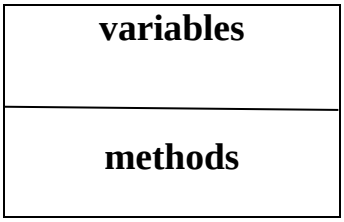
OBJECT

Object

- **It is a block of memory which can have multiple variables and methods in it.**
- **Every object will have a reference.**

reference



Why do we need an object?

- **Object is a heterogeneous collection of data.**
- **We need an object to represent a real-world object in software world.**
- **The variables represent the properties of an object and methods represent the actions performed by an object.**

Book

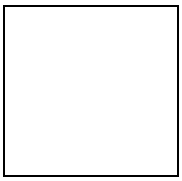
title

author

price

Real world:

B1



Harry Potter

J K Rowling

1250

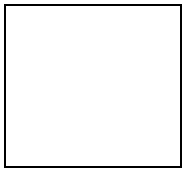
B2

Titanic

Cameron

800

B3



Java

Smith

900

Software world:

0x1

title: Harry Potter
author: JK Rowling
price: 1200

0x2

title: Titanic
author: Cameron
price: 800

0x3

title: Java
author: Smith
price: 900

To use these properties, we must know the address.

Eg1: to print title of 3rd book

```
s.o.pln(0x3.title);
```

Eg2: to print price of 2nd book

```
s.o.pln(0x2.price);
```

Eg3: to increase the price of 2nd book by 50%

```
0x2.price = 0x2.price*1.5;
s.o.pln(0x2.price);
```

Object creation

To create an object 'Blueprint' is necessary.

Blueprint

It provides specification for an object like variable declaration statements, method declaration etc.

In Java, we can create blueprint using 'class'.

class

It is a component in Java.

Purpose of a class

1. **To execute an application.**
2. **It acts as a blueprint for an object.**

Steps to create object

Step 1: Create a class or use the existing class.

Step 2: Create an object for the class using:

- **new operator**
- **constructor**

Syntax to create an object

```
   new       className( )
operator     constructor
```

new

- **It is a unary operator.**
- **new creates a block of memory in the heap area during the execution of java program.**
- **new do runtime memory allocation.**
- **new operator returns reference(address) of the block (object) created.**

Constructor

It is a special non-static member of a class, whose name is same as class name.

Purpose of constructor

It is used to load and initialize non-static member of the class into the object.

Note:

- **We can create object of one class inside same class or inside another class.**
- **For a class we create 'n' number of objects.**

Reference variable

- **The variable used to store the address of an object is known as reference variable.**
- **It can also be called as Non-primitive variable.**
- **We can create reference variable with the help of non-primitive datatype (class name).**
- **We can store default value (null) or the reference of an object of same class type in it.**

To store reference of an object in the reference variable

class Book{

}

Type 1 Declare and initialize in 2 lines	Type 2 Declare and initialize in 1 line
Book b1; **b1 = new Book();**	**Book b1 = new Book();**

Creating multiple objects for a class

```
 1 package com.object;
 2
 3 public class Book {
 4●      public static void main(String[] args) {
 5          Book b1= new Book();
 6          Book b2= new Book();
 7          Book b3= new Book();
 8          System.out.println(b1);
 9          System.out.println(b2);
10          System.out.println(b3);
11          System.out.println(b1==b2);
12      }
13  }
```

Problems Declaration Console ×

<terminated> Book (5) [Java Application] C:\Program Files\Java\jdk-17.0.2\bin\javaw.exe (28-May-2024, 12:25

```
com.object.Book@3fee733d
com.object.Book@5acf9800
com.object.Book@4617c264
false
```

Object referred by multiple reference variables

```
2
3 public class Book {
4     public static void main(String[] args) {
5         Book b1 = new Book();
6         Book b2 = b1;
7         Book b3 = b2;
8         System.out.println(b1);
9         System.out.println(b2);
10        System.out.println(b3);
11        System.out.println(b1==b2);
12    }
13  }
```

Problems | Declaration | Console ×

<terminated> Book (5) [Java Application] C:\Program Files\Java\jdk-17.0.2\bin\javaw.exe (28-May-2024, 3:33:44 pm –

```
com.object.Book@3fee733d
com.object.Book@3fee733d
com.object.Book@3fee733d
true
```

Non-static variable

Variable declared inside the class block without prefixed with 'static' keyword is known as non-static variable.

Eg1: class Book{

double price;

}

Eg2: class Phone{

String brand;

int ram;

}

Eg3: class Demo{

{

int i; → not a non-static variable

```
    }
}
```

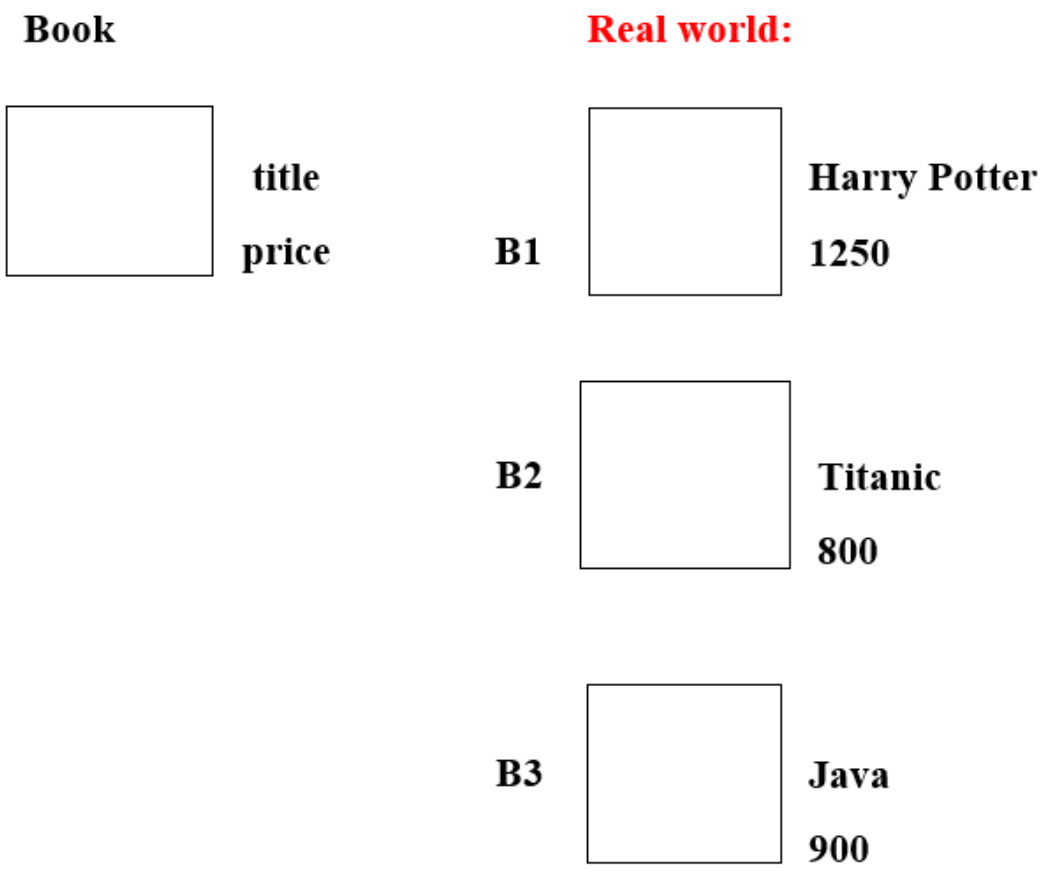
Characteristics of non-static variable

1. **Memory for the non-static variable is allocated inside the object, so it is also called as instance/object variable.**
2. **We cannot use a non-static variable without object of the class i.e. object creation is mandatory.**
3. **Non-static variable will be allocated once in every object of the class created.**
4. **Non-static variables are initialized with default values.**
5. **We can use a non-static variable only with the help of object reference.**

Note:

We need non-static variable to store the data of the real-world object.

Working with non-static variable



Write a Java program to store the data of these real-world book objects.

First, we need to create blueprint:

```java
package com.object;

public class Book {
	String title;
	double price;
  }


```

Second, create objects for Book class and then store the data by using the reference and non-static variable.

```java
package com.object;

public class BookDriver {

    public static void main(String[] args) {
        Book b1 = new Book();
        Book b2 = new Book();
        Book b3 = new Book();
        System.out.println(b1.title);
        System.out.println(b1.price);
        b1.title = "Harry Potter";
        b1.price = 1200;

        b2.title = "Titanic";
        b2.price = 800;

        b3.title = "Java";
        b3.price = 900;

        System.out.println(b1.title);
        System.out.println(b1.price);
        System.out.println(b2.title);
        System.out.println(b2.price);
        System.out.println(b3.title);
        System.out.println(b3.price);

    }
}
```

```
<terminated> BookDriver [Ja
null
0.0
Harry Potter
1200.0
Titanic
800.0
Java
900.0
```