26/4/17

INDIAN INSTITUTE OF ENGINEERING SCIENCE AND TECHNOLOGY, SHIBPUR

Dual degree, B. Tech- M. Tech, 4th Semester (CS) Examination, 2017

Programming Paradigm (CS 403)

Full Marks: 70 Time: 3 Hours

Answer any five questions

1. a) State the characteristic difference between C and Java.

b) Consider, as a programmer you are asked to develop a software for banking system.

i. What is your approach if you consider a procedure oriented programming language?

ii. How does your development strategy differ if an object oriented programming language is chosen?

iii. When do you think database being useful and when as an overhead?

(5+(3+3+3))

2. a) Write a program in C++ or Java to design two classes following the principle of inheritance with applicable constructors and display methods.

Circle:

Data member: radius

Method: Compute_area (to compute area of a circle)

Display_data(to display radius of a circle)

Cylinder:

Data member: radius, height

Method: Compute_area (to compute surface area of cylinder)

Compute_vol (to compute volume of the cylinder)

Display_data (to display height and radius)

b) Draw class diagrams for the above question. (10+4)

3. Develop a procedure in Scheme Lisp

a) To compute sum of N natural numbers of a list.

b) To evaluate $k(g,f)$ where

$$k(\alpha,\beta)=\alpha(\beta),\ f(x,y,z)=\frac{5x+\frac{1}{4z}+(2-(6+\frac{1}{3y}))}{3(x-1)(6-\frac{y}{5})} \text{ and } g(f)=\frac{1}{f}$$ (7+7)

4. a) Define primitive recursive function.

b) Check if $f(x,y) = x^{99} + 3y$ is a primitive recursive function. (6+8)

P.T.O

5. a) Prove that 2+3=5 using λ – Calculus.
   b) Define Predecessor function in λ – Calculus and express $x \geq y$. (7+7)

6. Discuss the following statements with appropriate code segments.
   a) Java does not support multiple inheritance but C++ does.
   b) Both, Java and C++ allow dynamic binding.
   c) Basic philosophy of using 'private constructor' is same for both Java and C++ but its implementation differs. (4+5+5)

7. Write short note on the following. To illustrate use appropriate code segment.
   a) Method overriding
   b) Virtual function
   c) Interface
   d) Exception handling

(3+4+3+4)