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# **Transient keyword with** Serialization in Java

O November 3, 2016 🔓 SJ 🗁 Serialization 🔎 0

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In this article, we will discuss *transient keyword or modifier* with serialization in detail

Whenever, we talk about *Serialization* then definitely there will be loads of questions on transient keyword

Also, it's one of the favorite interview questions in Java

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### **Serialization process**

During serialization process i.e.; saving the state of an Object to File, all instance variables will be participated and persisted to file storage

**Instance variable**: all member variables/attributes of an Object without any modifiers like static

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# What if we don't want to serialize specific variable/attributes for security or any other reasons?

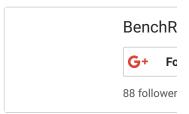
- The answer is declare respective member instance variable with transient modifier
- Yes, we can stop persisting specific variable during serialization process by declaring transient modifier (for that specific variable)

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## Transient keyword

- Transient keyword or modifier is applicable only for variables
- We can stop persisting specific variable, by declaring transient keyword
- During serialization, JVM ignores the original value of transient variable and saves default value to file
- Examples: Customer SSN or password need not to be stored.
   Hence, it's a good practice to declare those variables as transient
- So whenever we encounter *transient* keyword, it means that not to serialize



### Demo example on Transient keyword

For objects to participate in serialization & de-serialization process, corresponding *class* should implement *java.io.Serializable* interface

**Exception**: otherwise, *run time* exception will be thrown stating *NotSerializableException* 

Step 1: Create POJO which implements java.io. Serializable interface

In Customer POJO, there are *4 member variables* with *customerSSN* declared with *transient* keyword



Which means, during serialization instead of original value, *default* value will be saved to file and this can be proved by *de-serializing the* serialized object

#### Customer.java

```
1
2
3
4
5
6
7
8
9
10
     package in.bench.resources.serialization;
     import java.io.Serializable;
     public class Customer implements Serializable {
          // member variables
          int customerId;
          String customerName;
          int customerAge;
11
          transient int customerSSN;
12
13
14
          // 4-arg parameterized constructor
15
16
          public Customer(int customerId, String cust
                    int customerAge, int customerSSN) {
17
               super();
18
               this.customerId = customerId;
19
               this.customerName = customerName;
20
               this.customerAge = customerAge;
21
               this.customerAge = customerAge;
22
23
24
25
26
27
28
          }
          // overriding toString() method
          @Override
          public String toString() {
               return "Customer [customerId=" + custom
                        + ", customerName=" + customerN
+ ", customerAge=" -
                        + ", customerAge=" + customerA
+ ", customerSSN=" + customerSS
29
30
31
          }
32
     }
```

**Step 2**: Main program to demonstrate serialization/de-serialization

**To Serialize:** any Object, we can use *ObjectOutputStream* & *FileOutputStream* to *write/save* to the *file* (in binary format)

**To De-Serialize**: any Object, we can use *ObjectInputStream* & *FileInputStream* to *read/restore* from *file* (which is in binary format) into Java *heap memory* 

```
package in.bench.resources.serialization;
 1
2
3
     import java.io.FileInputStream;
 4
     import java.io.FileNotFoundException;
 5
     import java.io.FileOutputStream;
     import java.io.IOException;
import java.io.ObjectInputStream;
import java.io.ObjectOutputStream;
 7
 8
 9
10
     public class TransientDemo {
11
12
         public static void main(String[] args) {
13
14
              // create an customer instance using 4-
              Customer serializeCustomer =
    new Customer(102, "SR", 17, 112
15
16
17
              // creating output stream variables
18
19
              FileOutputStream fos = null;
20
              ObjectOutputStream oos = null;
21
22
23
24
25
26
27
28
              // creating input stream variables
              FileInputStream fis = null;
              ObjectInputStream ois = null;
              // creating customer object reference
              // to hold values after de-serializatio
              Customer deSerializeCustomer = null;
29
              30
31
32
                  fos = new FileOutputStream("Custome
33
34
                  // converting java-object to binary
35
                  oos = new ObjectOutputStream(fos);
36
37
                  // writing or saving customer object
38
                  oos.writeObject(serializeCustomer);
39
                  oos.flush();
40
                  oos.close();
41
42
                  System.out.println("Serialization s
43
                           + "object saved to Customer
44
45
                  // reading binary data
                  fis = new FileInputStream("Customer
46
47
48
                  // converting binary-data to java-o
49
                  ois = new ObjectInputStream(fis);
50
51
                  // reading object's value and casti
52
                  deSerializeCustomer = (Customer) oi
53
                  ois.close();
54
55
                  System.out.println("De-Serializatio
56
                           + "object de-serialized fro
57
58
              catch (FileNotFoundException fnfex) {
59
                  fnfex.printStackTrace();
60
              catch (IOException ioex) {
61
62
                  ioex.printStackTrace();
```

#### **Output:**

```
Serialization success: Customer object saved to?

De-Serialization success: Customer object de-ser from Customer.ser file

Printing customer values from de-serialized obje Customer [customerId=102, customerName=SR, customerName]
```

#### **Explanation:**

- In above Customer POJO, *customerSSN* declared as *transient*
- So during serialization process, original value of customerSSN
   won't be saved to file
- Instead default value will be saved (i.e.; o for int, null for String, etc)
- 1<sup>st</sup> half of the program illustrate serialization process
- And 2<sup>nd</sup> half deals with de-serialization process, which deserializes the serialized Object
- While de-serializing all instance member values are re-stored back perfectly except for customerSSN
- Reason: because this is marked with transient keyword

So, by declaring instance variable with *transient keyword* we can *restrict to store* that particular variable into *file* storage during *serialization process* 

And it depends purely on *business requirement* that, which all the *instance variables* need to be *restricted* 

#### References:

https://docs.oracle.com/javase/7/docs/api/java/io/Serializable.html

https://docs.oracle.com/javase/7/docs/platform/serialization/spec/serial-arch.html

https://docs.oracle.com/javase/7/docs/api/java/io/ObjectOutputStream.html

https://docs.oracle.com/javase/7/docs/api/java/io/ObjectInput Stream.html

https://docs.oracle.com/javase/7/docs/api/java/io/FileOutputStream.html

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http://docs.oracle.com/javase/specs/jls/se7/html/jls-8.html#jls-8.3.1.3

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SERIALIZATION

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