Application concern Selection (If, If-else, switch) structures

Example 1:

```
/* C++ program for computing the roots of second degree equation*/
#include<iostream>
#include<cmath> // for using the function sqrt
using namespace std;
int main()
{       int a,b,c;
        double x_1,x_2,discriminant;
        cout<<"the value of coefficient a is\t";
        cin>>a;
        cout<<"the value of coefficient b is\t";
        cin>>b;
        cout<<"the value of coefficient c is\t";
        cin>>c;
        cout<<"\n";
        discriminant=(pow(b,2))-(4*a*c);
        if (discriminant>0)
        {
        x_1=(-b-sqrt(discriminant))/(2*a);
        x_2=(-b+sqrt(discriminant))/(2*a);
        cout<<"the roots of your equation are : "<<x_1<<"\t and \t"<<x_2<<endl;
}
```

```
        else
        if(discriminant==0)
        {
        x_1=(-b)/(2*a);
        cout<<"You have only one root of order two is\t"<<x_1<<endl;
}
        else
        cout<<"No solutions in the set of real numbers."<<endl;
        return 0;
}
```

Example2:

```
#include <iostream>
using namespace std;
 int main ()
{
  int x = 1; // local variable declaration:
  switch (x) {
  case 1 :
    cout << "Hi!" << endl;
    break;
  default :
    cout << "Hello!" << endl;
  }
  return 0;
}
```

Example3:

```
/*C++ program to print if your number is odd or even*/
#include<iostream>
using namespace std ;
int main()
{
int value;
cout<<"Enter a number ";
cin>>value;
switch ( value % 2 )
{
case 0:
cout<< "Even integer\n" ;break;
default: cout<< "Odd integer\n" ;
}
return 0;
}
```

Example4:

```
#include<iostream>
using namespace std;
int main()
{
        char x='b';
        switch(x)
        {
```

```
            case 'a': cout<<"case a"<<endl; break;
            case 'b': cout<<"case b"<<endl; break;
            default:
            cout<<"wrong input"<<endl;
        }
        return 0;
 }
```

Example5:

```
#include<iostream>
using namespace std;
int main()
{
        int day;
        cout<<"Enter the day number\n";
        cin>>day;
        switch(day)
        {
                case 1: cout<<"The day is Sunday\n";
                break;
                case 2: cout<<"The day is Monday\n";
                break;
                case 3: cout<<"The day is Tuesday\n";
                break;
                case 4: cout<<"The day is Wednesday\n";
                break;
```

```
                case 5: cout<<"The day is Thursday\n";
                break;
                case 6: cout<<"The day is Friday\n";
                break;
                case 7: cout<<"The day is Saturday\n";
                default: cout<<"Wrong day number, try again\n";

        }
        return 0;
}
```

Example6:

```
#include<iostream>
using namespace std;
int main()
{
        char sign ;
        int a,b;
        cout<<"Enter the first integer number a=\n";
        cin>>a;
        cout<<"Enter the second integer number b=\n";
        cin>>b;
        cout<<"Please, choose an operation\n";
        cin>>sign;
                switch(sign)
        {
```

```
case '+': cout<<"The sum of "<<a<<"+"<<b<<"="<<a+b<<endl;
break;
case '-': cout<<"The substraction is\t"<<a-b<<endl;
break;
case '*': cout<<"The multiplication is\t "<<a*b<<endl;
break;
case '%': cout<<"The remainder is \t"<<a%b<<endl;
default: cout<<"You give a wrong operation, try again\n";
        }
return 0 ;
}
```

Application concern repetition (while, for, do-while) structures

Example1:

```
// Summation of even numbers from 2 to 100 with for loop.
#include <iostream>
using namespace std;
// function main begins program execution
int main()
{
 int sum = 0;                    // initialize sum
   // sum even integers from 2 through 100
 for ( int number = 2; number <= 100; number += 2 )
   sum += number;                // add number to sum
    cout << "Sum is " << sum << endl;  // output sum
 return 0;                       // successful termination
```

```
}   // end function main
```

Example2:

```
/*C++ program to print the factorial of a positive integer number*/
#include<iostream>
using namespace std;
int main()
{
        int i,n;
        float fact=1;
        cout<<"Enter an integer n= ";
        cin>>n;
        for(i=1;i<=n;i++)
        fact=fact*i;
        cout<<"factorial of \t"<<n<<"\t is "<<n<<"! = " <<fact<<endl;
                return 0;
        }
```

Example3:

```
/*C++ program that print the root of 5 numbers*/
# include <iostream>
# include <cmath>
using namespace std;
 int main()
{
   int i;
        float x;
```

```
        double rootx;
        const int counter=5;
        cout<< "hello\n"<<endl;
        cout<< "I will compute the root of\t" <<counter<< "\t numbers"<<endl;
        for (i=0; i<counter ;i++)
        {cout<<"Please Enter a number:";
        cin>>x;
        if (x<0.0)
        cout<<"Your number\t"<<x<<"\t does not have a root\n";
        else
        {
        rootx=sqrt(x);
        cout<<"The root of \t"<<x<< "\t is:"<<rootx<<endl ;
        }
        }
cout <<"Good work";
return 0;
}
```

Example4:

```
/*C++ program to draw an upper triangular*/
#include<iostream>
using namespace std;

int main()
{
```

```
int i,j,N;


cout<<"Enter an integer N : ";cin>>N;


for(i=1;i<=N;i++)
      {
      for(j=1;j<i;j++)
    cout<<" ";
      for(j=1;j<=N+1-i;j++)
    cout<<"*";
     cout<<endl;
      }
return 0;
}
```

Example5:

```
/*C++ program to draw lower triangular*/
#include <iostream>
using namespace std;
int main()
{
   int N=0;
   cout<<"Enter an intger N: ";
   cin>>N;
   cout<<endl<<endl;
```

```
   for(int i=0;i<N;i++)
   {
          for(int j=0;j<(N-i);j++)
         {
         cout<<"*";
         }
   cout<<endl;
   }
     cout << "Touch a botton to continue ..." << endl;
return 0;
}
```

Example6:

```
  // Summation of squared numbers from 1 to 10 using  do-while structure .
     #include <iostream>
     #include <cmath> // for using the function power two
     using namespace std;
     // function main begins program execution
     int main()
   {
      int sum = 0;                    // initialize sum
   int i=1;// initialize a counter
      // sum of squared integers from 1 through 10
      do
      {
```

```
      sum=sum + pow(i,2);// add squared of number to sum
      i++;
   }
      while (i<=10);

      cout << "Sum is " << sum << endl;  // output sum
      return 0;                    // successful termination
}   // end function main
```

Application concern increment-decrement operators

Example1:

```
#include<iostream>
using namespace std;
int main ()
{
int x=10;
cout<< x++<<"\n";
cout<<x<<"\n";
cout<<++x<<"\n";
cout<<x<<"\n";
cout<<x--<<"\n";
cout<<x<<"\n";
cout<<--x<<"\n";
cout<<x<<"\n";
return 0;
}
```