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Standard Output

In C++, the standard output command is used to print data to the screen. The syntax uses `cout`, which is part of the **iostream** library.

☑ Basic Syntax

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

int main() {
    cout << "Your message here";
    return 0;
}
```

🔍 Explanation

- `#include <iostream>` → includes the input/output stream library.
- `cout` → standard output object.
- `<<` → *insertion operator* (sends data to output).

📌 Examples

1. Printing text

```
cout << "Hello World!";
```

2. Printing variables

```
int a = 10;
cout << "Value of a is: " << a;
```

3. Printing multiple lines

```
cout << "Line 1" << endl;
cout << "Line 2";
```

✔ Alternative (without `using namespace std`)

```
std::cout << "Hello World!";
```

Example

Question: Write a C++ program that takes two floating-point numbers as input from the user, adds them, and displays the sum on the screen.

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

int main() {
    float num1, num2, sum;

    cout << "Enter first number: ";
    cin >> num1;

    cout << "Enter second number: ";
    cin >> num2;

    sum = num1 + num2;

    cout << "The sum is: " << sum << endl;

    return 0;
}
```

✔ What this program does:

- Takes two floating-point numbers as input.
- Adds them.
- Displays the result using `cout`.

Example

Question: Write a C++ program that takes the height and width of a rectangle as input from the user, calculates its area using the formula area = height × width, and displays the result on the screen.

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

int main() {
    float height, width, area;

    cout << "Enter height of the rectangle: ";
    cin >> height;
```

```
    cout << "Enter width of the rectangle: ";
    cin >> width;

    area = height * width;

    cout << "The area of the rectangle is: " << area << endl;

    return 0;
}
```

Escape Sequences

☑ 1. Newline (\n)

Question Statement

Write a C++ program that prints two lines of text using the newline escape sequence `\n`.

Example

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

int main() {
    cout << "Hello World!\n";
    cout << "Welcome to C++.";
    return 0;
}
```

☑ 2. Tab (\t)

Question Statement

Write a C++ program that prints a list of items, each separated by a tab (`\t`).

Example

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

int main() {
    cout << "Item\tPrice\n";
    cout << "Apple\t100\n";
    cout << "Mango\t150\n";
```

```
    return 0;
}
```

☑ 3. Backslash (\\)

Question Statement

Write a C++ program that displays a file path containing backslashes using the escape sequence \\.

Example

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

int main() {
    cout << "File path: C:\\Users\\Student\\Documents";
    return 0;
}
```

☑ 4. Double Quote (\")

Question Statement

Write a C++ program that prints a sentence containing double quotation marks using the escape sequence \".

Example

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

int main() {
    cout << "He said, \"C++ is fun!\"";
    return 0;
}
```

☑ 5. Single Quote (\')

Question Statement

Write a C++ program that prints a character enclosed in single quotes using the escape sequence `\'`.

Example

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

int main() {
    cout << "The character is: \'A\'";
    return 0;
}
```

☑ 6. Carriage Return (`\r`)

(Overwrites from the beginning of the line; behavior depends on console.)

Question Statement

Write a C++ program that prints a word and then overwrites it using the carriage return `\r`.

Example

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

int main() {
    cout << "Hello\rHi";
    return 0;
}
```

C++ Manipulators

☑ 1. Manipulator: `endl`

Question Statement

Write a C++ program that prints two lines of text using the manipulator `endl` to move the cursor to the next line.

Example

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

```cpp
int main() {
    cout << "Hello, C++ beginners!" << endl;
    cout << "This line is printed using endl.";
    return 0;
}
```

☑ 2. Manipulator: `setw`

(Note: `setw` requires `<iomanip>` library)

Question Statement

Write a C++ program that prints a simple table of numbers using the manipulator `setw` to align the output in columns.

Example

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

int main() {
    cout << setw(10) << "Number" << setw(10) << "Square" << endl;
    cout << setw(10) << 2 << setw(10) << 4 << endl;
    cout << setw(10) << 5 << setw(10) << 25 << endl;
    cout << setw(10) << 10 << setw(10) << 100 << endl;

    return 0;
}
```

Standard Input

★ 1. Basic Syntax of `cin`

Syntax

```cpp
cin >> variable;
```

- `cin` → standard input stream
- `>>` → extraction operator (takes input from keyboard)
- `variable` → where the input is stored

You can take multiple inputs in one line:

```
cin >> a >> b >> c;
```

☑ Example 1: Input a Single Integer

Question Statement

Write a C++ program that asks the user to enter an integer and displays the entered value.

Example

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

int main() {
    int num;

    cout << "Enter an integer: ";
    cin >> num;

    cout << "You entered: " << num;
    return 0;
}
```

☑ Example 2: Input Two Numbers and Add Them

Question Statement

Write a C++ program that takes two integers as input from the user using `cin` and prints their sum.

Example

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

int main() {
    int a, b;

    cout << "Enter two numbers: ";
    cin >> a >> b;

    cout << "Sum = " << a + b;
    return 0;
}
```

☑ Example 3: Input a Floating-Point Number

Question Statement

Write a C++ program that reads a floating-point number from the user and shows it on the screen.

Example

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

int main() {
    float value;

    cout << "Enter a float value: ";
    cin >> value;

    cout << "You entered: " << value;
    return 0;
}
```

☑ Example 4: Input a Character

Question Statement

Write a C++ program that asks the user to input a single character and prints it.

Example

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

int main() {
    char ch;

    cout << "Enter a character: ";
    cin >> ch;

    cout << "You entered: " << ch;
    return 0;
}
```

☑ Example 5: Input a Word (Single String)

Question Statement

Write a C++ program that reads a single word using `cin` and displays a message with that word.

Example

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

int main() {
    string name;

    cout << "Enter your name: ";
    cin >> name;

    cout << "Welcome, " << name << "!";
    return 0;
}
```
