

ABSTRACT CLASSES

1. abstract keyword is used to make a class abstract.

```
abstract class A { }
```

2. cannot be instantiated. It is created to be inherited.

```
abstract class A { }
```

```
A ob = new A(); //error
```

```
class B extends A { } //inheritance
```

3. It must contain **at least one** abstract method. (Abstract method is a method with empty method body)

```
abstract class A {  
    abstract void xyz() {}  
}
```

4. An abstract class can contain fully implemented methods

```
abstract class A {  
    abstract void xyz() {}  
    void abc() { ----- } //fully implemented method  
}
```

5. Each subclass of an abstract class must override and provide implementation of the abstract methods of the super class. If not, the subclass must also be declared abstract. (B must override xyz(). If not, then B must be declared abstract)

```
abstract class A {  
    abstract void xyz() {}  
}  
  
class B extends A  
{ void xyz() { ----- }  
}
```

6. Abstract classes can have variables and constructors

```

abstract class A
{ int i,j;
  public A() { i=10; j=20;}
  abstract void abc() { }
  public void xyz()
  { System.out.println(" Non abstract method");}
}
}

```

Program to demonstrate abstract classes

Write a java program to create the following classes:-

- i) Create a class Figure with 2 variables dim1 and dim2 to store its dimensions and initialize the variables through its constructor. Include an abstract method area()
- ii) Create a class Rectangle which inherits Figure and implements the abstract method area()
- iii) Create a class Triangle which inherits Figure and implements the abstract method area()
- iv) Create a class Demo which contains the main method and calls area for Rectangle and Triangle

```

abstract class Figure
{ double dim1,dim2;
  public Figure(double a ,double b)
  { dim1 = a;
    dim2=b;
  }
  abstract void area() { }
}

```

class Rectangle extends Figure

```

{ public Rectangle(double a ,double b)
  { super(a,b); }
}

```

```
void area()
{ System.out.println("The area of the rectangle is" +(dim1*dim2));
}
}
```

```
class Triangle extends Figure
{ public Triangle(double a ,double b)
    { super(a,b); }
  void area()
  { System.out.println("The area of the triangle is" +(dim1*dim2)/2);
  }
}
```

```
class Demo
{public static void main(String args[])
  { Rectangle r = new Rectangle(13500, 3450);
    r.area(); // Rectangles area()
    Triangle t = new Triangle(45,32);
    t.area(); //Triangle's area()
  }
}
```

Difference between class and abstract class

class	Abstract class
Can be instantiated	Cannot be instantiated
Does not contain abstract methods	Must have at least one abstract method
No keyword is used	abstract keyword is used
No compulsory overriding	Compulsory overriding (refer pt 5)
It is not created to be inherited	It is created to be inherited