There are 25 single choice questions. Each one is worth 4 points. The total score for the exam is 100.

NOTE: the right answer is marked with a * at the end.
Question 1

Given the equation: $1000^n + 9000n^2 + n! + \log(n)$

What is the growth term (i.e. the term that will be the largest when $n$ is very big)?

A) $9000n^2$
B) $1000^n$
C) $\log(n)$
D) $n!$ *
Question 2

Which of the following Big O terms is the least complex (i.e. would correspond to the fastest algorithm)?

A) \( O(n) \)
B) \( O(\log(n)) \) *
C) \( O(n \log(n)) \)
D) \( O(n^2) \)
Question 3

What does the program below output?

```python
msg = "ABBADABBA"
map = {'A': 'B', 'B': 'C', 'C': 'D', 'D': 'A'}
newMsg ="
for i in msg:
    newMsg = newMsg + map[i]
newMsg2 ="
for j in newMsg:
    newMsg2 = newMsg2 + map[j]
print(newMsg2)
```

A) ABBADABBA
B) BCCBABCBB
C) CDCCBCDCD *
D) DAADCDADAAD
Question 4

What does the program below output?

```python
A = {1:10, 2:20, 3:30, 4:40}
B = [A, (5,50), A]
C = [B, A, “this is a string”]
D = C[0][1][1]
print(D)
```

A) 10  
B) 50 *  
C) this is a string  
D) 5
Question 5

Which of the following functions will print the reverse of the string str?

I) def reverse(str):
    output = ""
    for i in range(0, len(str)):
        output = output + str[len(str) - i - 1]
    print(output)

II) def reverse2(str):
    output = ""
    for i in range(0, len(str)):
        output = output + str[i]
    print(output)

III) def reverse3(str):
    output = ""
    for i in range(0, len(str)):
        output = str[i] + output
    print(output)

IV) def reverse4(str):
    output = ""
    for i in range(0, len(str)):
        output = str[len(str) - i - 1] + output
    print(output)
A) I and II
B) II and III
C) I and IV
D) I and III *
Question 6

The following function named mysum() takes a list of integers as input parameter. It is supposed to add all the integers in the list and return the sum. However, the programmer has noticed that it produces unexpected results. What kind of bug is present in the code?

```python
def mysum(mylist):
    i = 1
    s = 0
    while i < len(mylist):
        s = s + mylist[i]
        i = i + 1
    return s
```

A) Logic error *
B) Syntax error
C) Name error
D) Infinite loop
Consider the following function:

```python
def func(list):
    if(len(list) < 3):
        return False
    status = True
    for i in range(2, len(list)):
        if (list[i] != list[i-1] + list[i-2]):
            status = False
    return status
```

For which of the lists below will this function return `true`?

I) [0, 1, 1, 2, 3, 5, 8]
II) [1, 2, 3, 5, 7]
III) [4, 5, 9, 14]

A) I and III *
B) I
C) III
D) II
Question 8

You are given the following tree:

Tree = ["a", "b", ["a", "b"], ["a", "b"], ["a", "b", "a"]]

Which of the following code snippets will select out the value “a”?

I) Tree[0][0]
II) Tree[2][0][0]
III) Tree[0][2][1]
IV) Tree[2][1]

A) I
B) II and IV
C) I and IV
D) I, II, and IV *
Question 9

Which of the following code snippets will produce an error?

I)
   a = “0,1,2,3,4,5”
   a[0] = “e”

II)
   a = [0,1,2,3,4,5]
   a[0] = “e”

III)
   a = (0,1,2,3,4,5)
   a[0] = “e”

IV)
   a = {0:1, 2:3, 4:5}
   a[0] = “e”

A) I and III *
B) II and IV
C) I, II, and IV
D) II and III
Question 10

You executed the statement: main() and received the error message shown below. What does this error message mean?

```python
>> main()
NameError: global name ‘x’ is not defined
```

A) There is no global variable named x, but it was used in the function main *
B) There is a local variable named x which conflicts with the global variable named x
C) There is a local variable named x but no global variable named x
D) The variable x was not globally defined and not used by the function main()
Question 11

What is the output of the following code?

def matFun():
    Mat = [[1,2,3], [4,5,6], [2,4,5]]
    x = 0
    for i in range(3):
        x = x + Mat[1][i]
    print(x)
matFun()
Question 12

What is the output of the following code?

def myFun(x, y, z):
    return [x*z for i in range(y)]
myFun(3, 4, 'A')

A) it produces an error
B) [['A', 'A', 'A'], ['A', 'A', 'A'], ['A', 'A', 'A'], ['A', 'A', 'A']] *
D) [['A', 'A'], ['A', 'A'], ['A', 'A']]
Consider the following code example and choose the statement that best describes the purpose of this function.

```python
def mystery(n):
    x = {}
    for i in range(128):
        x[i] = chr(i)
    return x[n]
```

A) It returns the range of characters corresponding to the argument n
B) It creates and returns a filled dictionary corresponding to the ASCII table
C) It returns the ASCII number that corresponds to the argument n
D) It performs the same function as the built in function `chr()`
Question 14

Which of the following code snippets will create a matrix with the first column containing the value 5 for all positions in that column? You can assume that all matrices are encoded row by row.

I) \[
\begin{bmatrix}
5, & 0, & 0, & 0 \\
5, & 0, & 0, & 0 \\
5, & 0, & 0, & 0
\end{bmatrix}
\]

II) \[
\begin{bmatrix}
5, & 5, & 5, & 5 \\
0, & 0, & 0, & 0 \\
0, & 0, & 0, & 0
\end{bmatrix}
\]

III) 
\[
c = 4 \\
r = 3 \\
[5]+[0] * (c-1) \text{ for } i \text{ in range}(r)
\]

IV) 
\[
c = 4 \\
r = 3 \\
m = [[0] * c \text{ for } i \text{ in range}(r)] \\
for j \text{ in range}(r): \\
\hspace{1cm} m[j][0] = 5
\]

A) I and IV
B) I, II, and IV
C) I, III and IV *
D) III and IV
Question 15

Which of the following code snippets prints a list that contains three strings?

I) \[ x = \text{"I love CS177!".split(" ")} \\
    \text{print}(x) \]

II) \[ x = \text{"10/31/2011".split("/")} \\
    \text{print}(x) \]

III) \[ x = \text{"0 0 0 0 0 0 0 0".split(" ")} \\
    \text{print}(x) \]

IV) \[ x = \text{"1,2,3,4,5,6".split(",\")} \\
    \text{print}(x) \]

A) I and II *
B) III and IV
C) I, II, III, and IV
D) I
Question 16

You are given the following complex structure of lists, tuples, and strings:

Complex= [("a", "b", ["a", "b"]), "ab", ("ab", "a")]

Which of the following pieces of code will select out “a”? 

I) Complex[0][0]
II) Complex[2][0][0]
III) Complex[0][2][1]
IV) Complex[2][1]

A) I
B) II and IV
C) I and IV
D) I, II, and IV *
Question 17

What is the output of the following function?

def func1():
    A = [4*[1] for i in range(3)]
    B = [3*[1] for i in range(4)]
    C = [3*[0] for i in range(3)]
    for i in range(3):
        for j in range(3):
            for k in range(4):
                C[i][j] = C[i][j] + ( A[i][k] * B[k][j])
    print(C)

A)  [[1, 1, 1], [1, 1, 1], [1, 1, 1]]
B)  [[3, 3, 3], [3, 3, 3], [3, 3, 3]]
C)  [[4, 4, 4], [4, 4, 4], [4, 4, 4]] *
D)  [[2, 2, 2], [2, 2, 2], [2, 2, 2]]


Question 18

Given the list: \( L = [1, 2, 3, 4, 5, 6, 7, 8, 9] \)

Which of the following code snippets will select out a random element from this list?

I) \( L[0] \)

II) \[
import \ \text{random} \\
\ x = \text{random.random()} \\
\ y = x*9 \\
\ z = \text{int}(y) \\
\ L[z]
\]

III) \[
import \ \text{random} \\
\ L[\text{int}(\text{random.random()} \ * \ 9)]
\]

IV) \[
\ \text{import \ random} \\
\ \text{random.choice}(L)
\]

A) I
B) I, II, III, and IV
C) II, III, and IV *
D) I, II, and III
Question 19

Which of the following code snippets will produce an error?

I)  
a = “0,1,2,3,4,5”
a[100] = “e”

II)  
a = [0,1,2,3,4,5]
a[100] = “e”

III)  
a = (0,1,2,3,4,5)
a[100] = “e”

IV)  
a = {0:1, 2:3, 4:5}
a[100] = “e”

A) I, II, III and IV
B) I, II and IV
C) I, II, and III *
D) II and III
Question 20

What is the output of the following python code? The length of the string “slice and dice” is 14.

def quirkyStrings(str):
    str2 = str[:int(len(str)/2)]
    output = 
    for i in str2:
        output = i + i + output
    return output

print(quirkyStrings("slice and dice"))

A) aa eecciiilss *
B) a ecils
C) nd dice
D) nndd ddiiccee
Question 21

What is the result of calling the following function?

def fileFun(filename):
    file = open(filename, “r”)
    str = “this is a string”
    for c in str:
        file.write(c)
    file.close()

A) The file defined by filename will now contain the string str on one line
B) The code produces an error *
C) The file defined by filename will now contain each character of the string str, with one character on each line of the file
D) The file defined by filename will contain half of the string str on one line and the other half on the following line
Question 22

If you have the following list:

```python
tree = [['Leaf 10', 'Leaf 4'],
        ['Leaf 3', 'Leaf 7'],
        ['Leaf 6'],
        ['Leaf 2', 'Leaf 8', 'Leaf 9']]
```

Which of the following print statements will produce the output:

Leaf 4  Leaf 8  Leaf 6

A) `print( tree[1][1] + tree[3][0] + tree[2][0])`

B) `print( tree[0][1] + tree[3][1] + tree[2][0]) *`

C) `print( tree[0][0] + tree[1][1] + tree[3][2])`

D) `print( tree[0][1] + tree[3][2] + tree[2][0])`
Question 23

What is the output of the following function:

def myFunc():
    aString = 'Hello World!
    aString = aString[6:]+aString[-1]+aString[:5]
    print(aString)

A) the code produces an error
B) World!Hell
C) World!!Hello *
D) WorldHello
Question 24

What will the following program print?

def myFunc():
    file = open("test", "w")
    file.write("ABC\nXYZ")
    file.close()
    file = open("test", "r")
    contents = file.readlines()
    file.close()
    file = open("test", "r")
    contents[0] = file.read()
    file.close()
    file = open("test", "r")
    contents[1] = file.readline()
    file.close()
    print(contents)
myFunc()

A) [['ABC', 'XYZ'], ['ABC\n']]
B) ['ABC\nXYZ', 'ABC\n'] *
C) ['ABC\nXYZ', 'XYZ']
D) [['ABC', 'XYZ'], 'ABC\n']
Question 25

Suppose you have the following dictionary:

```python
myDict = {'A': 'Avery',
          'Billy': 'B',
          'D': 'Darren',
          'Darren': 'D',
          'B': 'Billy',
          'Avery': 'A'}
```

Which of the following statements will output: Billy

A) `print(myDict['Billy'])`
B) `print(myDict['B'])`
C) `print(myDict('B'))`
D) `print(myDict('Billy'))`