



Sri Lanka Institute of Information Technology

B.Sc. Degree

in

Information Technology

Final Examination

Year 1, Semester 1 (2014)

Computer Programming Techniques and Practices  
(N101)

Duration: 3 Hours

Instruction to Candidates:

- ◆ This paper contains 4 questions on 2 pages without the cover page.
- ◆ Answer all questions on the WORKBOOK provided.
- ◆ Read all questions before start answering.
- ◆ The total marks obtainable for this examination is 100.
- ◆ This is a closed book examination.

**Question 01****(16 marks)**

- a) Write two similarities between 1<sup>st</sup> generation and 2<sup>nd</sup> generation languages. (4 marks)
- b) Write two differences between 2<sup>nd</sup> generation and 3<sup>rd</sup> generation programming languages. (4 marks)
- c) Write two characteristics of a 4<sup>th</sup> generation language. Give an example for a 4<sup>th</sup> generation language. (5 marks)
- d) Explain 5<sup>th</sup> generation computer languages by giving an example. (3 marks)

**Question 02****(20 marks)**

- a) 'Desk checking' and 'Walk through' are two methods of testing. Explain the difference between the two. (3 marks)
- b) Name and explain the three essential programming constructs. (6 marks)
- c) A user enters a number. The program prints a design of '@' as follows.

Sample output:

Enter a number: 4

```
@@@@
@@@
@@
@
```

- (i). Draw the defining diagram for the above problem. (2 marks)
- (ii). Draw a flow chart for the above description. (9 marks)

**Question 03****(32 marks)**

- a) Write three differences between 'While' loop and 'Repeat Until' loop. (6 marks)
- b) 'Program Design' subject is evaluated using one assignment and a written exam. There are 10 students in a batch. The lecturer need to do the following with the marks of these 10 students:
  - Enter and store the assignment and exam marks in a computer program.
  - Find the average mark of the written exam.
  - Find the highest assignment mark and the highest written exam mark.

Answer the following questions based on the above scenario.

- (i). Draw the defining diagram for the above problem. (4 marks)
- (ii). Design the pseudo code for the above problem using repetition construct. Use a two dimensional array to store marks. (12 marks)
- (iii). Design a test case. (4 marks)
- (iv). Desk check the written solution using your test case. (6 marks)

#### **Question 4**

**(32 marks)**

- a) Modularizing is a top-down design methodology. Explain modularizing by giving an example. (2 marks)
- b) Name four advantages of Modularizing. (4 marks)
- c) Explain the use of global variables and local variables. (3 marks)
- d) ABC Company requires a system to read an employee's number, pay rate and the number of hours worked in a week. The system will validate the pay rate field and the hours worked field. If they are valid, it will compute the employee's weekly pay and then print it. The system will continue reading employee records until the user input '0000' as the employee number. According to the company's rules, the maximum hours an employee can work per week is 60 hours, and the maximum hourly rate is RS 25.00 per hour. If the hours worked field or the hourly rate field is out of range, an appropriate message will be printed and the employee's weekly pay is not to be calculated.  
Weekly pay is calculated as hours worked times pay rate. If an employee has worked for more than 35 hours, payment for the overtime hours worked is calculated at rate \* 1.5 times.  
If an employee has worked for 40 hours and his pay rate is RS 20.00 per hour then the payment is calculated as follows.

$$\text{Payment} = (20 * 35) + (20 * 1.5 * 5)$$

Answer the following questions based on the above scenario.

- (i). Draw a defining diagram for the above problem (2 marks)
- (ii). Construct a hierarchy chart (3 marks)
- (iii). Write the pseudo code for mainline and each module in the hierarchy chart. Use parameter passing where necessary. (10 marks)
- (iv). Design a test case to test your solution (3 marks)
- (v). Desk check the written solution using your test case (5 marks)

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