

# Control structures

C++ Lecture 3

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# Motivation

- ◉ Need the ability to add logic to our programs
- ◉ Math is much easier with C++
- ◉ Error checking
  - Changing the flow of the program
  - Mainly used to check if a certain part of the code should be executed

# If statements

- ◉ Allows for changing code flow depending on conditions
- ◉ If (condition is true) { execute something } else {execute something else}
- ◉ Elseif

```
if (bank_account < 0){  
    cout << "Huh?" << endl;  
}  
elseif (bank_account > 1000000){  
    cout << "WHAAAAAAAAAAT?" << endl;  
}  
else{  
    cout << "Welcome to the 99%" << endl;  
}
```

# If statements

- Nesting means to put similar control structures within each other
- Helps in separating logic and making code more readable

```
if (bank_account > 0){  
    if (bank_account > 1000000){  
        cout << "WHAAAAAAAAAT?" << endl;  
    }  
    else{  
        cout << "Welcome to the 99%" << endl;  
    }  
}  
else{  
    cout << "Huh?" << endl;  
}
```

# Mini Task

Compile the code given in control structures code.cpp and make sure that it runs

If there are any errors, how would you fix it?

# Switch – case statements

- ◉ Sometimes you can go crazy with if statements

```
srand(time(NULL));
int die = rand() % 6 + 1;
if (die == 1){
    cout << "Hello I'm Mercury" << endl;
}
if (die == 2){
    cout << "Hello I'm Venus" << endl;
}
if (die == 3){
    cout << "Hello I'm Earth" << endl;
}
if (die == 4){
    cout << "Hello I'm Mars" << endl;
}
if (die == 5){
    cout << "Hello I'm Jupiter" << endl;
}
if (die == 6){
    cout << "Hello I'm Saturn" << endl;
}
```

```
switch (die){
case(1):
    cout << "Hello I'm Mercury" << endl;
    break;
case(2) :
    cout << "Hello I'm Venus" << endl;
    break;
case(3) :
    cout << "Hello I'm Earth" << endl;
    break;
case(4) :
    cout << "Hello I'm Mars" << endl;
    break;
case(5) :
    cout << "Hello I'm Jupiter" << endl;
    break;
case(6) :
    cout << "Hello I'm Saturn" << endl;
    break;
default:
    cout << "Hello I'm want to be Pluto" << endl;
}
```

# Switch – case statements

```
switch (die) {
case(1):
    cout << "Hello I'm Mercury" << endl;
    break;
case(2) :
    cout << "Hello I'm Venus" << endl;
    break;
case(3) :
    cout << "Hello I'm Earth" << endl;
    break;
case(4) :
    cout << "Hello I'm Mars" << endl;
    break;
case(5) :
    cout << "Hello I'm Jupiter" << endl;
    break;
case(6) :
    cout << "Hello I'm Saturn" << endl;
    break;
default:
    cout << "Hello I'm want to be Pluto" << endl;
}
```

Works with char, int, float, double NOT string

Need to put a break statement to avoid it bleeding into other statements

Goes to this line if none of the cases match

# Mini Task

Convert the if statements to switch case statements



# Loops

- 3 main types
  - While
  - Do – while
  - For loop
- You can repeat blocks of code based on certain conditions

# While loop

While (condition is true) { execute something }

- ◉ Will keep running till the condition is false

```
cout << "Countdown" << endl;
int count = 10;
while (count > 0){
    cout << count << endl;
    count = count - 1;
    Sleep(1000);
}
```

# Do while

- While loop backwards

do {execute something} while (condition is true);

- Will execute the body of the loop at least once

```
cout << "Countdown" << endl;
int count = 10;
do{
    cout << count << endl;
    count = count - 1;
    Sleep(1000);
} while (count > 0);
```

# For loop

- ◉ Convenience function that does a lot for us

for (initialize loop variable ; check condition is true ; increment loop variable) { execute something }

C++ takes care to execute everything properly and in order

```
for (int count = 10; count > 0; count = count - 1){  
    //Do something  
    cout << count << endl;  
}
```

# For loop

```
for (int count = 10; count > 0; count = count - 1){  
    //Do something  
    cout << count << endl;  
}
```

Initialization of loop variable  
run once only before  
entering the loop

Condition check run every  
time before entering the  
loop

Run every time after  
finishing the loop

# Mini Task

Make modifications to while loop

Convert to do while

Convert to for loop



**Questions?**

# Assignment

- ◉ Do the control structures assignment.cpp
- ◉ If you finish quickly enough, do the advanced one