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**University Examinations 2023/2024**

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF  
BACHELOR OF SCIENCE COMPUTER SCIENCE AND BACHELOR OF SCIENCE  
DATA SCIENCE

**CCS 3255: INTERACTIVE PROGRAMMING IN PYTHON**

**DATE: APRIL 2024**

**TIME: 2 HOURS**

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**INSTRUCTIONS:** Answer question *one* and any other *two* questions

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**QUESTION ONE (30 MARKS)**

- a) Write python code snippets to demonstrate the following concepts:
- i) Variable assignment (1 mark)
  - ii) Conditional statements (2 marks)
  - iii) Loops (2 marks)
- b) Write a python function that takes a single argument (radius) and calculates the area of a circle, display the result to the user. (5 marks)
- a) A python module in a file named *protect.py* has several attributes functions, among them a function named *getuser*. Write python statements to bind /reference the following;
- i) import the entire module to the current namespace (2 marks)
  - ii) import the *getuser* function only to the current namespace (2 marks)
- c) Using examples, explain the usage of the following built-in Python functions:
- i) `input()` (2 marks)
  - ii) `print()` (2 marks)



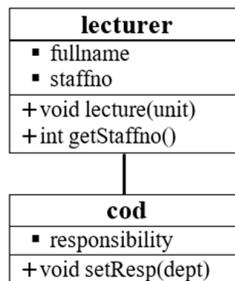
- d) Describe the purpose and features of the following Python libraries:
- i) NumPy (2 marks)
  - ii) Pandas (2 marks)
  - iii) Matplotlib (2 marks)
- e) Consider the following list;
- ```
items=['pen','cup','cat','chair','egg','spoon']
```
- Write python statements, using the slicing operator, that will output the following;
- i) ['cup', 'cat'] (2 marks)
  - ii) ['cup', 'cat', 'chair', 'egg', 'spoon'] (2 marks)
  - iii) ['spoon', 'egg', 'chair', 'cat', 'cup', 'pen'] (2 marks)

**QUESTION TWO (20 MARKS)**

- a) Write Python code to perform the following tasks using NumPy and Matplotlib:
- i) Create two arrays of numbers (3 marks)
  - ii) Plot a line graph using the two arrays. (4 marks)
- b) Write a Python function that takes an arbitrary number of arguments as input and returns the sum of all the even numbers in the list. (5 marks)
- c) Write a python function that demonstrates how to handle any exception arising from a suspicious block of code. (8 marks)

**QUESTION THREE (20 MARKS)**

- a) Using Python code, demonstrate the use of the input() function to get user input and then define a function that takes the input as an argument. (4 marks)
- b) Write a python function named *evenlister* that takes an integer number as an argument, creates a list containing the even numbers that are greater than zero but less than the number, and then returns the list. (6 marks)
- c) Given the following UML class diagram, write python code to



- i) implement the *lecturer* class (4 marks)

- ii) implement *cod* class. (4 marks)
- iii) create an object from each of the two classes (2 marks)

#### QUESTION FOUR (20 MARKS)

- a) Use relevant examples, to demonstrate how the following types of arguments are used while working with functions in python programming.
  - i) Required arguments (3 marks)
  - ii) Keyword arguments (3 marks)
  - iii) Default arguments (3 marks)
  - iv) Variable length arguments (3 marks)
  
- b) Write a python function that takes a phone number as an argument finds all digits that are missing from the number, put them in a list, and finally return the list of the missing numbers. (8 marks)

#### QUESTION FIVE (20 MARKS)

- a) As data scientist, you have been engaged to analyze some content that transcribed byv an artificial intelligence surveillance system into text files. Write a python function that takes a file path as an argument, opens the file for reading, and counts the occurrences of the word “love” in the text. (8 marks)
- b) Distinguish between assertions and exceptions as used in Python programming language (6 marks)
- c) A club has 48 male students and 16 female students. Write python code that represents this information graphically using a pie chart (6 marks)