

### Question 1:

When several processes access the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place, it is called:

Options:

- (A) Race condition
- (B) Critical condition
- (C) Virtual condition
- (D) Linear condition

**Answer: (A) Race condition**

**Explanation:** A race condition occurs when multiple processes or threads access shared data and try to change it at the same time. The final outcome depends on the timing and order of access, leading to unpredictable results. This is a common issue in concurrent programming and requires synchronization mechanisms to avoid.

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### Question 2:

Baud means:

Options:

- (A) The number of bits transmitted per unit time
- (B) The number of bytes transmitted per unit time
- (C) The rate at which the signal changes
- (D) None of the above

**Answer: (C) The rate at which the signal changes**

**Explanation:** Baud rate refers to the number of signal changes or symbols transmitted per second. It's a measure of how many times the signal can change state per second, and not directly the data rate in bits per second. For instance, a baud rate of 1,200 means the signal can change up to 1,200 times per second.

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### Question 3:

Which option will be used with the sort command to start sorting after the nth column of the (m + 1)th field?

Options:

- (A) -m n
- (B) +m ln
- (C) +n m +1
- (D) +(m+1) \*n

**Answer: (C) +n m +1**

**Explanation:** In older versions of the Unix sort command, options like +m were used to specify the starting position for sorting. Here, +n refers to starting the sort from the nth column. This notation, however, is largely deprecated in favor of the more straightforward -k options in modern implementations.

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**Question 4:**

Which command is used to set the three permissions for all the three categories of users of a file?

Options:

- (A) chgrp
- (B) chown
- (C) chmod
- (D) chusr

**Answer: (C) chmod**

**Explanation:** The `chmod` command in Unix/Linux is used to change the permissions of a file or directory. It allows setting permissions for the owner, group, and others. The permissions include read, write, and execute.

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**Question 5:**

Which one of the following is a deadlock avoidance algorithm?

Options:

- (A) Elevator algorithm
- (B) Banker's algorithm
- (C) LRU algorithm
- (D) SCAN algorithm

**Answer: (B) Banker's algorithm**

**Explanation:** Banker's algorithm is a deadlock avoidance algorithm used in operating systems to allocate resources safely and avoid deadlock situations. It simulates resource allocation for processes and checks if a safe sequence is possible before actually allocating resources.

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**Question 6:**

Which command is used for printing the current working directory?

Options:

- (A) dir
- (B) HOME
- (C) pwd
- (D) cd

**Answer: (C) pwd**

**Explanation:** The `pwd` (print working directory) command is used in Unix/Linux to display the current working directory path. It tells the user the full path of the current directory they are in.

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### Question 7:

What is the result of the following postfix expression  $ab*cd* +$  where  $a=2, b=2, c=3, d=4$ ?

Options:

- (A) 16
- (B) 12
- (C) 14
- (D) 10

**Answer: (C) 14**

**Explanation:** In postfix expressions, operations are performed in the order they appear without the need for parentheses to dictate precedence. Here's the step-by-step evaluation:

1. Compute  $a * b \rightarrow 2 * 2 = 4$
2. Compute  $c * d \rightarrow 3 * 4 = 12$
3. Add the results:  $4 + 12 = 16$

Hence, the result is 16.

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### Question 8:

Which one of the following does not have a Net ID and Host ID?

Options:

- (A) Class A
- (B) Class B
- (C) Class C
- (D) Class D

**Answer: (D) Class D**

**Explanation:** Class D addresses are used for multicast and do not divide the address into network and host portions like Class A, B, and C addresses. Class D IP addresses are in the range of 224.0.0.0 to 239.255.255.255.

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### Question 9:

Which layer of the OSI model is responsible for routing and forwarding packets?

Options:

- (A) Network Layer (Layer 3)
- (B) Transport Layer (Layer 4)
- (C) Data Link Layer (Layer 2)
- (D) Physical Layer (Layer 1)

**Answer: (A) Network Layer (Layer 3)**

**Explanation:** The Network Layer (Layer 3) of the OSI model is responsible for the logical addressing and routing of packets across different networks. It determines the best path to route the packets to their destination.

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**Question 10:**

**Which command is used to extract specific columns from a file?**

**Options:**

- (A) cat
- (B) cut
- (C) grep
- (D) paste

**Answer: (B) cut**

**Explanation:** The `cut` command in Unix/Linux is used to extract sections from each line of input, often based on delimiters like tabs or commas. It's typically used to select specific columns from a file.

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**Question 11:**

**Which command is used for displaying the beginning of a file in Unix?**

**Options:**

- (A) dir
- (B) begin
- (C) head
- (D) pwd

**Answer: (C) head**

**Explanation:** The `head` command in Unix/Linux is used to display the first few lines of a file. By default, it shows the first 10 lines, but this can be adjusted with options.

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**Question 12:**

**Consider three CPU-intensive processes, which require 10, 20, and 30 time units and arrive at times 0, 2, and 6 respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm? Do not count the context switches at time zero and at the end.**

**Options:**

- (A) 1
- (B) 2
- (C) 3
- (D) 4

**Answer: (B) 2**

**Explanation:** The Shortest Remaining Time First (SRTF) algorithm is a preemptive version of Shortest Job Next (SJN). Given the processes and their arrival times, context switches occur when a shorter job arrives:

1. Process 1 runs for 2 units, then Process 2 arrives (context switch 1).
2. Process 2 runs for 4 units until Process 3 arrives (context switch 2).
3. Process 3 runs for 6 units, Process 2 resumes, and Process 1 finishes.

This leads to a total of 2 context switches.

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### Question 13:

**A Port address in TCP/IP is:**

**Options:**

- (A) 32 bits long
- (B) 48 bits long
- (C) 16 bits long
- (D) 8 bits long

**Answer: (C) 16 bits long**

**Explanation:** In TCP/IP, port addresses are 16-bit numbers ranging from 0 to 65535. They are used to identify specific processes or services within a host, facilitating communication between devices over a network.

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### Question 14:

**What is the worst-case time complexity of inserting an element into an empty linear linked list if it needs to be maintained in sorted order after every insertion?**

**Options:**

- (A)  $O(\log n)$
- (B)  $O(n)$
- (C)  $O(n \log n)$
- (D)  $O(1)$

**Answer: (B)  $O(n)$**

**Explanation:** Inserting into a sorted linked list involves finding the correct position for the new element. In the worst case, you might have to traverse the entire list, which is  $O(n)$  time complexity.

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### Question 15:

**In IPv4, what are the Network ID and Host ID for Class A addresses?**

**Options:**

- (A) 8 bits for Network ID, 24 bits for Host ID
- (B) 24 bits for Network ID, 8 bits for Host ID
- (C) 14 bits for Network ID, 16 bits for Host ID
- (D) 16 bits for Network ID, 14 bits for Host ID

**Answer: (A) 8 bits for Network ID, 24 bits for Host ID**

**Explanation:** Class A addresses allocate the first 8 bits for the Network ID and the remaining 24 bits for the Host ID. This allows for a large number of hosts within a single network.

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### Question 16:

**In the OSI model, encryption and decryption are functions of which layer?**

**Options:**

- (A) Transport Layer
- (B) Session Layer
- (C) Presentation Layer
- (D) Application Layer

**Answer: (C) Presentation Layer**

**Explanation:** The Presentation Layer (Layer 6) of the OSI model is responsible for data translation, encryption, and decryption. It ensures that the data is in a readable format for the Application Layer.

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### Question 17:

**Which of the following is not a communication command?**

**Options:**

- (A) write
- (B) mesg
- (C) mail
- (D) grep

**Answer: (D) grep**

**Explanation:** The `grep` command is used for searching text within files based on patterns. It is not a communication command like `write`, `mesg`, or `mail`, which are used for messaging or mail.

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### Question 18:

**A deadlock avoidance algorithm dynamically examines the \_\_\_\_\_ to ensure that a circular wait condition can never exist.**

**Options:**

- (A) Radius

- (B) Proxy
- (C) Resources
- (D) Resource Allocation State

**Answer: (D) Resource Allocation State**

**Explanation:** Deadlock avoidance algorithms like the Banker's algorithm examine the resource allocation state to ensure that a system can always avoid a circular wait and safely allocate resources without falling into a deadlock.

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### Question 19:

**Which server is used to create a secure tunnel connection?**

**Options:**

- (A) Radius
- (B) VPN
- (C) Proxy
- (D) DNS

**Answer: (B) VPN**

**Explanation:** A VPN (Virtual Private Network) server is used to create a secure, encrypted tunnel connection over a public network. This ensures secure communication and data transmission between the client and the server.

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### Question 20:

**What is the prefix of the following expression  $A-B/(C*DAE)$  ?**

**Options:**

- (A)  $-AB*C^DE$
- (B)  $-ABC*^DE$
- (C)  $-ABCD*^DE$
- (D)  $A-B/(C*DAE)$

**Answer: (A)  $-AB*C^DE$**

**Explanation:** To convert the given infix expression to its prefix form, we follow these steps:

1. Identify the operators and their precedence.
  2. Convert using the highest precedence operators first, maintaining the left-to-right order for operations of the same precedence.
  3. The prefix form is  $-A/(B*(C*DAE))$ .
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### Question 21:

**Hamming code is used for:**

**Options:**

- (A) Error detection
- (B) Error correction
- (C) Error encapsulation
- (D) Both Error detection and correction

**Answer: (D) Both Error detection and correction**

**Explanation:** Hamming code is a type of error-correcting code used in digital communication to detect and correct errors. It can identify and correct single-bit errors and detect two-bit errors in transmitted data.

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**Question 22:**

**What is the worst-case complexity of inserting a node in a doubly linked list?**

**Options:**

- (A)  $O(\log n)$   $O(\log n)$   $O(\log n)$
- (B)  $O(n)$   $O(n)$   $O(n)$
- (C)  $O(n \log n)$   $O(n \log n)$   $O(n \log n)$
- (D)  $O(1)$   $O(1)$   $O(1)$

**Answer: (D)  $O(1)$   $O(1)$   $O(1)$**

**Explanation:** Inserting a node in a doubly linked list can be done in constant time  $O(1)$   $O(1)$   $O(1)$  if the position of the insertion is known. It involves updating the pointers of the adjacent nodes and the new node itself.

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**Question 23:**

**Virtual memory is normally implemented by:**

**Options:**

- (A) Demand Paging
- (B) Buses
- (C) Virtualization
- (D) All of the above-mentioned methods

**Answer: (A) Demand Paging**

**Explanation:** Virtual memory is commonly implemented using demand paging, where pages of data are loaded into memory only when they are needed, rather than loading all the data at once. This allows efficient use of memory and reduces the need for physical memory.

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**Question 24:**

**Which of the following sorting algorithms will be the most efficient if the elements are already in sorted order?**

**Options:**



- (A) Bubble sort
- (B) Selection sort
- (C) Insertion sort
- (D) Merge sort

**Answer: (C) Insertion sort**

**Explanation:** Insertion sort is highly efficient for sorting small datasets and lists that are already mostly sorted. It has a time complexity of  $O(n)O(n)O(n)$  in the best case when the input is already sorted, as it only needs to make one pass through the data.

## 25. Each stage in pipelining

Options: (A) 3 (B) 2 (C) 3 (D) 4

**Answer: (D) 4**

**Explanation:** In a typical pipelining process, there are usually four main stages: Fetch, Decode, Execute, and Write-back. This allows multiple instructions to be processed simultaneously, improving the efficiency of the CPU.

## 26. Relational calculus is a

Options: (A) Procedural language (B) Non-procedural language (C) Data definition language (D) High-level language

**Answer: (B) Non-procedural language**

**Explanation:** Relational calculus is a non-procedural query language, which means it focuses on what to retrieve rather than how to retrieve it. This is different from procedural languages like SQL, which specify the steps to retrieve the data.

## 27. What is the output of the following code snippet?

```
c
Copy code
#include <stdio.h>
int main() {
    int x = 65, *p = &x;
    void *q = p;
    char *r = q;
    printf("%c", *r);
    return 0;
}
```

Options: (A) A (B) Z (C) 65 (D) None of the above

**Answer: (A) A**

**Explanation:** The code converts the integer pointer to a void pointer, then to a char pointer. When dereferenced, the value at `r` is 65, which corresponds to the character 'A' in the ASCII table.

**28. ROM is a**

Options: (A) Combinational Circuit (B) Static Circuit (C) Sequential Circuit (D) Magnetic Circuit

**Answer: (A) Combinational Circuit**

**Explanation:** ROM (Read-Only Memory) is considered a combinational circuit because the output is a direct function of the current input. It does not require a clock signal to change its state.

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**29. A computer with a 32-bit wide data bus uses 4k x 8 static RAM memory chips. The smallest memory this computer can be completed within**

Options: (A) 8 kb (B) 16 kb (C) 24 kb (D) 32 kb

**Answer: (B) 16 kb**

**Explanation:** To calculate the smallest memory, we need to determine how many 4k x 8 chips are required to make up 32 bits (4 bytes). Since each chip provides 8 bits, we need 4 chips to provide 32 bits for each memory location. Therefore, for 4k locations, we need  $4k \times 4 \text{ bytes} = 16 \text{ kb}$ .

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**30. What is the maximum number of level-2 DFD possible if the number of processes in level-1 DFD is n?**

Options: (A) n (B) 2n (C)  $n^2$  (D) 2

**Answer: (C)  $n^2$**

**Explanation:** In a Data Flow Diagram (DFD), each process at level-1 can be decomposed into multiple processes at level-2. If each process at level-1 can be decomposed into n processes, the total number of level-2 processes can be up to  $n^2$ .

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**31. The small extremely fast RAMs are termed as**

Options: (A) Heaps (B) Accumulators (C) Stacks (D) Cache

**Answer: (D) Cache**

**Explanation:** Cache memory is a small, extremely fast type of RAM that stores copies of frequently accessed data to speed up subsequent access to that data.

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**32. K-means clustering method is an example of which type of clustering method?**

Options: (A) Hierarchical (B) Density based (C) Partitioning (D) Naive-Bayes

**Answer: (C) Partitioning**

**Explanation:** K-means is a partitioning method where the data set is divided into K clusters, and each data point is assigned to the cluster with the nearest mean.

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**33. How many parameters does a default constructor require?**

Options: (A) 1 (B) 2 (C) 0 (D) None of the above

**Answer: (C) 0**

**Explanation:** A default constructor does not take any parameters. It is called when an object is created without any arguments.

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**34. An artificially intelligent car decreases its speed based on its distance from the car in front of it. Which method is used?**

Options: (A) Decision Tree (B) Random Forest (C) Linear Regression (D) Reinforcement learning

**Answer: (D) Reinforcement learning**

**Explanation:** Reinforcement learning involves an agent that learns to make decisions by taking actions in an environment to maximize cumulative reward. In this case, the car learns to adjust its speed to maintain a safe distance.

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**35. The keyword friend does not appear in**

Options: (A) The class allowing access to another class (B) The class desiring access to another class (C) The private section of a class (D) The public section of a class

**Answer: (C) The private section of a class**

**Explanation:** The `friend` keyword in C++ is used to allow one class to access the private and protected members of another class. It is declared inside the class definition but not inside any access specifier like `private` or `public`.

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**36. Which C keyword is used to extend the visibility of variables?**

Options: (A) `extend` (B) `extern` (C) `extends` (D) `auto`

**Answer: (B) `extern`**

**Explanation:** The `extern` keyword in C is used to declare a global variable or function in another file.

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**37. Which of the following should not have transitive dependency?**

Options: (A) First normal form (B) Second normal form (C) Third normal form (D) Fourth normal form

**Answer: (C) Third normal form**

**Explanation:** In the third normal form (3NF), a database table should not have transitive dependency. This means that non-primary key attributes should not depend on other non-primary key attributes.

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**38. Regression is a type of:**

Options: (A) Supervised learning (B) Unsupervised learning (C) Reinforcement learning (D) None of the above

**Answer: (A) Supervised learning**

**Explanation:** Regression is a type of supervised learning where the goal is to predict a continuous output variable based on one or more input variables.

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**39. The store and forward mechanism is used in**

Options: (A) Packet switching (B) Message switching (C) Circuit switching (D) Datagram switching

**Answer: (A) Packet switching**

**Explanation:** In packet switching, data is broken into packets before being sent to its destination. Each packet may take a different path, and packets are stored and forwarded at intermediate nodes.

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**40. What is the output of the following C-program?**

```
#include <stdio.h>
int main() {
    const int a = 10;
    printf("%d", ++a);
    return 0;
}
```

Options: (A) 11 (B) 10 (C) Compilation Error (D) 0

**Answer: (C) Compilation Error**

**Explanation:** The code attempts to modify a constant variable `a`, which is not allowed in C. This results in a compilation error.

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**41. How can you display a list of all files including the hidden files?**

Options: (A) `ls -a` (B) `find -a` (C) `ls -all` (D) All of these

**Answer: (A) `ls -a`**

**Explanation:** The `ls -a` command in Unix/Linux systems lists all files, including hidden files (those starting with a dot).

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**42. In DMA transfers, the required signals and addresses are given by the**

Options: (A) Processor (B) Device drivers (C) DMA controllers (D) The program itself

**Answer: (C) DMA controllers**

**Explanation:** In Direct Memory Access (DMA) transfers, the DMA controller handles the transfer of data between memory and peripherals, providing the necessary signals and addresses.

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**43. What is the output of the following C program?**

```
#include <stdio.h>
#define CUBE(x) (x*x*x)
int main() {
    int a, b = 3;
    a = CUBE(b++);
    printf("%d, %d\n", a, b);
    return 0;
}
```

Options: (A) 9, 4 (B) 27, 4 (C) 27, 6 (D) Error

**Answer: (D) Error**

**Explanation:** The macro `CUBE(x)` will be expanded to `(b++*b++*b++)`, leading to undefined behavior due to multiple increments of `b` within the same statement. This is likely to cause an error or unexpected result.

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**44. The RSA is an asymmetric key cryptographic algorithm.**

Options: (A) RSA (B) Huffman code (C) Mono-alphabetic substitution (D) Steganography

**Answer: (A) RSA**

**Explanation:** RSA (Rivest-Shamir-Adleman) is a widely used asymmetric key cryptographic algorithm, which means it uses a pair of keys (public and private) for encryption and decryption.

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**45. What is the purpose of the confusion matrix in machine learning?**

Options: (A) To visualize the distribution of the data in a dataset (B) To evaluate the performance of a classification model (C) To measure the correlation between different features (D) To reduce the dimensionality of the data

**Answer: (B) To evaluate the performance of a classification model**

**Explanation:** A confusion matrix is used to evaluate the performance of a classification model by comparing the predicted labels against the true labels, providing metrics like accuracy, precision, recall, and F1 score.

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**46. In software engineering the tester does not know the internal design of the software application in case of:**

- (A) White Box
- (B) Black Box
- (C) Beta
- (D) Acceptance

**Answer: (B) Black Box**

**Explanation:** In black-box testing, the tester does not need to know the internal structure or design of the item being tested. The focus is on the inputs and outputs of the software system.

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#### 47. What is the output of the following C code?

```
int main() {  
    int x = 2, y = 1;  
    x *= x + y;  
    printf("%d", x);  
    return 0;  
}
```

- (A) Compilation error
- (B) Varies on Compiler
- (C) 5
- (D) 6

**Answer: (D) 6**

**Explanation:** The expression  $x *= x + y$  is equivalent to  $x = x * (x + y)$ . So,  $x$  becomes  $2 * (2 + 1)$  which is 6.

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#### 48. Which among the following can't be used for polymorphism?

- (A) Static member functions
- (B) Member function overloading
- (C) Predefined operator overloading
- (D) Constructor overloading

**Answer: (A) Static member functions**

**Explanation:** Polymorphism in object-oriented programming refers to the ability to present the same interface for different underlying forms (data types). Static member functions are not related to an instance of a class, hence they cannot be used for polymorphism.

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#### 49. If there are 32 segments each of size 1K bytes, then the logical address:

- (A) 12 bits
- (B) 13 bits
- (C) 14 bits
- (D) 15 bits

**Answer: (C) 14 bits**

**Explanation:** 32 segments require 5 bits to address (since  $2^5 = 32$ ). Each segment is 1K bytes, which requires 10 bits (since  $2^{10} = 1024$ ). Therefore, the total number of bits required for the logical address is  $5 + 10 = 15$  bits.

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### 50. What will be the output of the C code?

```
c
Copy code
#include <stdio.h>
int main() {
    int x;
    x = 5 > 8 ? 10 : 1 - 2 < 5 ? 20 : 30;
    printf("%d", x);
    return 0;
}
```

- (A) 5
- (B) 10
- (C) 20
- (D) 30

**Answer: (C) 20**

**Explanation:** The ternary operator evaluates the expression  $5 > 8$ , which is false, so it evaluates the next part  $1 - 2 < 5$  which is true, hence  $x$  is assigned 20.

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### 51. What is the output of the following code snippet?

```
c
Copy code
#include <stdio.h>
int main() {
    int x;
    printf("%d", x);
    return 0;
}
```

- (A) 5
- (B) 10
- (C) 666
- (D) No output

**Answer: (D) No output**

**Explanation:** The variable  $x$  is not initialized, so it contains an indeterminate value. Printing an uninitialized variable can result in unpredictable output, or no output at all depending on the compiler.

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### 52. Consider the following code snippet:

```
c
Copy code
#include <stdio.h>
int main() {
    int a = 1;
    if(a--)
        printf("True");
}
```

```
if(a++)
    printf("False");
return 0;
}
```

- (A) True
- (B) False
- (C) True False
- (D) No output

**Answer: (C) True False**

**Explanation:** The first `if(a--)` decrements `a` to 0 after checking it, so it prints "True". The second `if(a++)` increments `a` to 1 after checking it, so it prints "False".

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**53. The permission `-rwx r--- ---` represented in octal expression will be:**

- (A) 777
- (B) 744
- (C) 711
- (D) 644

**Answer: (B) 744**

**Explanation:** The permissions are read (4), write (2), execute (1) for user (`rwx`), read (4) for group (`r---`), and no permissions for others (`---`). So the octal representation is 744.

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**54. What is the difference between supervised and unsupervised learning?**

- (A) Supervised learning requires labeled data while unsupervised learning does not.
- (B) Unsupervised learning requires labeled data while supervised learning does not.
- (C) Supervised learning does not require data while unsupervised learning does.
- (D) There is no difference between supervised and unsupervised learning.

**Answer: (A) Supervised learning requires labeled data while unsupervised learning does not.**

**Explanation:** In supervised learning, the algorithm is trained on labeled data, which means the input comes with corresponding output labels. Unsupervised learning uses data that does not have labeled responses.

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**55. Which command changes a file's group owner?**

- (A) `cgrp`
- (B) `group`
- (C) `change`
- (D) `chgrp`

**Answer: (D) `chgrp`**

**Explanation:** The `chgrp` command is used in Unix and Unix-like operating systems to change the group ownership of a file or directory.



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**56. Which of the following is an example of a classification problem?**

- (A) Predicting the price of a house based on its features
- (B) Predicting the weight of a person based on their height
- (C) Predicting whether a customer will churn or not
- (D) Predicting the age of a person based on their income

**Answer: (C) Predicting whether a customer will churn or not**

**Explanation:** Classification problems involve predicting a discrete label. "Predicting whether a customer will churn or not" is a binary classification problem.

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**57. What is the output of the C-program?**

```
#include <stdio.h>
int main() {
    int i = 0;
    int x = i + t;
    int y = +t;
    printf("%d %d", x, y);
    return 0;
}
```

- (A) 0, 2
- (B) 1, 2
- (C) 1, 1
- (D) compile error

**Answer: (D) compile error**

**Explanation:** The variable `t` is not declared in the program, which will result in a compile error.

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**58. What is the output of the C-program?**

```
#include <stdio.h>
int main() {
    int i = 0;
    while (i = 0)
        printf("\nTrue");
    printf("\nFalse");
    return 0;
}
```

- (A) True (infinite time)
- (B) False (1 time)
- (C) True False
- (D) compile error

**Answer: (B) False (1 time)**

**Explanation:** The condition `i = 0` is an assignment, not a comparison. It assigns 0 to `i` and the while loop condition becomes false, so the loop does not execute, and "False" is printed once.

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**59. Identify the incorrect constructor type:**

- (A) Friend Constructor
- (B) Copy Constructor
- (C) Default Constructor
- (D) Parameterized Constructor

**Answer: (A) Friend Constructor**

**Explanation:** In C++, there is no such thing as a "Friend Constructor." Friend functions are used for accessing private and protected members of a class, but they are not constructors.

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**60. Which of the following features is shown by function overriding?**

- (A) Abstraction
- (B) Polymorphism
- (C) Encapsulation
- (D) Inheritance

**Answer: (B) Polymorphism**

**Explanation:** Function overriding is a feature that allows a subclass to provide a specific implementation of a method that is already defined in its superclass. This is an example of runtime polymorphism.

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**61. If a file has read and write permission for the owner, then the octal representation of the permissions will be:**

- (A) 3
- (B) 5
- (C) 6
- (D) 7

**Correct Answer: (C) 6**

**Explanation:** In UNIX-like operating systems, file permissions are represented using a three-digit octal number. Each digit represents the permissions for the owner, group, and others, respectively. Each digit is a sum of the following values: 4 for read, 2 for write, and 1 for execute. If a file has read (4) and write (2) permissions for the owner, the octal value would be  $4 + 2 = 6$ .

---

**62. In an ER diagram, an entity set is represented by a:**

- (A) Rectangle
- (B) Ellipse
- (C) Diamond box
- (D) Circle

**Correct Answer: (A) Rectangle**

**Explanation:** In Entity-Relationship (ER) diagrams, different symbols are used to represent entities, attributes, and relationships. An entity set, which is a collection of similar entities, is depicted using a rectangle. Attributes are shown as ellipses, and relationships are represented by diamonds.

---

**63. Specification is also known as the SRS document.**

- (A) White-box
- (B) Grey-box
- (C) Black-box
- (D) None of the above mentioned

- **Answer: (C) Black-box**
  - **Explanation:** The SRS (Software Requirements Specification) document describes the system's functionalities and constraints, which aligns with the concept of black-box testing where the internal workings are not known.
- 

**64. What is the output of the following code snippet?**

```
int i, k = 5;
if(i = k){
    printf("YES\n");
} else {
    printf("NO\n");
}
```

- (A) YES
- (B) NO
- (C) Compilation error
- (D) Runtime error

**Answer: (A) YES**

**Explanation:** The statement `if(i = k)` is an assignment, not a comparison. It assigns the value of `k` to `i`, which is 5, making the condition true. Hence, "YES" is printed.

---

**65. Which of the following is/are not shared by threads?**

- (A) Stack
- (B) Program counter
- (C) Both program counter and stack
- (D) None of the above mentioned

**Answer: (C) Both program counter and stack**

**Explanation:** Threads within the same process share the code, data, and files but have their own program counter and stack.

---

**66. A process is thrashing if**

- (A) it spends more time in execution, rather than paging
- (B) it spends more time in paging, rather than in execution
- (C) it has no memory allocated to it
- (D) it indefinitely waits for a resource

**Answer: (B) it spends more time in paging, rather than in execution**

**Explanation:** Thrashing occurs when a process spends most of its time swapping pages in and out of memory rather than executing.

---

**67. Which is not among the eight principles followed by the Software Code of Ethics and Professional Practice?**

- (A) PRODUCT
- (B) ENVIRONMENT
- (C) PUBLIC
- (D) PROFESSION

**Answer: (B) ENVIRONMENT**

**Explanation:** The eight principles are Public, Client and Employer, Product, Judgment, Management, Profession, Colleagues, and Self.

---

**68. Given an unsorted array. The array has this property that every element in the array is at most  $k$  distance from its position in a sorted array where  $k$  is a positive integer smaller than the size of an array. Which sorting algorithm can be easily modified for sorting this array and what is the obtainable time complexity?**

- (A) Insertion Sort with time complexity  $O(kn)$
- (B) Heap Sort with time complexity  $O(n \log k)$
- (C) Quick Sort with time complexity  $O(k \log k)$
- (D) Merge Sort with time complexity  $O(k \log k)$

**Answer: (B) Heap Sort with time complexity  $O(n \log k)$**

**Explanation:** Heap Sort can be adapted to sort elements that are at most  $k$  positions away from their correct position in  $O(n \log k)$  time.

---

**69. Which one of the following is a synchronization tool?**

- (A) Thread
- (B) Pipe
- (C) Semaphore
- (D) Socket

**Answer: (C) Semaphore**

**Explanation:** Semaphores are used to synchronize access to shared resources in concurrent programming.

---

**70. When a process is in a 'Blocked' state waiting for some I/O service. When the service is completed, it goes to the**

- (A) Terminated state
- (B) Suspended state
- (C) Running state
- (D) Ready state

**Answer: (D) Ready state**

**Explanation:** After I/O completion, a blocked process moves to the ready state, awaiting CPU allocation.

---

**71. Which of the following statements about primary key in a database table is true?**

- (A) A table can have multiple primary keys.
- (B) A primary key uniquely identifies each record in a table.
- (C) Primary keys can contain NULL values.
- (D) Primary keys are used to establish relationships between tables.

**Answer: (B) A primary key uniquely identifies each record in a table.**

**Explanation:** A primary key is a unique identifier for table records and cannot contain NULL values.

---

**72. Which of the following data structures is required to convert an arithmetic expression in infix form to its equivalent postfix form?**

- (A) Queue
- (B) Linked List
- (C) Binary Search Tree
- (D) Stack

**Answer: (D) Stack**

**Explanation:** A stack is used to hold operators and manage the order of operations for infix to postfix conversion.

---

**73. Making class members inaccessible to non-member functions is an example of:**

- (A) Polymorphism
- (B) Data hiding
- (C) Redundancy
- (D) Recursion

**Answer: (B) Data hiding**

**Explanation:** Data hiding is an object-oriented programming concept where class members are kept private to prevent unauthorized access.

---

**74. In a relational database, what does the term "ACID" stand for?**

- (A) Atomicity, Consistency, Integrity, Durability
- (B) Association, Constraint, Index, Database
- (C) Authorization, Compatibility, Isolation, Dependency
- (D) Aggregate, Collection, Inheritance, Design

**Answer: (A) Atomicity, Consistency, Integrity, Durability**

**Explanation:** ACID properties ensure reliable transactions in a database.

---

**75. Which of the given statement is the correct recurrence for the worst case of Binary Search?**

- (A)  $T(n) = 2T(n/2) + O(1)$  &  $T(1) = O(1) = T(0)$ .
- (B)  $T(n) = T(n-1) + O(1)$  &  $T(1) = O(1) = T(0)$ .
- (C)  $T(n) = T(n/2) + O(1)$  &  $T(1) = T(0) = O(1)$ .
- (D)  $T(n) = T(n-2) + O(1)$  &  $T(1) = T(0) = O(1)$ .

**Answer: (C)  $T(n) = T(n/2) + O(1)$  &  $T(1) = T(0) = O(1)$ .**

**Explanation:** Binary search divides the problem size by 2 in each step, leading to a recurrence relation of  $T(n) = T(n/2) + O(1)$ .

---

**76. Which of the following is popular for applications such as storage of log files in a database management system since it offers the best write performance?**

- (A) RAID level 0
- (B) RAID level 1
- (C) RAID level 2
- (D) RAID level 3

**Answer: (A) RAID level 0**

**Explanation:** RAID level 0 offers the best write performance because it stripes data across multiple disks without redundancy.

---

**77. Which of the following statements is correct?**

- (A) Pre-order traversal of Binary search tree gives sorted list.
- (B) In-order traversal of Binary search tree gives sorted list.
- (C) Post-order traversal of Binary search tree gives sorted list.
- (D) None of the above.

**Answer: (B) In-order traversal of Binary search tree gives sorted list.**

**Explanation:** In-order traversal of a binary search tree visits nodes in non-decreasing order.

---

**78. Which is the correct statement about operator overloading?**

- (A) Only arithmetic operators can be overloaded.

- (B) Only non-arithmetic operators can be overloaded.
- (C) Precedence of operators are changed after overloading.
- (D) Associativity and precedence of operators does not change.

**Answer: (D) Associativity and precedence of operators does not change.**

**Explanation:** Overloading an operator does not alter its precedence or associativity.

---

**79. A clustering index is defined on the fields which are of types**

- (A) Non-key and ordering
- (B) Key and non-ordering
- (C) Key and ordering
- (D) Non-key and non-ordering

**Answer: (A) Non-key and ordering**

**Explanation:** A clustering index is created on a non-key column that determines the physical order of the data.

---

**80. Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an empty binary search tree. The level-order traversal sequence of the tree is**

- (A) 7, 5, 1, 0, 8, 3, 6, 9, 4, 2
- (B) 7, 5, 1, 8, 0, 3, 6, 9, 2, 4
- (C) 7, 5, 1, 8, 0, 3, 6, 9, 4, 2
- (D) 7, 5, 1, 8, 0, 3, 2, 6, 9, 4

**Answer: (B) 7, 5, 1, 8, 0, 3, 6, 9, 2, 4**

**Explanation:** Inserting the numbers in the given order and performing a level-order traversal results in this sequence.