



Fundamentals of Object Oriented Programming

CSN- 103

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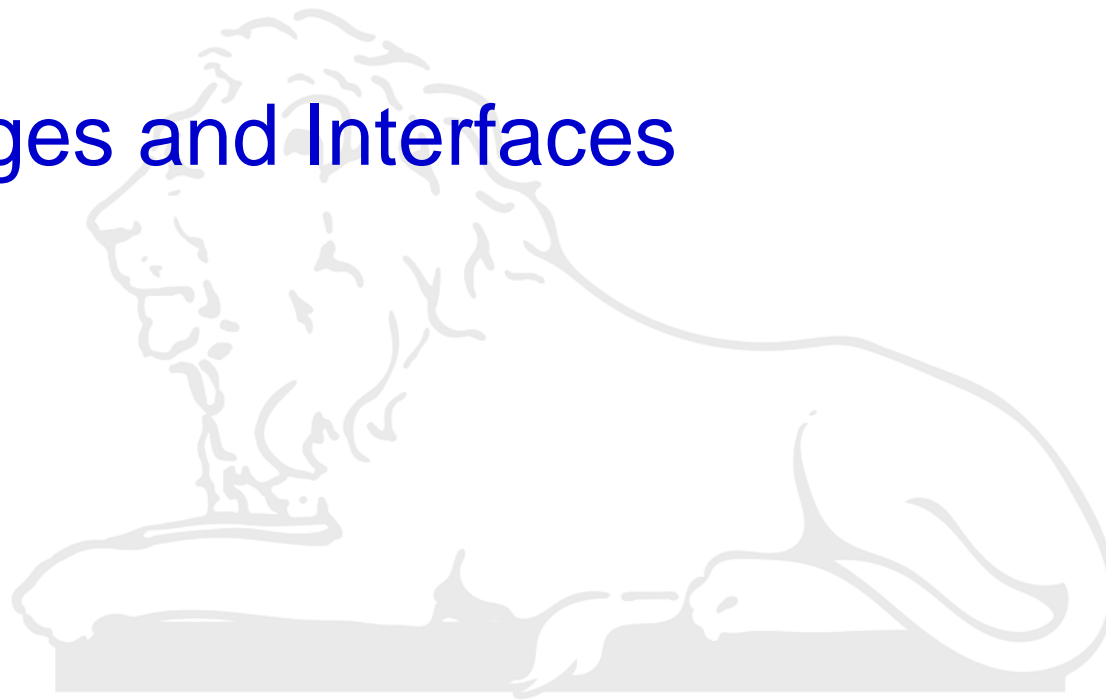
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<https://sites.google.com/site/balaiiitr/>



- Packages and Interfaces





Simple Example of Java Package

```
1 package mypack;  
2 public class Simple{  
3     public static void main(String args[]){  
4         System.out.println("Welcome to CSN-103, IIT Roorkee to learn the concept of package");  
5     }  
6 }
```

Terminal

```
sh-4.3$ javac -d . Simple.java  
sh-4.3$ java mypack.Simple  
Welcome to CSN-103, IIT Roorkee to learn the concept of package  
sh-4.3$
```

- <http://goo.gl/jBRYHT>

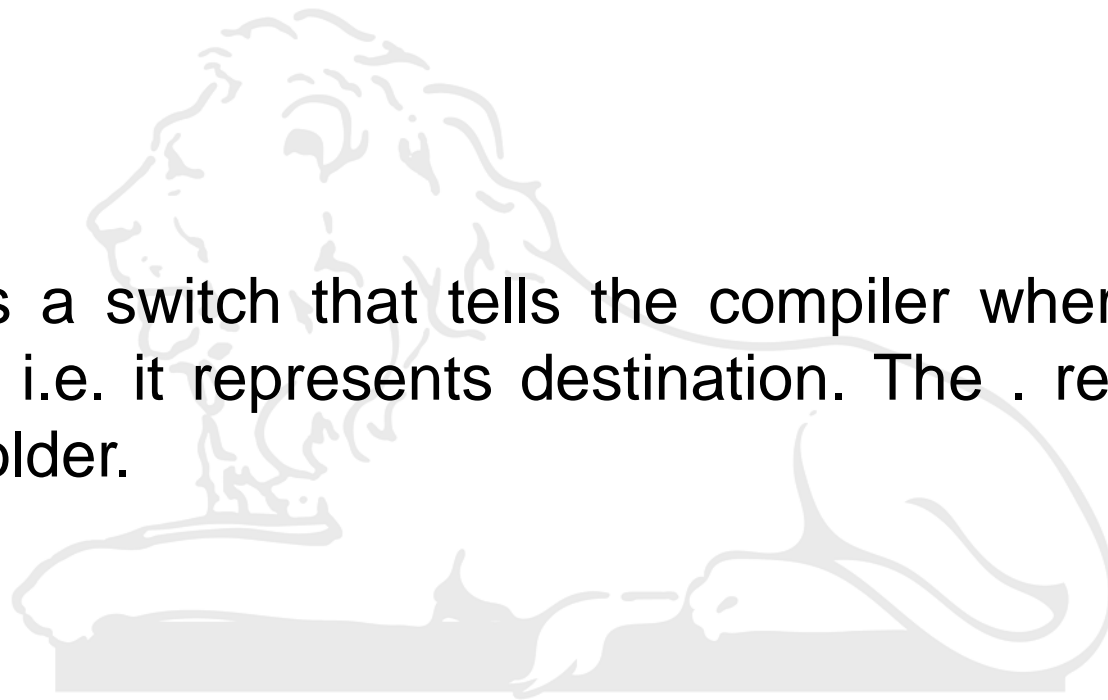


How to compile java package

- In Terminal
- `javac -d directory javafilename` (in general)
- `javac -d . Simple.java` (particular example)
- The `-d` switch specifies the destination where to put the generated class file. You can use any directory name like `/home` (in case of Linux), `d:/abc` (in case of windows) etc. If you want to keep the package within the same directory, you can use `.` (dot).

How to run java package program

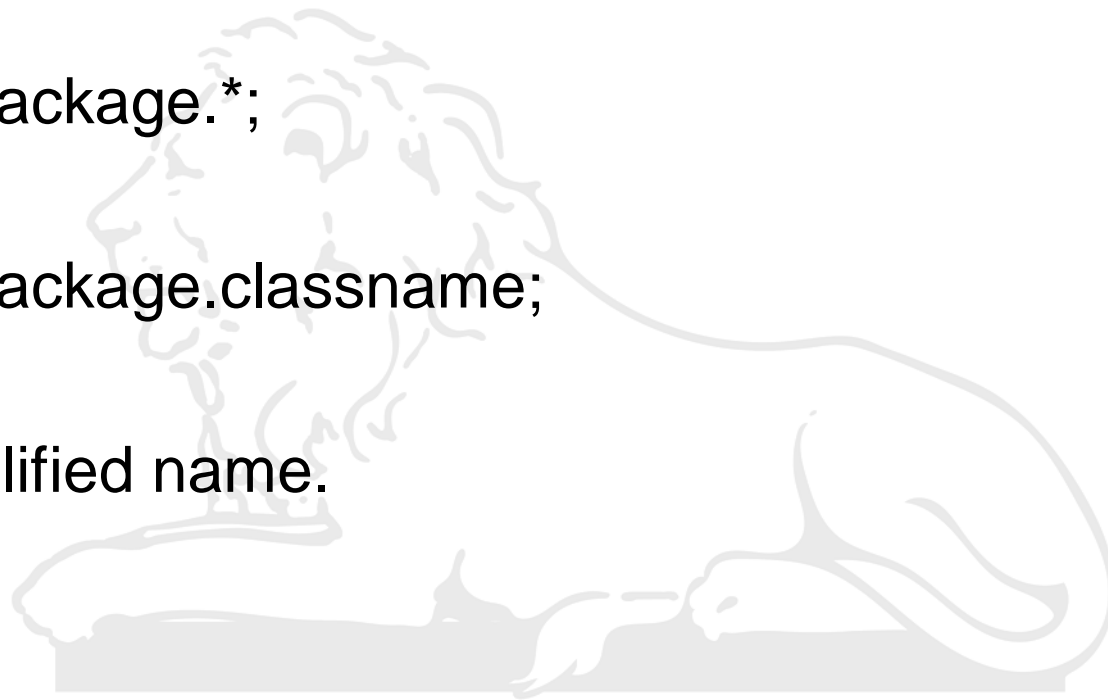
- **To Compile:** `javac -d . Simple.java`
- **To Run:** `java mypack.Simple`
- The `-d` is a switch that tells the compiler where to put the class file i.e. it represents destination. The `.` represents the current folder.



How to access package from another package?

There are three ways to access the package from outside the package.

1. `import package.*;`
2. `import package.classname;`
3. fully qualified name.



1) Using packagename.*

```
1 package pack;  
2 public class A{  
3     public void msg(){  
4         System.out.println("CSN-102, IITR");  
5         System.out.println("Packages");  
6     }  
7 }
```



- <http://goo.gl/h7Wkec>

```
1 package mypack;  
2 import pack.*;  
3  
4 class B{  
5     public static void main(String args[]){  
6         A obj = new A();  
7         obj.msg();  
8     }  
9 }
```

 Terminal

```
sh-4.3$ javac -d . A.java  
sh-4.3$ javac -d . B.java  
sh-4.3$ java mypack.B  
CSN-102, IITR  
Packages  
sh-4.3$
```


2) Using packagename.classname

```
1 package pack;  
2 public class X{  
3     public void msg(){System.out.println("Using packagename.classname");}  
4 }
```

- <http://goo.gl/7gH3LL>



```
1 package mypack;
2 import pack.X;
3
4 class Y{
5     public static void main(String args[]){
6         X obj = new X();
7         obj.msg();
8     }
9 }
```

Terminal

```
sh-4.3$ javac -d . X.java
sh-4.3$ javac -d . Y.java
sh-4.3$ java mypack.Y
Using packagename.classname
sh-4.3$
```

3) Using fully qualified name

```
1 package pack;
2 public class A{
3     public void msg(){
4         System.out.println("CSN-103, IITR");
5         System.out.println("Using fully qualified name");
6     }
7 }
```



- <http://goo.gl/DmDkFI>

```
1 package mypack;
2 class B{
3     public static void main(String args[]){
4         pack.A obj = new pack.A();//using fully qualified name
5         obj.msg();
6     }
7 }
```

Terminal

```
sh-4.3$ javac -d . A.java
sh-4.3$ javac -d . B.java
sh-4.3$ java mypack.B
CSN-103, IITR
Using fully qualified name
sh-4.3$
```

Runtime Polymorphism (Exercises)

```
1 class Animal{
2     void eat(){System.out.println("animal is eating...");}
3 }
4
5 class Dog extends Animal{
6     void eat(){System.out.println("dog is eating...");}
7 }
8
9 class BabyDog extends Dog{
10     void eat(){System.out.println("babydog is eating...");}
11 }
12 public static void main(String args[]){
13     Animal a=new BabyDog();
14     System.out.println(a);
15     a.eat();
16 }
```

Terminal

```
sh-4.3$ javac BabyDog.java
sh-4.3$ java BabyDog
BabyDog@659e0bfd
babydog is eating...
sh-4.3$
```

- <https://ideone.com/W11O49>

```
1 class Animal{
2     void eat(){System.out.println("animal is eating...");}
3 }
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5 class Dog extends Animal{
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7 }
8
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10     void eat(){System.out.println("babydog is eating...");}
11 public static void main(String args[]){
12     Dog a=new BabyDog();
13     System.out.println(a);
14     a.eat();
15 }
16 }
```

Terminal

```
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sh-4.3$ java BabyDog
BabyDog@659e0bfd
babydog is eating...
sh-4.3$
```

- <https://ideone.com/fXlqDy>

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sh-4.3$ javac BabyDog.java
sh-4.3$ java BabyDog
BabyDog@659e0bfd
babydog is eating...
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```

- <https://ideone.com/Ki8k5m>

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1 class Animal{
2     //void eat(){System.out.println("animal is eating...");}
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BabyDog@659e0bfd
babydog is eating...
sh-4.3$
```

- <https://ideone.com/8FWqzN>


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2   //void eat(){System.out.println("animal is eating...");}
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Terminal

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sh-4.3$ javac BabyDog.java
sh-4.3$ java BabyDog
BabyDog@659e0bfd
dog is eating...
sh-4.3$
```

- <https://ideone.com/QigR3m>

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- <https://ideone.com/1icrQJ>

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sh-4.3$ javac BabyDog.java
sh-4.3$ java BabyDog
BabyDog@659e0bfd
animal is eating...
sh-4.3$
```

- <https://ideone.com/TrWjed>

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2 void eat(){System.out.println("animal is eating...");}
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12 Dog a=new BabyDog();
13 System.out.println(a);
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Terminal

```
sh-4.3$ javac BabyDog.java
sh-4.3$ java BabyDog
BabyDog@659e0bfd
animal is eating...
sh-4.3$
```

- <https://ideone.com/9lnYWv>

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1 class Animal{
2     void eat(){System.out.println("animal is eating...");}
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4
5 class Dog extends Animal{
6     //void eat(){System.out.println("dog is eating...");}
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10     void eat(){System.out.println("babydog is eating...");}
11 }
12 public static void main(String args[]){
13     Dog a=new BabyDog();
14     System.out.println(a);
15     a.eat();
16 }
```

Terminal

```
sh-4.3$ javac BabyDog.java
sh-4.3$ java BabyDog
BabyDog@659e0bfd
babydog is eating...
sh-4.3$
```

- <https://ideone.com/Ksb1d8>

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1 class Animal{
2 void eat(){System.out.println("animal is eating...");}
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4
5 class Dog extends Animal{
6 //void eat(){System.out.println("dog is eating...");}
7 }
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12 Animal a=new BabyDog();
13 System.out.println(a);
14 a.eat();
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```

Terminal

```
sh-4.3$ javac BabyDog.java
sh-4.3$ java BabyDog
BabyDog@659e0bfd
babydog is eating...
sh-4.3$
```

- <https://ideone.com/Jbi7Rz>

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1 class Animal{
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4
5 class Dog extends Animal{
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15     }
16 }
```

 Terminal

```
sh-4.3$ javac BabyDog.java
sh-4.3$ java BabyDog
Dog@659e0bfd
animal is eating...
sh-4.3$
```

- <https://ideone.com/DNXW75>

```
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2 void eat(){System.out.println("animal is eating...");}
3 }
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5 class Dog extends Animal{
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13 System.out.println(a);
14 a.eat();
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Terminal

```
sh-4.3$ javac BabyDog.java
sh-4.3$ java BabyDog
Dog@659e0bfd
dog is eating...
sh-4.3$
```

- <https://ideone.com/lpTPFk>


```
1 class Animal{
2     void eat(){System.out.println("animal is eating...");}
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5 class Dog extends Animal{
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12        BabyDog a=new BabyDog();
13        System.out.println(a);
14        a.eat();
15    }}
```

```
sh-4.3$ javac BabyDog.java
sh-4.3$ java BabyDog
BabyDog@2a139a55
dog is eating...
sh-4.3$
```

<https://goo.gl/YI2RVb>

Creating Sub-Packages

- Sub-packages can be created as follows

```
package mypackage.Math
```

```
package mypackage.SecondPackage. thi rdPackage
```

- In this case, thi rdPackage in a sub-directory named, mypackage\SecondPackage; and SecondPackage and Math class in a sub-directory mypackage.
- Inbuilt Sub-packages
 - Java. lang. Math

Sub-Packages

```
1 package abcd.xyzw;  
2 class Simple{  
3     public static void main(String args[]){  
4         System.out.println("Hello subpackage");  
5     }  
6 }
```

Terminal

```
sh-4.3$ javac -d . Simple.java  
sh-4.3$ java abcd.xyzw.Simple  
Hello subpackage  
sh-4.3$
```

- <http://goo.gl/C6hurB>
