Theory Question

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## 1. What are conditional statements in C++? Explain the if-else and switch statements.

**Conditional Statements in C++**

Conditional statements control the **flow of execution** based on a condition.

**A. if-else Statement**

Used to execute code blocks based on whether a condition is true or false.

int x = 10;

if (x > 0) {

cout << "Positive number";

} else {

cout << "Non-positive number";

}

**B. switch Statement**

Used to select one of many code blocks to execute based on the value of a variable.

int day = 3;

switch (day)

{

case 1: cout << "Monday"; break;

case 2: cout << "Tuesday"; break;

case 3: cout << "Wednesday"; break;

default: cout << "Invalid day";

}

## 2. What is the difference between for, while, and do-while loops in C++?

**Difference Between for, while, and do-while Loops**

| **Loop Type** | **Entry/Exit Control** | **When Used** | **Syntax Example** |
| --- | --- | --- | --- |
| **for** | Entry-controlled | When number of iterations is known | for (int i = 0; i < 5; i++) |
| **while** | Entry-controlled | When condition is checked before loop | while (i < 5) |
| **do-while** | Exit-controlled | When code must run at least once | do { ... } while (i < 5); |

**Example:**

// for loop

for (int i = 1; i <= 3; i++)

{

cout << i << " ";

}

// while loop

int i = 1;

while (i <= 3)

{

cout << i << " ";

i++;

}

// do-while loop

int j = 1;

do {

cout << j << " ";

j++;

} while (j <= 3);

## 3. How are break and continue statements used in loops? Provide examples.

**break and continue Statements in Loops**

**break**

* Immediately **exits** the loop.

**continue**

* Skips the **current iteration**, continues with the next one.

**Example:**

for (int i = 1; i <= 5; i++)

{

if (i == 3) continue; // skip 3

if (i == 5) break; // stop at 5

cout << i << " ";

}

// Output: 1 2 4

## 4. Explain nested control structures with an example.

**Nested Control Structures (with Example)**

Using one control structure inside another is called **nesting**.

**Example: Nested if and for loop**

for (int i = 1; i <= 3; i++)

{

if (i % 2 == 0)

{

cout << i << " is even" << endl;

}

Else

{

cout << i << " is odd" << endl;

}

}

**Example: Nested for loops (printing a pattern)**

for (int i = 1; i <= 3; i++)

{

for (int j = 1; j <= i; j++)

{

cout << "\* ";

}

cout << endl;

}

// Output:

\*

\* \*

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