1. C Programming – Function Return Type

Question:
What will be the data type returned for the following C function?

```c
int func() {
    return 0;
}
```

Options:
A) char
B) int
C) double
D) multiple type-casting in return is illegal

Answer:
B) int

Explanation:
The function is explicitly defined to return an int type.

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2. C Programming – Infinite Loop

Question:
The C code for(;;) represents an infinite loop. It can be terminated by _____

Options:
A) break
B) exit(0)
C) abort()
D) terminate

Answer:
A) break

Explanation:
The break statement can be used to exit an infinite loop.

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3. C++ Programming – Function Overloading

Question:
What will be the output of the following C++ code?

```cpp
#include <iostream>
using namespace std;

void print(int i) {
    cout << "Integer: " << i << endl;
}

void print(double f) {
    cout << "Float: " << f << endl;
}

int main() {
    print(10);
    print(10.5);
    return 0;
}
```

Options:
A) Integer: 10
B) Float: 10.5
C) Integer: 10
Float: 10.5
D) Compile time error

Answer:
C) Integer: 10
Float: 10.5

Explanation:
Function overloading allows multiple functions with the same name but different parameters.

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4. Java Programming – String Manipulation

Question:
In the following Java code, which code fragment should be inserted at line 3 so that the output will be: “123abc 123abc”?

```java
public class Main {
    public static void main(String[] args) {
        StringBuffer sb1 = new StringBuffer("123");
        String s1 = "123";
        // Line 3
        System.out.println(sb1 + " " + s1);
    }
}
```

Options:
A) sb1.append("abc"); s1.append("abc");
B) sb1.append("abc"); s1.concat("abc");
C) sb1.concat("abc"); s1.append("abc");
D) sb1.append("abc"); s1 = s1.concat("abc");

Answer:
D) sb1.append("abc"); s1 = s1.concat("abc");

Explanation:
StringBuffer uses append, and String is immutable; thus, concat returns a new string which needs to be assigned.

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5. Data Structures – Time Complexity

Question:
What is the time complexity of traversing a string of length n?

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

Answer:
B) O(n)

Explanation:
Each character in the string needs to be accessed once, leading to linear time complexity.

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6. Data Structures – Suffix Tree Insertion

Question:
What is the time complexity for inserting an alphabet in the tree using hash maps?

Options:
A) O(log n!)
B) O(n!)
C) $O(n^2)$
D) O(1)

Answer:
D) O(1)

Explanation:
Using hash maps allows constant-time insertion in a suffix tree.

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7. C++ Programming – Exception Handling

Question:
What will be the output of the following C++ code?

```cpp
#include <iostream>
#include <exception>

void my_terminate() {
    std::cout << "terminate handler called\n";
    abort();
}

int main() {
    std::set_terminate(my_terminate);
    throw 1;
    return 0;
}
```

Options:
A) terminate handler called
B) aborted
C) both terminate handler & Aborted
D) runtime error

Answer:
C) both terminate handler & Aborted

Explanation:
The custom terminate handler is called, which then calls abort().)

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8. C Programming – String Length

Question:
What will be returned by the following C code?

```c
#include <stdio.h>
#include <string.h>

int main() {
    char s[] = "Hello";
    printf("%lu", strlen(s));
    return 0;
}
```

Options:
A) 4
B) 5
C) 6
D) 0

Answer:
B) 5

Explanation:
strlen returns the number of characters before the null terminator.

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9. C Programming – Infinite Loop

Question:
The C code for(;;) represents an infinite loop. It can be terminated by _____

Options:
A) break
B) exit(0)
C) abort()
D) terminate

Answer:
A) break

Explanation:
The break statement can be used to exit an infinite loop.

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10. C++ Programming – Template Functions

Question:
What does the following template function indicate?

```cpp
template <typename T>
void func(T a) {
    // function body
}
```

Options:
A) A function taking a single generic parameter and returning a generic type
B) A function taking a single generic parameter and returning nothing
C) A function taking a single int parameter and returning a generic type
D) A function taking a single generic parameter and returning a specific non-void type

Answer:
B) A function taking a single generic parameter and returning nothing)

Explanation:
The function is defined to take a generic parameter and has a void return type.
