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You will need:
Online C++ IDE / C++ Computer installed IDE
A computer with internet access

SWE20004 Technical Software Development

Lab 1 (week 1)

In this lab you will investigate C++ commands

Before you start the lab exercise, download an appropriate C++ IDE to run your commands and programs.

1. Answer the following questions? Don't copy and paste – write down what it is - in your own words. Write your answers briefly?

1.1 Why main function is special in C++?

Main function is special because it is the beginning point which all C++ programs begin their execution. Without this function, the program can not be executed

1.2 What is the role of #include directive in C++?

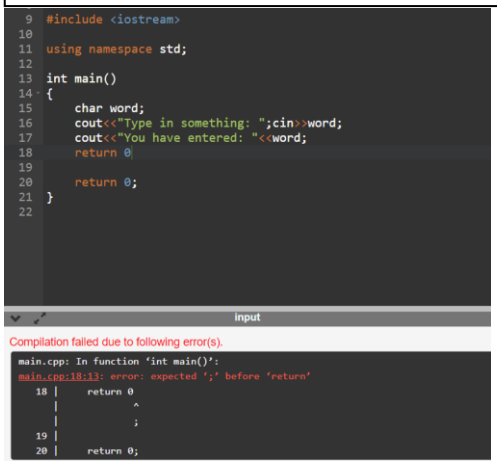
It tells the pre-processor to include the contents of a certain file at the location where it occurs in the program. Without it, the compiler will not be able to detact the required library to run the code.

1.3 What is compiler and linker?

Compiler takes the output of the preprocessor and creates an object file from it., while linker (also known as a link editor) creates a library or executable file from the object files the compiler has generated.

1.4 What is a syntax error? Give an example.

A syntax error is the mistake in using the programming language in general. For example: Missing a semicolon in a line.



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1.5 What do the following commands do? (Write down the answers here or in a notebook)

\n: Print a newline character to the screen
\t: Insert tab in output
cout: Character output, display output on screen
cin: Character input, accept input from user
return: Terminates the execution of a function and returns control to where it was called. A function may have many return statements.

1.6 Explain the following? (Write down the answers here or in a notebook)

Identifiers and Keywords: Identifiers are the names that are unique and were chosen by the programmers to assign to variables, classes, functions, and other things. Keywords are preset words with particular meanings according to the compiler.

Integer Constants: Constant elements which don't have any fractional parts or exponents.

Character Constants: One or more characters enclosed in single quotes.

Floating Constants: A decimal number that represents a signed real number.

String Literals: Indicates a sequence of characters that together create a null-terminated string.

2 Write a program to display the following output using a single Cout statement.

```
Subject         Marks
Mathematics     90
```

```
#include <iostream>
using namespace std;
int main()
{
cout<<"Subject\t\t"<<"Marks\n"<<"Mathematics\t"<<"90\n"<<"Computer\t"<<"
77\n"<<"Chemistry\t"<<"69\n";
   return 0;
}
```

```
Computer        77
Chemistry       69
```

```
#include <iostream>

using namespace std;

int main()
{
cout<<"Subject\t\t"<<"Marks\n"<<"Mathematics\t"<<"90\n"<<"Computer\t"<<"77\n"<<"Chemistry\t"<<"69\n";

    return 0;
}
```

input

```
Subject         Marks
Mathematics     90
Computer        77
Chemistry       69


...Program finished with exit code 0
Press ENTER to exit console.
```

2.1 Write a program which accept temperature in Farenheit and print it in centigrade.

```
#include <iostream>
using namespace std;
int main()
{
   float farenheit;
   float centigrade;
   cout<<"Input the temperature in Farenheit: ";cin>>farenheit;
   centigrade = (farenheit - 32) * 5/9;
   cout<<"The temperature in centigrade is: "<<centigrade;
   return 0;
}
```

```
#include <iostream>

using namespace std;

int main()
{
    float farenheit;
    float centigrade;
    cout<<"Input the temperature in Farenheit: ";cin>>farenheit;
    centigrade = (farenheit - 32) * 5/9;
    cout<<"The temperature in centigrade is: "<<centigrade;
    return 0;
}
```

input

```
Input the temperature in Farenheit: 0
The temperature in centigrade is: -17.7778

...Program finished with exit code 0
Press ENTER to exit console.
```

2.2 Write a program to calculate area of circle.

```
#include <iostream>
using namespace std;
int main()
{
   float area;
   float pi = 3.1415;
   float radius;
   cout<<"Insert the circle radius: ";
   cin>>radius;
   area = pi * radius * radius;
   cout<<"The circle area is: "<<area;
   retu
```

```
 9  #include <iostream>
10
11  using namespace std;
12
13  int main()
14  {
15      float area;
16      float pi = 3.1415;
17      float radius;
18      cout<<"Insert the circle radius: ";
19      cin>>radius;
20      area = pi * radius * radius;
21      cout<<"The circle area is: "<<area;
22
23      return 0;
24  }
25
```

input

```
Insert the circle radius: 6
The circle area is: 113.094

...Program finished with exit code 0
Press ENTER to exit console.
```

3. Write a code to take the string input from the user (Example: Hello) and write the output on the screen.

```
#include <iostream>
using namespace std;
int main()
{
  string word;
  cout<<"Type in something: ";
  getline(cin, word); //for displaying more than one word
  cout<<"You have entered: "<<word;
  return 0;
}
```

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```
8
9  #include <iostream>
10
11 using namespace std;
12
13 int main()
14 {
15    string word;
16    cout<<"Type in something: ";
17    getline(cin, word); //for displaying more than one word
18    cout<<"You have entered: "<<word;
19    return 0;
20 }
21
22
23
```

input

```
Type in something: ho ho lmao
You have entered: ho ho lmao

...Program finished with exit code 0
Press ENTER to exit console.
```

Report (SWE20004)

Write a one-page report on this lab covering the following:

1. Summarize the topics you explored and the activities you did during this lab.
2. Classify (group) these topics and actions under appropriate headings. Do not just copy the headings used in the instructions. For example, explain the following, what are the following commands do?
3. Discuss the relevance of these topics and actions in terms of C++ programming. i.e. How do the things in this lab work contribute to your understanding of C++ programming overall?
4. Why do you need to understand (and use) C++ commands?

This report is worth 5% towards your unit assessment. Use the below page as a template. Either you can type it or write it in your words.

1. This first lab is relatively important to me as I was taught about the fundamental of the C++ programming language, which I learnt about the heading and body of a program, the basic function and command of a program such as the ***cout*** and ***cin*** commands (which will be illustrated in detail later on). We also got to know about some of the backgrounds of C++, its history of development, the software built from it and its popularity in comparison with some other programming languages.

2. In terms of the history of C++, I was fascinated by the fact that most of the software we use nowadays were made from C++, such as Youtube, Amazon, Spotify, and even popular game franchise like Assassin's Creed. As for its popularity among other languages, it remains one of the most used programming languages and is the primary selection of many leading tech companies.

As for the language itself, we have learnt about the significance of the main function and the use of the #include directive in C++ and we understand that the absence of either would result in an error that leads to the failure during the execution of the program. Furthermore, as mentioned above, we also discussed the basic commands of the program like ***cin*** (which is used for taking the input from the programmer), ***cout*** (which is used to display the output on the monitor) as well as ***return*** (usually ***return 0***, to end the execution of the program after having done the given tasks). In addition, we were also introduced to simple calculations like addition and subtraction, which is very useful for mathematic programs. The tutor also gave us the definition of compiler and linker, which are two concepts that are new and needed to familiarize with. Moreover, we were also taught about the data types in C++ like string, int, char, as well as how to declare variables. Other helpful things that we was taught was the \t (adding a tab after the sentence) and \n (putting the output in a new line) functions.

We then started to have some practical exercises given by the tutor to strengthen the new knowledge. The exercises were pretty, such as putting the "Hello World" line on the screen (which is also the most basic exercise for all programming languages), to calculating the area of a circle based on the users' given radius. Although these exercises were not difficult to solve, the tutor still tried to explain it carefully to us and I really appreciate her dedication for the unit. After the lab session ended, we was given some homework and a report to finish.

3. The lab overall gave me a general view of the C++ programming. As I have previously studied other programming languages like Python or Pascal (which to me is outdated), the shift to C++ is not really difficult for me, yet there are some slight changes to memorize and not to be confused with other programming languages (e.g. in C++ we use ***cout*** to print the output while in Python we use ***print***). I also have had some further insight of the history of the language, which makes me appreciate the language more and encourages me to learn more about it. Finally, I also have to remind myself to try and memorize the necessary functions and concepts to use it more effectively for my future assignments.

4. Each command in C++ has its own use and cannot be misused in order to prevent failure during the execution of the program. In addition, the reckless use of them could also lead to unexpected outputs. Therefore, it is very essential to understand the commands and use them effectively.