THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

Introduction to Data Mining
DATS 6103
Date: *Mar-03-2020*

Exam 1

- **Show ALL Work, Neatly and in Order.**
- **No** credit for Answers Without Work.
- Closed Books, Closed Notes One Page of Cheat Sheet.
- Use Your Own Paper (Do Not Write on Exam Paper).

Question.1:

What is the output of the following code?

```
1 count = 1
2 def doThis():
3     global count
4     for i in (1, 2, 3):
5         count += 1
6 doThis()
7 print(count)
```

Question.2:

What is the output of the following code?

```
1 numberGames = {}
2 numberGames[(1, 2, 4)] = 8
3 numberGames[(4, 2, 1)] = 10
4 numberGames[(1, 2)] = 12
5 sum = 0
6 for k in numberGames:
7     sum += numberGames[k]
8 print(len(numberGames) + sum)
```

Question.3:

What is printed by the Python code?

```
1 print(14 // 4, 14 % 4, 14.0 / 4)
```

Question.4:

What will be the contents of the file prob2.txt? Indicate any blanks or newlines clearly.

```
1 fout = open('prob2.txt', 'w')
2 words = ['Hello', 'there', 'Mom']
3 for w in words:
4     fout.write(w)
5 fout.close()
```

Question.5:

what is printed?

```
1 for n in [1, 3]:
2     for s in ['a', 'b']:
3         print(s*n, end=' ')
```

Question.6:

Write a Python function that takes a sequence of numbers and determines whether all the numbers are different from each other.

Question.7:

Write a Python program to remove and print every third number from a list of numbers until the list becomes empty.

Question.8:

Write a Python program to print a long text, convert the string to a list and print all the words and their frequencies.

Example:

string_words = "United States Declaration of Independence From Wiki, the free encyclopedia The United States Declaration of Independence is the statement adopted by the Second Continental Congress meeting at the Pennsylvania State House (Independence Hall) in Philadelphia on July 4, 1776, which announced that the thirteen American colonies, then at war with the Kingdom of Great Britain, regarded themselves as thirteen independent sovereign states, no longer under British rule."

Question.9:

What kind of data types are supported by Python? (name 4 at least)

Question.10:

What is the use of enumerate() in Python?

Question.11:

What is a Class? How do you create it in Python?

Question.12:

Differentiate between append() and extend() methods. ?

Question.13:

How to delete a file in Python?

Question.14:

Fill in the missing line of code:

```
1 def find_max(nums):
2     max_num = float("-inf") # smaller than all other numbers
3     for num in nums:
4         if num > max_num:
5             # (Fill in the missing line here)
6             print()
7     return max_num
```

Question.15:

What is printed out when the following code is executed?

```
1 def modify(elems):
2     elems.append("foo")
3     elems = ["bar", "baz"]
4
5 array = ["qux"]
6 modify(array)
7 print (array)
```

Question.16:

What is printed when the following code is executed?

```
matrix = []
row = [0, 0]
for i in range(2):
    matrix.append(row)
matrix[1][1] = 1
print (matrix)
```

Question.17:

What is printed when the following code is executed?

```
def factory():
    values = []
    def widget(value):
        values.append(value)
        return values
    return widget

worker = factory()
worker(1)
worker(2)
print(worker(4))
```

Question.18:

Fill in the missing line of code:

```
def int_to_base(num, base):
    # Converts a non-negative integer to an arbitrary base
    # Returns an array, e.g. int_to_base(6, 2) => [1, 1, 0]
    if num == 0:
        return []
    quotient = num // base # Integer division
    remainder = num % base
    # (Fill in the missing line here)
```

Question.19:

Fill in the missing line of code:

```
def merge(list1, list2):
    # Takes two sorted lists and merges them in sorted order
    i1 = i2 = 0
    out_list = []
```

```
    # (Fill in the missing line here)
        elem1 = list1[i1] if i1 < len(list1) else None
        elem2 = list2[i2] if i2 < len(list2) else None
        if elem1 is None or (elem2 is not None and elem2 < elem1):
            out_list.append(elem2)
            i2 += 1
        else:
            out_list.append(elem1)
            i1 += 1
    return out_list
```

uestion.20:

s possible to use the binary search algorithm to find an element in a sorted array in O(log n) ne. Binary search trees have this same search performance. Why, then, do we ever use more mplicated binary search trees rather than sorted lists?

uestion.21:

rite a Python program to get the third side of right angled triangle from two given sides.

uestion.22:

rite a Python program to find the number of zeros at the end of a factorial of a given positive mber.

uestion.23:

hat is the output of this code?

```
str = 'lEaRn pYtHoN'
print(str.title())
```

uestion.24:

rite a python class to find the slope and equation of a line given two sets of points.

uestion.25:

hat is the output of the following code?

```
iterator = [i for i in range(1, 4)]
something = [[x * y for y in iterator] for x in iterator]
```

uestion.26:

hat is a set in python?

Question.27:

What are two different ways to create an empty numpy array in python?

Question.28:

What is the output of the following code?

```
iterator = (i for i in range(1, 4))
matrix = [[x * y for y in iterator] for x in iterator]
```

Question.29:

Write a Python program that accept a positive number and subtract from this number the sum of its digits and so on. Continues this operation until the number is positive.

Question.30:

What is the output of the following code?

```
listOne = [20, 40, 60, 80]
listTwo = [20, 40, 60, 80]
print(listOne == listTwo)
print(listOne is listTwo)
```

Question.31:

What is the output of the following code?

```
var = "James" * 2  * 3
print(var)
```

Question.32:

What is the output of the following code?

```
var= "James Bond"
print(var[2::-1])
```

Question.33:

What is the output of the following code?

```
def calculate (num1, num2=4):
  res = num1 * num2
  print(res)

```

Question.34:

What is the output of the following code?

```
x = 36 / 4 * (3 +  2) * 4 + 2
print(x)
```

Question.35:

What is the output of the following code?

```
sample = {"Jodi", "Eric", "Garry"}
sample.add("Vicki")
print(sample)
```

Question.36:

What is the output of the following code?

```
dict1 = {"key1":1, "key2":2}
dict2 = {"key2":2, "key1":1}
print(dict1 == dict2)
```

Question.37:

Write a correct syntax to print Emmas age.

```
student = {1: {'name': 'Emma', 'age': '27', 'sex': 'Female'},
           2: {'name': 'Mike', 'age': '22', 'sex': 'Male'}}
```

Question.38:

What is the output of the following nested loop

```
for num in range(10, 14):
   for i in range(2, num):
       if num%i == 1:
          print(num)
          break
```

Question.39:

What is the output of the following tuple operation

```
aTuple = (100, 200, 300, 400, 500)
aTuple.pop(2)
print(aTuple)
```

Question.40:

What is the output of the following tuple operation

```
1 x = float('NaN')
2 print(x)
```