Templates

23 September 2024 22:03

They are used for generic programming to create generic function or classes.

Function Templates

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

// Function template
template <typename T>
T add(T a, T b) {
    return a + b;
}

int main() {
    cout << "Integers: " << add(3, 4) << endl;    // Uses int
    cout << "Doubles: " << add(3.5, 4.5) << endl; // Uses double
    return 0;
}
```

Class Templates

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

// Class template
template <typename T>
class Calculator {
public:
    T add(T a, T b) {
        return a + b;
    }

    T subtract(T a, T b) {
        return a - b;
    }
};

int main() {
    Calculator<int> intCalc;
    Calculator<double> doubleCalc;

    cout << "Integer Addition: " << intCalc.add(10, 5) << endl;
    cout << "Double Addition: " << doubleCalc.add(10.5, 5.5) << endl;

    cout << "Integer Subtraction: " << intCalc.subtract(10, 5) << endl;
    cout << "Double Subtraction: " << doubleCalc.subtract(10.5, 5.5) << endl;

    return 0;
}
```