

## Defining a class

Classes are defined with **class** keyword followed by <class-name>. Class names should start with capital letter.

### Syntax:

```
1 class <class_name>    //you can use any name for your class except keywords
2 {
3     //body of class
4     //define variables here that will be shared between objects of this class
5 }
```

### Example 1: A simple class named Student

```
1 class Student
2 {
3     String name;
4     int rollNo;
5 }
```

## Creating objects

In java **new** keyword is used to create an object.

### Syntax:

```
<class_name> object_name = new <class_name>();
```

### Example 2: Creating object of our Student class

```
Student st = new Student();
```

## Accessing variables defined inside a class

OR

### What is .(dot) operator in java? And how to use it?

.(dot) is an operator. It is used to access variables defined in a class through its object. **We cannot directly access** these variables.

### Syntax:

```
object-name.variable = value;
```

### Example 3: Create an object of Student class and give values to variables defined in this class.

```
1 Student obj = new Student();
2 obj.name = "Rohit";
3 obj.rollNo = 5;
4 System.out.println(obj.name);
5 System.out.println(obj.rollNo);
```

### Output:

Rohit  
5

**Explanation:** In this example we are accessing the variable "name" and "rollNo" with dot operator and assigning values to them. Now name is Rohit and rollNo is 5.

## Default values of variables in class

After object creation every variables gets initialized with default value based on its data type.

Data type	Default value
boolean	false
char	'\u0000'
int	0
double	0.0
Any reference type (eg. String)	null

### Example 4: Default Values

```
1 Student obj = new Student();
2
3 System.out.println(obj.name);           //before any values are assigned
4 System.out.println(obj.rollNo);
5
6 obj.name = "Vivek";                     //after giving values
7 obj.rollNo = 50;
8
9 System.out.println(obj.name);
10 System.out.println(obj.rollNo);
```

### Output:

null  
0  
Vivek  
50

Problem 1	Based on the class given below. Give answers for the code segments that follows.
Calculate	Note: Explanation of each answer is mandatory.
<b>Class</b>	
<pre>1 class Calculate 2 { 3     int a, b, c; 4 }</pre>	
<b>Code 1.1</b>	
<pre>1 Calculate cal = new Calculate(); 2 cal.a = 5; 3 cal.b = 13; 4 int result = cal.a + cal.b; 5 System.out.println(result);</pre>	

**Code 1.2**

```
1 Calculate cal = new Calculate();
2 int num = 3;
3 cal.a = 5 * num;
4 System.out.println(cal.a + "::" + cal.b + "::" + cal.c);
```

**Code 1.3**

```
1 Calculate cal = new Calculate();
2 cal.a = 17;
3 cal.b = 7;
4 cal.c = 6;
5 cal.c = cal.c + cal.a + cal.b;
6 System.out.println(cal.a + "::" + cal.b + "::" + cal.c);
```

## Creating multiple objects of a class

Just like variables you can create multiple objects.

### Example 5: Multiple Objects

**Class:**

```
1 class StudentWithMarks
2 {
3     String name;
4     int marks;
5     int rollNo;
6 }
```

**Code:**

```
1 StudentWithMarks st1, st2;
2 st1 = new StudentWithMarks();
3 st2 = new StudentWithMarks();
4
5 st1.name = "Sanchit";
6 st1.rollNo = 10;
7 st1.marks = 90;
8
9 st2.name = "Mohit";
10
11 System.out.println(st1.name);
12 System.out.println(st1.rollNo);
13 System.out.println(st1.marks);
14
15 System.out.println(st2.name);
16 System.out.println(st2.rollNo);           //default value
17 System.out.println(st2.marks);           //default value
```

**Output:**

Sanchit

10  
90  
Mohit  
0  
0

Problem 2	Based on the class given below. Give answers for the code segments that follows.
Person	Note: Explanation of each answer is mandatory.
<b>Class</b>	
<pre> 1  class Person 2  { 3      int age; 4      String name; 5  }</pre>	
<b>Code 2.1</b>	
<pre> 1  Person person; 2  person = new Person(); 3  person.age = 18; 4  System.out.println(person.name); 5  System.out.println(person.age);</pre>	
<b>Code 2.2</b>	
<pre> 1  Person person1, person2; 2  person1 = new Person(); 3  person2 = new Person(); 4  person1.age = 18; 5  person1.name = "Rakesh"; 6  person2.name = "Jatin"; 7  person2.name = person1.name; 8  person2.age = person1.age + 5; 9  System.out.println(person2.name); 10 System.out.println(person2.age);</pre>	

Problem 3	Based on the class given below. Give answers for the code segments that follows.
Point	Note: Explanation of each answer is mandatory.
<b>Class</b>	
<pre> 1  class Point 2  { 3      int x; 4      int y; 5  }</pre>	
<b>Code 3.1</b>	

```
1 Point p1 = new Point();
2 p1.x = 4;
3 p1.y = 4;
4 Point p2 = new Point();
5 p2.y = 7;
6 p2.x = 4;
7 Point p3 = new Point();
8 p3.x = p1.y - p2.y;
9 p3.y = p1.x + p2.x;
10 System.out.println(p3.x);
11 System.out.println(p3.y);
```

**Code 3.2**

```
1 Point p1, p2;
2 p1 = new Point();
3 p2 = new Point();
4
5 p1.x = 4;
6 p1.y = 7;
7
8 p2.x = p1.x + 1;
9 p2.y = p1.y + 3;
10
11 System.out.println("P1:: " + p1.x + ", " + p1.y);
12 System.out.println("P2:: " + p2.x + ", " + p2.y);
13
14 p1.x = p1.x + p2.x;
15 p1.y = p1.y - p2.y;
16
17 System.out.println("P1:: " + p1.x + ", " + p1.y);
18 System.out.println("P2:: " + p2.x + ", " + p2.y);
```

**Example 6: Create a class Point that contains two fields x and y of type int.**

```
1 class Point
2 {
3     int x;
4     int y;
5 }
```

**Example 7: Create two objects of class Point. Give them random values and print these values**

```
1 Point p1 = new Point();
2 p1.x = 4;
3 p1.y = 1;
4
5 Point p2 = new Point();
6 p2.x = 6;
7 p2.y = 5;
8
```

```

9  System.out.println("Point 1 = " + p1.x + ", " + p1.y);
10 System.out.println("Point 2 = " + p2.x + ", " + p2.y);

```

**Output:**

```

Point 1 = 4, 1
Point 2 = 6, 5

```

**Example 8: Create another object of Point class. This object should be the mid-point of objects created in example 7.**

```

1  Point p3 = new Point();
2  p3.x = (p1.x + p2.x) / 2;
3  p3.y = (p1.y + p2.y) / 2;
4  System.out.println("Mid Point = " + p3.x + ", " + p3.y);

```

**Output:**

```

Mid Point = 5, 3

```

<b>Problem 4.1</b>	<b>Create a class Rectangle and takes two variable length and width of int type.</b>
<b>Rectangle</b>	
<b>Problem 4.2</b>	<b>Create an object of our Rectangle class and assign some values to the variables.</b>
<b>Problem 4.3</b>	<b>Print values of the object created in the previous step.</b>

<b>Problem 5.1</b>	<b>Create a class Teacher having variables name and subject of type String.</b>
<b>Teacher</b>	
<b>Problem 5.2</b>	<b>Create a teacher with name Rita and subject Maths.</b>
<b>Problem 5.3</b>	<b>Create another teacher with name and subject of your choice.</b>
<b>Problem 5.4</b>	<b>Print details of two teachers created in the previous steps.</b>