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 2016/2017

PROGRAM DESIGN [CMPU1024]

MR. JONATHAN MC CARTHY
DR. DEIRDRE LILLIS

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

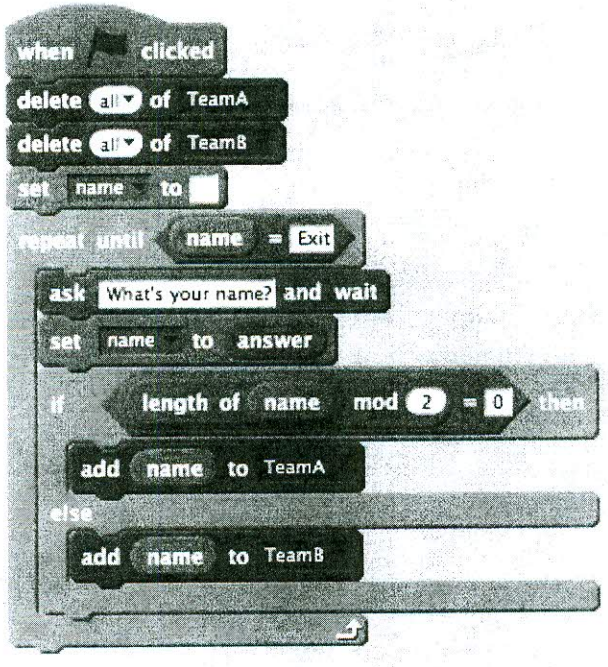
TWO HOURS

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) Requirements gathering and program design is an important part of the development lifecycle. List three benefits pseudocode and flowcharts offer for communicating with programmers or project stakeholders.

(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) Briefly explain how the Agile Software Development Methodology involves the customer in the development process.

(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 following algorithm using a loop structure. "Read in a person's age. If the person's age is 18 or over Print WELCOME, if it is not Print GOODBYE" using a flowchart.

(5 Marks)

(h) Express the algorithm "Prompt the terminal operator for the radius of a circle, accept the reading as an integer, calculate and display to the screen the area of the circle" using Pseudocode. *(Hint: the area of a circle is PI times the radius squared).*

(5 Marks)

2. (a) Create a flowchart to represent the logic for the following problem. An application is required to calculate the average of 100 exam grades. The user will enter the exam grades one at a time, and will finish when all 100 grades have been entered. The program must calculate the average of all the grades entered and then display the result.

(15 Marks)

(b) Create a flowchart to represent the logic of a guessing game. The application will randomly generate a number between 1 and 30. The user must try guess the number. The player is only allowed 3 guesses. If they guess correctly they will get a message of congratulations. If the user doesn't guess correctly within 3 goes the game is over, then tell the player and ask them if they wish to play again.

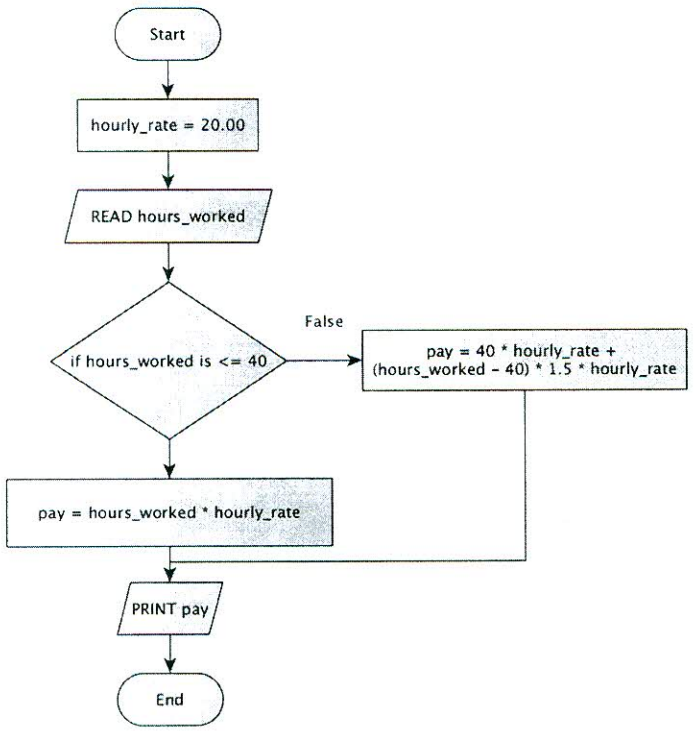
(15 Marks)

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

Create a game to randomly generate 2 number between 1 and 50 and present the player with the multiplication problem (eg. 3 * 7 = ?). The user must enter the correct answer for the given problem (eg. 21). The player is only allowed 3 lives. If the player gets the correct answer to the problem, add 1 to their score. If the player gives the incorrect answer for the problem, they will loose one of their lives. The player gets 3 lives at the start of the game.. The players score should be displayed at the end of the game.

(15 Marks)

(b) Express the following using Pseudocode:



(15 Marks)

4. (a) Create a Use Case Diagram for the following on-line store scenario:

Customers can search for products. The customer can view the product details and can place an order. If the customer is having difficulty they can obtain help by calling customer support. The customer support can search for products that the customer may be querying and advise customer on the products. The warehouse operative uses the system to process the order and post it to the customer. The Payment System 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)

4.50

COLLEGE EXAMINATIONS

AMENDMENTS TO EXAMINATION QUESTION PAPER

COURSE REF: DT211/DT282/DT228. VENUE: _____

SUBJECT: Program Design

DATE: 12/1/17

TIME: 4-6pm

SIGNED: [signature]

INSTRUCTIONS: Q3a.

Should read as:

- Express the following using Pseudocode.