COMP4101 : Principles of Programming Languages
Multiple Choice Question

1. Aliasing in the context of programming languages refers to
A. multiple variables having the same memory location
B. multiple variables having the same value
C. multiple variables having the same identifier
D. multiple uses of the same variable

2. What is printed by the print statements in the program P1 assuming call by reference parameter passing?

```
Program Pl()
{
 x=10;
 y=3;
 func1(y, x, x);
 print x;
 print y;
}
func1 (x, y, z)
{
  y = y + 4;
  z = x + y + z;
}
```
A. 10, 3
B. 31, 3
C. 27, 7
D. None of the above

3. Consider the following program

```
Program P2
   var n: int:
    procedure W(var x: int)
    begin
       x=x+1;
       print x;
    end
```

```
    procedure D
    begin
        var n: int;
        n=3;
        W(n);
    end
begin //beginP2
 n=10;
 D;
end
```
If the language has dynamic scoping and parameters are passed by reference, what will be printed by the program?
A. 10
B. 11
C. 3
D. None of the above

4. Translator which is used to convert codes of assembly language into machine language is termed as
A. assembler
B. attempter
C. compiler
D. Interpreter

5. Programming language which sometimes called 'write once, run anywhere' is
A. Java
B. Basic
C. Pascal
D. Ada

6. Language which is based on Pascal is
A. FORTRAN
B. COBOL
C. Ada
D. C++

7. Language in which single statements can be written to accomplish substantial tasks is termed as

A. machine language
B. assembly language
C. high level language
D. medium language

8. FORTRAN stands for

A. FORmulaTRAnslator
B. FanOutReTRAnslator
C. FORTh Translator
D. FORTeen language

9. Dividing a program into functions and modules is one of main feature of

A. machine language
B. interpreted language
C. structural language
D. structural language

10. Which of the following is true about system software.

A. The operating system and all programming support tools of a computer systems are collectively known as itsSystem Software.

B. The Operating System and the hardware tools of computer systems are called as system software.

C. The Operating System and the Macroinstruction interpreter collectively is known as system software.

D. System software is same as application software

11. Which of the following is the widely used programming language developed for Artificial Intelligence Application

A. ALGOL 60

B. LISP

C. FORTRAN

D. COBOL

12. Which is a scripting language developed by Netscape for use in both Web server and browsers.

A. Java Script

B. HTML

C. AWK

D. PHP

13. Which of the following is the language developed to produce business reports.

A. RPG

B. GPSS

C. PHP

D. ALGOL

14. Which was the first language for scientific applications

A. ALGOL 60

B. FORTRAN

C. LISP

D. COBOL

15. Which was the first high-level language developed for business purpose.

A. ALGOL 60

B. LISP

C. COBOL

D. FORTRAN

16. CGI stands for …

A. Common Gateway Interface

B. Computer Gateway Interface

C. Common Gateway interchange

D.None

17. The Unix Operating System is written almost entirely in _ _ _ _ __ _ Language

A. LISP

B. C

C. C++

D. Java

18. C was developed by _ _ _ _ _ _ _

A. Pascal

B. D.Ritchie

C. N.Writh

 D. A. Kay

19. List of Commands put in a file is called [01S06]

A. Script

B. Tag

C. Language

D. Program

20. Languages designed around the prevalent computer architecture, called the von Neumann architecture are called as

A. Imperative Languages

B. Functional languages

C. Object - oriented Languages

D. Improved Languages.

21. The first high level programming language to include pointer variables was _ _ _ _ _

A. Algol-60

B. Ada

C. PL/I

D. Fortran

22. The ability of a program to intercept run-time errors, take corrective measures and then continue execution is called

A. Error mechanics

B. Exception handling

C. Abstraction

D. Orthogonality

23. The first Language to provide even limited supported for data abstraction is

A. Smalltalk

B. SIMULA67

C. Prolog++

D. NONE OF THESE

24. Which of the following is true for abstraction

A. The ability to define and then use complicated structure in way that allow many of the details to be ignored

B. The process of hiding all low-level details from the user

 C. The ability to acquire properties of other class.

D. The ability of a program to intercept run-time errors.

25. A sentence generation is called a _ _ _ _ _ _ _ _ _ _ _ _ _

A. statement

 B. token

C. BNF

D. derivation

26. Which of the following is a device that can be used to generate the sentences of a language.

A. Sentence generator

B. Language generator

C. Program generator

D. Language recognizers

27. Which is correct about semantics

A. Rules for writing expressions, statements and program units

B. Meaning of the expression, statement and programs units

C. Protocol to be followed by statements

D. Conditions for writing expressions, statements and program units

28. Which of the following of a programming languages can be described by regular grammar

A. Tokens

B. Lexical units

C. Lexemes

D. Syntax

29. The syntax of a programming language is the form of its expressions, statements and _ _ _ _ _

A. program units

B. steps

C. functions

D. algorithms

30. For the instruction a = b/2 - 1 { a< 10 } is called as

A. Pre condition

B. Post condition

C. Weakest condition

D. strong condition

31. For the instruction x = 2 * y - 3, {y <0 } is called as

A. Pre condition

B. Post condition

C. Weakest condition

D. strong condition

32. _ _ _ _ _ _ _ data type stores the data in BDC notation

A. float

B. double

C. int

D. decimal

33. _ _ _ _ _ _ _ _ is one in which the range of possible values can be easily associated with the set of positive integers

A. variable

B. data

C. ordinal type

D. constant

34. _ _ _ _ _ _ data type model real numbers, but only as approximations

A. float

B. char

C. int

D. string

35. _ _ _ _ _ _ _ data type specifically available in a Language for business applications.

A. float

B. double

 C. int

D. decimal

36. The variables receive values at _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

A. compile time

B. run time

C. language design time

D. load time

37. The attributes of variables are determined at _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

A. compile time

B. run time

C. language design time

D. load time

38. A _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ is a set of objects & a set of operations on those objects, which create, build-up, destroy, modify & pick apart instance of the objects

A. Data type

B. Data valued

C. State space

D. Environment

39. _ _ _ _ _ _ _ is not primitive data type,

A. float

B. char

C. int

D. string

40. _ _ _ _ _ _ _ _ _ data type store true or false notation

A. float

B. boolean

C. int

D. char

41. _ _ _ _ _ _ _ _ type stores values as sequences of characters

A. float

B. boolean

C. int

D. string types

42.Multiple selector statement in C is _ _ _ _ _

A. break

B. switch

C. go to

D. continue

43. _ _ _ _ _ _ _ is a two way selector

A. if

B. if else

C. for

D. while

44. In C Switch-Case statement the default expression type can be _ _ _ _ _ _ _ _ _ _

A. int

B. float

C. double

D. char

45. The following is a Exit controlled loop

A. While

B. do-while

C. for

D. go to

46. In Pascal, after normal termination, loop variable is _ _ _ _ _ _ _ _ _ _ _

A. Undefined

B. assigned last value

 C. zero

D. one

47. _ _ _ _ _ _ _ _ _ _ language supports labeled iteration

A. C

B. C++

C. Java

D. Pascal

48. In FORTRAN 90, Loop parameters are evaluated _ _ _ _ _ _

A. only once

B. twice

C. thrice

D. every time

49. In Ada 60, Loop parameters are evaluated _ _ _ _ _ _

A. only once

B. Twice

C. Thrice

D. Everytime

50. The repeated execution of a statement or compound statement is accomplished by _ _ _ _ _

A. Iteration

B. Selection

C. Condition

D. Blocking

51. In Pascal, Loop parameters are evaluated _ _ _ _ _ _

A. Only once

B. Twice

 C. Thrice

D. Every time

52. Delaying decisions about program implementation until run time is known as _____

A. static binding

B. dynamic binding

C. late binding

D. early binding

53. The java language definition defines a machine-independent intermediate form known as _____.

A. bit code

B. byte code

C.both a and b

D. micro code

54. The interpreter is written in low-level instructions called _____.

A. bit code

B. byte code

C.both a and b

D. micro code

55. Lisp is an acronym for _____

A.lisp preprocessor

B. list processor

C. lisp processor

D. list preprocessor

56. Which one is not the constructor in lisp?

A. Cons

B. List

C. Append

D. Lists

57.A binding to an object that is no longer alive is called a----------------

A. Dangling pointer

B. object lifetime

C. dangling reference

D. none of these

58. To keep track of the names in a statically scoped program, a compiler relies on a data abstraction called a _____

A.lookuptable

B. symbol table

C. both a and b

D. none of these

59. Within the LISP community, implementation of dynamic scoping via an association list is sometimes called _____

A. shallow binding

B. deep binding

C. late binding

D. early binding

60. Implementation via a central reference table is sometimes called _____

A. shallow binding

B. deep binding

C. late binding

D. early binding

61. The _____ points to the top of an instance of the activation record of the caller.

A. static link

B. dynamic link

C. static chain

D. dynamic chain

62. The subprogram call and return operations of a language are together called its _____

A. subprogram linkage

B. program linkage

C. both of these

D. none of these

63. The format, or layout , of the non-code part of an executing subprogram is called __ _____

A. activation record instance

B. record

C. activation record

D. none of these

64. The environment of the call statement that passed the subprogram as an actual parameter, called as_____

A. deep binding

B. shallow binding

C. ad hoc binding

D. static binding

65. _____ is an unordered collection of date elements that are indexed by an equal number of values called keys.

A. union

B. associative array

C. record

D. pointer

66. _____is a collection of possibly different type of data elements in which the individual elements are identified by names.

A. pointer

B. record

C. union

D. array

67.A compound statement preceded by a set of declarations is usually called _____

A. unwinding

B. block

C. exception handling

D. none of these

Answer in one Question

1. Name two languages in which a program can write new pieces of itself "on-the-fly".
2. Define. Byte code
3. Define unification.
4. Define prolog and states which are 2 types of database support it.
5. What is iterator? What are two programming languages that supports iterator.
6. What is overloaded subprogram? What are the programming languages which has predefined overloaded subprograms.
7. What is l-value and r- value?
8. Define list in LISP and Unification in prolog.

9. Define virtual and non- virtual methods.
10. What is the difference between compiler and pre- processor.
11. What is calling sequence.
12. Describe three string length operations.
13. What is tail recursion.
14. Define orthogonality in the context of programming language design.
15. State 4 predicates in LISP with their purpose.

16. What is principle of programming language?
17. What are objectives of principles of programming language?

18. What are the Paradigms of Programming?

19. Why there is need of so many paradigms?
20. List the models of computation of language.
21. List various type of languages.
22. What are the issues for languages?
23. What is translation?
24. What are different types of translation and their roles?
25. What is trade's off of translation.

Short Notes

1. Describe the process of Array initialization?
2. Explain all of the difference between subtypes and derived types?
3. Compare and Contrast union, free union and discriminated union?
4. Explain the Various Design issues that are involved in functions?
5. Difference between procedures and functions?
6. What is the primary problem with using semaphores to provide synchronization?
7. Explain the difference between CONS, LIST and APPENED?
8. Write a Lisp function Fib (n) that computes a nth Fibonacci number?
9. Difference between compilation and interpretation?
10. Define the following?
    a) Stack Dynamic
    b) Explicit Heap Dynamic
    c) Implicit Heap Dynamic
    d) Static
11. Describe how the pointers used in C and C++ with examples?

12. Explain pointers, reference types, design issues of pointers, operations on pointers, pointer problems and implementation of pointer and reference types?
13. Difference between Static and Dynamic strings?
14. Discuss the benefits of operator overloading?
15. Discuss the applications of functional languages?
16. Explain the difference between Imperative and functional languages?
17. Outline the semantics of COND and LET?

Short Answer Question and Long Answer Question
1. What makes programming language successful?
2. What distinguishes declarative languages from imperative languages?
3. Explain C++ compilation process with the help of suitable diagram.
4. Why are there so many programming languages?
5. Explain the characteristics of functional languages?
6. What are the programming language spectrum?
7. What are the recursive functions in LISP? Explain with suitable example.
8. Define LISP recursive function to find intersection of two lists perceived as sets and taken as argument.
9. State the difference between CONS and append primitives in LISP with example.
10. Mammals have 4 legs and no arms, or 2 arms and 2 kegs. A cow is a mammal. A cow has no arms. Write a prolog to represent these sentence. Can we prove that cow has 4 legs? Why or why not?
11. Write a tail recursive prolog program to print numbers from n to 1.
12. Give a function to find a power. Power(m, n)=m raised to the power of n, in LISP.
13. Write a LISP function that takes one list L as an argument and returns L with last element removed.
14. Write a prolog program to print the factorial of every element of the given list.
15. All cats like to eat all types of fish. All calico are cats. All tuna are fish. Charlic is tuna. Herb is tuna. Puss is calico. Write a prolog program to answer the question "what does puss like to eat?"
16. State the purpose of Fail predicate in prolog.
17. State the difference between CONS and APPEND primitives in LISP.
18. Define a recursive function in LISP to return total number of elements of the list.
19. Consider the following statements: "John is a man. Mary is a woman. Tom is man. Rani is a woman. All women who lives in city are called City Females. Mary lives in city. All men like Wine. Rani lives in city. Mary likes wine. John loves all city females who likes wine.
20. Define a recursive function in Lisp named PALIND which takes one list as an argument and returns true if the list is palindrome.

21. Explain fail predicate and cut predicate.
22. Explain cut predicate . Also explain how it is used in combination with FAIL predicate.
23. Write a LISP program to count total no. of top level elements in a list
e.g.(count '(1 (2 3) 4 5) o/p 4)
24. What are static and dynamic databases in PROLOG.
25. Write a prolog program to find factorial of a number.
26. Explain tail recursion.
27. Explain prolog program structure.
28. Explain prolog variables.
29. Explain backtracking .
30. Explain CONS, CAR, CDR primitives in LISP.
31. Explain the data types in LISP.
32. Consider the following sentences:
John likes all animals. Cat, bird, dog and snake are animals. Write a prolog program such that goal: likes(john, snake) return /false, whereas for other animal it will return true.
33. What is internal and external fragmentation.
34. What is garbage collection
35. What is dangling reference?
36. Differentiate between deep and shallow binding of referencing environments.
37. Describe the difference between static and dynamic scope.
38. Describe the association list and central reference table data structures used to implement dynamic scoping?
39. What is closure and subroutine closure.
40. Describe the following terms:
1. Aliases
2. Overloading
3. Polymorphism
41. Consider the following pseudo code
X: integer;   //global
Procedure set(n : integer)
        {
                X := n;
        }
Procedure printx
        {
                Write-integer(x);   //display value of x
        }
Procedure first

```
        {
                Set(1);
                Printx;
        }
    Procedure second
        {
        x : integer;
        set(2);      printx;
        }
    Main
    {
    set(0); first(0); printx; second();
    printx;
    }
```

What does this program print if the language uses static scoping?
What does it print with dynamic scoping? Why?

42. Explain the difference between prefix, Infix and postfix notation. What is Cambridge polish notation? Name two programming languages that use postfix notation.
43. Describe enumeration controlled loops.
44. What is short circuit Boolean evaluation ?Why is it useful?
45. Objects lifetimes correspond to one of three principal storage allocation mechanisms. List all three mechanisms and explain any one in detail.
46. Explain iteration and recursion with example.
47. Explain difference between applicative and normal order evaluation of expression.
48. State dangling pointer problem . Explain its solution.
49. What is semaphore ? What operations does it support?
50. Define and explain with example, free union, and discriminated union.
51. Define
1.   fixed stack-dynamic array
2.   Stack dynamic array
3. Fixed heap-dynamic array
4. Heap dynamic array
    What are the advantages of each?
52. What is dangling reference ?explain tombstone and lock and keys approach.
53. Define
1. Static chain
2. Static_depth

3. Nesting_depth
4. Chain_offset
54. What are the design issues for subprograms?
55. Explain the implementation of virtual method with example?
56. Explain replicated inheritance ?
57. Explain Shared inheritance?
58. Explain Mix-in inheritance?
59. Explain the MIMD and SIMD structure.
60. Explain the initialization and assignment in C++ with suitable example.
61. Explain any four concepts of OOPS.
62. What is enumeration type? Give design issues for enumeration types.
63. Explain semaphore?
64. Define
1. Cooperation synchronization
2. Competition synchronization