Abstraction

Abstraction:

Abstract classes are the way to achieve abstraction in C++.

Abstraction in C++ is the process to hide the internal details and showing functionality only.

Abstraction can be achieved by two ways:

* Abstract class
* Interface

Abstract class and interface both can have abstract methods which are necessary for abstraction.

Abstract class

In C++ class is made abstract by declaring at least one of its functions as <>strong>pure virtual function.

A pure virtual function is specified by placing "= 0" in its declaration.
Its implementation must be provided by derived classes.

Let's see an example of abstract class in C++ which has one abstract method draw().

Abstraction using classes:

An abstraction can be achieved using classes.

A class is used to group all the data members and member functions into a single unitby using the access specifiers.

A class has the responsibility to determine which data member is to be visible outside and which is not.

```
#include<bits/stdc++.h>
```

Example:

```
#include<string.h>
using namespace std;
class Student
{
  public:
    string name;
    int roll_no;
    string school_name = "ABC
matric. Hr. secondary school";

  public:
   void scl_name(){
        cout<<"school name :
"<<school_name<<endl;
    }

    virtual void print() = 0;
};

class student1 : public Student{
public:
    void print(){
        cout<<"Student1 name is : ";
        cin>>name;
        cout<<"Student1 roll no is :
"<<" ";
```

```
        cin>>roll_no;
    }
};
class student2 : public Student{
public:
    void print(){
        cout<<endl<<"Student2 name
is : "<<" ";
        cin>>name;
        cout<<"Student2 roll no is :
"<<" ";
        cin>>roll_no;
    }
};
int main(){
    Student *s;
    student1 s1;
    s = &s1;

    s->print();
    s->scl_name();

    student2 s2;
    s = &s2;

    s->print();
    s->scl_name();

}
```

Output:

```
Student1 name is : Akash
Student1 roll no is : 231
school name : "ABC matric.
Hr. secondary school"

Student1 name is : Dinesh
Student1 roll no is : 232
school name : "ABC matric.
Hr. secondary school"
```

Interface:

An another type of abstraction is header file.

For example, pow() function available is used to calculate the power of a number without actually knowing which algorithm function uses to calculate the power.

Thus, we can say that header files hides all the implementation details from the user.

In the example, pow() function is used to calculate 4 raised to the power 3.

The pow() function is present in the math.h header file in which all the implementation details of the pow() function is hidden.

Example:

```
#include <iostream>
#include<math.h>
using namespace std;
int main()
{
    int s = 4;
    int power = 2;
    int result = pow(s,power);
    std::cout << "Square of s is : "
<<result<< std::endl;
    return 0;
}
```

output:

Square of s is : 16