OBJECT: To understand if-else statement and switch statement

INTRODUCTION

There are three major decision making structures. The 'if' statement, the 'if-else' statement, and the 'switch' statement. Another less commonly used structure is the conditional operator.

THE IF STATEMENT

The if statement enables you to test for a condition (such as whether two variables are equal) and branch to different parts of your code, depending on the result or the conditions with relational and logical operators are also included.

The simplest form of an 'if' statement is:

```
if (expression)
statement;
```

THE IF-ELSE STATEMENT

Often your program will want to take one branch if your condition is true, another if it is false. If only one statement is to be followed by the 'if' or 'else' condition then there is no need of parenthesis. The keyword else can be used to perform this functionality:

```
if (expression)
{
statement/s;
}
else
{
statement/s;
}
```

PROGRAM 1: Demonstrating the simple if statement

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

int main()
{
int a;
cout << "Enter a number: ";
cin >> a;                        //get number

if (a == 10)
cout << "The number is equal to 10";

if (a > 10)
cout << "The number is greater than 10";

if (a < 10)
cout << "The number is less than 10";

return 0;
}
```

PROGRAM 2: Demonstrating the simple if-else statement

```
#include <iostream>
using namespace std;
int main()
{
int age;
cout << "Enter age: ";   cin >> age;            //get number

if (age <= 15)
cout << " Welcome to children gift shop";
else
cout << " Welcome to glossary shop";

return 0;
}
```

PROGRAM 3: Demonstrating the if-else statement inside a for loop

```
#include <process.h>              //for exit()
#include <iostream>
using namespace std;
int main()
{
unsigned long n, j;
cout << "Enter a number: ";  cin >> n;        //get number to test

for(j=2; j <= n/2; j++)       //divide by every integer from
if(n%j == 0)                  //2 on up; if remainder is 0,
{                              //it's divisible by j
cout << "It's not prime; divisible by " << j << endl;
exit(0);                 //exit from the program
}
cout << "It's prime\n";
return 0;
}
```

PROGRAM 4: Demonstrating the if-else statement inside a while loop

```
#include <iostream>
#include <conio.h>            // for getche()
using namespace std;
int main()
{
int chcount=0;              //counts non-space characters
int wdcount=1;              //counts spaces between words
char ch = 'a';              //ensure it isn't '\r'

cout << "Enter a phrase: ";
while( ch != '\r' )         //loop until Enter typed
{
ch = getche();           //read one character
if( ch==' ' )            //if it's a space
wdcount++;               //count a word
else                     //otherwise,
chcount++;               //count a character
}                        //display results
cout << "\nWords=" << wdcount << endl
     << "Letters=" << (chcount-1) << endl;
return 0;
}
```

RAND() FUNCTION

The rand() function is used to generate random numbers. If we generate a sequence of random number with rand() function, it will create the same sequence again and again every time program runs.

int rand(void):

Returns a pseudo-random number in the range of 0 to RAND_MAX. RAND_MAX: is a constant whose default value may vary between implementations but it is granted to be at least 32767.

PROGRAM 5: Demonstrating the rand() function

```
#include <iostream>
#include <conio.h>
#include <cstdlib> // for rand() function
#include <iomanip> // for setw()

using namespace std;
int main() {
cout<<"RAND_MAX = "<<RAND_MAX<<endl;
for (int a=1 ; a<=10 ; a++)
if(a%4) //to display 4 values in one line
cout<<setw(8)<<rand();
else
cout<<setw(8)<<rand()<<endl;
return 0;
}
```

PROGRAM 6: Demonstrating the if-else inside do-while loop

```
#include <iostream>
#include <conio.h>
#include <cstdlib>
using namespace std;
int main() {

int a;
char ch;
do{
int x = (rand() % 5) + 1;
cout<<endl<<"Enter number between 1 to 5...";
cin>>a;
if (a==x)
cout<<"You guessed the right number";
else
cout<<"Sorry try again the number was "<< x;
cout<<endl<<"Do you want to run again?"
    <<endl<<"Press y for yes...";
ch = getch();
}
while(ch=='y');

return 0;
}
```

IF...ELSE IF...ELSE STATEMENT

An if statement can be followed by an optional else if...else statement, which is very useful to test various conditions using single if...else if statement. Once an else if succeeds, none of the remaining else if's or else's will be tested.

PROGRAM 7: Demonstrate the else-if structure

```
#include <iostream>
using namespace std;
int main() {
int marks;
float per;
cout << " Enter marks out of (800)";  cin >> marks;
per = (float)marks/800 * 100;
if (per >= 80)
cout << "Percentage = " << per <<" \t  A Grade :-D ";
else if (per >= 70)
cout << "Percentage = " << per <<"\t  B+ Grade :-D ";
else if (per >= 60)
cout << "Percentage = " << per <<"\t  B Grade :-) ";
else if (per >= 50)
cout << "Percentage = " << per <<"\t  C Grade :-| ";
else if (per >= 40)
cout << "Percentage = " << per <<"\t  D Grade :-| ";
else
cout << "Percentage = " << per <<"\t  Fail :-( ";
return 0;
}
```

THE SWITCH STATEMENT

Unlike if, which evaluates one value, switch statements allow you to branch on any of a number of different values. There must be break at the end of the statements of each case otherwise all the preceding cases will be executed including the default condition. The general form of the switch statement is:

```
switch (identifier variable)
{
case identifier One:
   statement(s);
   break;
case identifier Two:
   statement(s);
   break;
....
case identifier N:
   statement(s);
   break;
default:
   statement(s);
}
```

PROGRAM 8: Demonstrating the switch statement

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

int main()
{
int a;
char ch;

do
{
cout<<"Enter any number from 1 to 10: ";   cin>>a;
cout<<"The number is ";

switch(a)
{
case 1:  cout<<"One";   break;
case 2:  cout<<"Two";   break;
case 3:  cout<<"Three"; break;
case 4:  cout<<"Four";  break;
case 5:  cout<<"Five";  break;
case 6:  cout<<"Six";   break;
case 7:  cout<<"Seven"; break;
case 8:  cout<<"Eight"; break;
case 9:  cout<<"Nine";  break;
case 10: cout<<"Ten";   break;
default: cout<<"Sorry cannot convert this number";
}
cout<<endl<<"Do U want to continue.... (Y / N)?"; cin>>ch;
}
while (ch =='y');
return 0;
}
```

PROGRAM 9 Demonstrating the switch statement

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

int main()
{
int a, b;
char ch;
cout<<"Enter number operator number:";
cin>>a>>ch>>b;

switch(ch)
{
case '*':
cout<<"The answer is "<<a*b;     break;
case '/':
if (b == 0)
{
cout<<"Cant devide with Zero";   break;
}
cout<<"The answer is "<<a/b;     break;
case '-':
cout<<"The answer is "<<a-b;     break;
case '+':
cout<<"The answer is "<<a+b;     break;
default:
cout<<"Sorry wrong operator";
}
return 0;
}
```

Exercise 1:

Write a program to input day number (1-7) and print day of week name using switch case.

```
Input day number(1-7): 2
The day is Tuesday
```

Exercise 2:

Write a program to input month number and print total number of days in month using switch...case

```
Input month number(1-12): 2
Total number of days = 28
```

Exercise 3:

Write two programs to check whether an alphabet is vowel or consonant. First program by using switch statement and second by using else-if structure.

```
Input character: a
'a' is a vowel

Input character: b
'b' is a consonant
```

Exercise 4:

Write a program which prints ASCII table from 129 to 255
(Use setw() for arrangement and make sure there should be only 8 ASCII numbers and characters on each line. Take hint from program 5 of this handout)