## POKHARA UNIVERSITY

Level: Bachelor Semester: Fall Year : 2016
Programme: BE Full Marks: 100
Course: Principles of Programming Languages Pass Marks: 45
Time : 3hrs.

*Candidates are required to give their answers in their own words as far as practicable.*

*The figures in the margin indicate full marks.*

***Attempt all the questions.***

| | | | |
|---|---|---|---|
| 1. | a) | What are the characteristics of good programming language? Why is it important for software engineers to study principles of programming languages? Explain. | 8 |
| | b) | What are the major programming language domains? Explain the application of pseudo-code in programming. | 7 |
| 2. | a) | "Fortran has been revised several times." Explain this statement with successive history of Fortran. | 7 |
| | b) | How are data represented in Fortran? Differentiate the roles of arrays from scalar data types of Fortran data structure. | 8 |
| 3. | a) | Describe the modes of passing parameters in FORTRAN with examples. | 7 |
| | b) | Why is "Pass-by-name" in Algol-60 considered as a dangerous and expensive method? Explain with a suitable example. | 8 |
| 4. | a) | Explain the extended features of EBNF compared to BNF with the help of examples. | 8 |
| | b) | "Algol was a major milestone in programming languages". Justify. Also explain how Algol-60 became as its final version. | 7 |
| 5. | a) | What is Lisp? Explain the structural organization of Lisp with a suitable example. | 8 |
| | b) | How is information represented by property list and association list in Lisp? | 7 |
| 6. | a) | How do classes allow multiple representations of data types in the SmallTalk? Explain with the help of orthogonal classification. | 8 |
| | b) | Describe three forms of message templates in SmallTalk. | 7 |
| 7. | Write short notes on: (**Any two**) | | 2×5 |
| | a) | **car** and **cdr** function | |
| | b) | Garbage collection | |
| | c) | Contour diagram | |



## POKHARA UNIVERSITY

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***Attempt all the questions.***

| | | | |
|---|---|---|---|
| 1. | a) | Compare and contrast pseudo-code interpreter, symbolic pseudo-code interpreter and an assembler. | 7 |
| | b) | Explain different aspects of designing a pseudocode programming language. | 8 |
| 2. | a) | Explain multi-dimensional array implementation in fortran. Show that array subscript of the form c*v+c' can be optimized but that of the form u*v cannot.(u and v are variables whereas c and c' are constants.) | 7 |
| | b) | Write a Fortran Program to binary search a number on a sorted array using subroutine. | 8 |
| 3. | a) | How is dangling-else problem addressed in Algol-60? Give examples of usage of Context-sensitive, Context-free and regular grammars in defining constructs. | 8 |
| | b) | Explain control-flow structures in Algol-60. Critique on the flexibility and baroqueness of these constructs. | 7 |
| 4. | a) | How are hierarchical structures processed in LISP? | 7 |
| | b) | Define functionals and lambda expressions. How is functional programming different from iterative programming? | 8 |
| 5. | a) | How are Objects and Classes represented in Smalltalk? | 7 |
| | b) | Describe how Ada, C++, Java and CLOS have added support for Object-oriented Programming. | 8 |
| 6. | a) | State different principles of programming languages and illustrate at least one example each where programming languages either violate or follow these principles. | 8 |
| | b) | Explain Recursive Interpreters with examples. | 7 |
| 7. | Write short notes on: (**Any two**) | | 2×5 |
| | a) | Parameter passing mechanism | |
| | b) | Activation Records | |
| | c) | Garbage Collection | |