

KATHMANDU UNIVERSITY
End Semester Examination [C]
December, 2024

Marks Scored:

Level : B.E.
Year : III

Course : COMP 301
Semester : I

Exam Roll No. : Time: 30 mins.

F. M. : 10

Registration No.:

Date 18 DEC 2024

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Choose and encircle in the most appropriate option from each set of choices

- Which of the following is not the reasons for studying concept of programming language _____
 - Improved background for choosing appropriate language
 - Increased ability to learn new language
 - Increased ability to express ideas
 - Increased ability to write functions
- Artificial intelligence (AI) is a broad area of computer applications characterized by the use of _____
 - Symbolic computation
 - Numeric computation
 - Image processing
 - Image rendering
- In Java, a user can increment a simple integer variable in four different ways:
 $count = count + 1$
 $count += 1$
 $count++$
 $++count$
This is called.....
 - Orthogonality
 - Feature multiplicity
 - Abstraction
 - Simplicity
- Which Any string of terminals that can be generated by the following CFG is
 $S \rightarrow AB$
 $A \rightarrow 0A \mid 1B \mid 0$
 $B \rightarrow B0 \mid B1 \mid 0$
 - Has atleast one '1'
 - Should end in a '0'
 - Has no consecutive 0's or 1's
 - Has at least two 0's
- The syntax analyzer takes the lexical units from the lexical analyzer and uses them to construct the hierarchical structure called _____
 - Token
 - DAG
 - Parse trees
 - Intermediate code
- In the given code
 $index = 2 * count + 15;$
lexeme is _____ and token is _____
 - index, identifier
 - Identifier, index
 - mult_op, *
 - int_literal, 15

15. The primary design issues specific to _____ are the following:
- What types are legal for subscripts?
 - Are subscripting expressions in element references range checked?
 - When are subscript ranges bound?
 - When does its allocation take place?
 - Are ragged or rectangular multidimensioned of it allowed, or both?
 - Can it be initialized when they have their storage allocated?
 - What kinds of slices are allowed, if any?
- a. Union types
b. Array types
c. Pointer and reference type
d. Function
16. _____ are nameless (abstract) memory cells that are allocated and deallocated by explicit run-time instructions specified by the programmer.
- a. Stack Variable
b. Explicit-Heap-Dynamic Variables
c. Stack-Dynamic Variables
d. Implicit Heap-Dynamic Variables
17. _____ is a variable that is bound to a value only once.
- a. Named Constant
b. Name type equivalence
c. Structure type equivalence
d. Static Member
18. A _____ is the collection of the attributes of a variable. In an implementation, it is an area of memory that stores the attributes of a variable.
- a. Descriptor
b. Ordinal Type
c. Character String Type
d. Substring Reference
19. Converting the double to a float in Java program is an example of
- a. Short-circuit evaluation
b. Mixed-mode expression
c. Narrowing conversion
d. Widening conversions
20. A _____ is one whose computation can be done on data of different types in different calls.
- a. Nested subprogram
b. Overloaded subprogram
c. Generic sub-program
d. Referencing environment

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

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

18 DEC 2024
SECTION "B"

[6 Q. × 4 = 24 marks]

Attempt ANY SIX questions.

1. Why is it useful for a programmer to have the ability to learn new languages, even though he or she may have a good knowledge of a number of programming languages?
2. After language design and implementation, what are the four times bindings can take place in a program?
3. Describe the different uses of the type system of a programming language.
4. Explain mixed-mode expression and short-circuit evaluation with example.
5. What are the two general categories of a selection statement? What is the limitation of building a multiple selector from two-way selectors and gotos?
6. What is a subprogram call? Illustrate the three general characteristics of subprograms.
7. During implementing subprogram, which of the caller or callee saves status information? Explain in detail.

SECTION "C"

[2 Q. × 8 = 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 $aaaaaaaaabbbbbbbb$ 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) $A \rightarrow aB \mid b|cBB$
 - ii) $B \rightarrow aB \mid bA \mid aBb$
 - iii) $C \rightarrow aaA \mid b \mid caB$
9. Consider the following grammar
 - $E \rightarrow T \mid E + T$
 - $T \rightarrow F \mid T * F$
 - $F \rightarrow id \mid (E)$

Construct the LR parsing table and show the complete parse including the stack contents, input string and action for the string $(id+id)*id$

P.T.O.

10. Many languages distinguish between uppercase and lowercase letters in user-defined names. What are the pros and cons of this design decision? Also explain about language evaluation criteria.