Sri Lanka Institute of Information Technology

B.Sc. Degree
in
Information Technology

Final Examination
Year 1, Semester 1 (2017)
June Intake

Computer Programming Techniques and Practices (N101)

Duration: 3 Hours

Instructions to Candidates:

- This is a closed book examination.
- This paper contains 4 questions on 4 pages without the cover page.
- Answer all questions on the answer booklet provided.
- Read all questions before answering.
- The total marks obtainable for this examination is 100.

Question 01 (25 marks)

a) State two differences between second generation and third generation programming languages. (4 marks)

b) Write an example for each of the following programming language generations: (5 marks)

i. 1st generation

ii. 2nd generation

iii. 3rd generation

iv. 4th generation

v. 5th generation

c) What is the role of a translator? List two types of translators. (3 marks)

d) Name and explain three types of errors that could be found in a computer program. (6 marks)

e) How can you detect each of the above explained errors in part (d)? Explain. (3 marks)

f) Explain the importance of testing after coding a program. State two types of testing methods. (4 marks)

Question 02 (20 marks)

a) Write one similarity and one difference between flow charts and Pseudocodes. (3 marks)

b) Name three essential programming constructs. (2 marks)

c) State two different criterias that can be used for the data validation. (2 marks)

d) A program request the user to enter a number and print a pattern as follows:

```
Enter number: 4
Output:
1
2 2
3 3 3
4 4 4 4
```

i. Draw the defining diagram for the above problem. (2 marks)

ii. Write the pseudo code for the above problem. (5 marks)

iii. Draw a flow chart for the above problem. (6 marks)

Question 03 (30 marks)

a) Draw the flow chart for the following problem description: (4 marks)

A program asks the user to enter two numbers. First number is the base and the second number is the power. It calculates the power of the first number and displays the result.

An example is given below.

```
Sample Output:
     Enter number 1: 2
     Enter number 2: 3
     Power         : 8
```

b) Write two differences between **While loop** and **Repeat until loop**. (4 marks)

c) A program is required by a company to get an employee's number, pay rate and the number of hours worked in a week. The program is then to compute the employee's weekly pay and print it along with the employee's number. The program is to repeat until user enters -999 as the employee's number.

Write the pseudocode for the above problem using **repeat –until loop.** (5 marks)

d) The following Figure1 illustrate a number pattern. Identify the pattern and write the pseudocode to store the numbers in a **two dimensional array**. (7 marks)

Hint: Use nested for loops.

20	22	24	26
40	42	44	46
60	62	64	66

Figure 1

e) Consider the following function.

The Employee number (Eno) should be entered in to the system. If the employee gets a salary below Rs: 25000 and is unmarried, he is entitled to receive 10% bonus. If the employee gets a salary equivalent or above Rs: 25000 and is unmarried, he is entitled to receive 8% bonus. All the Married employees will get 15% bonus regardless of the salary amount. The bonus percentage should be printed on the screen respectively.

i. Draw the decision tree for the above function. (5 marks)

ii. Draw the decision table for the above function. (5 marks)

Question 04 (25 marks)

a) What is Modularization? (2 marks)

b) Write three advantages of Modularization. (3 marks)

c) A program is required for a Vehicle Quality Testing Center to test the vehicles based on the standard procedure.

Consider the following to write the program:

A. Module to read the vehicle number and the score obtained from the test.

B. Module to find the corresponding category of the vehicle based on the following criteria:

Score obtained from the test	Category
41-50	Excellent
31-40	Good
21-30	Average
11-20	Marginal
0-10	Failure
<0	Error Message

Hint: Use the nested –if statements.

C. Module to print the vehicle details, (vehicle number) and the relevant category.

D. The program should also be able to handle many vehicles. After displaying the category of the first vehicle, your program should display the prompt "Do you have more data". If the user inputs 'Y', the program should ask for the vehicle number and the score obtained by next vehicle. If user inputs 'N', program should terminate.

```
Sample Output:
Enter vehicle number: CAC-2345
Enter score: 25
The vehicle number: CAC-2345 Category is: Average
Do you have more data: Y?
Enter vehicle number: CAA-1231
Enter score: 35
The vehicle number: CAA-1231 Category is: Good
```

Answer the following questions based on the above scenario.

i. Draw a defining diagram for the above problem. (2 marks)

ii. Program is to be implemented using modularization. Draw a hierarchy chart.
(Hint: Use global variables if necessary). (2 marks)

iii. Write the pseudo code for mainline and each module in the hierarchy chart.
(12 marks)

iv. Desk check the written solution using the below test case. (4 marks)

Assume that after executing the below test case user doesn't have any more vehicles to enter.

Inputs	Vehicle number	CAA - 2222
	score	25
Output	The vehicle number:', CAA - 2222,'Category is:', Average	