KATHMANDU UNIVERSITY
End Semester Examination
January/February 2024

Level : B.E.
Year : III
Time : 2 hrs. 30mins.

22 JAN 2024

Course : COMP 301
Semester : I
F. M. : 40

SECTION "B"
[6 Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. What major features would a perfect programming language include, in your opinion?
2. Define lifetime, scope, static scope and dynamic scope of variable.
3. What is a descriptor? What are the advantages and disadvantages of decimal data types?
4. Define operator precedence and operator associativity. How does operand evaluation order interact with functional side effects?
5. What is the definition of control structure? Write the design issues for selection structure.
6. What does it mean for a program to be active? Also, what are the design issues for subprogram?
7. What are the reasons why implementing subprograms with stack-dynamic local variable is more difficult than implementing simple sub-program?

SECTION "C"
[8 Q. × 2 = 16 marks]

Attempt *ANY TWO* questions.

8. a. Write a grammar for the language consisting of strings that have *n* copies of letter *a* followed by the same number of copies of the letter *b*, where $n>0$. For example, the string *ab*, *aaaabbbb*, and *aaaaaaaabbbbbbbb* are in the language but *a, abb, ba* and *aaabb* are not. Also draw the parse tree for *aabb* and *aaaabbbb*.

   b. Perform the pairwise disjointness test for the following grammar rules.
      i) A → aB| b|cBB
      ii) B → aB | bA | aBb
      iii) C → aaA | b | caB

9. Check whether the given grammar is SLR or not by constructing parsing table and with necessary explanation.
   S → L=R
   S → R
   L → *R
   L →id
   R → L

10. Explain about language evaluation criteria. How can user-defined operator overloading harm the reliability of a program?