**ADDIS Ababa UNIVERSITY**

**College of Natural and Computational Science**

**Department of Computer Science**

***Exit Exam Model***

Date: April, 07/2023

Time Allowed:\_ \_\_\_

***Full Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***ID No.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

**Directions:**

1. Make sure this exam booklet contains 16 pages including this cover page and the answer sheet on the back.
2. Please give your answers on the answer sheet provided.
3. Write your name and you ID on the answer sheet.
4. Don’t forget to switch off your mobile phones and store them away for the duration of the exam.
5. Please don’t turn this page until you’re told to do so.

1. How many times is the phrase ″In the loop″ printed when the following code is executed?
2. int i, j=8;
3. for(i=0; i<j; i++, j--)
4. {
5. if(i%2!=0) continue;
6. cout << "In the loop " << endl;
7. }
8. 20
9. 10
10. 3
11. 2
12. What is the output of the following code snippet?
13. int main ()
14. {
15. int a= 5, x = 1, y = 0, z = 4;
16. a = (x && y) || ++z;
17. std::cout<<z<<endl<<a;
18. return 0;
19. }
20. 5

1

1. 5

2

1. 4

1

1. 4

2

1. \_\_\_\_\_\_ is a function that invokes itself?
   1. Recursive function
   2. Inline function
   3. Built in function
   4. User defined function
2. Which control flow statement is represented by the flowchart shown in the figure below?
3. while loop
4. do…while loop
5. if…else statement
6. for loop
7. What is the output of the following code snippet?
8. double ph=15.3;
9. if(ph<0 || ph>15)
10. {
11. cout<< “Invalid PH value. ”;
12. }
13. if(ph<=6.5)
14. cout<< “Acidic”;
15. else if(ph>6.5 && ph<7.5)
16. cout<< “Neutral”;
17. else
18. cout<< “Alkaline”;
19. Invalid PH Value
20. Neutral
21. Alkaline
22. Invalid PH Value. Alkaline
23. What will be the result after executing the following program?
24. int func (int a, int b) {
25. a \*= 5;
26. b +=5;
27. return (a + b);
28. }
29. void main() {
30. int x = 9, y = 3;
31. cout << "Result = " <<func(x, y)<<", "<<x<<", "<<y<<endl;
32. }
33. 12, 9, 3
34. 50, 9, 3
35. 53, 9, 3
36. 53, 45, 8
37. What do arrays do?
38. Hold address of a single value
39. Hold one value
40. Hold values of the same type under a single name
41. Hold addresses of values under a single name
42. Which of the following statement best describe relational data model?
43. It is a database model that allows multiple records to be linked to the same owner file.
44. It structures data in a tree like structure using parent to child relationship.
45. It is a database model to manage data as tuples grouped into relations
46. It is a model that use concepts such as entities, attributes, and relationships
47. Describe how data is stored in the computer, representing information such as record structures, record ordering, and access paths.
48. Consider the following record of an employee database and answer the question that follows

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Employee** | | | | |
| Emp\_ID | First\_Name | Last\_Name | Salary | Department |
| 101 | Lula | Getachew | 35,000 | Accounting |
| 102 | Natnael | Abera | 18,000 | IT |
| 103 | Henok | Teshome | 45,000 | Accounting |
| 104 | Selamawit | Tadesse | 120,000 | IT |
| 105 | Solomon | Nigusse | 32,000 | Sales |

|  |  |
| --- | --- |
| **Department** | |
| Dept\_Name | Manager |
| Accounting | 101 |
| IT | 102 |
| Sales | 105 |

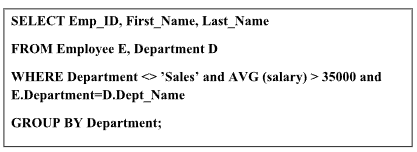
Which of the following constraint will violate when a data base administrator try to execute the following SQL statement?

**INSERT INTO Department (Dept\_Name, Manager) VALUES (null, 107);**

1. Domain constraint
2. Key constraint
3. Entity Integrity constraint
4. Referential Integrity constraint
5. Consider a relation R (A,B,C,D) with set of functional dependencies F={C🡪D,C🡪B,B🡪C).

Which of the following statement is true about R?

1. The relation R is in second normal form
2. The relation R is in third normal form
3. The candidate key for R is BC
4. The relation R is in second normal form
5. None
6. Which schema of the three-schema Architecture describe the structure of the whole database?
7. Internal schema
8. Conceptual schema
9. External schema
10. schema
11. Which of the following is the disadvantage of a database approach?
12. Data consistency
13. Sharing of data
14. Improved data integrity
15. Increased concurrency
16. Enforcement of standards
17. Complexity
18. None
19. Which of the following is a correct statement about relation? (Choose all that applies)
20. Values of each columns is a repeating group/array
21. Values in a column can be from different domain
22. A relation is in the 1NF
23. Two rows in a relational table can be identical
24. The sequence of columns and rows is insignificant
25. None
26. Which of the following statement is correct about executing the following SQL query on the employee database given in question 2? (Choose all that applies)



1. the query will execute successfully and will obtain all departments with an average salary higher than 35,000
2. the query will not execute because Department attribute in Group by statement was not included in the select statement list
3. the query will not execute because we can’t include aggregate function in the where statement
4. the query will execute successfully and will obtain employees of all departments with an average salary higher than 35,000
5. In which database security measure is aggregate data are accessible to users by hiding details from users:
6. Inference control
7. Access control
8. Integrity control
9. Encryption
10. None of the above
11. Which of the following query optimization technique used to modify the internal representation of query?
12. Systematically estimation
13. Semantic query optimization
14. Cost Estimation
15. Heuristic rules
16. A and C
17. Which of the following is not true about locks?
    1. Locks with large granularity are easier for the DBMS to administer.
    2. Locks with small granularity cause more conflicts.
    3. Locks with large granularity produce fewer details for the DBMS to track.
    4. Locks may have a table-level granularity.
    5. Locks may have a database-level granularity.
18. For every transaction T participating in the schedule, if all the operations of T are executed consecutively in the schedule. The schedule is
19. Cascaded schedule
20. Serial schedule
21. Cascadeless schedule
22. Recoverable schedule
23. None
24. A transaction property state about changes applied to the database by a committed transaction must persist in the database?
25. Isolation
26. Durability or permanency
27. Atomicity
28. Consistency preservation
29. None
30. If a transaction does not modify the database until it has committed, it is said to use the \_\_\_\_\_\_\_\_\_\_\_ technique.
31. Undo C. Immediate-modification
32. Late-modification D. Deferred-modification
33. Which one of the following is false?
34. In object-oriented database, data are stored as collections of rows and tables
35. In relational database, data are perceived by users as tables
36. Object oriented database allows object identification and communication
37. Object oriented database allows reusability of objects
38. None of the above
39. Which of the following is correct about software product in the context of software engineering?
    1. Software product refers any software created to meet the client’s requirements.
    2. Software product includes design nd test documentation.
    3. Software product includes requirement specifications, and user manuals.
    4. All of the above
40. One of the followings is type of requirements associated with quality features of a software.
41. Business requirements
42. Functional requirements
43. Non-functional requirements
44. User requirements
45. A type of requirement that describes why the software project is needed and used to define the objective of the software is .
46. Business requirements
47. Functional requirements
48. Non-functional requirements
49. User requirements
50. Which of the following is used to model the functionality of software?
51. Use case diagram
52. Class diagram
53. E-R diagram
54. Deployment diagram
55. Which of the following refers to the deployment platform?
56. Use case
57. Tier
58. Layer
59. Component
60. Which of the following process model is not suitable to accommodate changes?
61. Waterfall
62. Scrum
63. RAD
64. Agile
65. Which of the following aims to find errors?
66. Requirement Analysis
67. Design
68. Testing
69. None of the above
70. Which of the following will work if you want to create a table which looks like the following?

|  |  |  |
| --- | --- | --- |
| 12 | -9 | 8 |
| 7 | 14 |  |
| -32 | -1 | 0 |

1. double[][] table = {12, -9, 8, 7, 14, -32, -1, 0};
2. double[][] table = {{12, -9, 8}, {7,14,0}, {-32,-1,0}};
3. double[][] table = {{12,-9,8}{7,14}{-32,-1,0}};
4. double[][] table = { {12, -9, 8},{7, 14},{-32, -1, 0} };
5. Which of the following is a good candidate to be static?
6. The PI field of a circle class
7. A method that displays the salary of an Employee class
8. A method that calculates the hypotenuse of a right-angle triangle class
9. A name field of a Student class
10. All except B
11. Here is the general syntax for method definition:

accessModifier returnType methodName(parameterList ){

Java statements

return returnValue;

}

What is true for the accessModifier?

1. It must always be private or public.
2. It can be omitted, but if not omitted it must be private or public.
3. It can be omitted, but if not omitted there are several choices, including private and public
4. The access modifier must agree with the type of the return value.
5. All of the above
6. What is the output of the following Java code?

class FinalExam{

int num1;

public FinalExam() {

num1 = 4;

}

void display() {

System.*out*.println(num1);

}

}

class Final1 extends FinalExam{

int num=3;

public Final1() {

this(5);

num1 = num;

}

public Final1(int num) {

this.num = num \* num;

}

}

public class Main{

public static void main(String[] args){

Final1 f = new final1();

f.display();

}

}

1. 4
2. 25
3. 12
4. 20
5. Which one of the following is important to implement dynamic Polymorphism?
6. Polymorphic variable
7. Method overriding
8. Inheritance
9. All of the above
11. What **must** a non-abstract child do about an abstract method in its parent class?
12. A child must override an abstract method inherited from its parent by defining a method with the same signature and same return type
13. A child must define an additional method similar to the one inherited from its parent by defining a method with the same signature and different return type.
14. A child must not define any method with the same signature as the parent's abstract method.
15. A non-abstract child must define an abstract method with the same signature and same return type as the parent's abstract method.
16. All of the above
17. Which of the following is true?
18. A child class can extend a parent or implement an interface, but not do both.
19. A child class can extend just one parent and can implement just one interface.
20. A child class can extend just one parent and can implement zero or more interfaces.
21. A child class can extend zero or more parents, and can implement zero or more interfaces.
22. In computers, subtraction is carried out generally by\_\_\_\_.
23. 1's complement method
24. 2's complement method
25. signed magnitude method
26. BCD subtraction method
27. Pick the different
    1. Decoder
    2. Encoder
    3. Multiplexer
    4. Shift Register
28. An operation performed on the contents of a register is known as
29. Instruction code
30. Micro-operation
31. Accumulator
32. Register
33. Which one is true about RISC computers?
34. RISC are with few numbers of registers when compared to CISC
35. RISC use complex and efficient machine instructions when compared to CISC
36. RISC is with hardwired control unit with pipelining processing
37. RISC uses extensive addressing capabilities for memory operations
38. None
39. Which of the following is not a basic element within the microprocessor?
40. Microcontroller
41. Arithmetic logic unit (ALU)
42. Register array
43. Control unit
44. Which method bypasses the CPU for certain types of data transfer?
45. Software interrupts
46. Interrupt-driven I/O
47. Polled I/O
48. Direct memory access (DMA)
49. Which bus is bidirectional?
50. Address bus
51. Control bus
52. Data bus
53. None of the above
54. Error detection, Error Correction and Flow Control tasks are performed on which layers of the OSI reference model \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_? (Choose all that applies)
    1. Application
    2. Presentation
    3. Network
    4. Transport
    5. Session
    6. Data link
    7. Physical
55. Which of the following statement(s) is/are **WRONG**? (Choose all that applies)
56. Internet/Network layer is responsible for routing
57. Physical address can be assigned by the network administrator.
58. Physical layer is concerned with specifying the characteristics of the transmission medium, the nature of the signals and the data rate.
59. Transport layer provides only unreliable data transmission.
60. Network layer is responsible for host to host communication.
61. None of the above
62. Which one of the following Medium Access Control protocols is supported by WLAN (802.11)?
63. ALOHA
64. CSMA/CA
65. Token Passing
66. FDMA
67. CSMA
68. Which one of the following network devices operates on all the layers of the OSI reference model\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?
69. Hub
70. Switch
71. Router
72. Gateway
73. Bridge
74. Which of the following is an IP address that can be assigned for a host in your LAN?
75. 127.0.0.0
76. 9.0.0.1
77. 192.168.1.256
78. 172.16.1.27
79. All of the above
80. None of the above
81. Which of the following statement(s) is/are correct? (Choose all that applies)
82. Circuit Switching and Virtual Packet Switching methods reserve the required resources for the duration of the session during communication between end systems
83. Circuit switching technique uses store and forward method.
84. In message switching technique, it is not required to create a dedicated path.
85. In circuit switching techniques, resources are allocated on demand.
86. Packet switching is used mainly for data transmission as the delay is not uniform.
87. Which information is not correct about the IP address 172.16.35.72/27?
88. 172.16.35.64 is one of the subnet addresses.
89. The default mask for the network is 255.255.0.0.
90. It is Class B address.
91. The number of bits used for the host address is 5.
92. The broadcast address of the second subnet is 172.16.35.255
93. Consider an implementation of unsorted singly linked list with a start pointer only. Given the representation, which of the following operation can be implemented in O(1) time?
    1. Insertion at the front of the linked list
    2. Insertion at the end of the linked list
    3. Deletion of the front node of the linked list
    4. Deletion of the last node of the linked list
    5. A & C
94. Given the following C++ function, what is the Big O of code?

int function( int n )

{

int a,n;

cout<< “Enter a positive integer \n”;

for ( int i = 1; i < n; i \*= 2 )

a = i;

return 0;

}

1. nlogn
2. n2
3. logn
4. n
5. Which of the following data structure is more appropriate to represent a heap tree?
6. Two dimensional array
7. Doubly linked list
8. Linear array
9. Single linked list
10. Linear search is highly inefficient compare to binary search when dealing with\_\_\_\_\_?
11. Small, unsorted arrays
12. Large, sorted arrays
13. Small, sorted arrays
14. Large, unsorted arrays

For Question 54 -56(separately) by considering the array elements

int a[6]={11,13,15,17,19,21}

1. Implementing stack, the elements after pop(); push(9); are:
2. 9, 11, 13, 15, 17, 19
3. 13, 15, 17, 19, 21, 9
4. 11, 13, 15, 17, 19, 9
5. 9, 13, 15, 17, 19, 21
6. Implementing queue, the elements after dequeue(); and enqueu(9); are:
7. 9, 11, 13, 15, 17, 19
8. 13, 15, 17, 19, 21, 9
9. 11, 13, 15, 17, 19, 9
10. Queue overflow
11. Implementing circular queue, the elements after dequeue(); and enqueue(9); are:
12. 9, 11, 13, 15, 17, 19
13. 13, 15, 17, 19, 21, 9
14. 11, 13, 15, 17, 19, 9
15. 9, 13, 15, 17, 19, 21
16. Which one of the following is false?
17. A web browser is a software that runs on a server
18. A user agent renders resources for a user to view
19. A website is a collection of resources in various forms
20. A web page is the basic unit of information storage on the www
21. Which one of the following is false about HTTP protocol?
22. It is a stateless protocol
23. An HTTP message body can be empty
24. It is a protocol used for communication between a web browser and a web server
25. None of the above
26. Which one of the following is the correct syntax for document type declaration in HTML5?
27. <doctype html>
28. <!doctype html>
29. </doctype html>
30. All of the above
31. In HTML, how do we create a link to another site?
32. <a href="http://www.somedomain.com">click here</a>
33. <a url="http://www.somedomain.com">click here</a>
34. <a link="http://www.somedomain.com">click here</a>
35. <a "http://www.somedomain.com">click here</a>
36. Which one of the following form attribute is used to assign the server side script file that processes the form data?
37. method
38. action
39. target
40. autocomplete
41. What would be the output of the following javascript code?  
     <script type="text/javascript">  
     x=4+"4";  
     document.write(x);  
     </script>
42. 44 B. 8 C. 4 D. The code contains an error
43. What will be the output of the following PHP code?

<?php  
 $color = "maroon";  
 $var = $color[2];  
 echo "$var";  
 ?>

1. a
2. Error
3. var
4. r
5. In PHP, which function initiates a session?
6. start()
7. s\_start()
8. session\_start()
9. session\_str()
10. In php, which one of the following is a super global varible?
11. $\_GET
12. $\_POST
13. $\_SERVER
14. All of the above
15. One is not the goal of I/O software
16. Buffering
17. Device independence
18. Uniform naming
19. Error handling
20. None of the above
21. Hardware device that maps physical address to logical address is
22. MMU
23. IRQ
24. DMA
25. Cache
26. Relocation Register
27. In terms of speed and storage utilization,
28. First fit algorithm is better
29. Best fit algorithm is better
30. Worst fit algorithm is better
31. All of the above
32. Assuming process execution time is known in advance, for which of the following algorithm(s) can the maximum wait time for a given process be computed at the time the job is submitted?
    1. Shortest job first
    2. Shortest remaining time
    3. Priority based
    4. Round Robin
    5. All of the above
33. One is not a problem caused by concurrency of processes
    1. Race condition
    2. Starvation
    3. Deadlock
    4. Mutual exclusion
    5. None
34. Which of the following methods can be used to recover deadlock
35. Kill the process
36. Rollback
37. Non-preempt the resource
38. Lock the process
39. One deadlock prevention method says, “if a process must wait for a needed resource, it drops all of its previously held resources and tries to acquire all resources gain.” These attacks
40. Circular wait condition
41. No preemption conditions
42. Mutual exclusion condition
43. Hold and wait condition
44. None of the above
45. The data structure used in the standard implementation of **Breadth** First Search is\_\_\_\_\_?
46. Stack
47. Array
48. Linked List
49. Queue
50. The data structure used in the standard implementation of **Depth** First Search is\_\_\_\_\_?
51. Stack
52. Array
53. Linked List
54. Queue
55. Recursion is a method in which the solution of a problem depends on \_\_\_\_\_\_\_\_\_\_\_\_.
56. Larger instances of different problems
57. Larger instances of the same problem
58. Smaller instances of the same problem
59. Smaller instances of different problems
60. In recursion, the condition for which the function will stop calling itself is \_\_\_\_\_\_\_\_\_\_\_.
61. Best case
62. Worst case
63. Base case
64. There is no such condition
65. If an optimal solution can be created for a problem by constructing optimal solutions for its subproblems, the problem possesses \_\_\_\_\_\_\_\_\_\_\_\_ property.
66. Overlapping subproblems
67. Optimal substructure
68. Memoization
69. Greedy
70. If a problem can be broken into subproblems that are reused several times, the problem possesses \_\_\_\_\_\_\_\_\_\_\_\_ property.
71. Overlapping subproblems
72. Optimal substructure
73. Memoization
74. Greedy
75. If a problem can be solved by combining optimal solutions to non-overlapping problems, the strategy is called \_\_\_\_\_\_\_\_\_\_\_\_\_.
76. Dynamic programming
77. Greedy
78. Divide and conquer
79. Recursion
80. Among the following which kind of algorithm is used in the Game tree to make decisions of win/Lose?
    1. Depth First Search
    2. Breadth First Search Algorithm
    3. Heuristic Search Algorithm
    4. Min/Max Algorithm
    5. Greedy Search Algorithm
81. Agents’ behavior can be best described by \_\_\_\_\_\_\_\_\_\_\_\_
82. Perception sequence
83. Agent function
84. Sensors and Actuators
85. Environment in which agent is performing
86. Which type of agent deals with happy and unhappy states?
87. Simple reflex agent
88. Model based agent
89. Utility based agent
90. Learning agent
91. What is the purpose of “Agent” in Artificial Intelligence?
92. Mapping of goal sequence to an action
93. Work without the direct interference of the people
94. Mapping of environment sequence to an action
95. Mapping of precept sequence to an action
96. Which of the following is also called as exploratory learning?
97. Supervised learning
98. Active learning
99. Unsupervised learning
100. Reinforcement learning
101. None of the Above
102. Suppose the predicate F(x, y, t) is used to represent the statement that person x can fool person y at time t. which one of the statements below expresses best the meaning of the formula ∀x∃y∃t(¬F(x, y, t))?
103. Everyone can fool some person at some time
104. Everyone cannot fool some person all the time
105. No one can fool some person at some time
106. No one can fool everyone all the time
107. What one is the main challenge/s of NLP?
108. Handling Tokenization
109. Handling Ambiguity of Sentences
110. Handling POS-Tagging
111. Handling Semantics of Sentences
112. All of the mentioned
113. Based on the predefined policy of Network management, controlling access to the network is the task of
114. Fault Management
115. Performance Management
116. Security Management
117. Configuration Management
118. None
119. A Unix utility which used for checking and repairing file system inconsistencies.
120. init
121. halt
122. inittab
123. fsck
124. Which one of the following authentication procedures is bounded to user’s body?
125. One-factor authentication
126. Two-factor authentication
127. Three-factor authentication
128. Forth-factor authentication
129. A PC obtains its IP address from a DHCP server. If the PC is taken off the network for repair, what happens to the IP address configuration?
130. The configuration is permanent and nothing changes.
131. The address lease is automatically renewed until the PC is returned.
132. The address is returned to the pool for reuse when the lease expires
133. The configuration is held by the server to be reissued when the PC is returned.
134. None of the above
135. Which command in Microsoft Windows will allow you to verify your IP address, subnet mask, default gateway, and MAC address?
136. *C:\>ipconfig*  B) *C:\>ipstatus* C) *C:\>ipconfig /all*
137. *C:\>ping* E) *None of the above*
138. A system that monitors traffic into and out of a network and automatically alerts personnel when suspicious traffic patterns occur, indicating a possible unauthorized intrusion attempt is called a (n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
139. IDS B) Firewall C) Router D) Anti-Virus Software E) None of the above
140. You are the administrator of an active directory domain. A user complains to you that he is unable to change his password. No other users have this issue. What is the most likely cause of the problem?
     1. Insufficient login credentials
     2. He is a member of the Administrators group
     3. He is not a member of the domain
     4. The property “User cannot change password” has been enabled when it was created
141. Which one of the following languages over alphabet {0, 1} is described by the regular expression **(0+1)\*0(0+1)\*0(0+1)\***
142. Strings with substring 00
143. Strings with at least two 0’s
144. Strings with at most two 0’s
145. Strings with postfix 1.
146. Transition function in FSA maps which pair?
147. Q and Σ to Σ
148. Q and Q to Σ
149. Σ and Σ to Q
150. Q and Σ to Q
151. A grammar has the following productions:

A → aB | bA | bBa

B → bB | cA | b

Which one of the following strings is in the language generated by the grammar?

1. abbcabbcbbbcbbaca
2. bcbbbcabbcbaa
3. acbcbbbbcaba
4. bbbbcbbbbcab
5. When we can say two grammars are equivalent?
6. When the languages represented by both grammars are the same
7. When the language derived from one of the grammars become the subset of the other
8. When the alphabets of the two grammars are the same
9. When a single string is member of the language represented by both grammars
10. If L1 and L2 are two regular languages, which one of the following is true
11. L1U L2 is a regular language only if empty string is not a member
12. L1\* is the same with L2\* and are both regular languages
13. L1L2 is also a regular language
14. L1R is a regular language and is equivalent to L1
15. Let *G* = {*N*, *T*, *P*, *S*} be a grammar where:

N={S, A}, T={ 0, 1}, S={S} and *P* = {*S*→ 11*S* | 0A | 1A, *A*→ 0 | 1 | 0S}.

Which one of the following is a sentential form?

1. 111011110S
2. 11111101
3. 0000111001AS
4. 00001110A
5. Which one of the following properties of a graph represents the derivation steps performed to generate a valid string?
6. Root of the graph
7. Degree of the vertex
8. Path of a vertex from the root
9. Parent vertex

**Answer Sheet**

Full Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ID:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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