1. C Programming: Array Passing

Question:
In C, when an array is passed as a function argument, what is actually passed?

Options: A) The entire array
B) The base address of the array
C) The first element of the array
D) The size of the array

Answer:
B) The base address of the array

Explanation:
In C, when you pass an array to a function, you're actually passing the address of its first element. This means any modifications made to the array elements within the function affect the original array.

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2. Data Structures: Stack Operations

Question:
What is the time complexity of the pop() operation in a stack implemented using an array?

Options: A) O(1)
B) O(n)
C) O(log n)
D) O(n log n)

Answer:
A) O(1)

Explanation:
In an array-based stack, the pop() operation involves removing the top element, which is a constant-time operation, hence O(1) complexity.

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3. Java: finalize() Method

Question:
What is the purpose of the finalize() method in Java?

Options: A) To initialize objects
B) To clean up resources before garbage collection
C) To finalize variable values
D) To execute after the main method

Answer:
B) To clean up resources before garbage collection

Explanation:
The finalize() method is called by the garbage collector on an object when garbage collection determines that there are no more references to the object. It's used to perform cleanup operations before the object is removed from memory.

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4. SQL: Aggregate Functions

Question:
Which of the following is an aggregate function in SQL?

Options: A) SELECT
B) COUNT
C) WHERE
D) JOIN

Answer:
B) COUNT

Explanation:
Aggregate functions perform a calculation on a set of values and return a single value. COUNT returns the number of rows that match a specified criterion.

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5. Networking: DNS Role

Question:
What is the role of the Domain Name System (DNS) in networking?

Options: A) Assign IP addresses to devices
B) Translate domain names to IP addresses
C) Secure data transmission
D) Manage network traffic

Answer:
B) Translate domain names to IP addresses

Explanation:
DNS translates human-readable domain names into IP addresses that computers use to identify each other on the network.

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6. Operating System: Deadlock

Question:
Which of the following is **NOT** a necessary condition for deadlock to occur?

Options:
A) Mutual Exclusion
B) Hold and Wait
C) Preemption
D) Circular Wait

Answer:
C) Preemption

Explanation:
For deadlock to occur, **Mutual Exclusion**, **Hold and Wait**, **No Preemption**, and **Circular Wait** must all be true. "Preemption" actually *prevents* deadlock by forcibly taking resources.

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7. C Programming: Pointers

Question:
What will be the output of the following C program?

```
#include<stdio.h>

int main() {

   int x = 10;

   int *ptr = &x;

   printf("%d", *ptr);

   return 0;

}
```

Options:
A) Address of x
B) Garbage Value
C) 10
D) Compilation Error

Answer:
C) 10

Explanation:
*ptr dereferences the pointer ptr and prints the value stored at the address, which is **10**.

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8. DBMS: Primary Key

Question:
Which statement about a **Primary Key** is correct?

Options:
A) Primary Key can have NULL values.
B) Primary Key must be unique and not NULL.
C) Primary Key is used only for foreign keys.
D) Primary Key values can be duplicated.

Answer:

B) Primary Key must be unique and not NULL

Explanation:
A **Primary Key** uniquely identifies each record and **cannot** be NULL or duplicate.

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9. Data Structures: Trees

Question:
What is the maximum number of nodes at level 'l' in a binary tree?

Options:
A) 2^(l-1)
B) 2^l
C) l^2
D) l * 2

Answer:
A) 2^(l-1)

Explanation:
In a binary tree, the number of nodes at level l is at most 2^(l-1), where level numbering starts from 1.

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10. Computer Networks: Protocol Layers

Question:
In the OSI model, which layer is responsible for **end-to-end communication**?

Options:
A) Session Layer
B) Transport Layer
C) Network Layer
D) Data Link Layer

Answer:
B) Transport Layer

Explanation:
The **Transport Layer** ensures complete and reliable data transfer between source and destination (e.g., TCP operates at this layer).
