

## Generics

=====

- a. To promote typesafety and to avoid type casting problems

Type parameter at class level

```
class Test<T>{
```

```
}
```

- a. <T extends X>
- b. <T extends X&Y>
- c. <T extends X&Y&Z>

X,Y,Z can be interface

X,Y can be interface

X -> it should be class name ,Y,Z is interface name

method level Type parameter

1. methodOne( ArrayList<String> t)
2. methodOne( ArrayList<? extends X> t)
3. methodOne(ArrayList< ? super X> t)

return type of method Type Parameter

1. public <T> void m1(T t)
2. public <T extends X&Y> void m1(T t)
3. public <T extends X&Y&Z> void m1(T t)

Generics concept is applicable only at the compiler level, not at JVM level(runtime)

Even if we have code in generics in .classfile the syntax of generics will be removed

```
eg: ArrayList<String> al = new ArrayList<String>();
    ArrayList<String> al = new ArrayList<>();
```

```
    |
    |
    |
    ArrayList al =new ArrayList();
```

```
class Test{
    public void m1(Arraylist<String> al){ =====> m1(ArrayList al)
    }
    public void m1(ArrayList<Double> al ){ =====> m1(ArrayList al)
    }
}
```

this mechanism is called "type erasure"

Basically my question is what is the difference between Arrays.asList() & List.of() methods to create objects in collaboration?

Arrays.asList() --> gives a copy of Array to read as List(only for reading purpose)

List.of() ---> creates a list which are immutable.

SpringORM

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```
public T m1(T t) {}
    and
public <T> void m1(T t) {
    //control the behaviour with T
}
```

Then how to JVM resolve the type casting problem , if its erase the generics part at compile time itself?

```
class ArrayList<String>{
    add(String data)
    String get(int index)
}
```

```
ArrayList<String> al = new ArrayList<String>();
    al.add("sachin");
    al.add("saurav");
    ;;;;
    ;;;;
    String data = al.get(0);
```

JVM

```
ArrayList al = new ArrayList();
    al.add("sachin");
    al.add("saurav");
    ;;;;
    ;;;;
    String data = al.get(0);
```

How can we restrict Generics to a subclass of particular class?

```
    Person
    |
    |
    Student
```

```
Demo<? extends Person> d = new Demo<Student>();
```

Difference b/w Callable and Runnable

Compiled from "Runnable.java"

```
public interface java.lang.Runnable {
    public abstract void run();
}
```

Compiled from "Callable.java"

```
public interface java.util.concurrent.Callable<V> {
    public abstract V call() throws java.lang.Exception;
}
```

Q>ArrayList<?> al = new ArrayList<Number>();Is it allowed?

```
ArrayList<Number> al =new ArrayList<Number>();
    m1(al);
```

```
public void m1(ArrayList<?> al){// ArrayList<?> al =new ArrayList<Number> ();
    ;;;;
    ;;;;
    ;;;;
}
```

```
}  
AL<Object> al =new AL<String>; //invalid
```