

FOURTH SEMESTER B.TECH (ENGINEERING) DEGREE EXAMINATION
DECEMBER 2010

IT 2K 404 - PROGRAMMING LANGUAGE CONCEPTS

Time : Three Hours



PART - A

- I a) Rewrite the following expressions in prefix notation. Treat sort as an operator with one argument.
- $a * b + c$
 - $a * (b + c)$
 - $a * b + c * d$
 - $a * (b + c) * d$
 - $\left(\frac{b}{2} + \text{sqrt} \left(\left(\frac{b}{2} \right) * \left(\frac{b}{2} \right) - a * c \right) \right) / a$
- b) Explain the concept of procedures as parameters with an example.
- c) Differentiate call by value and call by references with an example in object oriented programming.
- d) Define a directed graph. Also explain the closure-set data structure and the operations supported by it.
- e) Define parametric polymorphism in functional programming. Give an example.
- f) Write a short note on storage allocation for lists.
- g) Discuss about the data structures used in PROLOG.
- h) Give geometric interpretations of all possible interleavings of
- The threads $a b$ and $y z$
 - The threads $a b c$ and $x y z$

(8 × 5 = 40)

PART - B

- II a) i) Develop a program to find the K^{th} occurrence of x , from left to right, $K \geq 0$, is a subarray $A[i..n]$.
- ii) The dynamic scope rule specifies that nonlocals must be evaluated in the calling environment. Explain why macro-expansion of procedure calls produces the same result as would be obtained under the dynamic scope rule.
- (OR)
- b) i) Explain the concept of imperative programming with an example.
- ii) Describe the working of abstract syntax trees with example.
- III a) i) Define a template. When it is used? Explain its working with an example.
- ii) How is information hiding achieved in object oriented programming? Give an example.
- (OR)
- b) i) Define inheritance. How is the inheritance concept implemented in C++ and small talk. Give examples.
- ii) How is dynamic memory allocation implemented in object oriented programming? Give an example.

- IV a) i) Explain the working of lists in functional programming with examples.
ii) How is type checking done in functional programming? Give examples.
- b) i) Explain the concept of functional programming in a typed language
ii) Explain the concept of "structures of lists" with an example.
- V a) i) How is parallelism in hardware implemented? Give an example.
ii) Explain the concept of implicit synchronization with an example

(OR)

- b) i) Discuss about the synchronized access to shared variables in detail.
ii) Define relations corresponding to the following operations on lists:
 - a) Remove the second and succeeding adjacent duplicates.
 - b) Leave only the elements that do not have an adjacent duplicate.
 - c) Leave only one copy of the elements that have adjacent duplicates.

(4×15 = 60)
