Code No: R1622056 **R16** SET - 1

II B. Tech II Semester Regular/Supplementary Examinations, April/May - 2019
PRINCIPLES OF PROGRAMMING LANGUAGES
(Com to CSE, IT)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer**ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Write the advantages of the data structure that Python use in place of arrays? (2M)
   b) What is the difference between Indexed array and Associative array? (3M)
   c) Write about pass-by-value result implementation model for parameter passing with an example. (3M)
   d) Define Abstract Data Type. (2M)
   e) How is Lazy evaluation strategy useful? Explain. (2M)
   f) Write a note on First order predicate calculus. (2M)

PART -B

2. a) Explain the features of Attribute grammars with an example. (6M)
   b) Give any three reasons for separating Lexical analysis from Syntax analysis. (4M)
   c) Discuss the disadvantages of having too many features in a programming language. (4M)

3. a) Explain in detail about the Static binding and Dynamic binding. (7M)
   b) Define Union data type. Explain the implementation details of Union data type and also mention its advantages. (7M)

4. a) Write a generic C++ function that takes an array of generic elements and a scalar of the same type as the array elements. The type of the array elements and the scalar is the generic parameter. The function must search the given array for the given scalar and return the subscript of the scalar in the array. (7M)
   b) Explain in detail the Deep access way of implementing dynamic scoping. (7M)

5. a) How C, C++, JAVA, and RUBY implement abstract data types? Explain. (7M)
   b) What is meant by Exception Handling? Discuss the two issues of binding of exceptions to handlers and continuation with a neat sketch. (7M)

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6. a) What is typeless programming language? Discuss the pros and cons of typeless programming languages. (5M)
   b) Draw the internal representation of the following lists in LISP. (4M)
      i) (A B C D)
      ii) (A (B C) D (E (F G)))
   c) Write a Scheme function that computes the real roots of a given quadratic equation. If the roots are complex, the function must display a message indicating that. This function must use an IF function. The three parameters to the function are the three coefficients of the quadratic equation. (5M)

7. a) Explain about fact statements and rule statements in PROLOG. (7M)
   b) Discuss in detail the limitations of PROLOG. (7M)

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PART –A

1. a) What is the purpose of Parse Tree? (2M)
   b) What is Garbage collection and how it works? (3M)
   c) Write about Parametric polymorphism. (3M)
   d) Mention the most significant benefits of encapsulation in Object Oriented Programming. (2M)
   e) What is the main objective of designing functional programming languages? (2M)
   f) What is the relationship between resolution and unification in Prolog? (2M)

PART -B

2. a) Express the syntax of conditional control statements in 'C' programming language using Backus Naur Form. (7M)
   b) Explain different approaches to build a lexical analyzer. (7M)

3. a) Is a variable declaration the same as variable binding? Give explanation. (4M)
   b) Explain the structure and operation of Associative arrays. (5M)
   c) Explain about Operator overloading and its benefits. (5M)

4. Explain about various implementation models of parameter passing mechanism with detailed programming and also discuss the advantages and disadvantages of each model. (14M)

5. a) Discuss the two distinct categories of Concurrency in programming. (5M)
   b) Explain the following (9M)
      i) Assertions
      ii) Checked and Unchecked Exceptions in JAVA
      iii) Event Handling in JAVA

6. a) Is LISP a typed or typeless language? Give explanation to your answer with a detailed programming. (7M)
   b) Write a Scheme predicate function that tests for the structural equality of two given lists. (7M)

7. a) Explain the difference between a depth-first and a breadth-first search when discussing how multiple goals are satisfied. (6M)
   b) Write a Prolog program that implements quick sort. (8M)

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2. Answer**ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Write about Left Factoring with an example. (2M)
   b) Write about Scope and Lifetime of a variable. (2M)
   c) What kind of information is stored in Activation record? (2M)
   d) Give any three reasons to design concurrent software systems. (3M)
   e) Write a Scheme function that takes two numeric parameters namely A and B, and returns the value of A raised to the B power. (3M)
   f) What distinguishes declarative languages from imperative languages? (2M)

PART -B

2. a) Define Context Free Grammar. Explain any one application of Context Free Grammar. (7M)
   b) What is the Pair Wise disjointness Test? Explain the purpose of Pair Wise disjointness test with an example. (7M)

3. a) Explain the following (8M)
      i) Static variables
      ii) Stack-dynamic variables
      iii) Explicit Heap-dynamic variables
      iv) Implicit Heap-dynamic variables
   b) Explain about the pretest and posttest loop statements with an example. (6M)

4. a) What is a Nested Subprogram? Explain the Static chain method of implementing nested subprograms. (7M)
   b) Compare the efficiency of the deep-access method to that of the shallow access method in terms of both calls and nonlocal accesses. (7M)

5. a) Explain the concept of Encapsulation in Object Oriented Programming by taking a suitable example. (6M)
   b) Explain the implementation of cooperation synchronization in JAVA with a sample JAVA program. (8M)

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6. a) Explain the following concepts with a detailed programming (7M)
   i) LET
   ii) LAMBDA expression
   b) Write a Scheme function that takes a list as a parameter and returns a list identical to the parameter list except with the second top-level element removed. If the given list does not have two elements, the function should return (). (7M)

7. a) In what way are the list-processing capabilities of Scheme and Prolog different? Explain. (5M)
   b) Discuss the applications of PROLOG. (5M)
   c) Write a Prolog program that finds the maximum of a list of numbers. (4M)

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PART –A

1. a) What is the problem with Left Recursion and why it needs to be removed? (2M)
   b) Is C language Strongly typed or Weakly typed? Give explanation to your answer. (2M)
   c) Write the merits and demerits of Shallow access implementation of dynamic scoping. (3M)
   d) What happens if a monitor procedure calls another procedure in the same monitor? (2M)
   e) Write a Scheme function that returns the number of zeros in a given simple list of numbers. (3M)
   f) How backtracking is useful in prolog? (2M)

PART -B

2. a) Explain the differences between Static semantics and Dynamic semantics with an example. (7M)
   b) With a neat diagram, explain the structure of LR parser and also discuss the merits and demerits of LR parsers. (7M)

3. a) How to determine Static scoping and Dynamic scoping? Explain. (7M)
   b) What is meant by Short Circuit evaluation of an Expression? Explain the impact of Short circuit evaluation on the performance of program by discussing its merits and demerits. (7M)

4. a) With a neat sketch, explain the actual implementation (by showing function call Stack trace) of parameter passing models. (8M)
   b) Explain about the Overloaded subprograms and Generic subprograms. (6M)

5. a) Write about Constructors and Destructors in C++. (4M)
   b) What is the best action a system can take when deadlock is detected? (5M)
   c) How do semaphores ensure mutual exclusion? Explain. (5M)

6. a) Discuss the most significant differences between Scheme and ML programming languages. (7M)
   b) Write a Scheme function that takes a simple list of numbers as its parameter and returns a list identical to the parameter list except with the numbers in ascending order. (7M)

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7. a) Explain the two basic statement forms of Prolog. (7M)

   b) Write a Prolog program that returns a list containing the union of the elements of two given lists. (7M)

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