

KATHMANDU UNIVERSITY
End Semester Examination
March, 2026

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

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

SECTION "B"
[6 Q. × 4 = 24 marks]

Attempt ANY SIX questions.

1. / Discuss the criteria for evaluating programming languages. Why has Readability become more heavily emphasized than Writability in modern software development?
2. / Write the design issues for string types and arrays.
3. / Define operator precedence and operator associativity. Give a solution to the problem of operational evaluation order and side effects.
4. / Explain selection statement? Write the design issues for selection structure.
5. What is the task of a linker? Write the difference between an activation record and an activation instance.
6. What is an activation record? Differentiate between the activation record structure of a simple subprogram and one that supports stack-dynamic local variables.
7. Discuss the concept of strong typing. Which languages are considered strongly typed and why? Provide examples to support your context.

SECTION "C"
[2 Q. × 8 = 16 marks]

Attempt ANY TWO questions.

8. What is Axiomatic Semantics? Define the concepts of precondition, postcondition, and weakest precondition. Given the following assignment statement, compute the weakest precondition.
 $x = 2 * y + x - 1 \{x > 1\}$
Show the proper logical steps for your proof. [3+3+2]
9. Explain the reason for studying concept of programming languages language illustrating the particular example for each reason. What are different programming domains and explain why each domain is important in modern computing? [4+4]
10.
 - a. Construct a context-free grammar (CFG) for arithmetic expressions consisting of variables, 'id', numbers, and operators '+' and '*' that enforces the proper operator precedence (+ is lower precedence than *).
 - b. Using your grammar, draw a syntax tree (parse tree) for the expression: id + id * id.