

CS 111

if statements, if/else, Boolean operators, logical conditions

Model for if

```
if (CONDITION) {  
    STATEMENT(s);  
}
```

- If the CONDITION is true, execute the STATEMENT
- If the CONDITION is not true, do not execute the STATEMENT
 - In other words, if CONDITION is false, just skip the following code block

Model for if/else

```
if (CONDITION) {  
    STATEMENT(s);  
} else {  
    STATEMENT(s);  
}
```

- If CONDITION is true, execute first STATEMENT(s)
- If CONDITION is false, execute second STATEMENT(s) after else

Model for if/else if/else

```
if (CONDITION) {  
    STATEMENT(s);  
} else if (CONDITION) {  
    STATEMENT(s);  
} else {  
    STATEMENT(s);  
}
```

- Use this when you have three or more branches for your decision tree
- Use additional else if (CONDITION) statements for each additional decision tree branch

Example

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

```
int main() {
    int num;
    cout << "Enter a number: ";
    cin >> num;
    if(num < 0){
        cout << "The number is negative.";
    } else if (num % 10 == 0){
        cout << "The number is divisible by 10.";
    } else if (num % 5 == 0){
        cout << "The number is divisible by 5.";
    } else {
        cout << "Nice number.";
    }
    return 0;
}
```

Boolean operators

- Use when you want to test more than one condition for a single if statement
- And - &&
 - In an expression connected by &&, all elements must be true for the entire expression to evaluate as true
- Or - ||
 - In an expression connected by ||, if any element is true, the entire expression is evaluated as true
- Not - !
 - !(true) = false
 - !(false) = true

Logical Conditions

- Greater than: $a > b$
- Less than: $a < b$
- Greater than or equal to: $a \geq b$
- Less than or equal to: $a \leq b$
- Equal to: $a == b$
- Not equal to: $a != b$

Examples of conditions (single and compound)

- Examples using count = 0, limit = 10, x = 12, y = 15
 - (x == 12)
 - !(count != limit)
 - (count < 10) && (x < y)
 - (limit < 20) || ((limit / x) > 7)
 - (count == 0) && (x > y)
 - !(x == count)
 - !((limit != x) || (count < limit))