 0
(C) "MERLIN%i"
(D) ★
"MERLIN2"
(E) "MERLINMERLIN"
Solution.

13. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
(B) String
(C) None
(D) ★
Integer
(E) Boolean
Solution.

14. (1 point) Consider the following incomplete Python program.

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

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

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

s[i:i+2]

(D) s[i:i-1]

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

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

- (A) -1
- (B) 5
- (C) 2
- (D) **★**

3

(E) 4

```
a=["A","C","C","I","0"]
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	noint	\ L'rro laso to	+ 60	following	OTTO MODELIA DE
11. (		DOTTE	т гуалпале	ыне	TOHOWINS	expression:
<b></b>	_	POLLE	, =	0110	10110 11 1110	orrest coordin

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) []
```

```
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) **★**

- (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

```
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
```

 $23.\ (1\ \mathrm{point})$  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

0 1 ile(i*i)<=9: x=x+(i*i) i=i+1	
ter it is run, what is the final value of x?	
A) ★	
14	
B) 30	
C) 3	
D) 5	
E) 4	
olution.	

 $24.\ (1\ \mathrm{point})$  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) ["-","-","\*"]

x=3 a=7 if (a%3)==2: x=x\*\*2elif(a%3)==1: x = x \* \* 1else: x = x \* \* 0What is the **value** of **x** after this program is executed? (A) 7 (B) None of the other answers are correct. (C) 9 (D) **★** 3 (E) 1 Solution.

26. (1 point) Consider the following program:

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]

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

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)
- $(\mathrm{D})$  while i in range(100)

<pre>pi="3.14159" e="2.71828" x=pi in pi*len(e) What is the type of x after this program is executed?</pre>
(A) ★
Boolean
$(\mathrm{B})$ None
$(\mathrm{C})$ String
(D) Float
$(\mathrm{E})$ Integer
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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
- $(\mathrm{B})$  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	mathematica	l equation	be	implemented	as a	a Python	expressi	ion?
As	sur	ne a, t	o, and	sin	have	e 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)

```
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]

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
10
(B) 14
(C) 11
(D) 13
(E) 12
Solution.

<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of <b>x</b> ?
(A) ★
4
(B) 30
(C) 14
(D) 5
(E) 3
Solution.

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

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]

```
a=["A","C","C","I","0"]
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"

len("ABCD"[0:3])
What value is produced?
(A) 1
(B) ★ 3
(C) 2
(D) 4
Solution.

10. (1 point) Evaluate the following expression:

pi="3.14159" e="2.71828" x=pi*len(e)+pi
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
String
$(\mathrm{B})$ Float
(C) Boolean
(D) None
$(\mathrm{E})$ Integer
Solution.

```
12. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1==s2:
    x.sort()
elif s1<s2:
   x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['twelve', 'eleven', 'two', 'one']
 (B) ['one', 'two', 'eleven', 'twelve', 'six']
 (C) ['one', 'two', 'eleven', 'twelve']
 (D) ★
     ['eleven', 'one', 'twelve', 'two']
 (E) ['two', 'twelve', 'one', 'eleven', 'six']
```

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

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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
Float
(B) Integer
$(\mathrm{C})$ String
$(\mathrm{D})$ None
(E) Boolean
Solution.

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

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

- (A) 2
- (B) **★**

3

- (C) 5
- (D) 4
- (E) -1

x=3 a=7 if (a%3)==2:	Solution.	
a=7 if (a%3)==2:     x=x**2 elif(a%3)==1:     x=x**1 else:     x=x**0  What is the <b>value</b> of x after this program is executed?  (A) 9 (B) 1 (C) ★ 3	(E) 7	
a=7 if (a%3)==2:		
<pre>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</pre>	3	
<pre>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</pre>	(C) ★	
<pre>a=7 if (a%3)==2:     x=x**2 elif(a%3)==1:     x=x**1 else:     x=x**0</pre> What is the value of x after this program is executed?	(B) 1	
<pre>a=7 if (a%3)==2:     x=x**2 elif(a%3)==1:     x=x**1 else:     x=x**0</pre>	(A) 9	
<pre>a=7 if (a%3)==2:     x=x**2 elif(a%3)==1:     x=x**1 else:</pre>	What is the <b>value</b> of <b>x</b> after this program is executed?	
a=7	<pre>x=x**2 elif(a%3)==1:     x=x**1 else:</pre>	

```
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) **★**

- (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)  $\bigstar$  None of the other answers are correct.

a=3
b=4
if a!=b:
a=b
elif a==4:
a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.
(B) 7
(C) 3
(D) ★
4
(E) 5
Solution.

s="G+R+A+I+L" x=s.split("+")[1:-2]			
What is the <b>value</b> of $x$ after this program is executed?			
(A) 3			
(B) 'RAI'			
(C) None			
$(\mathrm{D})$ False			
(E) ★			
['R','A']			
Solution.			

 $20.\ (1\ \mathrm{point})$  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.

```
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

```
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']

(A)	*
	"1.21.2"
(B)	None of the other answers are correct.
(C)	2.4
(D)	"2.4"
(E)	"1.2*2"

 $24.\ (1\ \mathrm{point})$  Consider the following program:

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

x=str(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)  $\bigstar$

s[i:i+2]

- (C) s[i:i+1]
- (D) s[i+1:i+2]

27. (1 point) Consider the following program:				
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>				
What is the $\mathbf{type}$ of $x$ after this program is executed?				
$(\mathrm{A})$ Float				
(B) None				
(C) Boolean				
(D) Integer				
(E) ★				
String				
Solution.				

28. (1 point) Consider the following program.			
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>			
s=artificing("MERLIN")			
After it is run, what is the final <b>value</b> of s?			
(A) None			
(B) "MERLIN"			
(C) "MERLIN2"			
(D) ★			
"MERLINMERLIN"			
(E) 12			
Solution.			

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

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

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

```
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']
```



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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

pi="3.14159" e="2.71828" x=pi in pi*len(e)				
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?				
$(\mathrm{A})$ None				
$(\mathrm{B})$ Integer				
(C) ★				
Boolean				
$(\mathrm{D})$ String				
(E) Float				
Solution.				

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

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

- (A) **★** 
  - 2
- (B) 4
- (C) 3
- (D) 0
- (E) 1

```
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) **★**

- (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) **★**

$$(m \% n) != 0$$

	en("ABCD"[0:3])			
W	What value is produced?			
(	(A) 4			
(	(B) 2			
(	(C) ★ 3			
(	(D) 1			
_				
$\mathbf{S}$	Solution.			

6. (1 point) Evaluate the following expression:

7. (1 pc	oint) How	can	the following	mathematical	equation	be imp	olemented	as a	Python	express	ion?
Assume	a, b, and	lsin	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) **★**

s="-B-O-R-S-" x=s.split("-")[2:-2]	
What is the <b>value</b> of <b>x</b> after this program is executed?	
(A) None	
(B) False	
(C) ★	
['O', 'R']	
(D) ''	
(E) 'ORS'	
Solution.	

```
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"
Solution.

<pre>i=2 x=3 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 12
(B) ★
15
(C) 11
(D) 13
(E) 14
Solution.

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

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

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

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

s[i:i+2]

(D) s[i:i+1]

13. (1 point) Consider the following program:
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
(B) String
(C) ★
Integer
$(\mathrm{D})$ Boolean
(E) None
Solution.

14. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
String
(B) Boolean
(C) Integer
$(\mathrm{D})$ None
(E) Float
Solution.

```
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 <b>value</b> of $x$ after this program is executed?
(A) "333"
(B) None of the other answers are correct.
(C) "33"
(D) 33
(E) ★
"3str(3)"
Solution.

```
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']
```

<pre>f1 f0 file(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>	
fter it is run, what is the final value of x?	
A) 5	
B) 3	
C) 30	
D) 14	
E) ★	
4	
plution.	

```
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.
```

## Solution.

(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']
Solution.

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

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

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

- (A) sum=sum+1
- (B) sum+1=sum
- (C) sum=sum+i
- (D) **★**

sum=sum+i+1

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 <b>value</b> of $x$ after this program is executed?
(A) 7
(B) ★
3
(C) 1
(D) 9
(E) None of the other answers are correct.
Solution.

 $23.\ (1\ \mathrm{point})$  Consider the following program:

a=3
b=4
if a!=b:
a=b
elif a==4:
a=5 else:
b=a
U-a
What is the <b>value</b> of a after this program is executed?
(A) 5
(B) 3
(C) None of the other answers are correct.
(D) 7
(E) ★
4
Solution.

 $24.\ (1\ \mathrm{point})$  Consider the following program:

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
```

```
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"

```
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']

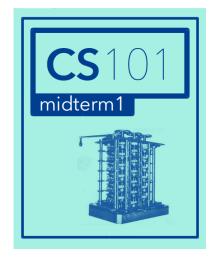
```
s="Hobbes"
i=0
x=-1
while i<len(s):
    if s[i]=='b':
        x=i
i+=1</pre>
```

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']
```



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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

```
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)  $\bigstar$  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"]
```

```
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=[]

- (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]

```
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

```
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) <b>★</b>	

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

[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']
```

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 12
(B) 13
(C) 11
(D) ★
10
(E) 14
Solution.

10.	(1 point)	How	can tl	he following	mathematical	equation	be i	mplemented	as a	Python	expressi	ion?
Ass	ume a, b,	and o	cos ha	ave 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)

<pre>a=3 b=4 if a==3:     a=b elif a==4:     a=5 else:     b=a</pre>
What is the <b>value</b> of a after this program is executed?
(A) 5
(B) ★
4
(C) 3
(D) 7
(E) None of the other answers are correct.
Solution.

12. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. We ignore indentation for this problem.

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

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

```
a=["A","C","C","I","0"]
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"

s="-B-0-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 'ORS'
(B) ''
$(\mathrm{C})$ False
$(\mathrm{D})$ None
(E) ★
['O', 'R']
Solution.

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 <b>value</b> of <b>x</b> after this program is executed?
(A) ★
3
(B) 9
(C) None of the other answers are correct.
(D) 1
(E) 7
Solution.

x=str("1"*3)			
What is the <b>value</b> of $x$ after this program is executed?			
(A) ★			
"111"			
(B) None of the other answers are correct.			
(C) "3"			
(D) 111			
(E) 3			
Solution.			

17. (1 point) What is the result of the following expression?

[ 1, 2, 3 ] \* 3.0

(A) **★** 

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

- (B) [3, 6, 9]
- (C) [3.0, 6.0, 9.0]
- (D) [1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]
- $\left( \mathrm{E}\right)$  None of the above.

```
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.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) 5
(B) 30
(C) 4
(D) ★
14
(E) 3
Solution.

len("ABCDE"[1:4])
What value is produced?
(A) 1
(B) 5
(C) ★ 3
(D) 4
Solution.

20. (1 point) Evaluate the following expression:

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) **★**

$$(m \% n) != 0$$

<pre>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?</pre>
$(\mathrm{A})$ None
$(\mathrm{B})$ Integer
(C) String
(D) ★
Boolean
(E) Float
Solution.

```
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) ★

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

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

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

```
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']

- $(\mathrm{B})$  ['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+"%1" % 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"

 $29.\ (1\ \mathrm{point})$  Consider the following incomplete program.

sum=0
???:

sum=sum+i

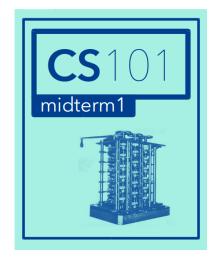
The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

- (A) while i in range(100)
- $(\mathrm{B})$  for i in range(0,100)
- (C) ★

for i in range(1,101)

(D) while i<=100

30. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ None
(B) Float
(C) Boolean
(D) ★
String
$(\mathrm{E})$ Integer
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- This is a 60-minute exam.
- $\bullet$  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]
- $(\mathrm{B})$  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]

a=3
b=4
if a==3:
a=b
elif a==4: a=5
else:
b=a
What is the <b>value</b> of a after this program is executed?
(A) 3
(B) <b>★</b>
4
(C) None of the other answers are correct.
(D) 7
(E) 5
Solution.

<pre>len("ABCD"[0:3]) What value is produced?</pre>		
(A) ★ 3		
(B) 2		
(C) 1		
(D) 4		

3. (1 point) Evaluate the following expression:

```
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:
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
$(\mathrm{A})$ None
(B) Boolean
(C) Float
(D) ★
Integer
(E) String
Solution.

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

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

- (A) 4
- (B) **★**

3

- (C) -1
- (D) 2
- (E) 5

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of $x$ after this program is executed?
(A) 14
(B) 11
(C) 13
(D) ★
10
(E) 12
Solution.

9. (1 point) Evaluate the following expression	n
[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]

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 3:

x[i]+=1

i+=1
```

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

- (A) [3, 5, 7, 7]
- (B) **★**

- (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.
<pre>def artificing(s):     return s+"%i" % 2     return s*2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final value of s?
$(\mathrm{A})$ None
(B) ★
"MERLIN2"
(C) "MERLIN%i"
(D) 0
(E) "MERLINMERLIN"
Solution.

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

sum=0

???:

sum=sum+i

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

(A) **★** 

for i in range(1,101)

- $(\mathrm{B})$  for i in range(0,100)
- (C) while i<=100
- $(\mathrm{D})$  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) 
$$(n // m) == 0$$

```
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:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
$(\mathrm{A})$ None
(B) Boolean
(C) Float
(D) Integer
(E) ★
String
Solution.

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

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

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

(A) 3
(B) 16
(C) 8
(D) 0
(E) ★
12

Solution.

17. (1 point)	How c	an the	following	mathematical	equation	be	implemented	as a	Python	express	ion :
Assume a, b,	and si	in have	already l	been defined.							

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

(A) **★** 

- (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']
```

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 'ORS'
(B) ★
['O', 'R']
(C) None
(D) ''
(E) False
Solution.

20. (1 point) Consider the following program:
<pre>pi="3.14159" e="2.71828" x=(float(e)**float(pi)-float(pi)) == 20</pre>
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ String
(B) ★
Boolean
$(\mathrm{C})$ Float
(D) None
$(\mathrm{E})$ Integer
Solution.

21. (1 point) Consider the following program.
kay = 2
wart = 3

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

kay = knight(wart, kay) + knight(kay, wart)
After it is run, what is the final value of kay?

(A) 3
(B) 2

(D)  $\bigstar$  None of the other answers are correct.

Solution.

(C) 5

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
```

```
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

<pre>10 ile(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
eter it is run, what is the final value of x?
A) 4
B) ★
14
C) 5
D) 30
E) 3
olution.

 $24.\ (1\ \mathrm{point})$  Consider the following program.

(A)	*
	"1.21.2"
(B)	"2.4"
(C)	None of the other answers are correct.
(D)	2.4
(E)	"1.2*2"

 $25.\ (1\ \mathrm{point})$  Consider the following program:

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

x=str(1.2)\*2

```
a=["A","C","C","I","0"]
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)  $\bigstar$

"OCCIO"

- (D) "ACCOA"
- (E) "ACCIA"

```
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) **★**

- (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

```
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']

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 <b>value</b> of <b>x</b> after this program is executed?
(A) ★
3
(B) 7
(C) 9
(D) 1
(E) None of the other answers are correct.
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.
- $\bullet$  There are several different versions of this exam.

L.	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

```
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?</pre>

(A) 3

- (B) 4
- (-) -
- (C) 0
- (D) 1
- (E)  $\bigstar$

2

3. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
String
(B) Boolean
(C) Float
$(\mathrm{D})$ Integer
$(\mathrm{E})$ None
Solution.

pi="3.14159" e="2.71828" x=pi*len(e)+pi								
What is the <b>type</b> of $x$ after this program is executed?								
(A) ★								
String								
$(\mathrm{B})$ Boolean								
(C) None								
(D) Float								
$(\mathrm{E})$ Integer								
Solution.								

x=str(3)+"str(3)"										
What is the <b>value</b> of $x$ after this program is executed?										
(A) 33										
(B) None of the other answers are correct.										
(C) "333"										
(D) "33"										
(E) ★										
"3str(3)"										
Solution.										

5. (1 point)

```
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	expressi	on?
Ass	ume a, b	, and	cos	have already	been defined.							

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

- (A) (b^a)cos(a-b)
- (B) **★**

- (C) None of the other answers are correct.
- (D) (a\*\*b)cos(a-b)
- (E) (a^b)\*cos(a-b)

=0 =1 nile(i*i)<=9: x=x+(i*i) i=i+1
fter it is run, what is the final <b>value</b> of x?
A) 5
(B) 3
(C) ★
14
D) 30
(E) 4
olution.

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]

```
x=[1,2,3,4,5,6,7,8,9]

x=x[2:-2]

i=1

while i \le 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:
<pre>s="ECTOR" t="GAWAIN" x=(len(s)/(len(t)-1))+1</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Integer
(B) ★
Float
(C) String
$(\mathrm{D})$ None
(E) Boolean
Solution.

13. (1 point) Consider the following Python program.
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
 d[i%3]+=e[i]
x=d[1]

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

(A) 16
(B) 0
(C) 3
(D) 8
(E) ★
12

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

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

- (A) 0
- (B) 5
- (C) **★**

-1

- (D) 3
- (E) 6

len("ABCDE"[1:4])
What value is produced?
(A) 5
(B) ★ 3
(C) 4
(D) 1
Solution.

15. (1 point) Evaluate the following expression:

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

```
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]
- $(\mathrm{B})$  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]

s="-B-0-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
$(\mathrm{A})$ False
(B) ★
['O', 'R']
(C) ''
(D) 'ORS'
$(\mathrm{E})$ None
Solution.

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

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2 What is the value of x after this program is executed?</pre>
That is the varie of k after this program is executed.
(A) 13
(B) 11
(C) 12
(D) 14
(E) ★
10
Solution.

22. (1 point) Consider the following program.

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

s=artificing("MERLIN")

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

(A) 0

(B) None

(C) "MERLINMERLIN"

(D) "MERLIN%i"

(E) ★
 "MERLIN2"

```
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
```

Solution.	
(E) 1	
27	
(D) ★	
(C) None of the other answers are correct.	
(B) 3	
(A) 9	
What is the <b>value</b> of <b>x</b> after this program is executed?	
x=x**1	
x=x**2 else:	
elif(a%3)==1:	
if (a\%3)==2: x=x**3	
a=5	
x=3	

 $25.\ (1\ \mathrm{point})$  Consider the following program:

```
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.
```

## Solution.

(D) 3

a=3
b=4
if a!=b:
a=b
elif a==4:
a=5
else: b=a
b-a
What is the <b>value</b> of a after this program is executed?
(A) None of the other answers are correct.
(B) ★
4
(C) 2
(C) 3
(D) 7
(E) 5
Solution.

 $27.\ (1\ \mathrm{point})$  Consider the following program:

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

20	(1	noint)	Evaluate	the	following	expression:
49.	( I	pomi,	) Evaluate	ше	ionowing	expression.

What value is produced?

- (A) [1,2,"3"]
- (B) [1,2,1,2,1,2]
- (C) **★**

[1,2,1]

(D) [1,2,3]

```
a=["A","C","C","I","0"]
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"



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  on your Scantron.
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- There are several different versions of this exam.

L.	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
```

Solution.

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

en("ABCDE"[1:4])	
Vhat value is produced?	
(A) ★ 3	
(B) 4	
(C) 5	
(D) 1	
Solution.	

 $2.\ (1\ \mathrm{point})$  Evaluate the following expression:

x=3 a=5 if (a%3)==2: x=x\*\*3 elif(a%3)==1: x = x \* \* 2else: x = x \* \* 1What is the  ${\bf value}$  of  ${\bf x}$  after this program is executed? (A) 1 (B) 3 (C) None of the other answers are correct. (D) 9 (E) **★** 27 Solution.

3. (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) ["-","-","\*"]

```
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']
```

<pre>i=3 x=2 while i &lt; 7:     x+=i     i+=2 What is the value of x after this program is executed?</pre>
What is the value of x after this program is executed:
(A) 12
(B) 11
(C) 13
(D) 14
(E) <b>★</b>
10
Solution.

```
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

```
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)

s="G+R+A+I+L" x=s.split("+")[1:-2]
What is the <b>value</b> of $x$ after this program is executed?
(A) False
(B) None
(C) 'RAI'
(D) 3
(E) ★
['R','A']
Solution.

12. (1 point) Consider the following incomplete function.

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

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

- (A) (m // n) != 0
- (B) ★

$$(m \% n) != 0$$

- (C) (n % m) == 0
- (D) (n // m) == 0

```
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']
- $(\mathrm{B})$  ['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:
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) Float
(B) String
(C) None
(D) Boolean
(E) ★
Integer
Solution.

```
16. (1 point) Consider the following program:
a=["merlin","sir agravaine","king pellinore"]
b=[ ]
for i in range(0,4):
    b.append(a[0-i].title())
What is the value of b after this program is executed?

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

17. (1 point) Consider the following program:
<pre>s="TRIS %i" t="ISEU" x=len(s) % len(t[2:-1])</pre>
What is the $\mathbf{type}$ of $\mathbf{x}$ after this program is executed?
(A) String
(B) Float
(C) ★
Integer
(D) None
(E) Boolean
Solution.

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

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

(A) **★** 

-1

- (B) 5
- (C) 0
- (D) 6
- (E) 3

```
a=["A","C","C","I","0"]
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)  $\bigstar$

"OCCIO"

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

Solution.
(E) 7
(D) 4
3
(C) ★
(B) None of the other answers are correct.
(A) 5
What is the <b>value</b> of a after this program is executed?
else: a=b
elif a==4: a=5
if a==3: b=a
b=4
a=3

 $20.\ (1\ \mathrm{point})$  Consider the following program:

21.	(1 point)	) How	can the	e following	mathematical	equation	be imp	olemented	as a	Python	express	ion?
Ass	ume a, b	, and	sin hav	e 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) **★**

22. (1 point) Evaluate the following expression:
[1,2]*len("3")

(A) **★** 

[1,2]

What value is produced?

- (B) [1,2,1]
- (C) [1,2,3]
- (D) [1,2,1,2,1,2]

```
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)  $\bigstar$  None of the other answers are correct.
- (B) 5
- (C) 2
- (D) 3

24. (1 point) Consider the following program.
<pre>x=0 i=1 while(i*i)&lt;=9:     x=x+(i*i)     i=i+1</pre>
After it is run, what is the final <b>value</b> of x?
(A) 5
(B) ★
14
(C) 3
(D) 4
(E) 30
Solution.

25. (1 point) Consider the following incomplete Python program.

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

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

- (A) s[i+1:i+2]
- (B) **★**

s[i:i+2]

- (C) s[i:i-1]
- (D) s[i:i+1]

(B)	"2.4"
(C)	*
	"1.21.2"
(D)	2.4
(E)	None of the other answers are correct.

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

x=str(1.2)\*2

(A) "1.2\*2"

```
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) **★** 

- (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+"%1" % 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"

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

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

- (A) 0
- (B) **★**

3

- (C) 2
- (D) 1
- (E) 4

pi="3.14159" e="2.71828" x=pi in pi*len(e)
What is the <b>type</b> of $x$ after this program is executed?
$(\mathrm{A})$ None
$(\mathrm{B})$ Integer
(C) Float
$(\mathrm{D})$ String
(E) ★
Boolean
Solution.



- $\bullet$  Be sure to enter your  $\underline{NetID}$  and  $\underline{the\ code\ below}$  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.

L.	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

s="-B-O-R-S-" x=s.split("-")[2:-2]
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) ★
['O', 'R']
(B) ''
(C) 'ORS'
(D) None
(E) False
Solution.

3. (1 point) Consider the following program:
pi="3.14159" e="2.71828" x=pi*len(e)+pi
What is the <b>type</b> of $x$ after this program is executed?
(A) Float
(B) <b>★</b>
String
(C) Boolean
(D) None
$(\mathrm{E})$ Integer
Solution.

```
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]

<pre>i=2 x=3 while i &lt; 7:     x+=i     i+=2</pre>
What is the <b>value</b> of <b>x</b> after this program is executed?
(A) 13
(B) 11
(C) 12
(D) ★
15
(E) 14
Solution.

7.	(1 point	) How	can	the following	mathematical	equation	be im	plemented	as a	Python	expressi	on?
As	ssume 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) **★**

- (D) a\*sin(b^a b)
- (E) a\*sin(a^b b)

```
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']

- $(\mathrm{B})$  ['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) Evalu	ate the following expression:
[1,2]*len("3")	
What value is pro	duced?

(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:
<pre>s="ECTOR" t="GAWAIN" x=len(str(s.isupper()))-t.find("A")</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) String
(B) Boolean
(C) ★
Integer
$(\mathrm{D})$ None
(E) Float
Solution.

```
11. (1 point) Consider the following program:
a=["merlin","sir agravaine","king pellinore"]
b=[]
for i in range(1,3):
    b.append(a[0-i].title())
What is the value of b after this program is executed?

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

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

x=str("1"*3)				
What is the <b>value</b> of <b>x</b> after this program is executed?				
(A) None of the other answers are correct.				
(B) "3"				
(C) 111				
(D) 3				
(E) ★				
"111"				
	_			
Solution.				

len("ABCD"[0:3])
What value is produced?
(A) 2
(B) 1
(C) $\star$ 3
(D) 4
Solution.

13. (1 point) Evaluate the following expression:

```
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]

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

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

- (A) 0
- (B) 1
- (C) **★**

2

- (D) 4
- (E) 3

x=3 a=5 if (a%3)==2: x=x\*\*3 elif(a%3)==1: x = x \* \* 2else: x = x \* \* 1What is the  ${\bf value}$  of  ${\bf x}$  after this program is executed? (A) 1 (B) 9 (C) 3 (D) None of the other answers are correct. (E) **★** 27 Solution.

16. (1 point) Consider the following program:

17. (1 point) Consider the following program.
<pre>def artificing(s):     return s*2     return s+"%i" % 2     return s</pre>
s=artificing("MERLIN")
After it is run, what is the final <b>value</b> of s?
(A) 12
(B) "MERLIN"
(C) "MERLIN2"
(D) ★
"MERLINMERLIN"
(E) None
Solution.

```
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) **★**

$$(m \% n) != 0$$

```
a=["A","C","C","I","0"]
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  ${\tt x}$  is 33?

(A) **★** 

s[i:i+2]

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

<pre>a=3 b=4 if a!=b:     a=b elif a==4:     a=5</pre>
else:
b=a What is the <b>value</b> of a after this program is executed?
(A) 7
(B) 5
(C) None of the other answers are correct.
(D) ★
4
(E) 3
Solution.

<pre>x=1 i=0 while(x*x)&lt;=9:     i=i+(x*x)     x=x+1</pre>
After it is run, what is the final <b>value</b> of $x$ ?
(A) 30
(B) 3
(C) 14
(D) 5
(E) ★
4
Solution.

 $23.\ (1\ \mathrm{point})$  Consider the following program.

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
```

Solution.

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

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

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

- (A) 0
- (B) 6
- (C) 5
- (D) 3
- (E) **★**

-1

```
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:
<pre>s="TRIS %i" t="ISEU" x=s % len(t)</pre>
What is the <b>type</b> of $x$ after this program is executed?
(A) ★
String
(B) Float
(C) Boolean
(D) None
$(\mathrm{E})$ Integer
Solution.

```
28. (1 point) Consider the following program:
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)
x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])
if s1<s2:
    x.sort()
elif s1==s2:
   x.reverse()
else:
    x.append("six")
What is the value of x after this program is executed?
(A) ['two', 'twelve', 'one', 'eleven', 'six']
 (B) ['eleven', 'one', 'twelve', 'two']
 (C) ['one', 'two', 'eleven', 'twelve', 'six']
 (D) ★
     ['twelve', 'eleven', 'two', 'one']
 (E) ['one', 'two', 'eleven', 'twelve']
```

```
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.
```

## Solution.

(D) 3