Object Oriented Programming Laboratory

Assignment – 4

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CSE-34

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Question 1:

```cpp
// Write a program to find the factorial of n natural numbers using default constructor.

#include<iostream>
using namespace std;

class factorial
{
    int num;
    int fact;
    public:
        factorial()
        {
            fact = 1;
        }
        void read_data(){
            cout<<"Enter a number: ";
            cin>>num;
        }
        void display()
        {
            cout<<"Factorial of "<<num<<" is "<<fact;
        }
        void calc();
};

void factorial::calc()
{
    for(int i=1;i<=num;i++)
    {
        fact=fact*i;
    }
}

int main()
{
    factorial f;
    f.read_data();
    f.calc();
    f.display();
    return 0;
}
```

Output:

```
PS C:\Users\KIIT01\Desktop\programming> cd "c:\Users\KIIT
1_default_const }
Enter a number: 7
Factorial of 7 is 5040
PS C:\Users\KIIT01\Desktop\programming\OOP\13 october>
```

Question 2:

```cpp
// Write a program to find the sum of n natural numbers using parameterized constructor.

#include<iostream>
using namespace std;

class sum
{
    int n;
    int s;
    public:
        sum();
        sum(int x)
        {
            s=x;
        }
        void get_data()
        {
            cout<<"Enter last number to add: ";
            cin>>n;
        }
        void display()
        {
            cout<<"Sum of numbers is "<<s;
        }
        void calc();
};

void sum::calc()
{
    for(int i=1;i<=n;i++)
    s+=i;
}

int main()
{
    int p;
    cout<<"Enter a number to start: ";
    cin>>p;
    sum num(p);
    num.get_data();
    num.calc();
    num.display();
    return 0;
}
```

Output:

```
PS C:\Users\KIIT01\Desktop\programming> cd "c:\Users\KIIT01\Desktop\programming\OOP\13 october\" ;
ra_const }
Enter a number to start: 3
Enter last number to add: 5
Sum of numbers is 18
PS C:\Users\KIIT01\Desktop\programming\OOP\13 october>
```

Question 3:

```cpp
// Write a program to demonstrate a copy constructor.

#include<iostream>
using namespace std;

class Copy{
    int a;
    int b;
    public:
        Copy(){
            cout<<"Defualt constructor invoked."<<endl;
        }
        Copy(int x,int y){
            a=x;
            b=y;
            cout<<"\nparameterized const executed\n values are: ";
            cout<<a<<" "<<b<<endl;
        }
        Copy(Copy &c){
            a=c.a;
            b=c.b;
            cout<<"\ncopy const executed\n values are: ";
            cout<<a<<" "<<b<<endl;
        }
        ~Copy(){
            cout<<"\nDestructor invoked."<<endl;
        }
};

int main(){
    Copy c1;
    Copy c2(10,20);
    Copy c3(c2);
    return 0;
}

```

Output:

```
PS C:\Users\KIIT01\Desktop\programming> cd "c:\Users\KIIT01\Desktop\programming\OOP\13 october\"
Defualt constructor invoked.

parameterized const executed
 values are: 10 20

copy const executed
 values are: 10 20

Destructor invoked.

Destructor invoked.

Destructor invoked.
PS C:\Users\KIIT01\Desktop\programming\OOP\13 october>
```

Question 4:

```cpp
/* Write a program using single inheritance to calculate the grade of the students, use the
 parent class person to read the name and use the child class to read three marks of the
 student and display the grade. */

#include<iostream>
using namespace std;

class person
{
    char name[20];
    int roll;
    public:
        void get_data()
        {
            cout<<"Enter name: ";
            cin>>name;
            cout<<"Enter roll number: ";
            cin>>roll;
        }
        void display_detail()
        {
            cout<<"Name: "<<name;
            cout<<"Roll number: "<<roll;
        }
};

class student: public person
{
    int m1,m2,m3;
    public:
        void read_marks()
        {
            cout<<"Enter marks of three subjects: ";
            cin>>m1>>m2>>m3;
        }
        void display()
        {
            cout<<"Marks: "<<m1<<", "<<m2<<", "<<m3<<endl;
            cout<<"Grade: ";
            int avg = (m1+m2+m3)/3;
            if(avg>=90)
                cout<<"O";
            else if(avg>=80)
                cout<<"E";
            else if(avg>=70)
                cout<<"A";
            else if(avg>=60)
                cout<<"B";
            else if(avg>=50)
                cout<<"C";
            else
                cout<<"F";
        }
};

int main()
{
    student s;
    s.get_data();
    s.read_marks();
    s.display_detail();
    s.display();
    return 0;
}
```

Output:

```
PS C:\Users\KIIT01\Desktop\programming> cd "c:\Users\KIIT01\Desktop
ritence } ; if ($?) { .\q4_inheritence }
Enter name: Yishap
Enter roll number: 21052960
Enter marks of three subjects: 78 86 81
Name: YishapRoll number: 21052960Marks: 78, 86, 81
Grade: E
PS C:\Users\KIIT01\Desktop\programming\OOP\13 october>
```