Object Serialization

Agenda

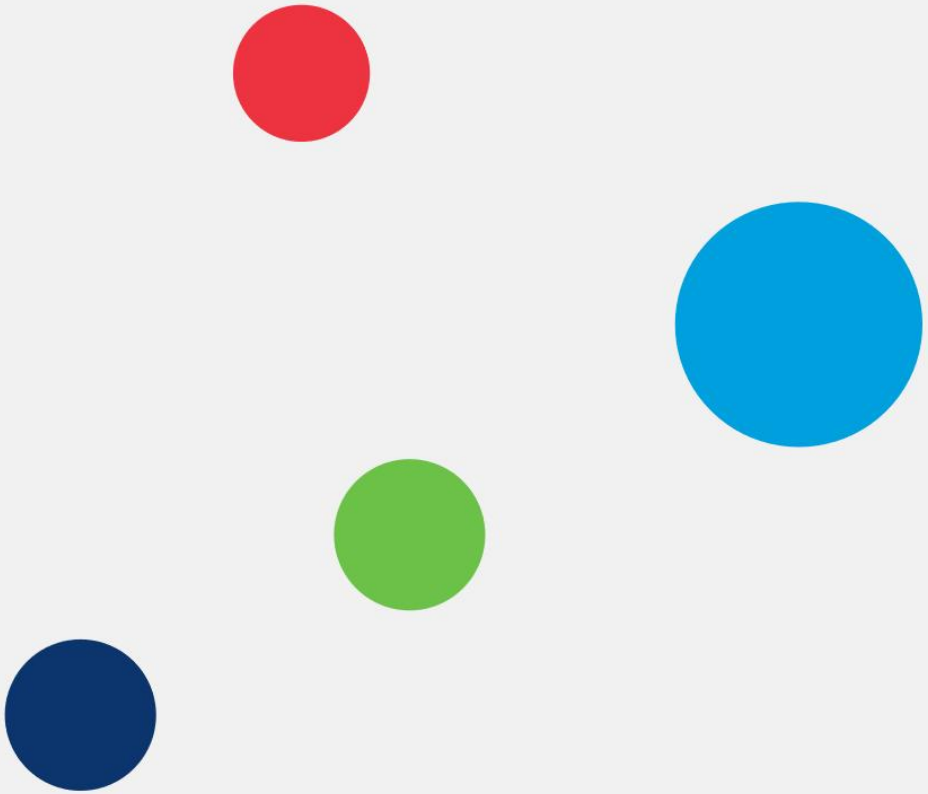
1 **Object Serialization**

Objectives

At the end of this module, you will be able to:

- Understand Object Serialization

Object Serialization



Serialization

- Object serialization is the process of saving as object's state to a sequence of bytes (on disk), as well as the process of rebuilding those bytes into a live object at some future time
- The Java Serialization API provides a standard mechanism to handle object serialization

- You can only serialize the objects of a class that implements Serializable interface

Serialization(Contd.).

- After a serialized object is written to a file, it can be read from the file and deserialized (that is we can recreate the object in memory)

- The process of Serialization and DeSerialization is JVM independent. That is, an object can be serialized on one platform and deserialized on an entirely different platform.

- Classes **ObjectInputStream** and **ObjectOutputStream** are used for serialization & deserialization.

Serializing Objects

- **How to Write to an ObjectOutputStream**

```
FileOutputStream out = new FileOutputStream("theTime");
ObjectOutputStream s = new ObjectOutputStream(out);
s.writeObject("Today");
s.writeObject(new Date());
s.flush();
```

- **How to Read from an ObjectOutputStream**

```
FileInputStream in = new FileInputStream("theTime");
ObjectInputStream s = new ObjectInputStream(in);
String today = (String)s.readObject();
Date date = (Date)s.readObject();
```

Object Serialization

```
package m10.io;
import java.io.*;

public class MyClass implements Serializable {
  String s;
  int i;
  double d;
  public MyClass(String s, int i, double d) {
       this.s = s;
       this.i = i;
       this.d = d;
  }
  public String toString() {
       return "s=" + s + "; i=" + i + "; d=" + d;
  }
}
```

Object Serialization (Contd.).

```
public class SerializationDemo {
  public static void main(String args[]) {
        try {
              MyClass object1 = new MyClass("Hello", -7, 2.7e10);
                 System.out.println("object1; " + object1);
                 FileOutputStream fos = new FileOutputStream("serial");
              ObjectOutputStream oos = new ObjectOutputStream(fos);
              oos.writeObject(object1);
              oos.flush();
              oos.close();
        }
        catch(Exception e) {
            System.out.println("Exception during serialization:"+ e);
              System.exit(0);
        }
```

Object Serialization (Contd.).

```
// Object Deserialization
        try {
                MyClass object2;
                FileInputStream fis = new FileInputStream("serial");
                ObjectInputStream ois = new ObjectInputSream(fis);
                object2 = (MyClass)ois.readObject();
                ois.close();
                System.out.println("object2: " + object2);
        }
        catch(Exception e) {

                System.out.println("Exception during deserialization: "
    + e);
                System.exit(0);
        }
   }
}
```

The keyword : transient

- *transient* keyword is used in Object Serialization.
- By default, when you serialize an object, all its fields are serialized except for static variables.
- When you construct this object back from its persistent state, you will get the values of all the fields that are serialized(except static variables)
- If you do not want to store the value of a particular non static field, then you can declare this field as transient.
- This keyword is used only with a variable declaration.

The keyword : transient

- Transient keyword provides us with the ability to control the serialization process and gives us the flexibility to exclude some of object properties from serialization process.
- Sometimes, it does make sense not to serialize certain attributes of an object.
- For e.g. If you are developing an application for Weather forecasting and you have created objects that store current weather conditions, then storing current temperature does not make much sense, since temperature keeps fluctuating and you may not require the temp data at a later date when you de-serialize this object.

Demo : transient

```
import java.io.*;
class Xyz implements Serializable {
    double d1;
    transient double d2;
    static double d3;
    void  m1() {

  System.out.println("The value of d1 is :" +d1);
  System.out.println("The value of d2 is :" +d2);
  System.out.println("The value of d3 is :" +d3);
    }
}
```

Try this demo first by declaring the variable d2 as non-transient(delete the key word transient). Try again by declaring the variable d2 as transient and observe the difference

Demo : transient(Contd.).

```
class TransientExample1 {
    public static void main(String [] args) throws IOException
  {
       Xyz x = new Xyz();
       x.d1=10.3;
       x.d2=20.5;
       x.d3=99.99;
       x.m1();
       FileOutputStream fx = new FileOutputStream("A1.xyz");
       ObjectOutputStream ox = new ObjectOutputStream(fx);
       ox.writeObject(x);
       ox.flush();
    }
}
```

Demo : transient(Contd.).

```
import java.io.*;
class TransientExample2 {
        public static void main(String [] args) {
                try {

        FileInputStream fx = new FileInputStream("A1.xyz");

        ObjectInputStream ox = new ObjectInputStream(fx);
                Xyz x = (Xyz) ox.readObject();
                x.m1();
                }
                catch(Exception e) {
                System.out.println(e);
                }
        }
}
```

Demo : transient(Contd.).

Scenario 1 : **When d2 is not transient !**

- When you compile all the three source files viz. Xyz.java, TransientExample1.java and Tra nsientExample2.java and execute first TransientExample1 and then TransientExample2, you will get the following output (from e xecuting TransientExample2):
- The value of d1 is :10.3
- The value of d2 is :20.5
- The value of d3 is :0.0

- In the above result, d3 is not serialized since d3 is declared as static.

Demo : transient(Contd.).

Scenario 1 : **When d2 is transient !**

- After declaring d2 as transient, when you compile Xyz.java and then execute first Transient Example1 and then TransientExample2, you will get the following output :
- The value of d1 is :10.3
- The value of d2 is :0.0
- The value of d3 is :0.0

- In the above result, d2 is not serialized since it is declare as transient.

Thank You