COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)
SHIVAJI NAGAR, PUNE - 411 005

END Semester Examination

(CT(ILE)-14001) Intermediate Programming Concepts and Tools (IPCT)

Course: B.Tech Branch: Computer Engineering

Semester: Sem VII

Year: 2014-2015 Max.Marks:60

Duration: 3 Hours Time: 2.00 pm - 5.00pm Date: 20 NOV 2014

Instructions:

1. Solve any **five** Questions. Question Paper contains **six** questions.
2. Figures to the right indicate the full marks.
3. Mobile phones and programmable calculators are strictly prohibited.
4. Writing anything on question paper is not allowed.
5. Exchange/Sharing of anything like stationery, calculator is not allowed.
6. Assume suitable data if necessary.
7. Write your MIS Number on Question Paper.

Q1.(a) (i) **Explain the differences between procedural languages and Object Oriented languages. Which is better in which case? Justify your answers. Give suitable examples.** **(03)**

(ii) **Write an algorithm to sort an array of strings.** **(03)**

(b) Define all the classes that you will require for the solution to the problem given below. List the data which the classes hold as well as the methods which are applicable to the classes. Show the class hierarchy / class relations using a diagram. Explain your design in short. (Make suitable assumptions wherever required and specify them. Ignore the internal details of algorithms): (06)

You have to design a drawing program like MS-paint. The program should be able to draw different standard shapes on a canvas. It should let the user move the shapes around, rotate and scale them and to color the shapes using paint-bucket / fill tools. There should be a color picker with many colors. There should be an eraser tool also.

Design the structure of this program.

Q.2 Define all the classes that you will require for the solution to the problem given below. List the data which the classes hold as well as the methods which are applicable to the classes. Show the class hierarchy / class relations using a diagram. Explain your design in short. (Make suitable assumptions wherever required and specify them. Ignore the internal details of algorithms):

(a) In the game `Snake' there is a digital snake that is seen to move continuously accross a canvas .The snake's direction can be changed by the user. At any random point on the canvas, a particle of food appears. If the snake hits the particle it grows by X units and the score is increased by some `Y' units. If it hits the walls of the canvas or its own body, the snake dies and the game ends. The X and Y units increase as the snake becomes longer. The speed of the snake's motion also increases as the snake becomes longer, making it harder to control. (06)

Design the structure of this program.

(b) In the MIS of the college, there is a record of each student, the courses taken by the student and the marks obtained in T1, T2 and ESE. The grade levels for each subject are decided based on the relative scores and are stored in the MIS. Based on all that data, the grades for all courses are obtained, grade point averages (GPA) are calculated per semester (SGPA) and for all the semesters so far (CGPA). (06)

Design the structure of this program.

Q.3(a) When we consider Algorithm A is better than Algorithm B? Describe with suitable examples the following: (06)

(i) Running time of Algorithms
(ii) Comparison of growth functions and notations

(b) "A Design Pattern systematically names, explains, and evaluates an important and recurring design" Explain the statement. (06)

Describe the following in brief:

(i) Structure of template pattern
(ii) Example of observer pattern

Q.4(a) What is 'Program Correctness'? (06)

Explain in brief with suitable example, the types of program correctness.

(b) Explain by giving suitable examples 'good programming styles' with respect to the following: (06)

(i) Names
(ii) Expressions and statements
(iii)Comments

Q.5(a) What the parameter to classify various processing elements architecture? Draw and explain in brief the following: (06)

(i) Shared Memory MIMD Architecture
(ii) Distributed Memory MIMD Architecture

(b) Draw and explain various 'levels of parallelism'. Describe in brief with respect to the tasks, Control, Data, and Multiple issue. (06)

Q.6(a) By giving suitable illustration explain how 'gprof time profiler' helps in: (06)

(i) Detail time statistics for each subroutine
(ii) Create graph for all subroutines
(iii)Analyze the program bottleneck

(b) Describe the problems handled by using 'Makefile utility'. In this context write in brief: (06)

(i) Rule Syntax for writing Makefile utility
(ii) Make operations