1 C++: Lecture 2 on 24 May 2020

1.1 How does C++ work?

C++ is a compiled language. This means taht the langauge has to go through a specific process to get a result. First a source file is created (.cpp) like we are doing right now. Then a preproceeser takes all the header files (#include) and makes an object file without all the headers Then a compilier takes the object file and turns it into a library or an exe file.

1.2 Strings

What is a string? A string is a variable that stores sequences of characters like letters and sentences. First thing is to include in the header is the type defined. *#include < string >*

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

int main() {
    string a;
    string b;
    string c;

    // Alternatively: string a, b, c;

    a = "Hello";
    b = "How are you?";
    c = "Thank you!";

    // You can also do an inline definition
    string j = "No, thank you.";

    // You can also redefine strings like so:

    string k = "Hello!";
    cout << k << endl;
    k = "See you later!";
    cout << k << endl;
}
```

1.2.1 Task: Conversation between people using Strings

Make a conversation between people by utilizing string variables and printing them out using *cout*.

1.3 Doubles

Doubles are similar to integers except allow for the introduction of decimal points.

```
double a;
double b;
double c;

double a, b, c;

a = 80.43597;
b = 20.42385;
c = 230.98;

// Inline definitions also work here:
double j = 90.78;
```

Similar to integers, you can do addition, subtraction, multiplication, and division.

1.3.1 Task: Cashier

Using doubles, ask a custormer how many toys, shirts, gallons of milk, and shoes they want. The price of a toy is 9.08, shirt - 10.90, gallon of milk - 2.36, pair of shoes - 78.98. Finally, output the final price.

1.4 Booleans

Another really imporatnt type of variable is a boolean. Booleans can have two values, True or False, and are represened by either a 1 (True) or a 0 (False).

```
// Example: 5 < 7 is true so this code should print out true:
cout << (5 < 7) << endl;

// The operator we used above is called a conditional operator

// == is equal
// (note that == checks for equality, = is used for defining variables)

cout << (5 == 9) << endl;
cout << (78 == 78) << endl;

// ! means not
// !true is false
// !false is true
//(!(3 < 5)) is false

// !=  is not equal to
cout << (5 != 9) << endl;
cout << (78 != 78) << endl;

// > is greater than
cout << (5 > 9) << endl;
cout << (79 > 78) << endl;

// < is less than
cout << (5 < 9) << endl;
cout << (79 < 78) << endl;

// >= Greater than or equal to
cout << (5 >= 9) << endl;
cout << (79 >= 78) << endl;

// <= Less than or equal to
cout << (5 <= 9) << endl;
cout << (79 <= 78) << endl;

// To combine more than one conditional statement
// You can use the and ( && ) or the or ( || ) statmements
cout << ((5 > 3) && (4 < 3)) << endl; // this is false
```

1.4.1 Task: Number Comparisions

Take the input of two numbers and evaluate whether or not the first number is equal to the second one, greater than the second one, or smaller than the second one. Take about 4 minutes to solve this.

```
if (condition) {
    // code here
}
```

The condition uses a conditional operator that we just learned to execute the task described within the curly brackets. For example:

```
if (5 < 7) {
    cout << "5 is indeed less than 7" << endl;
}
```

If statements can accomplish alot by themselves, but another addtion makes them more useful. the else statement. It just adds on to the end of the if statments like so:

```
if(conditon){
    // code here
} else{
    // code here
}

// for example:
int h = 9;
if(h < 10){
        cout << "H is less than 10" << endl;
} else{
        cout << "H is greater than 10" << endl;
}
```

We can go ever further by incorporating the if-else-if-else statmement:

```
if(condtion){
    // code here
} else if(condtion) {
    // code here
} else {
    // code here
}

//for example:
int temp = 50;
if(temp <= 32) {
        cout << "It is freezing outside" << endl;
} else if(temp <= 50) {
        cout << "Its a chilly day outside" << endl;
} else if(temp <= 80) {
        cout << "Its a nice day outside" << endl;
} else {
        cout << "Its really hot outside. You should go inside!" << endl;
}
```

1.4.2 Task: Driver Speed Controller

By inputting a speed, tell a driver whether he needs to speed up, stay his speed, or slow down. The speed limit is 60 and if the driver is within 5 mph of the limit, they can continue with their current speed. Take about 7 minutes to solve this quesiton.