Programming Fundamental

Lab Manual 4

Learning Outcomes:

- Students should be able to think logically and develop problem-solving skills
- Students should be able to define the need for conditional statements.
- Students should be able to implement the learned concepts of If Statement and If-else Block
- Students should be able to define problem-solving through programming concepts

Introduction

In our daily life, we encounter many situations where we have to decide from multiple options. For example, whether to buy a dress or not? Or Whether to go to university today or not?

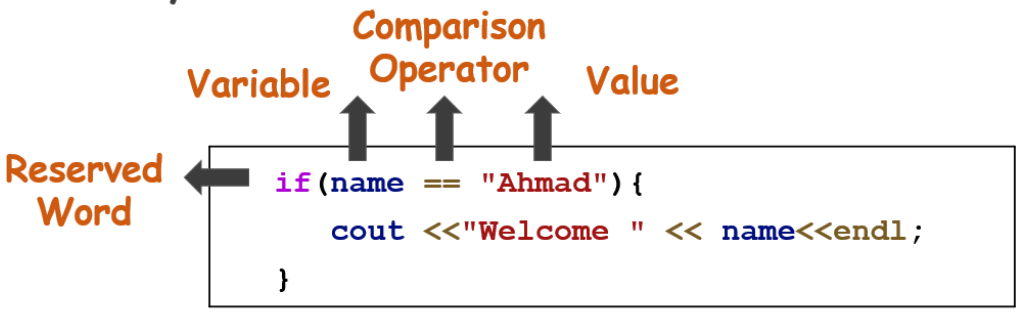
Even these simple phenomena pose us with these optional solutions that can be opted depending upon different conditions. For example, **IF** the cost of the dress is more than 1500 **Then** you will buy that dress. OR **IF** your friends are going to university **Then** you will go to the university.

Similarly, we are faced with similar problems in programming as well. Where we, as programmers, have to write programming code to solve such problems. Therefore, for such problems, we make use of the **IF Statement**.

IF Condition

Take a look back now. The following picture explains the different components of the **IF Statement**.

- IF statement
- Body of IF statement



Recall your memory, you have been taught these concepts earlier in the theory class.

Now, Let's use the **IF Statement** to solve the above-mentioned small problems.

Example#1:
IF the cost of the dress is less than 1500 **Then** you will buy that dress.

Solution	The code produces the following output.

`#include<iostream>`
`using namespace std;`
 	
`int main(){`
`int cost;`
`cout<<"Enter the cost of the dress : ";`
`cin>>cost;`
 	
`if(cost > 1500){`
`  cout<<" Buy the Dress ";`
`}`
 	
`}`
	`D:\Codes>c++ test.cpp -o test.exe`
	
	`D:\Codes>test.exe`
	`Enter the cost of the dress: 1200`
	`Buy the Dress`
	`D:\Codes>`

Example#2:

IF your friends are going to university **Then** you will go to the university.

Solution	The code produces the following output.

```cpp
#include<iostream>

using namespace std;

int main()
{
char going;
cout<< "Are your friends going? (Press Y for yes)";
cin>> going;

if (going == 'y'){
        cout<<"You are also going!";
}
}
```

```
D:\Codes>c++ test.cpp -o test.exe

D:\Codes>test.exe
Are your friends going? (Press Y for yes)y
You are also going!
D:\Codes>
```

Example#3:

Consider that Ali is a student, who recently got admission to UET. We need to write a program to congratulate Ali.

Try for yourself first.
Do not worry. The solution is given below.

Solution:	The code produces the following output.

```cpp
#include<iostream>

using namespace std;

int main()
{

string name;
cout << "Please Enter your name ";
cin >> name;
        if(name == "ali"){
        cout <<"Welcome " << name<<endl;
        }

}
```

```
D:\Codes>c++ test.cpp -o test.exe

D:\Codes>test.exe
Please Enter your name ali
Welcome ali

D:\Codes>
```

You have learned how to use **IF-STATEMENT**
Now, Let's continue with the learning

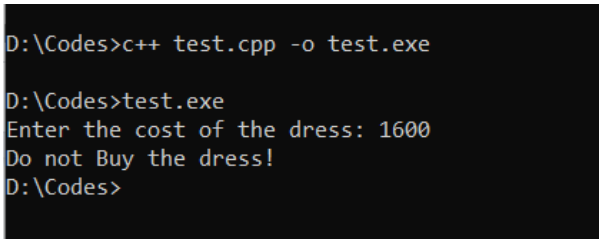
IF-Else Statement

Consider the previously defined scenarios, however, consider them with the following constraints.

Example #1:

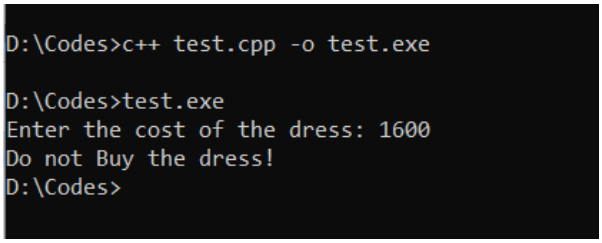
IF the cost of the dress is less than 1500 **Then** you will buy that dress **Otherwise** you will not buy the dress.

Solution:	The code produces the following output.

`#include<iostream>`
`using namespace std;`
 	
`int main(){`
`int cost;`
`cout<<"Enter the cost of the dress : ";`
`cin>>cost;`
 	
`if(cost > 1500){`
`  cout<<" Buy the dress ";`
`}`
 	
`if(cost < 1500){`
 	
`  cout<"Do not buy the dress ";`
`}`
 	
`}`
	

The same operation can be performed by using the **IF-Else Block.**

Solution:	The code produces the following output.

`#include<iostream>`
`using namespace std;`
 	
`int main(){`
`int cost;`
`cout<<"Enter the cost of the dress : ";`
`cin>>cost;`
 	
`if(cost > 1500){`
`  cout<<" Buy the dress ";`
`}else{`
 	
`  cout<"Do not buy the dress ";`
`}`
 	
`}`
	

Now, if the user enters any number below "**1500**" the program will print "**Buy the dress**" however if the number is not less than "**1500**" the program will print "**do not buy the dress**"	

Question 02:

Example#2:

IF your friends are going to university **Then** you will go to the university **Otherwise** you will not go to the university.

Solution:	The code produces the following output.

`#include<iostream>`
 	
`using namespace std;`
 	
`int main()`
`{`
`char going;`
`cout<< "Are your friends going? (Press Y for yes N for no: )";`
`cin>> going;`
 	
`if (going == 'y'){`
`cout<<"You are also going!";`
`}`
`if (going == 'n'){`
`cout<<"You are not going!";`
`}`
 	
`}`
	`D:\Codes>c++ test.cpp -o test.exe`
	
	`D:\Codes>test.exe`
	`Are your friends going? (Press Y for yes N for no: )n`
	`You are not going!`
	`D:\Codes>`

The same operation can be performed by using the **IF-Else Block.**

Solution:	The code produces the following output.

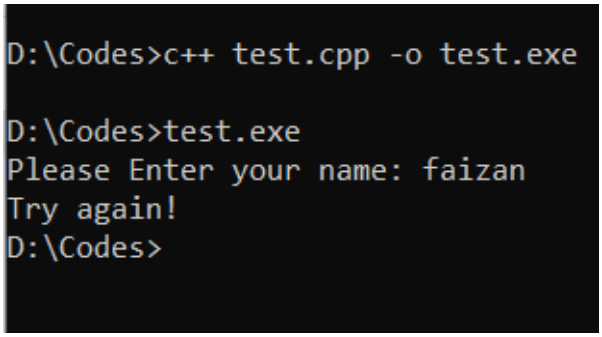
`#include<iostream>`
 	
`using namespace std;`
 	
`int main()`
`{`
`char going;`
`cout<< "Are your friends going? (Press Y for yes): ";`
`cin>> going;`
 	
`if (going == 'y'){`
`cout<<"You are also going!";`
`}`
`else{`
`cout<<"You are not going!";`
`}`
 	
`}`
	`D:\Codes>c++ test.cpp -o test.exe`
	
	`D:\Codes>test.exe`
	`Are your friends going? (Press Y for yes): f`
	`You are not going!`
	`D:\Codes>`

Now, if the user enters “**y**” the program will execute the “**you are also going**”. However, if the user does not enter “**y**”, the program will execute “**you are not going**”	

Example#3:

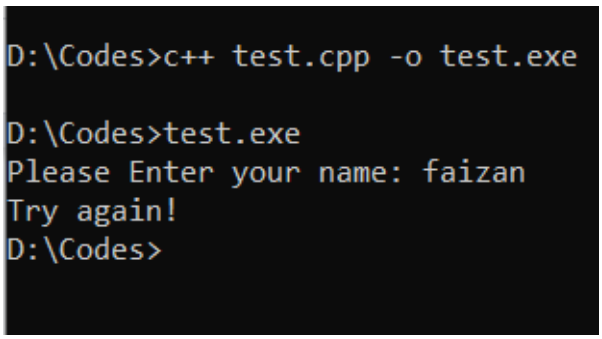
Consider that Ali is a student, who recently got admission to UET. We need to write a program to congratulate if it is Ali otherwise print "**try again**".

Solution:	The code produces the following output.

`#include<iostream>`
 	
`using namespace std;`
 	
`int main()`
`{`
 	
`string name;`
`cout << "Please Enter your name: ";`
`cin >> name;`
`if (name == "ali"){`
`cout<< "Welcome "<< name;`
`}`
`if (name != "ali"){`
`cout<< "Try again!";`
`}`
`}`
	

The same operation can be performed by using the **IF-Else Block.**

Solution:	The code produces the following output.

`#include<iostream>`
 	
`using namespace std;`
 	
`int main()`
`{`
 	
`string name;`
`cout << "Please Enter your name: ";`
`cin >> name;`
`if (name == "ali"){`
`cout<< "Welcome "<< name;`
`}`
`else{`
`cout<< "Try again!";`
`}`
`}`
	

Now, if the user enters "**ali**" the program will display the "**welcome ali**" message, however, if the user does not enter "**ali**" the program will generate a "**try again**" message.	

Congratulations, now you have learned and practiced the fundamental concepts of **IF-Statement** and **IF-ELSE Statement.**

Let's start with the Challenges.

Challenge #1:
Write a program that checks whether an integer is even or odd.

Solution:

Solution:	The code produces the following output.

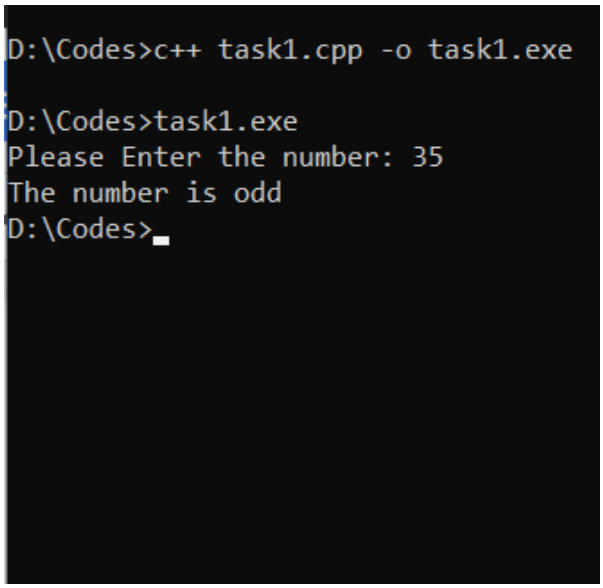
task1.cpp - Notepad

File Edit Format View Help

```
#include<iostream>

using namespace std;

int main()
{
int number, even;
cout << "Please Enter the number: ";
cin >> number;
even = number%2;
if(even == 0){
cout<< "The number is even";
}
else{
cout<< "The number is odd";
}
}
```



Challenge #2:
Write a program that inputs two integers and prints the larger one.

Solution:	The code produces the following output.

task2.cpp - Notepad

File Edit Format View Help

```
#include<iostream>

using namespace std;

int main()
{
int number1, number2;
cout << "Please Enter the number: ";
cin >> number1;
cout<< "Please Enter the second number: ";
cin>> number2;

if( number1<number2 ){
cout<< "Number "<< number2 << " is greater than "<< number1;
}
else{
cout<< "Number "<< number1 << " is greater than "<< number2;
}
}
```

```
D:\Codes>c++ task2.cpp -o task2.exe

D:\Codes>task2.exe
Please Enter the number: 45
Please Enter the second number: 56
Number 56 is greater than 45
D:\Codes>
```

Challenge #3:

Write a program that inputs two words and checks if they are the same. Make a difference between uppercase and lowercase letters (“Ali”, “ali”, “ALI” are different words). You have to print "yes, the words are the same" or "no, the words are different".

Solution:	The code produces the following output.

task3.cpp - Notepad

File Edit Format View Help

```
#include<iostream>

using namespace std;

int main()
{
string word1, word2;
cout<< "Enter the first word: ";
cin>> word1;
cout<< "Enter the second word: ";
cin>> word2;

if( word1 == word2){
cout<< "yes, the words are same";
}
else{
cout<< "No, the words are different";
}
}
```

```
D:\Codes>c++ task3.cpp -o task3.exe

D:\Codes>task3.exe
Enter the first word: ali
Enter the second word: ali
yes, the words are same
D:\Codes>
```

Challenge #4:
Write a program that inputs a password (one word with random text) and checks if the input matches the password.

Solution:	The code produces the following output.

task4.cpp - Notepad

File Edit Format View Help

```
#include<iostream>

using namespace std;

int main()
{
string my_password, user_enter;

my_password = "Pass@123!";
cout<< "Enter the password: ";
cin>> user_enter;

if( user_enter == my_password){
cout<< "Wow ! You have cracked the code!";
}
else{
cout<< "It is not that simple, Try Agian";
}
}
```

```
D:\Codes>c++ task4.cpp -o task4.exe

D:\Codes>task4.exe
Enter the password: password#@12345
It is not that simple, Try Agian
D:\Codes>
```

Challenge #1:
Mr. Aslam is running a medical store in Lahore near UET Main Campus. He does not know how to calculate the discount for shopping. His business model only allows two types of discounts. The two scenarios for discount include.
5% discount on Rs 5000 or less amount.
10% discount on greater than Rs 5,000.
Consider that you are a programmer. Write a program to solve this issue faced by Mr. Aslam.

Challenge #2:
Ali works at a fast-food restaurant for Rs 10,000/ salary per month. Now, he wants to buy a laptop for his son. The price of the laptop is 50,000/-. For this purpose, he has asked his manager to give him a 50% advance salary for the next 6 months.
YOU ARE A PROGRAMMER.
Write a program to tell Ali whether he can buy the laptop with this advanced salary or not. If not, your program should also suggest the number of months' salary that is required for purchasing the laptop.

Challenge #3:
Develop a calculator that performs operations in inverse order like if a user asks the program to add the number it subtract the number and vice versa.
Make a calculator for Add, Subtract, Multiply and Divide operations.
Program will take the first value from the user as input, then it will ask for the operator and then the 2nd number.

Challenge #4:
Write a program that takes a **single character** from the user and tells whether the character is vowel, consonant or number. (hint : Program will contains many conditions)

Challenge #5:
A program takes 3 brothers ages and names from the user, your program displays the younger brother name.