Programming Fundamentals with C++

Lecture 16 – Functions

Dr. Muhammad Sajjad

RA: Asad Ullah

Overview

- **Returning Data From Functions**
- **Return Statement**
- **Declaration of Function that Return a value**
- **Function Definition that Return a value**
- **Calling a Function that Return a value**

Return Statement

- The return statement is used to send a value back to the function caller.
- When a function executes return, it immediately exits and passes back the specified value.
- The return type of the function must match the type of value being returned.

- **Example:**

```
int square (int num) {
    return num * num;  // Returns the square of num
}
```

Declaration of Function that Return a value

- A function declaration (prototype) tells the compiler that a function will return a value.
- It specifies the return type, function name, and parameter types.

- **Syntax:**

```
returnType functionName (parameterType1 param1, parameterType2 param2, ...);
```

- **Example:**

```
int add(int a, int b);   // Function declaration that returns integer value
double getArea(double radius); // Returns double value
```

Function Definition that Return a value

- A function definition implements the logic for computing the return value.
- The return type must match the function declaration.
- The function must include a return statement.
- **Example:**

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

// Function definition: returns the sum of two numbers
int add(int a, int b) {
    return a + b;  // Returns the sum
}

// Function definition: returns the area of a circle
double getArea(double radius) {
    return 3.14159 * radius * radius;  // Returns computed area
}
```

Calling a Function that Return a value

- A function call executes the function and uses the returned value.
- The returned value can be stored in a variable or used directly.
- **Example:**

```
int main() {
    int result = add(10, 20);  // Store return value in a variable
    cout << "Sum: " << result << endl;

    cout << "Area of circle with radius 5: " << getArea(5) << endl;  // Use
return value directly

    return 0;
}
```

Output:

```
Sum: 30
Area of circle with radius 5: 78.5397
```

Summary

- The return statement sends a value back to the caller.
- A function declaration specifies the return type.
- A function definition implements logic and must match its declaration.
- Function calls use the returned value in calculations, assignments, or directly in cout.

Practice Questions for Students

- Write a function that returns the factorial of a number.
- Write a function that returns the largest number among three numbers.
- Write a function that returns the square of a number.

Thank You