Computer Science Practical
Paper 2
ISC 2013

You will NOT be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper.

The time given at the head of this paper is the time allowed for writing the answers.

Full Marks : 100   **Time : 3hrs**
                                                    Planning Session: 90 minutes(maximum)
                                                            Examination session : 90 minutes.

As it is a practical examination the candidates are expected to do the following:
1. Write an algorithm for the selected problem.
                                                                                        [10]
2. Write a program in Java. The program should follow the algorithm and should be logically and syntactically correct.
                                                                                        [20]
3. Document the program using mnemonic names /comments , identifying and clearly describing the choice of data types and meaning of variables.
                                                                                        [10]
4. Type the program on the computer and get a printout (hard copy). Typically this should be a program that compiles and runs correctly.
                                                                                        [10]
5. Test run the program on the computer using the given sample data and get a print out of the output in the format specified in the problem.
                                                                                        [10]
6. Viva voce on the selected problem.
                                                                                        [20]

Solve any one of the following problems.

Question 1

An ISBN (International Standard Book Number) is a ten digit code which uniquely identifies a book.
The first nine digits represent the Group, Publisher and Title of the book and the last digit is used to check whether ISBN is correct or not.

Each of the first nine digits of the code can take a value between 0 and 9. Sometimes it is necessary to make the last digit equal to ten; this is done by writing the last digit of the code as X.
To verify an ISBN, calculate 10 times the first digit, plus 9 times the second digit, plus 8 times the third and so on until we add 1 time the last digit. If the final number leaves no remainder when divided by 11, the code is a valid ISBN.

For example :
1. 0201103311   =   10*0 + 9 *2 + 8*0 +7 *1 + 6 * 1 + 5 * 0 + 4 * 3 + 3 * 3 + 2 * 1 + 1 * 1 = 55

    Since 55 leaves no remainder when divisible by 11, hence it is a valid ISBN.

2. 007462542X = 10*0 + 9 *0 + 8*7 +7 *4 + 6 *6 + 5 *2 + 4 *5 + 3 * 4 + 2 *2 + 1 * 10 = 176

Since 176leaves no remainder when divisible by 11, hence it is a valid ISBN.

3. 0112112425 = 10*0 + 9 *1 + 8*1 +7 *2 + 6 * 1 + 5 * 1 + 4 *2 + 3 * 4 + 2 *2 + 1 *5 =71

Since 55 leaves no remainder when divisible by 11, hence it is a valid ISBN.

Design a program to accept a ten digit code from the user. For an invalid input, display an appropriate message. Verify the code for its validity in the format specified below:

Example 1
INPUT CODE :   0201530821
OUPUT: SUM =99
                 LEAVES NO REMAINDER – VALID ISBN CODE

Example 2
INPUT CODE: 035680234
OUTPUT: INVALID INPUT

Example 3
INPUT CODE :   0231428031
OUPUT: SUM =122
                 LEAVES REMAINDER – INVALID ISBN CODE

Question 2.
Write a program to declare a square matrix A[][] of order (M x M) where M is the number of rows and the number of columns such that M must be greater than 2 and less than 20. Allow the user to input integers into this matrix. Display the appropriate error message for an invalid input. Perform the following tasks:

a) Display the input matrix

b) Create a mirror image of the inputted matrix

c) Display the mirror image matrix

Test your program for the following data and some random data:
Example 1

INPUT   :   M = 3
                4   16   12
                8   2   14
                6   1   3

OUTPUT   :

    ORIGINAL MATRIX
4	16	12
8	2	14
6	1	3

    MIRROR IMAGE MATRIX
12	16	4
14	2	8
3	1	6

Example 2

INPUT   :   M=22

OUTPUT   :   SIZE OUT OF RANGE

Question 3.
A palindrome is a word that may be read the same way in either direction. Accept a sentence in UPPERCASE which is terminated by either ".", "?", or "!". Each word of the sentence is separated by a single blank space.

Perform the following tasks:
    a) Display the count of palindromic words in the sentence.

    b) Display the palindromic words in the sentence

Example of palindromic words:

MADAM, ARORA, NOON

Test your program with the sample data and some random data:

Example 1

INPUT   :   MOM AND DAD ARE COMING AT NOON.

OUTPUT   :   MOM DAD   NOON
                               NUMBER OF PALINDROMIC WORDS   :   3

Example 2

INPUT   :   NITIN ARORA USES LIRIL SOAP.

OUTPUT   :   NITIN   ARORA   LIRIL
                               NUMBER OF PALINDROMIC WORDS   :   3

Example 3

INPUT   :   HOW ARE YOU?

OUTPUT   :   NO PALINDROMIC WORDS