

Civil

F.G. (All Br) II (R)

816107

Con. 2948-07.

[REVISED COURSE]

Computer Programming II, May '07, Pg. 1  
ND-2044

(3 Hours)

[Total Marks : 100

MADEER

- N.B. (1) Question No.1 is compulsory.  
 (2) Answer any four out of remaining six questions.  
 (3) Assumptions made should be clearly stated.  
 (4) All computer programs and program segment only in C++.

1. (a) Shown below is a Floyd's triangle :- 10

```

1
2 3
4 5 6
7 8 9 10
11.....15

```

79.....91

Write an Object Oriented Program (In terms of Class and Object) to print the triangle.

(b) Write an Object Oriented program for fitting a straight line through a set of points 10  
(x, y), i = 1 ..... n. the straight line equation is

$$y=mx+c$$

and the values of m and c are given by

$$m = \frac{n \sum(x_i y_i) - (\sum x_i) (\sum y_i)}{n(\sum x_i^2) - (\sum x_i)^2}$$

$$c = \frac{(\sum y_i) - m \sum x_i}{n}$$

all summations are from 1 to n

2. Explain following terms with the help of suitable programs :- 20

- (a) Over loaded functions
- (b) Overriding functions
- (c) Friend function
- (d) Template functions.

3. (a) Write an Object Oriented program that uses Euclid's Algorithm to display the greatest 10  
common divisor of two integers. The greatest common divisor of two numbers is the largest number that divides into both numbers. Here is how the algorithm works.

- (i) Find the remainder after dividing the larger number by the smaller number, using the modulus operator.
- (ii) Change the larger number to the smaller number and change the smaller number to the remainder from step i)
- (iii) Keep doing this until the remainder is zero.

Incorporate member functions for data input, displaying the result, default constructor and constructors with two parameters. Also create objects to reference the member functions.

[TURN OVER

8/10/18

Comp. Programming II, May '07, Pg. 2

Con. 2948-ND-2044-07.

2

- (b) Write an Object Oriented program to extract a portion of a character string and print the extracted string. Assume that **m** characters are extracted, starting with the **n<sup>th</sup>** character. 10
4. Implement a class named 'Matrix' having following members. 20  
 Private members :  
 (a) A two dimensional array variable A of 10 x 10 integer elements  
 (b) Number of rows and columns of the array – M and N  
 Public members are to be incorporated as member functions and the list is as follows :-  
 (a) Function for reading a matrix from console  
 (b) Function for display of Matrix  
 (c) Function for addition of two matrices  
 (d) Function which over loads multiplication operator (\*) for Multiplication of two conformable matrices.
- Use object as function parameter in addition of matrices. Write suitable main program to test the member functions.
5. (a) Explain inheritance in Object oriented programming in C++ in terms of Multiple inheritances, level of inheritance, Deriving classes in public, private and protected mode. Use suitable programs and class definitions for exemplifications of the concepts. 10  
 (b) Write notes on Virtual functions exemplifying in terms of suitable classes and its members in terms of Pure Virtual function, abstract classes and dynamic binding. 10
6. Develop a class with member functions facilitating arithmetic operations on rational numbers. 20  
 i.e. carrying out addition, subtraction, division and multiplication of rational numbers. All of the Member functions need to be overloading binary operators. Develop suitable main program to demonstrate various aspect of binary operator overloading. Incorporate suitable constructors and over loaded constructors. Rational numbers assume the form of a/b, where a and b are integer constants.
7. Develop a class for linked list (Dynamic data structure) with the following member functions 20  
 to carryout the following.  
 (a) Create a linked list to store set of integer data  
 (b) Display the Linked list  
 (c) Insert a node containing data in a sorted list  
 (d) Delete a node from the list containing a specific data.

Use **object** as node rather than using a **struct** variable to model a node.