

# The **abstract** Keyword in Java

## 1. Introduction

**abstract** keyword Java te use hoy **abstract classes and abstract methods** declare kortei  
Abstract class **complete implementation provide kore na**, kintu **child class** ke method implement korte  
obligate korei

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## 2. Uses of **abstract** Keyword

1. **Abstract Class** – class er kuch part incomplete thake
  2. **Abstract Method** – method er body na thake, sirf signature thake
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## 3. Abstract Class and Abstract Method

```
abstract class Animal {  
    abstract void sound(); // abstract method  
  
    void eat() { // normal method  
        System.out.println("Animal eats food");  
    }  
}  
  
class Dog extends Animal {  
    @Override  
    void sound() { // provide implementation  
        System.out.println("Dog barks");  
    }  
}  
  
public class TestAbstractClass {  
    public static void main(String[] args) {  
        Dog d = new Dog();  
        d.sound(); // overridden method  
        d.eat(); // normal method from parent  
    }  
}
```

**Output:**

Dog barks  
Animal eats food

## 4. Rules for Abstract Classes and Methods

1. **Abstract class cannot be instantiated!**
2. **Abstract method must be implemented in child class!**
3. Abstract class can have normal methods!
4. **Abstract + concrete methods** same class e thakte pare!
5. **Child class override** kore **all abstract methods** na korle, child class o abstract hote hobe!

## 5. Example: Multiple Abstract Classes

```
abstract class Shape {  
    abstract void draw();  
}  
  
abstract class Polygon extends Shape {  
    void color() {  
        System.out.println("Polygon color is blue");  
    }  
}  
  
class Triangle extends Polygon {  
    @Override  
    void draw() {  
        System.out.println("Drawing triangle");  
    }  
}  
  
public class TestAbstractHierarchy {  
    public static void main(String[] args) {  
        Triangle t = new Triangle();  
        t.draw();  
        t.color();  
    }  
}
```

**Output:**

Drawing triangle  
Polygon color is blue

## 6. Summary Table

Feature	Description	Example
Abstract Class	Cannot instantiate	abstract class Animal
Abstract Method	No body, must override	abstract void sound()
Concrete Method	Can exist in abstract class	void eat()
Child Obligation	Must implement all abstract methods	Dog implements sound()

## 7. Points to Remember

1. Abstract keyword **partial abstraction** provide korel
2. Abstract classes can have **constructors, variables, and methods!**
3. Use abstract classes to **define common behavior** and **force implementation** in child classes!
4. Java **does not allow abstract methods in final classes!**