Section 1

1. What is the output of the following lines of code?

```python
weather = 'raining'
if weather == 'sunny':
    print('wear sunblock')
elif weather == 'raining':
    print('use umbrella')
elif weather == 'snowing':
    print('make snowman')
elif weather == 'raining':
    print('I see a rainbow!')
else:
    print(weather)
```

- a. use umbrella
- b. wear sunblock
- c. make snowman
- d. use umbrella
- e. I see a rainbow!

2. What is the output of the following lines of code?

```python
for i in range(2):
    print(i)
```

- a. i
- b. i
- c. 0
- d. 1
- e. None of the above

3. You are given the following lines of code

```python
x = 0
while x < 5:
    print(x)
    x = x+1
```
Which of the following is true?

a. The Python interpreter will warn of an infinite loop
b. The Python interpreter will report a syntax error in the line `x = x+1`
c. The while loop will execute indefinitely (infinite loop)
d. The while loop execute five times
e. None of the above.
Section 2

1. Looking at the above tree, which is the following is true:
   a. A is a leaf node
   b. A is an internal node
   c. E is the left child of D
   d. I is a leaf

2. Which of the following Python codes traverses the top half of an image.
   a. image = Image(Point(0, 0), 'image.gif')
      image.move(image.getWidth()/2, image.getHeight()/2)
      window = GraphWin("Image Modify", image.getWidth(), image.getHeight())
      image.draw(window)
      for y in range(0, image.getHeight()/2):
         for x in range(0, image.getWidth()):
            color = image.getPixel(x, y)
   b. image = Image(Point(0, 0), 'image.gif')
      image.move(image.getWidth()/2, image.getHeight()/2)
      window = GraphWin("Image Modify", image.getWidth(), image.getHeight())
      image.draw(window)
      for x in range(0, image.getHeight()/2):
         for y in range(0, image.getWidth()):
            color = image.getPixel(x, y)
   c. image = Image(Point(0, 0), 'image.gif')
      image.move(image.getWidth()/2, image.getHeight()/2)
      window = GraphWin("Image Modify", image.getWidth(), image.getHeight())
      image.draw(window)
      for x in range(0, image.getHeight()):
         for y in range(0, image.getWidth()/2):
            color = image.getPixel(x, y)
d. image = Image(Point(0, 0), ‘image.gif’)
    image.move(image.getWidth()/2, image.getHeight()/2)
    window = GraphWin("Image Modify", image.getWidth(), image.getHeight())
    image.draw(window)
    for y in range(0, image.getHeight()):
        for x in range(0, image.getWidth()/2):
            color = image.getPixel(x, y)
Section 3

1. What does the following python function do?
   def func(a, b):
       res = 1
       for i in range(b):
           res = res * a
       return res
   a. computes a + b
   b. computes a * b
   Xc. computes a ^ b
   d. none of the above

2. What does the following python function do?
   from math import sqrt
   def func(a):
       for i in range(2, (int)(sqrt(a)) + 1):
           if(a % i == 0):
               return False
       return True
   a. returns True if a is even
   Xb. returns True if a is prime
   c. returns True if a is odd
   d. none of the above

3. What does the following python function do?
   def func(list):
       for i in range(len(list)-1):
           if(list[i]>list[i+1]):
               return False
       return True
   Xa. returns True if list is sorted in ascending order
   b. returns True if list is sorted in descending order
   c. Error, code has infinite loop
   d. none of the above
1. def func1(s):
    flag = True
    y = len(s) - 1
    for x in range(int(len(s)/2)):
        if(s[x] != s[y]):
            flag = False
            break
        y = y-1
    return flag

What will func1(“malayalam”) return?
   a. False
   Xb. True
   c. TypeError: 'str' object does not support item assignment
   d. “malayam”

2. def func2(s):
    t= ""
    for x in range(0, len(s), 2):
        t = t + s[x]
    return t

What will func2(“washington”) return?
   a. ""
   b. “washington”
   Xc. “wsgio”
   d. “ahntn”

3. How many levels does the following tree have?

   T = [[13, 1, 2], [3, 3, 4], [32, 5, -1], [1, 6, 7], [6, 8, -1], [19, 9, 10],[-1, -1, -1], [2, -1, -1], [5, -1, -1], [10, -1, -1], [24, -1, -1]]

   a. 3
   Xb. 4
   c. 5
   d. 6
Section 5

1. Which of the following is true about the function below?
   ```python
def func(s):
    if(s == ":"): # I. The function is recursively defined
        return ">
    return func(s[1:]) + s[0]
```
   II. The function works on strings
   III. The function works on a list of integers
   IV. The function reverses a given string
   V. Given a string “abcd” the function returns “bcda”
   VI. Give a list [1, 2, 3, 4] the function returns [2, 3, 4, 1]

   Xa. I, II and IV
   b. II and IV
   c. I, III and VI
   d. III and VI
   e. I, II and V

3. Consider the following set of statements.

   A) ```python
   for i in range(10):
       print(i)
   ```

   B) ```python
   i = 0
   while(i < 10):
       print(i)
       i = i+1
   ```

Which of the following statements are true?
   XA. A and B produce the same output
   B. A prints numbers 0 to 10 and B prints numbers 0 to 9
   C. A prints numbers 1 to 10 and B prints numbers 0 to 10
   D. A prints numbers 0 to 9 and B prints numbers 0 to 10
   E. None of the above
Section 6

1. What is the output of the following Python program:
def func (n , k ) :
    if k==n :
        return k
    else :
        return n + func (n-1,k)

func( 5 , 2 )
A. 15
XB. 14
C. 120
D. 2
E. None of the above

2. Considering the following code:
def func (x , y ) :
    if x<=1:
        print ( 'left ')
    elif x>1 and y>=1: # LINE A
        print ( 'top right ')
    elif y<2:
        print ( 'bottom right ')
    else : # LINE B
        print ( 'none ' ) # LINE C

Which of the following modification does not affect the function of the original code?
I  remove 'x > 1 and' in line A
II  remove 'and y >= 1' in line A
III  remove lines B and C completely

A.  I and II
B.  I
C.  II
D.  III
XE. I and III
3. Which of the following boolean expression describes this truth table?

<table>
<thead>
<tr>
<th></th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

| x | 0 | 1 | 0 | 1 |

A. x and y
B. (not x) and y
C. x or (not y)
D. (not x) or y
E. none of the above
Section 7

1. Which of the following code will set variable p to 2 and q to 0?

a.  
```python
def myFun(a,b):
    x= a+ b
    return x
    y= a-b
    return y
(p, q) = myFun(1, 1)
```

b.  
```python
def myFun(a,b):
    x= a+ b
    y = a-b
    print(x, y)
(p, q) = myFun(1, 1)
```

Xc.  
```python
def myFun(a,b):
    x= a+ b
    y = a-b
    return (x, y)
(p, q) = myFun(1, 1)
```

d.  
```python
def myFun(a,b):
    x= a+ b
    y = a-b
    return x
    return y
(p, q) = myFun(1, 1)
```
2. What does the following Python code print?

```python
def args(x, y):
    x = 'Hello'
    return x
    y = 'World!'
    z = x + y
    return z
print(args('World!', 'Hello'))
```

Xa. Hello  
   b. World!  
   c. HelloWorld!  
   d. World!Hello

3. What is the output of the following Python Code?

```python
nameA = 'Tom'
nameB = 'Jerry'
def myFun(nameA, nameB):
    nameA = nameA + nameB
    return nameA
nameB = myFun(nameA, nameB)
print(nameA+nameB)
```

a. TomJerryTom  
   b. TomJerryTomJerry  
   c. TomTomJerry  
   d. JerryTom
Section 8

1. Considering the following definitions:

```python
def alpha(x, y):
    return x + beta(y, x)

def beta(x, y):
    return y - x
```

What is the return value \( \alpha(2, 3) \)?

a. 1  
b. 2  
c. 3  
d. 4  
e. 5

2. Consider the following two Python code fragments:

```python
if x == 5:
    x = x + 1
elif x == 6:
    x = 8

if x == 5:
    x = x + 1
if x == 6:
    x = 8
```

Will the value of \( x \) be the same after executing one code or the other?

a. Yes  
b. No
Section 9

1. What does the following Python code do?
   
   ```python
   myInput = eval( input( "Input a number: " ) )
   ```
   
   a. It prints Input a number:
   b. The input function takes what is typed and returns it as a string.
   c. The eval function takes the returned string from input and translates into a number. The result is then stored in the myInput variable.
   d. X a, b, and c
   e. a and c

2. What is the difference between an internal node and a leaf node in a binary tree?
   
   a. There is no difference.
   b. An internal node always has a parent and at least one child while a leaf node only has a parent, or only has children.
   c. X A leaf node is any node without children. An internal node is any node with at least one child.
   d. An internal node must have 2 children. A leaf node may have one child or no children.

3. Consider the following two Python functions. One is recursive, and one is not.
   
   ```python
   def power(base, p):
       value = 1
       for i in range(p):
           value = value * base
       return value
   ```
   
   ```python
   def powerR(base, p):
       if p == 0:
           return 1
       return powerR(base, p-1) * base
   ```
   
   a. X Both functions will compute base^p for all p where p>=0 and p is an integer.
   b. powerR will work, but is not a recursive function.
   c. The recursive function will fail for p=0.
   d. The non-recursive function will fail for p=0.
   e. c and d