শিক্ষা নিয়ে গড়বো দেশ তথ্য-প্রযুক্তির বাংলাদেশ

Bangabandhu Sheikh Mujibur Rahman Digital University, Bangladesh

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LAB REPORT-05

COURSE NO.- PROG 112
COURSE TITLE- OBJECT ORIENTED PROGRAMMING SESSIONAL

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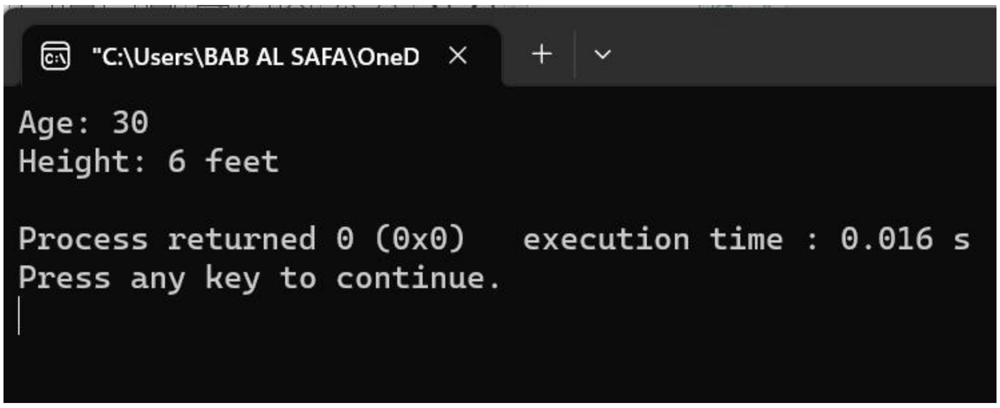
Problem No.: 01

Problem Name: Access Modifier in C++, Public & Private.

Code:

```
#include <iostream>
using namespace std;
class Human{
   private:
      int age;
      int height;
   public:
      Human(int ag, int h){
         age=ag;
         height=h;
      }
      void display(){
         cout<<"Age: "<<age<<endl;
         cout<<"Height: "<<height<<" feet"<<endl;
      }
};

int main() {
   Human h1(30, 6);
   //h1.age;//not accessible
   //h1.height;//not accessible
   h1.display();

   return 0;
}
```

Output:


"C:\Users\BAB AL SAFA\OneD

```
Age: 30
Height: 6 feet

Process returned 0 (0x0)   execution time : 0.016 s
Press any key to continue.
```

Fig 1.1: Output on console.

Explanation:

In this code, defined a class named Human with two private integer data members age and height. The class also has a public constructor and a public member function named display() to the age and height given to the constructor.

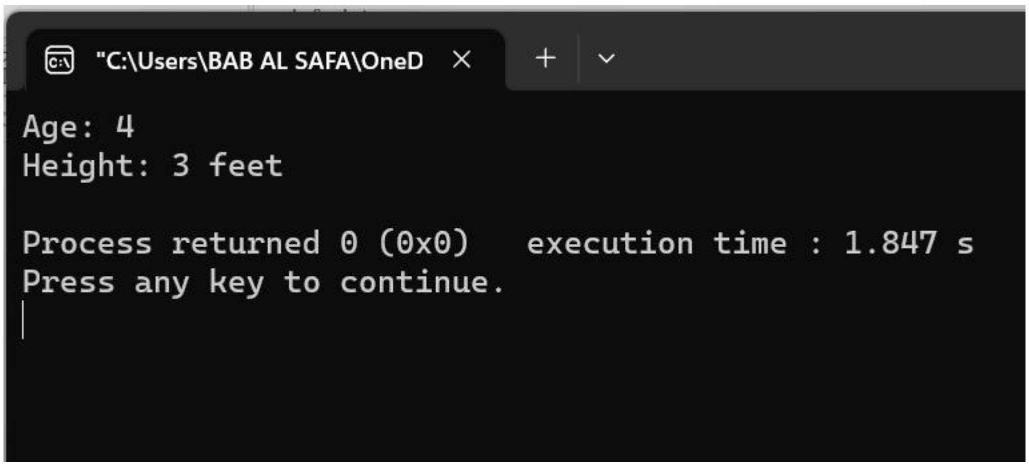
Problem No.: 02

Problem Name: Protected Access Modifier in C++.

Code:

```
#include <iostream>
using namespace std;
class Human{
   protected:
      int age;
      int height;

      Human(int ag, int h){
         age=ag;
         height=h;
      }
      void display(){
         cout<<"Age: "<<age<<endl;
         cout<<"Height: "<<height<<" feet"<<endl;
      }
};
class Child:public Human{
   public:
      Child(int ag, int h):Human(ag, h){

      }
      void display(){
         Human::display();
      }
};
int main() {
   Child c1(30, 6);
   //c1.age;//not accessible
   //c1.height;//not accessible
   c1.display();

   return 0;
}
```

Output:



```
Age: 4
Height: 3 feet

Process returned 0 (0x0)   execution time : 1.847 s
Press any key to continue.
```

Fig 2.1: Output on console.

Explanation:

In this code, there defined a class Human with protected member variables and functions that are inherited by Child class in public mode which is then accessed by the main function.

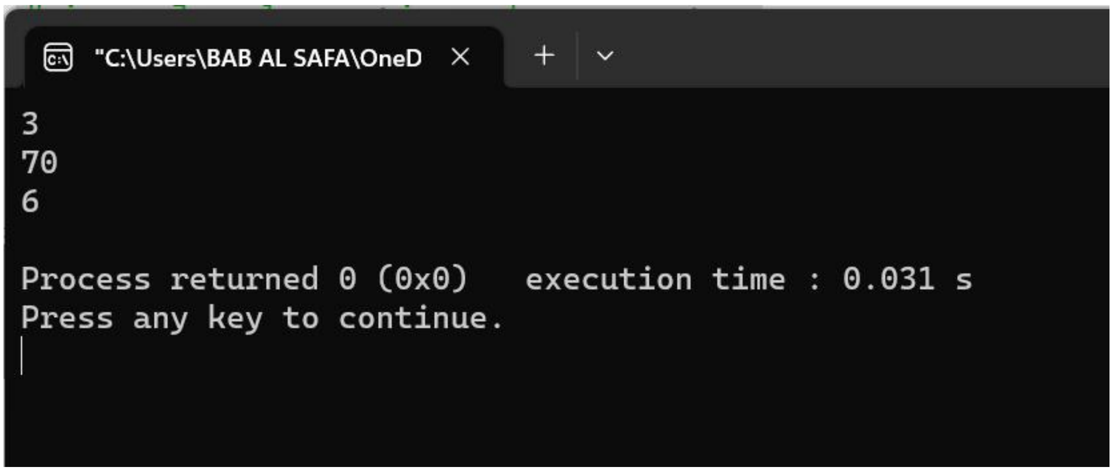
Problem No.: 03

Problem Name: Function Overloading in C++.

Code:

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

int add(int a, int b){
   return a+b;
}

int add(char a, int b){
   return a+b;
}

int add(int a, int b, int c){
   return a+b+c;
}

int main() {
   cout<<add(1,2)<<endl;
   cout<<add('D',2)<<endl;
   cout<<add(1,2,3)<<endl;

   return 0;
}
```

Output:



```
"C:\Users\BAB AL SAFA\OneD
3
70
6

Process returned 0 (0x0)   execution time : 0.031 s
Press any key to continue.
```

Fig 3.1: Output on console.

Explanation:

In this code, defined a function named add() and then overloaded it with different number of parameters and different types of parameters.

Problem No.: 04

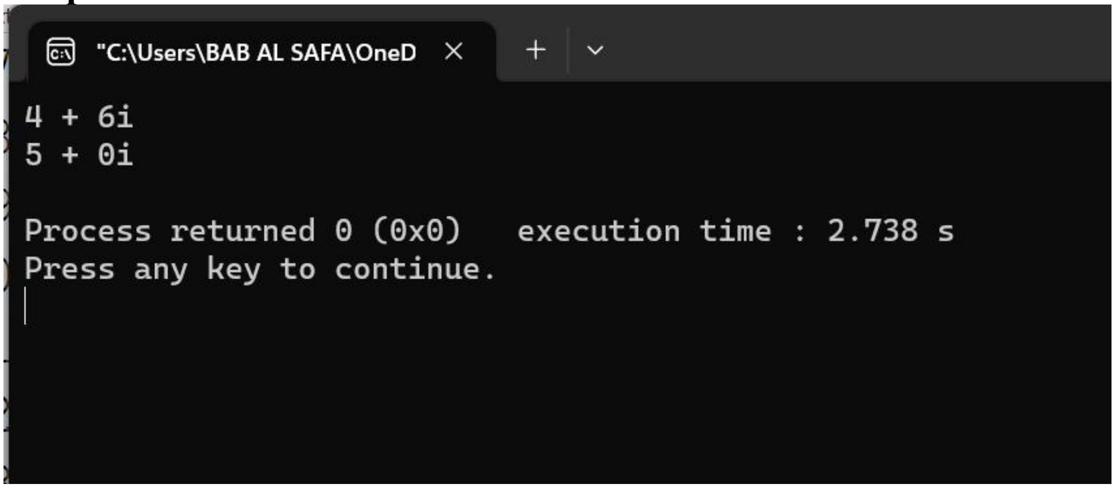
Problem Name: Constructor Overloading In C++.

Code:

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

class Complex
{
   int a, b;

public:
   Complex(){
      a = 0;
      b =0;
   }

   Complex(int x, int y)
   {
      a = x;
      b = y;
   }

   Complex(int x){
      a = x;
      b = 0;
   }



   void printNumber()
   {
      cout << a << " + " << b << "i" << endl;
   }
};

int main(){
   Complex c1(4,6);
```

```
    c1.printNumber();

    Complex c2(5);
    c2.printNumber();
    return 0;
}
```

Output:



```
4 + 6i
5 + 0i

Process returned 0 (0x0)   execution time : 2.738 s
Press any key to continue.
```

Fig 4.1: Output on console.

Explanation:

In this code, it is defined a class called Complex with a constructor, which is later overloaded by changing the parameters.

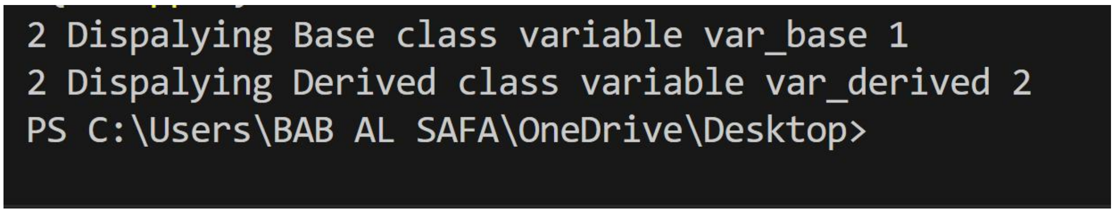
Problem No.: 05

Problem Name: Virtual Functions in C++ .

Code:

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

class BaseClass{
   public:
      int var_base=1;
       virtual void display(){
         cout<<"1 Dispalying Base class variable var_base "<<var_base<<endl;
      }
};

class DerivedClass : public BaseClass{
   public:
         int var_derived=2;
         void display(){
            cout<<"2 Dispalying Base class variable var_base "<<var_base<<endl;
                              cout<<"2  Dispalying  Derived  class  variable  var_derived
"<<var_derived<<endl;
         }
};

int main(){
   BaseClass *bptr;
   BaseClass b;
   DerivedClass d;
   bptr = &d;
   bptr->display();

   return 0;
}
```

Output:



```
2 Dispalying Base class variable var_base 1
2 Dispalying Derived class variable var_derived 2
PS C:\Users\BAB AL SAFA\OneDrive\Desktop>
```

Fig 5.1: Output on console

Explanation:

In this code, by creating a pointer of the base class pointing to the derived class, and by creating a virtual function in base class which was overridden n derived class, when that display() function is called via the base class, the display function of the derived class is being executed.

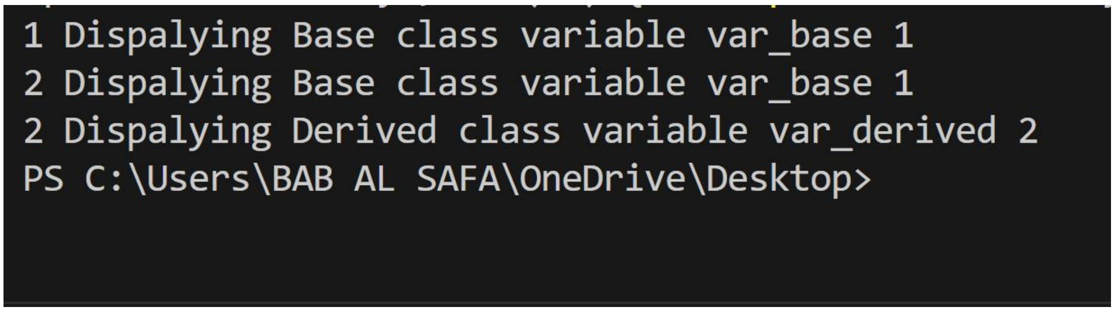
Problem No.: 06

Problem Name: Function overriding in C++.

Code:

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

class BaseClass{
    public:
        int var_base=1;
         void display(){
            cout<<"1 Dispalying Base class variable var_base "<<var_base<<endl;
        }
};

class DerivedClass : public BaseClass{
    public:
            int var_derived=2;
            void display(){
                cout<<"2 Dispalying Base class variable var_base "<<var_base<<endl;
                                cout<<"2  Dispalying  Derived  class  variable  var_derived
"<<var_derived<<endl;
            }
};

int main(){
    BaseClass b;
    DerivedClass d;
    b.display();
    d.display();

    return 0;
}
```

Output:



```
1 Dispalying Base class variable var_base 1
2 Dispalying Base class variable var_base 1
2 Dispalying Derived class variable var_derived 2
PS C:\Users\BAB AL SAFA\OneDrive\Desktop>
```

Fig 6.1: Output on console

Explanation:

In this code, derived function display() has been overridden. And based on which object is calling it, the function changes.

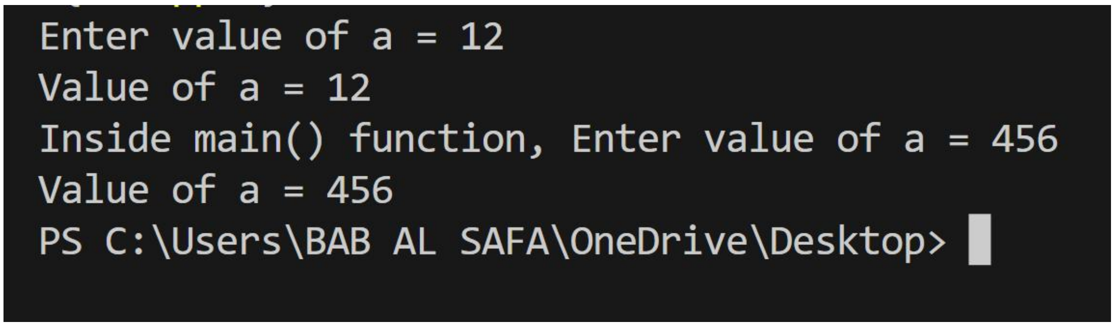
Problem No.: 07

Problem Name: Friend Functions in C++ .

Code:

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

void f();

class BaseClass{
   private:
      int a;

   public:
      void disp(){
         cout<<"Value of a = "<<a<<endl;
      }
      friend void f(BaseClass& b);
      friend int main();
};

void f(BaseClass& b){
   cout<<"Enter value of a = ";
   cin>>b.a;
}

int main(){
   BaseClass b;
   f(b);
   b.disp();
   cout<<"Inside main() function, Enter value of a = ";
   cin>>b.a;
   b.disp();
   return 0;
}
```

Output:



```
Enter value of a = 12
Value of a = 12
Inside main() function, Enter value of a = 456
Value of a = 456
PS C:\Users\BAB AL SAFA\OneDrive\Desktop>
```

Fig 7.1: Output on console

Explanation:

In this code, the main function and a non-member function of class BaseClass got access to it's private member a by declaring them as friend.