**Computer Programming (C20013) Examination**

### Date: 18/03/2013 - Allowed Time: 2 Hours

Procedure:

There are 4 questions. Answer only 3 questions. Answer all parts of these 3 questions.

Each question carries 40 marks. There are a total of 120 marks available.

***100% from this exam will contribute 40% towards your final grade.***

***Note:*** The use of any kind of electronic equipment is not permitted during the exam. Write your answers on A4 Paper (plain or with lines). Ensure all of your work is submitted to the teacher at the end of the examination. Write your name on every A4 page you use. Examination attendance must be signed to receive a grade.

### Question 1 (40 marks)

1. List three data types in Python and describe when it is appropriate to use each. [4 marks]
2. Explain the syntax and semantics of an “if” statement in Python. [4 marks]
3. Explain the syntax and semantics of an assignment “=” statement. [4 marks]
4. Write Python code that adds two hard-coded numbers together. Print out “Sum is greater than 10” if the sum is greater than 10. [4 marks]
5. Write Python code that takes an integer grade from the user. The program should print “Distinction” for a grade from 80 to 100, “Merit” for a grade from 65 to 79, “Pass” for a grade from 50 to 64, and “Fail” for all other grades. This should be done with the use of an “if” statement, with “elif”, and “else”. [6 marks]
6. List and describe three logical operators in Python. Provide an example of how each logical operator works. [4 marks]
7. What is the difference between a compiler and an interpreter? [4 marks]
8. Write Python code that iterates through the numbers from 0 to 100 and prints “fizz” if the iterable is evenly divisible by 3, “bang” if the iterable is evenly divisible by 5 and “fizz bang” if the iterable is evenly divisible by both 3 and 5. [6 marks]
9. Write Python code that uses for loop to draw the graphical shape of a right-angled triangle of asterisks like so: [4 marks]



### Question 2 (40 marks)

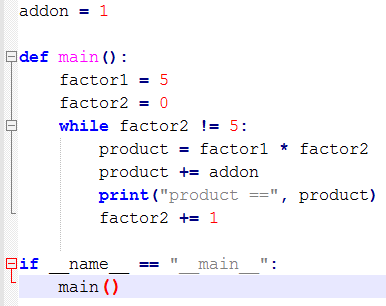
1. What is a program? [2 marks]
2. What is a programming language? [2 marks]
3. Describe two different generations of programming languages with two examples of languages belonging to each generation. Include a language that belongs to each generation in your answer. [4 marks]
4. What are the relative advantages and disadvantages of each of the two language generations you described in the previous question? [4 marks]
5. List the stages in the construction a loop. [3 marks]
6. Explain the syntax and semantics of a “while” statement in Python. [4 marks]
7. Explain the syntax and semantics of a “for” loop in Python. [4 marks]
8. What is a list in Python? [2 marks]
9. With the use of an example, explain why is the list data structure is useful. [2 marks]
10. What is the difference between the value of a list element and its corresponding index? Include a relevant diagram. [3 marks]
11. Write Python code that populates list with 5 numbers (hard-coded) and searches the list for a certain (hard-coded) number. Display a message saying whether or not the search value was found in the list being searched. [4 marks]
12. Write Python code that populates a list with 5 numbers (hard-coded) and prints out the sum of the values in the list using:
    1. a “while” loop. [3 marks]
    2. a “for” loop. [3 marks]

### Question 3 (40 marks)

1. What is the difference between system software and application software? Include three examples of each. [4 marks]
2. What is a sentinel? Include Python code with a while loop and a sentinel to better explain a sentinel. [4 marks]
3. What is top-down development? [2 marks]
4. Use the top-down development technique to describe an approach to programming an ATM. [5 marks]
5. List three uses of an editor for software development. [2 marks]
6. Explain, with examples, the following programming constructs:
   1. Input/Ouput [1 mark]
   2. Cursor position [1 mark]
   3. Reverse video [1 mark]
7. What is a variable? [2 marks]
8. List three relational operators for the string data type in Python and briefly describe how they work. [3 marks]
9. What does ASCII stand for? [2 marks]
10. What is the ASCII table? [2 marks]
11. What are control characters? [2 marks]
12. List three control characters and describe what each does. [3 marks]
13. Justify the statement: the ASCII table is an ordinal set of values. [2 marks]
14. What is the role of the extended ASCII set? [2 marks]
15. Write Python code to initialize and print a string. [2 marks]

### Question 4 (40 marks)

1. What is a procedure? [3 marks]
2. What is a function? [3 marks]
3. Explain the need for procedures and functions. [3 marks]
4. Write down the standard syntax for a procedure definition in Python. [2 marks]
5. Write a Python procedure without parameters to print “Hello”. [2 marks]
6. What does “scope” mean in relation to variables in a program? [3 marks]
7. What does it mean if a variable has function scope? [3 marks]
8. Identify the scope of each variable in the following program: [5 marks]



1. What is the difference between user-defined functions and built-in functions? [3 marks]
2. Define the length of a string. Which built-in Python function can be used to calculate the length of a string? [2 marks]
3. Write Python code to that creates a string that uses a “for” loop to calculate the length of the string. Do not use the built-in function to calculate the length of a string. [5 marks]
4. Why is data validation needed? [3 marks]
5. What do the following boolean expressions evaluate to:
   1. True and not True [1 mark]
   2. (True and False) or True [1 mark]
   3. (False or not False) and True [1 mark]