ARSI UNIVERSITY

Computer Science Model Examination

1. Which of the following is not a valid identifier in c++?
   A. Abc7_4 B. ABC_4!fa C. A$C_45fa D. $6AbCD!
2. _____ implements the same function name, but different parameters.
   A. Abstraction B. Overriding C. Overloading D. Encapsulation
3. What is printed by this block of code?

```
int i=9;

for(int i=0;i<2;i++)

{

for(int j=0;j<5;j++)

{ cout<<i<<" "<<j<<” “;

break;

} }
```

   A. 0 0 B. 0 0 1 0 C. 0 0 1 1 D. 0 1 1 1
4. What is a file?
   A. A file is a selection of main storage used to store data.
   B. A file is another name for floppy disk.
   C. A file is a part of a program that is used to describe what the program should do.
   D. A file is a collection of information that has been given a name and is stored in secondary memory.
5. Which of the following correctly declares an array?
   A. int array[10]; B. int array; C. array{10}; D. array array[10];
6. What is the index number of the last element of an array with 9 elements?
   A. 9 B. 8 C. 0 D. Programmer-defined
7. What is a database?
   a) Organized collection of information that cannot be accessed, updated and managed
   b) Collection of data or information without organizing
   c) Organized collection of data or information that can be accessed, updated, and managed
   d) Organized collection of data that cannot be updated.
8. What is DBMS?
   a) DBMS is a collection of queries
   b) DBMS is a high-level language
   c) DBMS is a programming language
   d) DBMS stores, modifies and retrieves data

9. Which type of data can be stored in the database?
   a) Image oriented data
   b) Text, files containing data
   c) Data in the form of audio or video
   d) All of the above
10. Which of the following is not a type of database?
   a) Hierarchical
   b) Network
   c) Distributed
   d) Decentralized
11. Which of the following is a feature of the database?
   a) No-backup for the data stored
   b) User interface provided
   c) Lack of Authentication
   d) Store data in multiple locations
12. The ability to query data, as well as insert, delete, and alter tuples, is offered by _____
   a) TCL (Transaction Control Language)
   b) DCL (Data Control Language)
   c) DDL (Data Definition Langauge)
   d) DML (Data Manipulation Langauge)

13. Which of the following data model that require a complex array of pointers that thread through set of records?
   A. A. Relational Data Model. C. Network data model
   B. B. Hierarchical Data model. D. A and B.

14. Which of the following is true regarding converting the following sentences into relational algebra query Student Information?

Find the Name, Country of all students who are 30 years old or greater and Whose Birthplace and residence are the same?

   A. $\pi_{\text{Name, Country}}(\sigma_{\text{Age>=30 and Birthplace=Residence}}(\text{Students}))$
   B. $\sigma_{\text{Name, Country}}(\pi_{\text{Age >=30 and Birthplace=Residence}}(\text{Students}))$
   C. $\sigma_{\text{Name, Country}}(\pi_{\text{Age >=30 and Birthplace>=Residence}}(\text{Students}))$
   D. $\pi_{\text{Name, Country}}(\sigma_{\text{Age <30 and Birthplace=Residence}}(\text{Students}))$

15. Which of the following key is required in to handle the data when the encryption is applied to the data so that the unauthorized user cannot access the data?
   A) Primary key
   B) Authorized key
   C) Encryption key
   D) Decryption key

16. For designing a normal Relational Database Management system which of the following normal form is considered adequate?
    a) 4 Normal form
    b) 3 Normal Form
    c) 2 Normal form
    d) 1 Normal form.
17. Based on the following tables, which of the following true about sql code that display who order the product and what did they order?

Employee table

| Emp id | Name |
|---|---|
| **Emp1** | Daniel Biiftu |
| **Emp2** | Hana Temezgen |
| **Emp3** | Chala |

order table

| Proid | product | Emp Id |
|---|---|---|
| **45** | LG tv | Emp1 |
| **60** | table | Emp3 |
| **78** | chair | Emp3 |

A. SELECT Employees. Name, Orders FROM Employees, Orders WHERE Employees. Employee ID=Orders. Employee ID.
B. SELECT Employees.Name, Orders. Product FROM Employees, Orders WHERE Employees. Employee ID=Orders. Employee ID.
C. SELECT Employees. Name, Orders.Product FROM Employees WHERE Employees. Employee_ID=Orders.Employee_ID.
D. SELECT Employees. Name, Orders. Product FROM Employees, Orders WHERE Employees.Employee_ID=Employee ID.
E. None

18. Based on the following tables, which of the following true about sql code junction table that display student cannot registered twice for the same course?

**Student**

| Name | Stud id | age |
|---|---|---|
| Yohanis | S1 | 20 |
| Hana Temezgen | S2 | 23 |
| Chala | S3 | 24 |

**Course.**

| Cotitle | cocode | crhr |
|---|---|---|
| Database | Comp1 | 4 |
| C++ | Comp2 | 3 |
| network | Comp3 | 2 |

**Junction**

| Stud.no | cocode | Grade |
|---|---|---|
| S1 | Comp1 | B |
| S1 | Comp2 | C |
| S2 | Comp2 | A |
| S3 | Comp3 | A |

A. CREATE TABLE JUNCTION (STUDID char(8)not null,
COCODE CHAR (8) not null,
primary key (STUDID, COCODE),
FOREIGN KEY (IDNO) REFERENCES STUDENT(STUDID),
FOREIGN KEY (COCODE) REFERENCES COURSE(COCODE),GRADE CHAR(6)).

B. CREATE TABLE JUNCTION (STUDID char(8)not null,
COCODE CHAR (8) not null,
primary key (STUDID),
FOREIGN KEY (IDNO) REFERENCES STUDENT(STUDID),
FOREIGN KEY (COCODE) REFERENCES COURSE(COCODE),GRADE CHAR(6)).

C. CREATE TABLE JUNCTION (STUDID char(8)not null,
COCODE CHAR (8) not null,
primary key (STUDID, COCODE),
FOREIGN KEY (IDNO) REFERENCES STUDENT(STUDID),
(COCODE) REFERENCES COURSE(COCODE),GRADE CHAR(6)).

D. CREATE TABLE JUNCTION (STUDID char(8)not null,
COCODE CHAR (8) not null,
primary key (STUDID, COCODE),
FOREIGN KEY (IDNO) REFERENCES STUDENT(STUDID),
FOREIGN KEY (COCODE) COURSE(COCODE),GRADE CHAR(6)).

19. Which feature of OOP derives the class from another class?
    A. Inheritance
    B. Data hiding
    C. Encapsulation
    D. Polymorphism
20. Which of the following definition is incorrect for polymorphism?
    A. Polymorphism helps in redefining the same functionality
    B. Polymorphism concept is the feature of object-oriented programming (OOP)
    C. It always increases the overhead of function definition
    D. Ease in the readability of the program
21. Which member of the superclass is never accessible to the subclass?
    A. Public member
    B. Protected member
    C. Private member
    D. All of the mentioned
22. Which of the following syntax is incorrect for the class definition?
    A. student class{ };
    B. class student{ student(int a){} };
    C. class teacher{ public: teacher(int a){ } };
    D. None of the mentioned
23. Which of the following definition best describes the concept of polymorphism?
    A. It is the ability to process the many messages and data in one way
    B. It is the ability to process the undefined messages or data in at least one way
    C. It is the ability to process the message or data in more than one form
    D. It is the ability to process the message or data in only one form
24. Which one is the correct order of exception handling?

A. try { }
catch (Exception ex) {
}
catch (RuntimeException ex) {
}

B. try { }
catch (RuntimeException ex) {
}
catch (Exception ex) {
}

C. A and B

D. None

25. A *n*-bit regist*e*r is a set of _____ that is capable of storing *n* bits of binary information.

A. Storing device
B. n flip-flop
C. n memories
D. D-flip-flop

26. One of the following is not correctly Matched

A. $22_{10} = (10110)_2$
B. $(22)_{10} = (00100010)_{BCD}$
C. $25_8 = (11001)_2$
D. $72_{10} = (110)_8$

27. Which one of the following is part of central processing unit?

A. Arithmetical logic unit
B. Control unit.
C. Register
D. All of the above

28. Which primary storage device contain special instruction called BIOS that the computer uses when it is turned on.

A. Cache memory
B. CMOS
C. RAM
D. ROM

29. Which One Of The Following Operation Code(Opcode) refers Memory-Reference Instructions.

A. OP-code = 000 ~ 110

B. OP-code = 111, I = 0

C. OP-code =111, I = 1

D. OP-code =101, I = 1

30. what is the second step result of the program R2 ← *shr* R2,For unsigned, R2 = 110101001111.

A. 110101001111

B. 111010100111

C. 111101010011

D. 101010011111

31. Which one of the following is true?

A. All trees are binary search tree.

B. Subtree of binary search tree is binary search tree.

C. All right subtree are not larger than root tree but larger than left subtree.

D. All

32. What is postfix version of the following expression?

5 + 3*6 - (8/2)

A) - +5*36/82

B) - +*/53682

C) 536*/82+-

D) 536*+82/-

33. Which one of the following is not true?

A. Big-Oh ignores constant, coefficients, and higher order.

B. Algorithm which its run-time is independent of the size of problem have complexity of O(1).

C. O(n!) is larger than $O(2^n)$.

D. None

34. What is the optimal complexity we can achieve when removing duplicates from an unsorted linked list?

A. O(n)

B. O(n^2)

C. O(n * log n)

D. None of the above

35. What will be the output of the following code snippet for 1->2->3->4->5?

```
int List(ListNode* head) {
   while(head != NULL) {
      cout << head -> data << " ";
      head = head -> next;}}
```

A. 1 2 3 4 5

B. 5 4 3 2 1

C. 1 3 5 2 4

D. 2 4 1 3 5

36. If n elements are sorted in a binary search tree. What would be the asymptotic complexity to search a key in the tree?

    A. O(1)

    B. O(logn)

    C. O(n)

    D. O(nlogn)

37. Suppose a binary tree is constructed with n nodes, such that each node has exactly either zero or two children. The maximum height of the tree will be?

    A. (n+1)/2

    B. (n-1)/2

    C. n/2 -1

    D. (n+1)/2 -1

38. Which of the following is not a web development technology?
    A) HTML
    B) CSS
    C) MySQL
    D) Java

39. Which of the following is a principle of responsive web design?
    A) Using fixed-width layouts
    B) Designing for a specific device size
    C) Prioritizing content based on importance
    D) Using only images for navigation

40. Which of the following is a server-side scripting language?
    A) JavaScript
    B) PHP
    C) HTML
    D) CSS

41. Which of the following is a client-side scripting language?
    A) Java
    B) Python

C) jQuery
D) SQL

42. Which of the following is not a common content management system (CMS) used to build information-rich websites?
    A) WordPress
    B) Drupal
    C) Joomla
    D) MySQL
43. Which of the following is a key principle of user-centered design for websites?
    A) Using complex navigation menus
    B) Prioritizing business goals over user needs
    C) Testing design and functionality with real users
    D) Using bright, flashy colors and animations
44. Which of the following is a commonly used protocol for real-time communication in client-server systems?
    A) HTTP
    B) FTP
    C) WebSocket
    D) SMTP
45. Which of the following is an example of a technique for implementing concurrency control in client-server systems?
    A) Locking
    B) Compression
    C) Encryption
    D) Hashing
46. Which of the following is a commonly used protocol for client-server communication on the web?
    A) TCP
    B) SMTP
    C) HTTP
    D) FTP

47. Hamiltonian path problem is _____
    A. P class problem
    B. NP problem
    C. N class problem
    D. NP complete problem
48. Dynamic programming is used to find_____
    A. One solution is generated
    B. All optimal solution is generated

C. No optimal solution s generated

D. Partial solution is generated

49. What is the objective of the knapsack problem?

A. To get maximum weight in the knapsack

B. To get minimum total value in the knapsack

C. To get maximum total value in the knapsack

D. To get minimum weight in the knapsack

50. Kruskal's Algorithm for finding the Minimum Spanning Tree of a graph is a kind of a?

A. Dp problem

B. Greedy algorithm

C. Adhoc problem

D. None of the above

51. In Hamiltonian Cycle for n vertices, we

A. Can visit to same vertex two times

B. Can't visit same vertex more than one time

C. Can omit one vertex

D. None of these

52. What is recurrence for worst case of QuickSort and what is the time complexity in Worst case?

A. T(n)=T(n-4)+T(n-2)+O(1)

B. T(n)=T(n-1)+T(0)+O(n)

C. T(n)=2T(n/2)+O(n)

D. T(n)=4T(n/2)+O(n)

53. An 'agent' is anything that,

a) Perceives its environment through sensors and acting upon that environment through actuators

b) Takes input from the surroundings and uses its intelligence and performs the desired operations

c) A embedded program controlling line following robot

d) All of the mentioned

54. Categorize Crossword puzzle in Fully Observable / Partially Observable.

a) Fully Observable

b) Partially Observable

c) All of the mentioned

d) None of the mentioned

55. Which agent deals with happy and unhappy states?

a) Simple reflex agent

b) Model based agent

c) Learning agent

d) Utility based agent

56. Training data for supervised learning is:

A. Data B. Data and correct output C. States, actions, and rewards D. All

57. The Set of actions for a problem in a state space is formulated by a _____.

a) Intermediate states

b) Initial state

c) Successor function

d) None of the mentioned

58. First-order logic is used to model the world in terms of :

A. Objects B. Classes C. Functions D. All

59. What is the role of a formal grammar in relation to a formal language?
A. It specifies the syntax and semantics of the language.
B. It defines the alphabet and rules for generating valid strings in the language.
C. It provides a set of keywords and operators for the language.
D. It determines the types and data structures used in the language.

60. Which class of formal languages is defined by regular expressions and can be recognized by finite automata?
A. Regular languages
B. Context-free languages
C. Context-sensitive languages
D. Recursively enumerable languages

61. Which of the following is a valid example of a context-free grammar production rule?
A. A -> aBa B. AB -> BA C. A -> ε D. Aa -> aA

62. Which type of automaton is suitable for recognizing context-free languages?
A. Finite-state machine (FSM)
B. Pushdown automaton (PDA)
C. Turing machine (TM)
D. Linear-bounded automaton (LBA)

63. Which complexity class represents the set of problems for which a solution can be verified in polynomial time on a non-deterministic Turing machine?
    A. P  B. NP  C. PSPACE  D. EXPTIME
64. What is the relationship between P and NP complexity classes?
    A. a. P = NP  C. NP ⊂ P
    B. P ⊂ NP  D. P ∩ NP = ∅
65. Which technique is commonly used for syntax analysis in compilers?
    A. Abstract Syntax Trees
    B. Dynamic Programming
    C. Backtracking
    D. Finite Automata
66. Which phase of the compiler ensures the correctness of the program's logic, such as type compatibility, scoping rules, and other language-specific rules?
    A. Lexical Analysis  C. Syntactic Analysis
    B. Semantic Analysis  D. Code Generation
67. Which technique is commonly used for lexical analysis in compilers?
    A. Finite Automata
    B. Backtracking
    C. Abstract Syntax Trees
    D. Greedy Algorithms
68. Which of the following best describes the role of a compiler?
    A. Translates high-level programming languages to machine code
    B. Executes programs and produces output
    C. Provides an integrated development environment
    D. Analyzes and detects runtime errors in the program
69. What does semantic analysis in compiler design primarily focus on?
    A. Translating the program into an intermediate representation
    B. Checking type compatibility and performing type inference
    C. Transforming the program to improve its efficiency
    D. Generating the target machine code
70. What is type checking in compiler design?
    A. A process of verifying the syntax of the input program
    B. A technique to optimize the generated machine code
    C. An analysis to ensure the compatibility and correctness of data types
    D. A step to generate intermediate code for the program
71. Which protocol layer used WWW, HTTP and FTP protocols?
    A. Presentation layer protocol
    B. Physical layer protocol
    C. Application layer protocol
    D. Internet layer protocol
72. Which layer take data from network layer and encapsulates them into frames?
    A. Physical layer  C. Presentation layer
    B. Data link layer  D. Transport layer

73. Which data communication method is used to send over a serial communication lik?
    A. Simplex
    B. Half duplex
    C. Full duplex
    D. All of them
74. A user wants to upload a text document at the rate of 10 pages per 20 second. What will be the required data rate of the channel? (Assume that 1 page contains 1600 characters and each character is of 8 bits).
    A. 6400bps
    B. 6.25bps
    C. 20bps
    D. 2000bps
75. Which one is not advantage of serial data transmission mode?
    A. used for long-distance data transmission
    B. Uses only one communication channel
    C. Data transmission rate is slow due to a single transmission channel
    D. None
76. Which one of the following is true
    A. A reliable delivery service is accomplished with transmissions and acknowledgements
    B. Without flow control, the frames can get lost
    C. Error correction can detect the errors and determine where the errors have occurred in the frame
    D. All of the above
77. Which one of the following is not true about class “A” IP address?
    A. The network ID is 8 bits long
    B. The total number of hosts used in Class A is 224
    C. The total number of networks in Class A is 27
    D. The total number of hosts in Class A is 224
78. The network ID cannot start with 127, why?
    A. It is loop-back functions
    B. It is broadcast address
    C. It is used for specific host on the local network
    D. It is used for Subnet Masks
79. Which one of the following is true on network masks?
    A. Class A networks use a default subnet mask of 255.0.0.0
    B. Class B networks use a default subnet mask of 255.255.0.0
    C. Class C networks use a default subnet mask of 255.255.255.0
    D. All
80. Which one is responsible for reassembling the segments on the receiving end, turning it back into data that can be used by the session layer?
    A. Application layer
    B. Transport layer
    C. Session layer
    D. Physical layer

81. _____ is used to combines N input lines to generate a single output line.
    A. Multiplexing
    B. De-multiplexing
    C. DEMUX
    D. B and C
82. In which all signals operate at the same frequency with different time?
    A. Time Division Multiplexing
    B. Frequency Division Multiplexing
    C. Wavelength Division Multiplexing technique
    D. All
83. ____ is a software development life cycle model that is chosen if the development team has less experience on similar projects.
    A. Iterative Enhancement Model
    B. RAD
    C. Spiral
    D. Waterfall
84. Which one of the following is not a step of requirement engineering?
    A. Elicitation
    B. Design
    C. Analysis
    D. Documentation
85. ____ is a software development activity that is not a part of software processes.
    A. Validation
    B. Specification
    C. Development
    D. Dependence
86. Attributes of good software is___
    A. Development
    B. Maintainability & functionality
    C. Functionality
    D. Maintainability

87. Which one of the following is not a software process quality?
    A. Visibility
    B. Timeliness
    C. Productivity
    D. Portability
88. In which step of SDLC actual programming of software code is done?
    A. Development and Documentation
    B. Maintenance and Evaluation
    C. Design
    D. Analysis

89. Which of the following is/are false about random access file?

**A.** it is suitable for database system

**B.** the records are accessed by the key rather than position

**C.** Skipping some bytes or reading out of order is not allowed

**D.** All

90. _____ take the pointer word from each disk block and putting it in a table in memory.

**A.** Linked allocation

**B.** Contiguous allocation

**C.** Indexed allocation

**D.** All

91. Operating System provides user an interface to interact with system and manages input devices to take inputs from the user, this property of operating system is_____

A. Real time system C. Interactivity

B. Time sharing D. Distributed system

92. Which of the following is the disadvantages of multi programming operating system

A. High and efficient CPU utilization

B. User feels that many programs are allotted CPU almost simultaneously

C. CPU scheduling and memory management is required

D. All

93. In priority scheduling algorithm, if all priorities are equal then the process can be managed by_____

A. SJF scheduling C. Round-robin scheduling

B. FCFS scheduling

94. which of the following is/are not true about segmentation

A. In-order to specify an address among segment, addressing mechanism is used

B. Each segment consists of linear sequence of address from 0 to some maximum

C. like paging, different segments may have same length

D. All

95. Malicious destruction of a hardware device and erasure of a program or data file happen when:

A. Confidentiality is compromised

B. Integrity is compromised

C. Availability is compromised

D. System is intercepted

96. Illicit copying of program or wiretapping to obtain data in a network happen when

A. Integrity is compromised C. Availability is compromised

B. Confidenciality iscompromised D. All

97. Which one of the following is not the example of passive attacks?

A. Unauthorized deletion of data. C. Stealing the data

B. Eavesdropping D. None of the above

98. Which one of the following is not way of securing operating system?

A. Performing regular OS patch updates

B. Installing updated antivirus engines and software

C. Freely accept incoming network traffic through a firewall

D. Creating secure accounts with required privileges only

99. The art of searching for algorithm vulnerabilities and break into cryptography or information security systems is called_____

A. Decryption C. Cryptography

B. Cryptanalysis D. Hacking

100. _____Requires that neither the sender nor the receiver of a message be able to deny the transmission

A. Denial of service C. Replay

B. Non repudiation D. Traffic Analysis