Java Serialization and Deserialization

Serialization is a process of converting an object into a sequence of bytes which can be persisted to a disk or database or can be sent through streams. The reverse process of creating object from sequence of bytes is called **deserialization**.

A class must implement **Serializable** interface present in java.io package in order to serialize its object successfully. **Serializable** is a **marker interface** that adds serializable behaviour to the class implementing it.

Java provides **Serializable** API encapsulated under java.io package for serializing and deserializing objects which include,

- java.io.serializable
- java.io.Externalizable
- ObjectInputStream
- ObjectOutputStream

Java Marker interface

Marker Interface is a special interface in Java without any field and method. Marker interface is used to inform compiler that the class implementing it has some special behaviour or meaning. Some example of Marker interface are,

- java.io.serializable
- java.lang.Cloneable
- java.rmi.Remote
- java.util.RandomAccess

All these interfaces does not have any method and field. They only add special behavior to the classes implementing them. However marker interfaces have been deprecated since Java 5, they were replaced by **Annotations**. Annotations are used in place of Marker Interface that play the exact same role as marker interfaces did before.

To implement serialization and deserialization, Java provides two classes ObjectOutputStream and ObjectInputStream.

ObjectOutputStream class

It is used to write object states to the file. An object that implements java.io.Serializable interface can be written to strams. It provides various methods to perform serialization.

ObjectInputStream class

An ObjectInputStream deserializes objects and primitive data written using an ObjectOutputStream.

writeObject() and readObject() Methods

The writeObject() method of ObjectOutputStream class serializes an object and send it to the output stream.

```
public final void writeObject(object x) throws IOException
```

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The readObject() method of ObjectInputStream class references object out of stream and deserialize it.

```
public final Object readObject() throws
IOException,ClassNotFoundException
```

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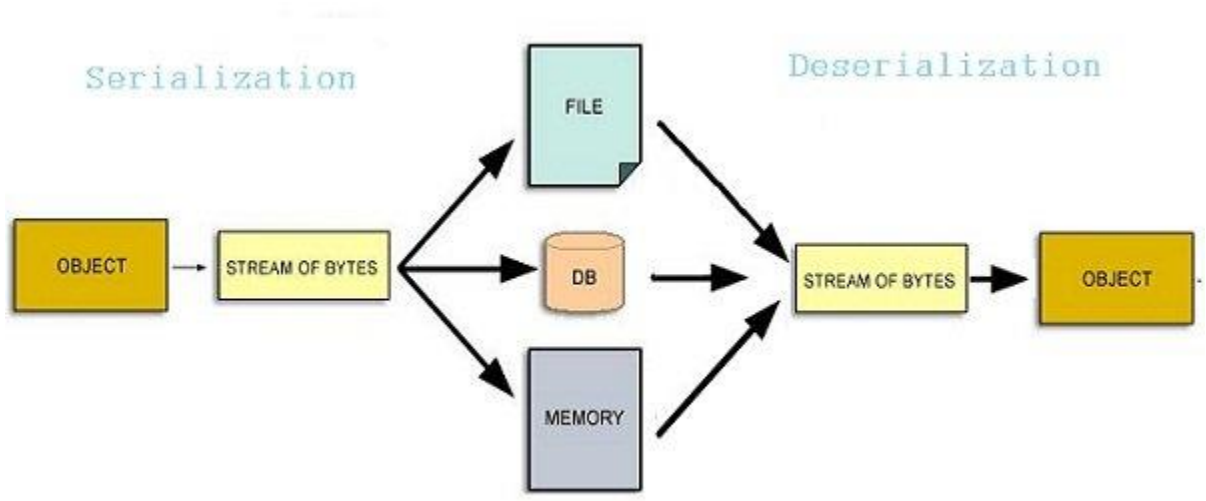
while serializing if you do not want any field to be part of object state then declare it either **static or transient** based on your need and it will not be included during java serialization process.



Example: Serializing an Object in Java

In this example, we have a class that implements Serializable interface to make its object serialized.

```
import java.io.*;

class Studentinfo implements Serializable

{

    String name;

    int rid;

    static String contact;

    Studentinfo(String n, int r, String c)

    {

    this.name = n;

    this.rid = r;

    this.contact = c;

    }

}


class Demo

{

    public static void main(String[] args)
```

```
    {
        try
        {
            Studentinfo si = new Studentinfo("Abhi", 104, "110044");
            FileOutputStream fos = new FileOutputStream("student.txt");
            ObjectOutputStream oos = new ObjectOutputStream(fos);
            oos.writeObject(si);
            oos.flush();
            oos.close();
        }
        catch (Exception e)
        {
            System.out.println(e);
        }
    }
}
```

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Object of Studentinfo class is serialized using `writeObject()` method and written to `student.txt` file.

Example : Deserialization of Object in Java

To deserialize the object, we are using ObjectInputStream class that will read the object from the specified file. See the below example.

```
import java.io.*;


class Studentinfo implements Serializable
{
    String name;
    int rid;
    static String contact;
    Studentinfo(String n, int r, String c)
    {
    this.name = n;
```

```
    this.rid = r;

    this.contact = c;

    }

}


class Demo

{

    public static void main(String[] args)

    {

        Studentinfo si=null ;

        try

        {

            FileInputStream fis = new
FileInputStream("/filepath/student.txt");

            ObjectInputStream ois = new ObjectInputStream(fis);

            si = (Studentinfo)ois.readObject();

        }

        catch (Exception e)

        {

            e.printStackTrace(); }

            System.out.println(si.name);

            System.out. println(si.rid);

            System.out.println(si.contact);

          }

}
```

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```
Abhi

104

null
```

Contact field is null because,it was marked as static and as we have discussed earlier static fields does not get serialized.

NOTE: Static members are never serialized because they are connected to class not object of class.

`transient` Keyword

While serializing an object, if we don't want certain data member of the object to be serialized we can mention it transient. transient keyword will prevent that data member from being serialized.

```
class studentinfo implements Serializable

{

    String name;

    transient int rid;

    static String contact;

}
```

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- Making a data member `transient` will prevent its serialization.
- In this example `rid` will not be serialized because it is **transient**, and `contact` will also remain unserialized because it is **static**.