# LOGICAL OPERATORS

## CONDITIONAL STATEMENT

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# TOPIC OUTLINE

Logical AND

Logical OR

Logical NOT

# LOGICAL OPERATORS

# LOGICAL OPERATORS

**Logical operators** are used to perform logical operations on Boolean expressions (i.e., expressions that evaluate to **`true`** or **`false`**). These operators are essential for controlling the flow of a program and making decisions.

# LOGICAL AND

| AND Truth Table | | |
|---|---|---|
| a | b | y |
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

The AND **(&&)** operator returns true only if **both** operands are **true**.

```
bool a = true;

bool b = true;

if(a && b){

   cout << "both are true";

}
```

# LOGICAL OR

| OR Truth Table | | |
|---|---|---|
| a | b | y |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

The OR `(||)` operator returns true if **at least one** of the operands is **`true`**.

```
bool a = true;

bool b = false;

if(a || b){

   cout << "at least one is true";

}
```

# LOGICAL_NOT_

| NOT Truth Table | |
|---|---|
| a | y |
| 0 | 1 |
| 1 | 0 |

The NOT `(!)` operator is a unary operator that **negates** the value of its operand. If the operand is **`true`**, it returns **`false`**, and vice versa.

```
bool a = true;
!a //evaluates to false

bool b = false;
!b //evaluates to true
```

# EXERCISE

```
float grade = 0;

cin >> grade;

if(grade < 0 || grade > 10) {

    cout << "invalid entry!";

} else{

    cout << "Your grade is " << grade;

}
```

# EXERCISE

```
float grade = 0;

cin >> grade;

if(grade >= 0 && grade <= 10) {

    cout << "Your grade is " << grade;

} else{

    cout << "invalid entry!";

}
```

# EXERCISE

```
float grade = 0;
cin >> grade;
if(grade >= 0 && grade <= 10) {
    cout << "Your grade is " << grade;
    if(grade >= 5.0){
        cout<< "\nPASSED!";
    } else{
        cout<< "\nFAILED!";
    }
} else{
     cout << "invalid entry!";
}
```

# EXERCISE

```
float grade = 0;
cin >> grade;
if(grade >= 0 && grade <= 10) {
    cout << "Your grade is " << grade;
    if(!(grade >= 5.0)){
        cout<< "\nPASSED!";
    } else{
        cout<< "\nFAILED!";
    }
} else{
     cout << "invalid entry!";
}
```

# LABORATORY