Institute of Computer Technology
B. Tech Computer Science and Engineering
Subject: ESFP-II (2CSE203)

PRACTICAL-8

AIM: - To learn about virtual function & Friend Function in C++.

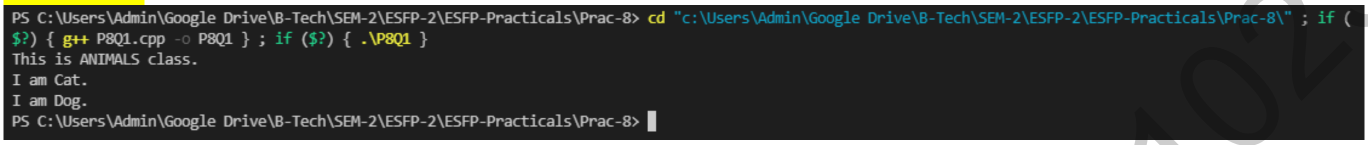
Exercise:

1. Create an animal class and also create another 2 child classes of animal class called cat & dog. All the defined classes has one common method named gettype(). Print the animal type as per class name using virtual functions.

CODE:

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

class Animal
{
   public:
   virtual void gettype()
   {
      cout<<"This is ANIMALS class."<<endl;
   }
};
class Cat:public Animal
{
   public:
   void gettype() override
   {
      cout<<"I am Cat."<<endl;
   }
};
class Dog:public Animal
{
   public:
   void gettype() override
   {
      cout<<"I am Dog."<<endl;
   }
};

int main()
{
   Animal A;
   A.gettype();
   Cat C;
   C.gettype();
   Dog D;
   D.gettype();
   return 0;
}
```

OUTPUT:



```
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8> cd "c:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8\" ; if (
$?) { g++ P8Q1.cpp -o P8Q1 } ; if ($?) { .\P8Q1 }
This is ANIMALS class.
I am Cat.
I am Dog.
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8>
```

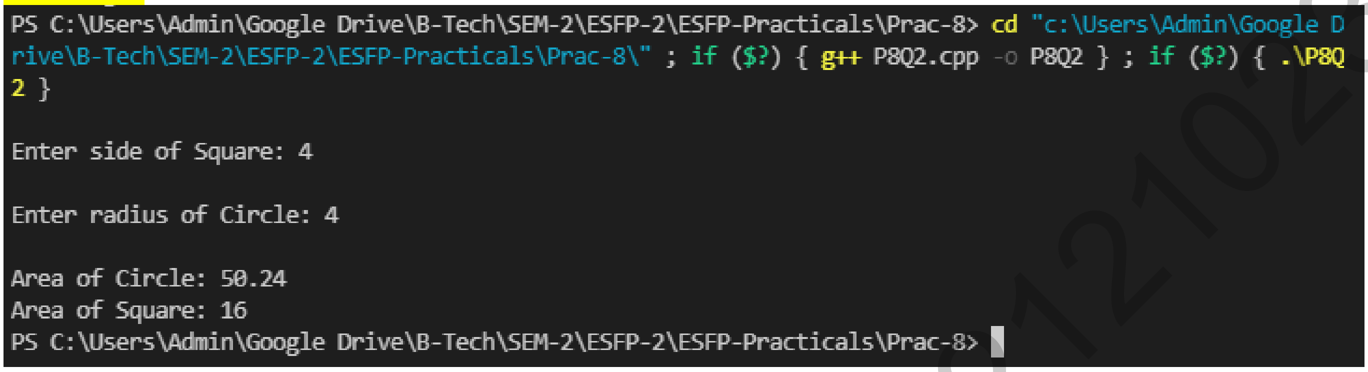
2. Create a program to calculate the area of a square and a circle using Abstract class & Pure virtual Function.

CODE:

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

class Shape
{
   public:
   virtual void CalcArea()=0;
};
class SquareCircle:public Shape
{
   public:
   int l,r;
   void CalcArea() override
   {
      float C_Area,S_Area;
      cout<<"\nEnter side of Square: ";
      cin>>l;

      cout<<"\nEnter radius of Circle: ";
      cin>>r;

      C_Area=3.14*r*r;
      S_Area=l*l;

      cout<<"\nArea of Circle: "<<C_Area;
      cout<<"\nArea of Square: "<<S_Area;
   }
};
int main()
```

```
{
   SquareCircle SC;
   SC.CalcArea();
   return 0;
}
```

OUTPUT:



```
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8> cd "c:\Users\Admin\Google D
rive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8\" ; if ($?) { g++ P8Q2.cpp -o P8Q2 } ; if ($?) { .\P8Q
2 }

Enter side of Square: 4

Enter radius of Circle: 4

Area of Circle: 50.24
Area of Square: 16
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8>
```

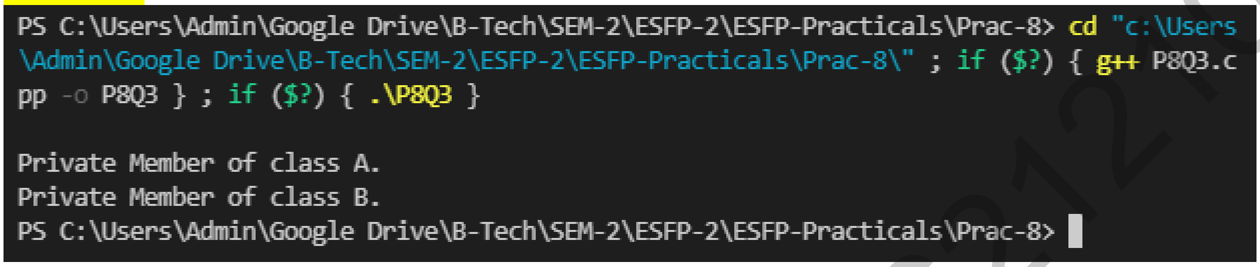
3. Create 2 classes A and B with common private data member function. How can we call that Private data member function of both classes from outside the class?

CODE:

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

class A {
   private:
      void FunA()
      {
         cout<<"\nPrivate Member of class A.";
      }

      friend void getData();
};

class B {
   private:
      void FunB()
      {
         cout<<"\nPrivate Member of class B.";
      }
      friend void getData();
};

void getData() {
   A Aobj;
   Aobj.FunA();
```

```
    B Bobj;
    Bobj.FunB();
}

int main() {
    getData();
    return 0;
}
```

OUTPUT:



```
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8> cd "c:\Users
\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8\" ; if ($?) { g++ P8Q3.c
pp -o P8Q3 } ; if ($?) { .\P8Q3 }

Private Member of class A.
Private Member of class B.
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8>
```

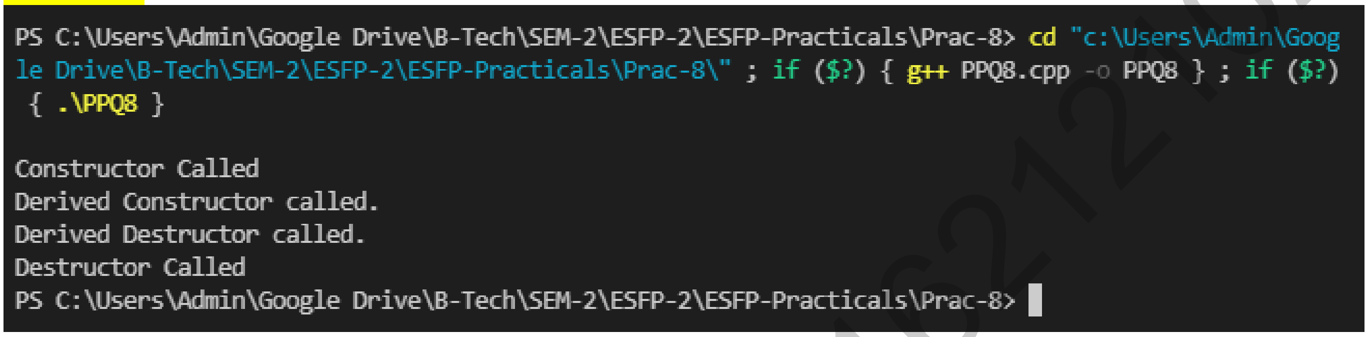
Post Practical Work

1. Demonstrate the use of virtual destructor using appropriate C++ code.

CODE:

```
#include<iostream>
using namespace std;
class Yash
{
    public:
    Yash()
{
    cout << "\nConstructor Called";
}
 virtual ~Yash()
{
    cout << "\nDestructor Called";
}
};

class Derived: public Yash
{
    public:
    Derived()
{
    cout << "\nDerived Constructor called." ;
}
 ~Derived()
{
    cout << "\nDerived Destructor called.";
 }
};
int main()
{
    Yash *p = new Derived;
    delete p;
}
```

OUTPUT:

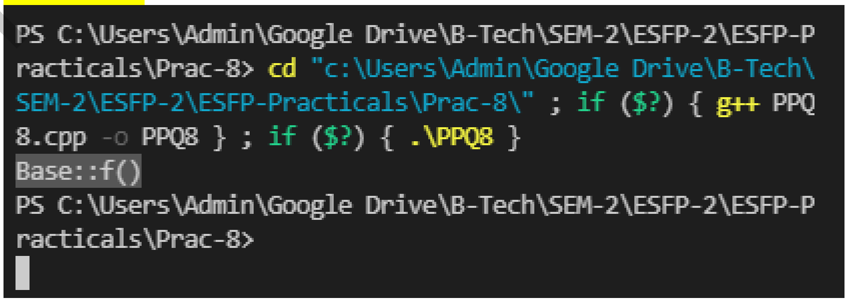


```
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8> cd "c:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8\" ; if ($?) { g++ PPQ8.cpp -o PPQ8 } ; if ($?) { .\PPQ8 }

Constructor Called
Derived Constructor called.
Derived Destructor called.
Destructor Called
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8>
```

2. What is the output of following C++ program?
class Base{
public:
void f(){
cout<<"Base::f()"<<endl;
}
};
class Derived:public Base{
public:
void f(){
cout<<"Derived::f()"<<endl; } }; int main(){ Base *d = new Derived(); d->f();
return 0;
}

A. Base::f()
B. Derived::f()
C. Base::f() Derived::f()
D. Compiler error

OUTPUT:



```
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8> cd "c:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8\" ; if ($?) { g++ PPQ8.cpp -o PPQ8 } ; if ($?) { .\PPQ8 }
Base::f()
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8>
```

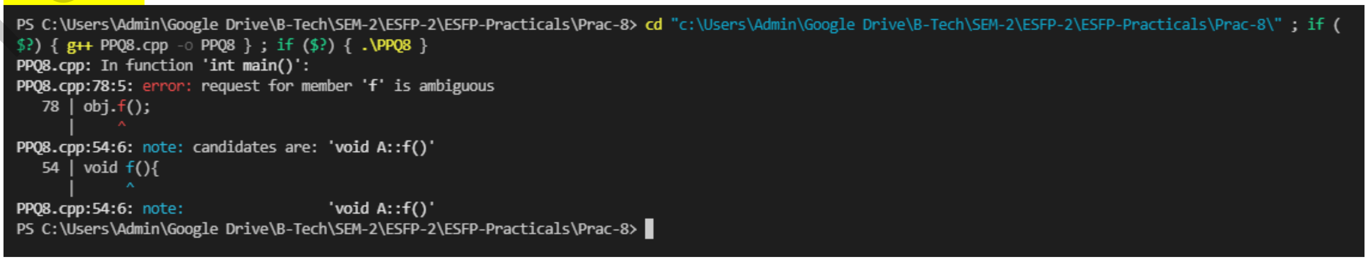
3. What is output of the following C++ program?

```
class A{
public:
void f(){
cout<<"A::f()"<<endl;
}
};
class B:public A{
public:
void fb(){
cout<<"A::fb()"<<endl;
}
};
class C:public A{
public:
void fc(){
cout<<"A::fc()"<<endl;
}
};
class D: public B,public C{
public:
void fd(){
cout<<"A::fd()"<<endl;
}
};
int main(){
D obj;
obj.f();
return 0;
}
```

A. A::f()
B. A::f() A::f()
C. A::f() A::f()

D. Compiler error

OUTPUT:



```
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8> cd "c:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8\" ; if (
$?) { g++ PPQ8.cpp -o PPQ8 } ; if ($?) { .\PPQ8 }
PPQ8.cpp: In function 'int main()':
PPQ8.cpp:78:5: error: request for member 'f' is ambiguous
   78 | obj.f();
      |     ^
PPQ8.cpp:54:6: note: candidates are: 'void A::f()'
   54 | void f(){
      |      ^
PPQ8.cpp:54:6: note:                 'void A::f()'
PS C:\Users\Admin\Google Drive\B-Tech\SEM-2\ESFP-2\ESFP-Practicals\Prac-8>
```