

Classes and objects I

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Agenda

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2. *
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Creating a Class

- A class is a technique of using one or a group of variables to be used as a foundation for a more detailed variable.
- To create a class, you start with the **class** keyword followed by a name and its body delimited by curly brackets.

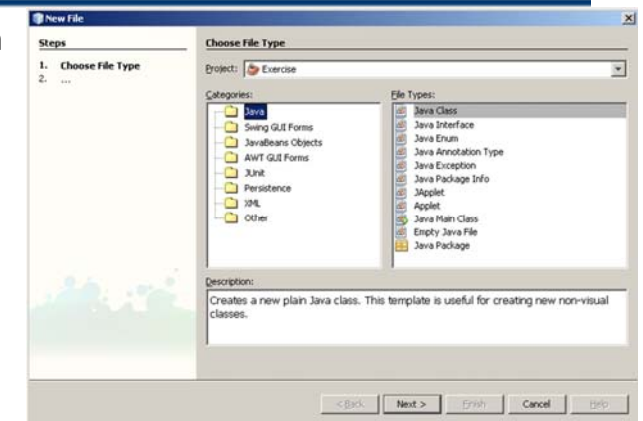
```
class House  
{  
}
```

- A class is created in a code file. As such, you can include it in the first file of your project.

```
1  /*...*/  
5  package lecture0401;  
6  
7  /*...*/  
11 public class Lecture0401 {  
12  
13     /*...*/  
16     public static void main(String[] args) {  
17         // TODO code application logic here  
18     }  
19  
20     class House  
21     {  
22  
23  
24 }
```

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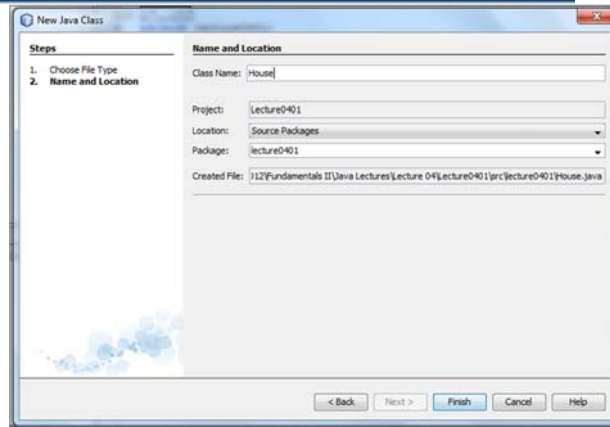
- You can also create a class in its own file.
- On the main menu, click File -> New File...
- On the File toolbar, click the New File button
- Type class name "House2"



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Declaring a Variable of a Class Type

- A new file contains “House2” class in created



```
1  [ ] /*...*/
5  package lecture0401;
6
7  [ ] /*...*/
11 public class House2 {
12
13 }
14
```

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- Like any normal variable, to use a class in your program, you can first declare a variable for it like the variables we introduced before.
- This is not a value variable, it's an object variable.
- So you need another line, to allocate memory for it using the **new** operator.

```
1  [ ] /*...*/
5  package lecture0401;
6
7  [ ] /*...*/
11 public class Lecture0401 {
12
13 [ ] /*...*/
16 public static void main(String[] args) {
17     House property;;
18 }
19
20 class House1
21 {
22
23 }
```

```
1  [ ] /*...*/
5  package lecture0401;
6
7  [ ] /*...*/
11 public class Lecture0401 {
12
13 [ ] /*...*/
16 public static void main(String[] args) {
17     House1 property1;
18     property1=new House1();
19 }
20
21 class House1
22 {
23
24 }
```

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Sharing a Class

- You can do the both steps in a single line

```
1  [ ] /*...*/
5  package lecture0401;
6
7  [ ] /*...*/
11 public class Lecture0401 {
12
13 [ ] /*...*/
16 public static void main(String[] args) {
17     House1 property1;
18     property1=new House1();
19     House1 property2 = new House1();
20 }
21 }
22 class House1
23 {
24
25 }
```

- When creating a class, if you want it to be accessible by code in other files (packages), precede the **class** keyword with **public** when creating it.
- If the **class** keyword is preceded by **public**, the class must be created in its own file.

Class' Member Variables

- The section between the curly brackets, { and }, of a class is referred to as its body.
- In the body of a class, you can create a list of the parts that make up the class.
- Each of these parts must be a complete variable with a name and a data type.
- For example, here are the characteristics that make up a house,

```
25 class House {
26
27     long propertyNumber;
28     String propertyType;
29     byte Stories;
30     public int Bedrooms;
31     double MarketValue;
32 }
33
```

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Initializing an Object

- After declaring an instance of a class, you can access each of its members and assign it the desired value.

```
public static void main(String[] args) {
    House property = new House();
    property.propertyNumber = 283795;
    property.propertyType = "Single Family";
    property.Bedrooms = 4;
    property.MarketValue = 652880;
}
```

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- Once a member variable has been initialized, you can use the dot operator to access it and retrieve its value:

```
public static void main(String[] args) {
    House property = new House();
    property.propertyNumber = 283795;
    property.propertyType = "Single Family";
    property.Bedrooms = 4;
    property.MarketValue = 652880;
    System.out.println("Altair Realty");
    System.out.println("Properties Inventory");
    System.out.println("Property #: " + property.propertyNumber);
    System.out.println("Property Type: " + property.propertyType);
    System.out.println("Bedrooms: " + property.Bedrooms);
    System.out.println("Market Value: " + property.MarketValue);
}
```

Lecture0401

check Lab manual

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The Methods of a Class

- A method is simply a section of code that takes care of a particular detail for the functionality of the class.
- To create a method, you specify its name, which follows the rules we defined for **variables**.

```
20
21 class House {
22
23     long propertyNumber;
24     String propertyType;
25     byte Stories;
26     public int Bedrooms;
27     double MarketValue;
28
29     void Display() {
30     }
31 }
```

- After creating a method, in its body delimited by its curly brackets, you can define the desired behavior.

```
29 void Display() {
30     System.out.println("Altair Realty");
31     System.out.println("Properties Inventory");
32     System.out.println("Property Type: " + propertyType);
33     System.out.println("Bedrooms: " + Bedrooms);
34 }
35 }
```

Lecture0402

Check Lab manual

Lecture0403

Check Lab manual

The Static Members of a Class

“Static Fields”

- A variable you have declared of a class is also called an instance of the class.
- In the same way, you can declare various instances of the same class as necessary:
- Each one of these instances gives you access to the members of the class but each instance holds the particular values of the members of its instance.

```
Book book1= new Book();  
Book book2= new Book();
```

lecture0404

Check Lab manual

-
- In your application, you can declare a class member and refer to it regardless of which instance of an object you are using. Such a member variable is called static.
 - To declare a member variable of a class as static, type the **static** keyword on its left.
 - Whenever you have a static member, in order to refer to it, you must "qualify" it in the class in which you want to call it.
 - Qualifying a member means you must specify its class.

Lecture0405

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Lecture0406

- you don't need to declare a variable of their class in order to access them.

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Lecture0407

- You can also declare member variables of the main class as static.
- If you are referring to a static member variable in the same class in which it was declared, you don't have to qualify it.

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The Static Members of a Class

Static Methods

- Like a member variable, a method of a class can be defined as static.
- Consequently, this particular method can access any member of the class regardless of the instance if there are many instances of the class declared.

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Lecture0408

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Characteristics of Members of a Class

Constants

- You can create a constant variable in a class. To create a constant variable, type the **final** keyword to the left of the variable.
- Once again, when declaring a constant, you must initialize it with an appropriate constant value.

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Characteristics of Members of a Class

this Instance

- If a class contains member variables and methods, the (non-static) member variables are automatically available to the method(s) of the class, even member variables that are private.
- When accessing a member variable or a method from another method of the class, to indicate that the member you are accessing belongs to the same class, you can precede it with the **this** member and the period operator.
- When using the **this** member variable (in C/C++, it is a pointer), you can access any member of a class within any method of the same class.

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There are rules you must observe when using **this**:

- The **this** member can never be declared: it is automatically implied when you create a Class **this** cannot be used in a class A to access a member of class B.
- **this** cannot be used in a **static** method

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Lecture0410

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Lecture0411 (Class methods)

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Lecture0412 (Class methods)

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Lecture0413 (Methods' Arguments)

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Thanks,
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