DUBLIN INSTITUTE OF TECHNOLOGY

DT211C BSc. (Honours) Degree in Computer Science (Infrastructure)

DT228 BSc. (Honours) Degree in Computer Science

DT282 BSc. (Honours) Degree in Computer Science (International)

Year 1

WINTER EXAMINATIONS 2015/2016

PROGRAM DESIGN [CMPU1024]

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TUESDAY 12TH JANUARY 4.00 P.M. – 6.00 P.M.

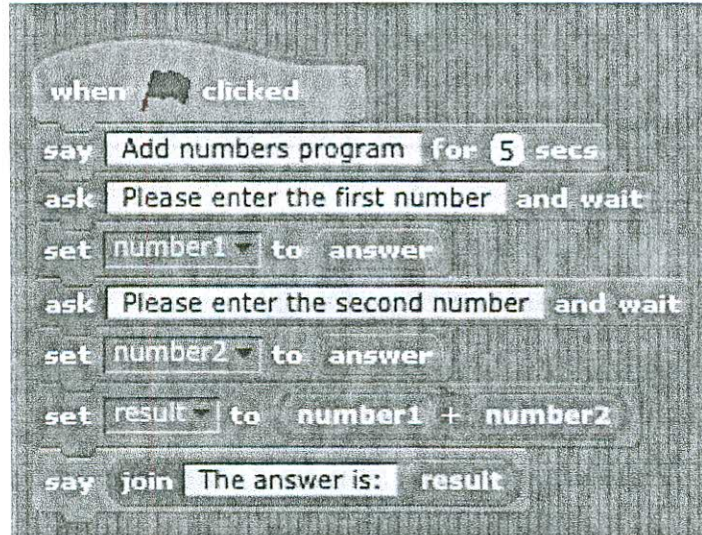TWO HOURS

INSTRUCTIONS TO CANDIDATES
QUESTION 1 IS COMPULSORY
ANSWER **QUESTION 1** AND **TWO OF THE OTHER THREE QUESTIONS**

1. **(a)** Explain the five stages in a program design process.

(5 Marks)

(b) For the following code written in Scratch, explain the exact operation of the program.

(5 Marks)

(c) List the main advantages for using flowchart in the program design process.

(5 Marks)

(d) What are the five basic symbols used in flowcharts? For each symbol, give its name and the corresponding function.

(5 Marks)

(e) What is a persona and how is it used in application design?

(5 Marks)

(f) How can test cases be used to demonstrate the expected output of a program? Use an example to compliment your answer.

(5 Marks)

(g) Express the algorithm "Read in a number called A. If A divided by 2 has a remainder print ODD, else print EVEN " using a flowchart.

(5 Marks)

(h) Express the algorithm "Prompt the terminal operator for the length and width of a rectangle, accept those readings as integers, calculate and display to the screen the area of the rectangle." using Pseudocode.

(5 Marks)

2. (a) Express the following as a flowchart:

Ask 10 students to enter their exam grade. Display the highest grade at the end of the program. Use a loop structure in your flowchart.
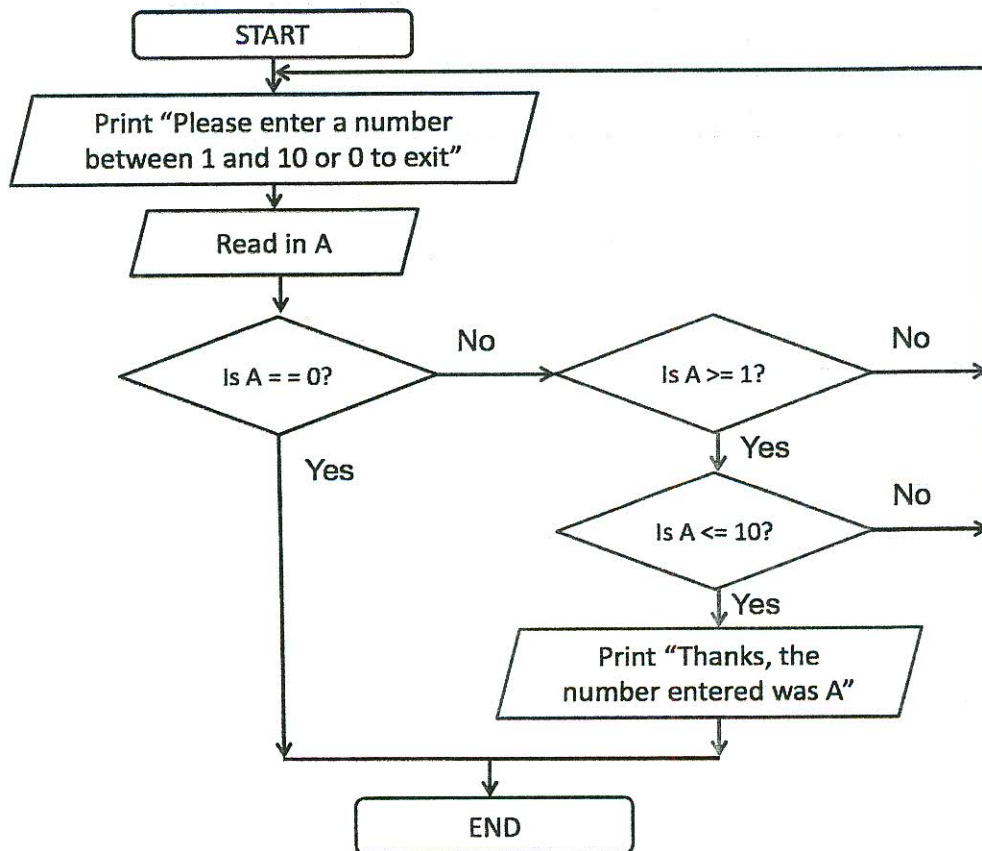
(15 Marks)

(b) Express the following as a flowchart:

A cinema requires a program to check if a person is over 18. If a person is over 18 they are allowed into the cinema to view the film.. The cinema has a maximum capacity of 100 seats, when 100 people have entered the cinema the program ends.

(15 Marks)

3. (a) Express the following flowchart as Pseudocode:

(15 Marks)

(b) Express the following using Pseudocode:

Every day, a weather station receives 15 temperatures expressed in degree Fahrenheit. A program is to be written that will accept each Fahrenheit temperature, convert it to Celsius and display the converted temperature to the screen. After 15 temperatures have been processed, the words "All temperatures processed" are to be displayed on the screen. Hint: Celsius temperatures = (Fahrenheit temperature – 32) * 5 / 9

(15 Marks)

4. (a) Create a Use Case Diagram for the following scenario:

Customers contact the company secretary to request a quotation.
The secretary books the quotation and advises the customer of the date and time.
The window installer uses the system to calculate the quotation at the customer's house.
The bursar processes the customer's payment. If the customer paid by credit card, the card needs to be processed first.

(20 Marks)

(b) Explain the main purpose of the UML Use Case Diagram

(10 Marks)