

Lecture – 13 –

Logical Operators

- Use **logical operators** to combine conditional statements and return **true** or **false**.

| Operator | Name of Operator | Form |
|----------|------------------|--------|
| && | AND Operator | y && y |
| | OR Operator | x y |
| ! | NOT Operator | ! x |

- The **AND** operator works the following way:

| Left Operand | Right Operand | Result |
|--------------|---------------|--------------|
| false | false | false |
| false | true | false |
| true | false | false |
| true | true | true |

- In the AND operator, both operands must be **true** for the entire expression to be **true**.
- **Example:**

```
int age = 20;
if (age > 16 && age < 60) {
cout << "Accepted!" << endl;
}
```

// Outputs "Accepted"

- In the example above, the logical AND operator was used to combine both expressions.
- The expression in the if statement evaluates to **true** only if both expressions are **true**.
Within a single if statement, logical operators can be used to combine **multiple** conditions.

```
int age = 20;
int grade = 80;
if (age > 16 && age < 60 && grade > 50) {
cout << "Accepted!" << endl;
}
```

- The entire expression evaluates to **true** only if all of the conditions are **true**.

The **OR** Operator

- The **OR** (`||`) operator returns true if any one of its operands is **true**.

| Left Operand | Right Operand | Result |
|--------------|---------------|--------|
| false | false | false |
| false | true | true |
| true | false | true |
| true | true | true |

- Example:

```
int age = 16;
int score = 90;
if (age > 20 || score > 50) {
    cout << "Accepted!" << endl;
}
```

// Outputs "Accepted!"

- You can combine any number of logical **OR** statements you want.
- In addition, multiple **OR** and **AND** statements may be chained together.

Logical **NOT**

- The logical **NOT** (`!`) operator works with just a single operand, reversing its logical state.
- Thus, if a condition is **true**, the NOT operator makes it **false**, and vice versa.

| Right Operand | Result |
|---------------|--------|
| true | false |
| false | true |

```
int age = 10;
if ( !(age > 16) ) {
    cout << "Your age is less than 16" << endl;
}
```

// Outputs "Your age is less than 16"