ASSIGNMENT 3

Module 2: Object Oriented Programming in JAVA

ABSTRACT

In this assignment, I have completed 13 questions on java basic topics like Garbage Collector, File Handling, Serialization and De-Serialization, Collection Framework, Generic assignment, Multi-Threading and Exception Handling. Every question starts from new page along with its code and output. Also, I have connected the screenshot of text file wherever required.

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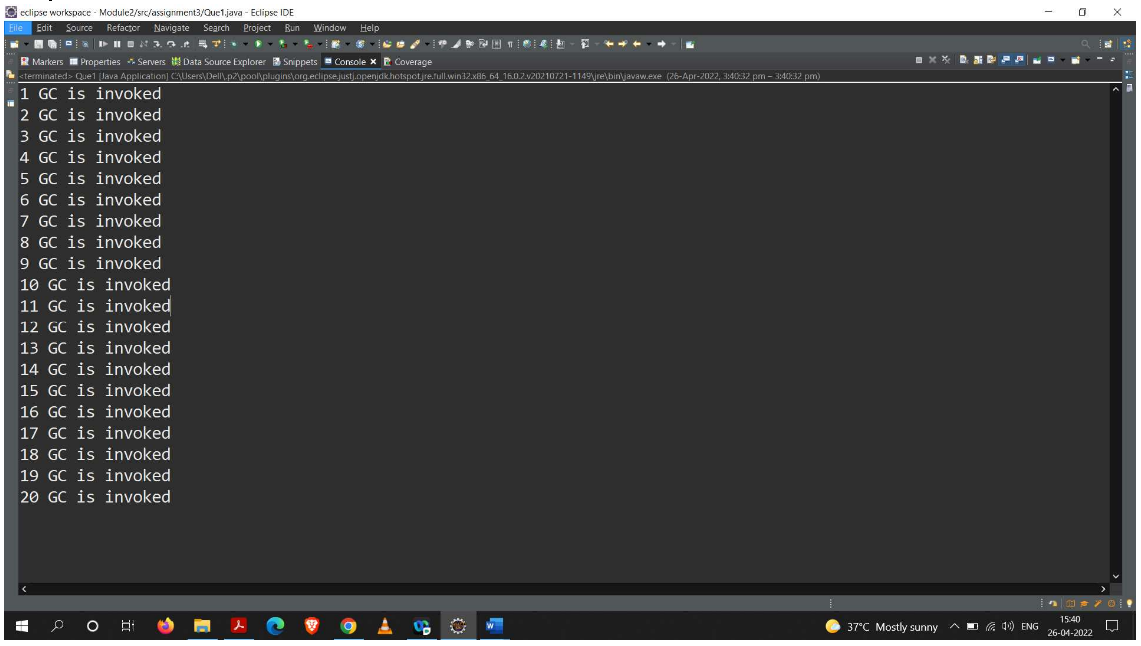
Module 2: Object Oriented Programming in JAVA

1. Override finalize method to understand the behavior of JVM garbage collector.
Code:

```java
package assignment3;

public class Que1 {
	static int i = 0;
	static int j = 0;
	@Override
	protected void finalize() {
		i++;
		System.out.println(i+" GC is invoked");
	}
	public static void main(String[] args) {
		int n = 20;
		Que1 q[] = new Que1[n];
		for(int i = 0 ; i < n ; i++)
			q[i] = new Que1();
		q = null;
		System.gc();
	}
}
```

Output:



```
<terminated> Que1 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe (26-Apr-2022, 3:40:32 pm – 3:40:32 pm)
1 GC is invoked
2 GC is invoked
3 GC is invoked
4 GC is invoked
5 GC is invoked
6 GC is invoked
7 GC is invoked
8 GC is invoked
9 GC is invoked
10 GC is invoked
11 GC is invoked
12 GC is invoked
13 GC is invoked
14 GC is invoked
15 GC is invoked
16 GC is invoked
17 GC is invoked
18 GC is invoked
19 GC is invoked
20 GC is invoked
```

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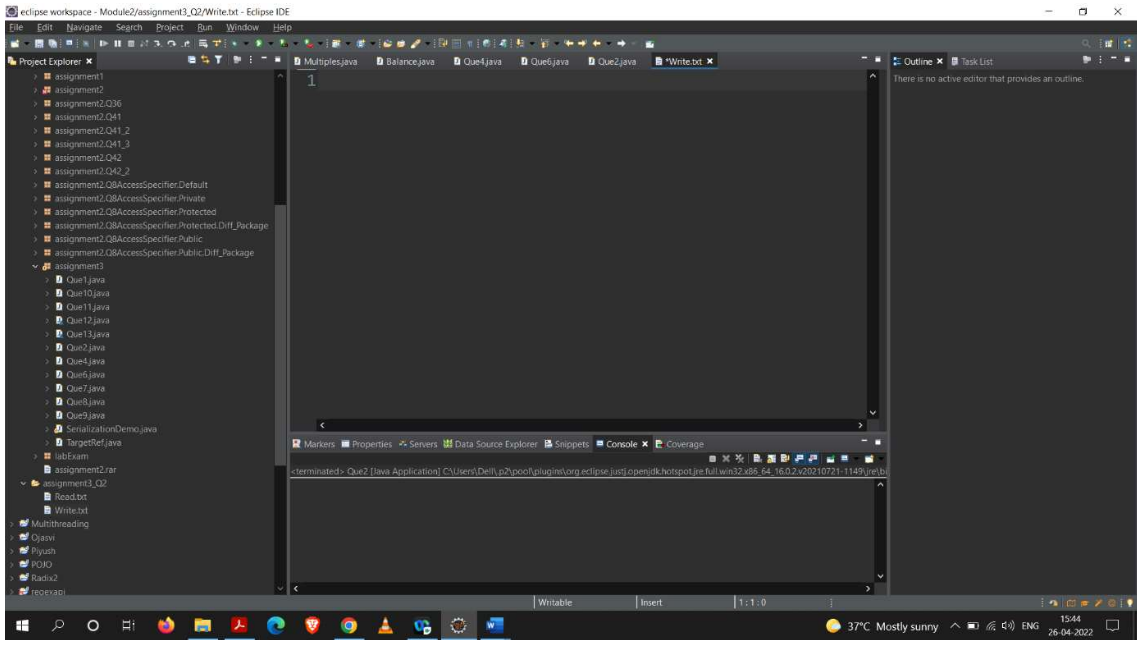
2. Create a Demo class to Read & write image/text files.
Code:

```
package assignment3;

import java.io.BufferedReader;
import java.io.FileReader;
import java.io.FileWriter;

public class Que2 {
	public static void main(String[] args) throws Exception {
		BufferedReader fr = new BufferedReader(new 
FileReader("E:\\eclipse workspace\\Module2\\assignment3_Q2\\Read.txt"));
		FileWriter fw = new FileWriter("E:\\eclipse 
workspace\\Module2\\assignment3_Q2\\Write.txt",false);
		String ch;
		while((ch=fr.readLine())!=null) {
			fw.write(ch+"\n");
		}
		fr.close();
		fw.close();
	}

}
```

Output: **(state of write.txt before and after executing program)**

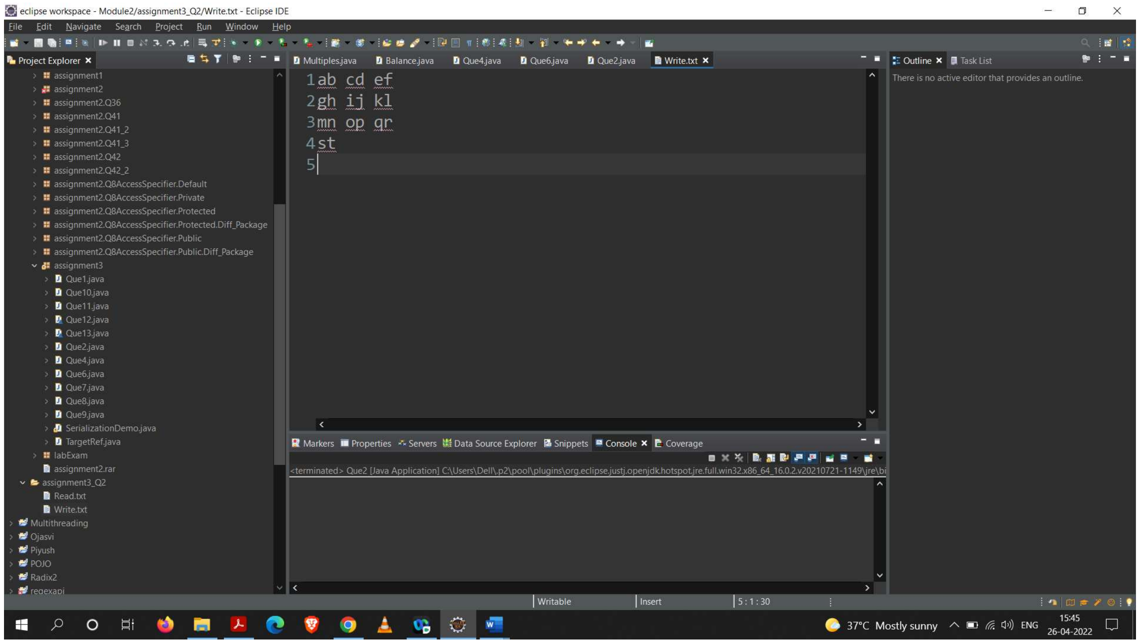
Before



There is no active editor that provides an outline.

```
<terminated> Que2 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bi
```

After


eclipse workspace - Module2/assignment3_Q2/Write.txt - Eclipse IDE
File Edit Navigate Search Project Run Window Help
Project Explorer
Multiples.java Balance.java Que4.java Que6.java Que2.java Write.txt
Outline Task List
There is no active editor that provides an outline.
Markers Properties Servers Data Source Explorer Snippets Console Coverage
Writable Insert 5 : 1 : 30

```
ab cd ef
gh ij kl
mn op qr
st

```

```
<terminated> Que2 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bi
```

3. Create SerializationDemo class to illustrate serialization and de-serialization process.
Code:

```
package assignment3;

import java.io.FileInputStream;
import java.io.FileOutputStream;
import java.io.ObjectInputStream;
import java.io.ObjectOutputStream;
import java.io.Serializable;
@SuppressWarnings("serial")
class Person implements Serializable{
    String name;
    int age;
    transient String password;
    public Person(String n, int a, String p){
    name=n;
    age=a;
    password=p;
    }
    @Override
    public String toString(){
        return name+" "+age+" "+password;
    }
}
public class SerializationDemo{
    @SuppressWarnings("resource")
      public static void main(String[] args) throws Exception {
        Person p1=new Person("Java",27,"java");
        // serialization
        FileOutputStream fos=new FileOutputStream("person.ser");
        ObjectOutputStream oos=new ObjectOutputStream(fos);
        oos.writeObject(p1);
        // de-serialize
        FileInputStream fis=new FileInputStream("person.ser");
        ObjectInputStream ois=new ObjectInputStream(fis);
        Person p2=(Person)ois.readObject();
        System.out.println(p1);
        System.out.println(p2);

      }

}
```

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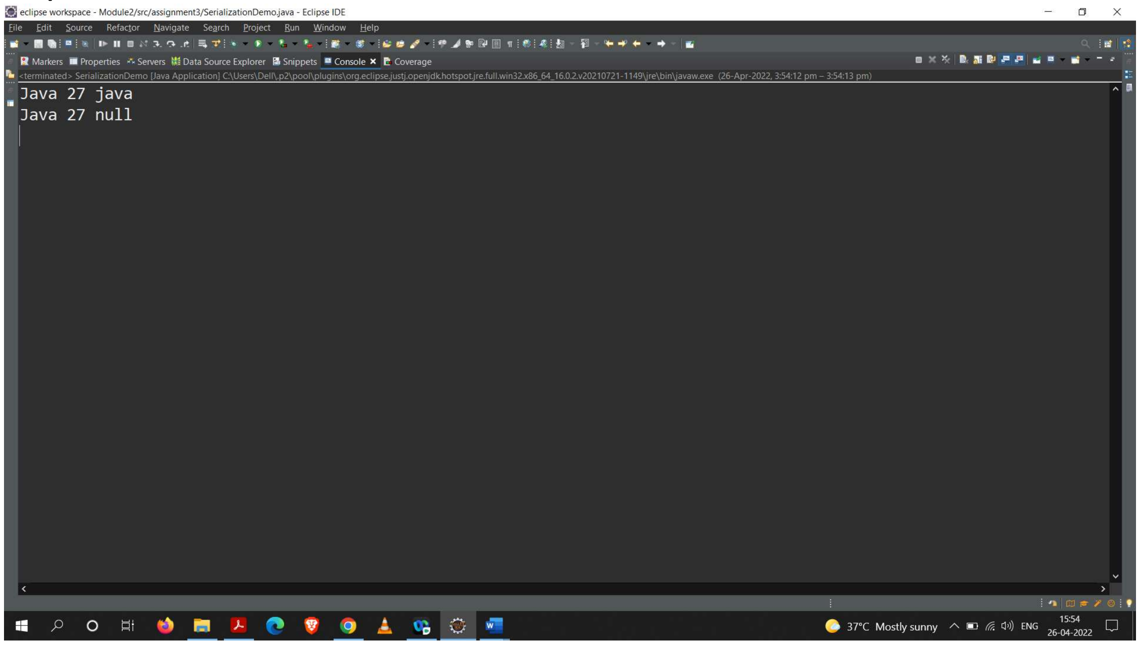
Output:


eclipse workspace - Module2/src/assignment3/SerializationDemo.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console Coverage
37°C Mostly sunny
ENG
15:54
26-04-2022

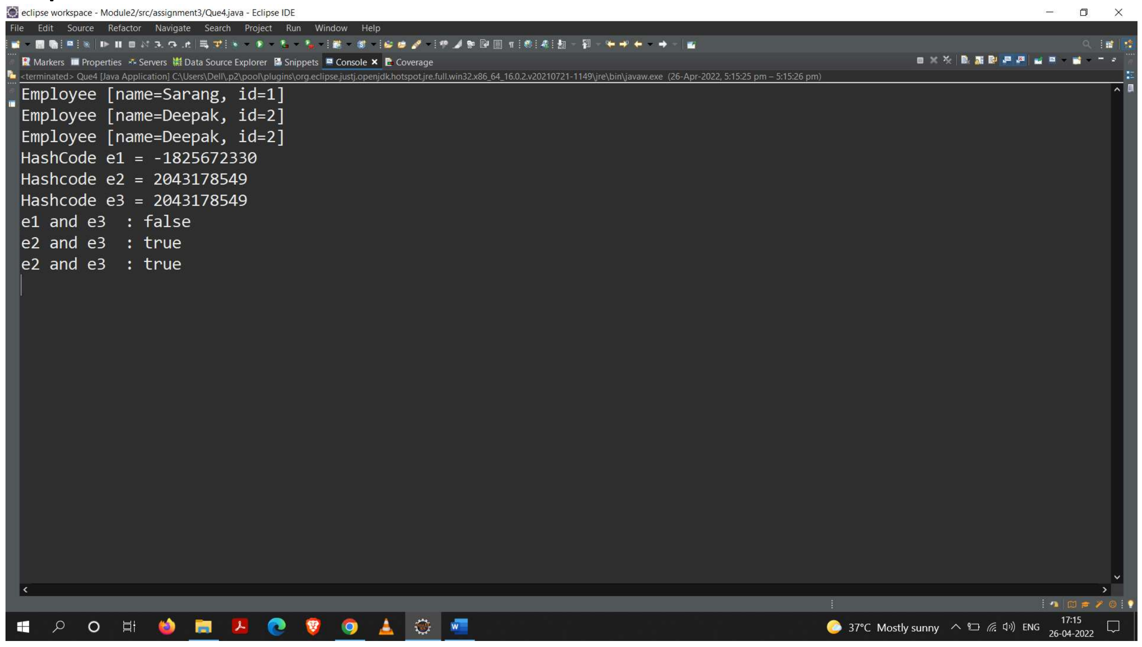
```
<terminated> SerializationDemo [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe  (26-Apr-2022, 3:54:12 pm – 3:54:13 pm)
Java 27 java
Java 27 null
```

4. Create an Employee HashSet collection and override equals & hashCode methods to understand how the set maintains uniqueness using these methods.
Code:

```
package assignment3;

import java.util.*;
class Employee {
      private String name;
      private int id;

      public Employee(int id, String name){
            this.id = id;
            this.name = name;
      }

      public String getName() {
            return name;
      }

      public void setName(String name) {
            this.name = name;
      }

      public int getId() {
            return id;
      }

      public void setId(int id) {
            this.id = id;
      }

      @Override
      public String toString() {
            return "Employee [name=" + name + ", id=" + id + "]";
      }

      @Override
      public int hashCode() {
            return Objects.hash(id, name);
      }
      @Override
      public boolean equals(Object obj) {
            if (this == obj)
                  return true;
            else if (obj == null)
                  return false;
            else if (getClass() != obj.getClass())
                  return false;
            Employee other = (Employee) obj;
            return id == other.id && Objects.equals(name, other.name);
```

```java
	}
}
public class Que4
{
	public static void main(String[] args)
	{
		HashSet<Employee> hs = new HashSet<Employee>();
		Employee e1 = new Employee(1,"Sarang");
		Employee e2 = new Employee(2,"Deepak");
		hs.add(e1);
		hs.add(e2);

		for(Employee e : hs)
			System.out.println(e);

		Employee e3=e2;
		System.out.println(e3);

		System.out.println("HashCode e1 = "+e1.hashCode());
		System.out.println("Hashcode e2 = "+e2.hashCode());
		System.out.println("Hashcode e3 = "+e3.hashCode());

		System.out.println("e1 and e3  : "+e1.equals(e3));
		System.out.println("e2 and e3  : "+e2.equals(e3));
		System.out.println("e2 and e3  : "+(e2==e3));
	}
}
```

Output:

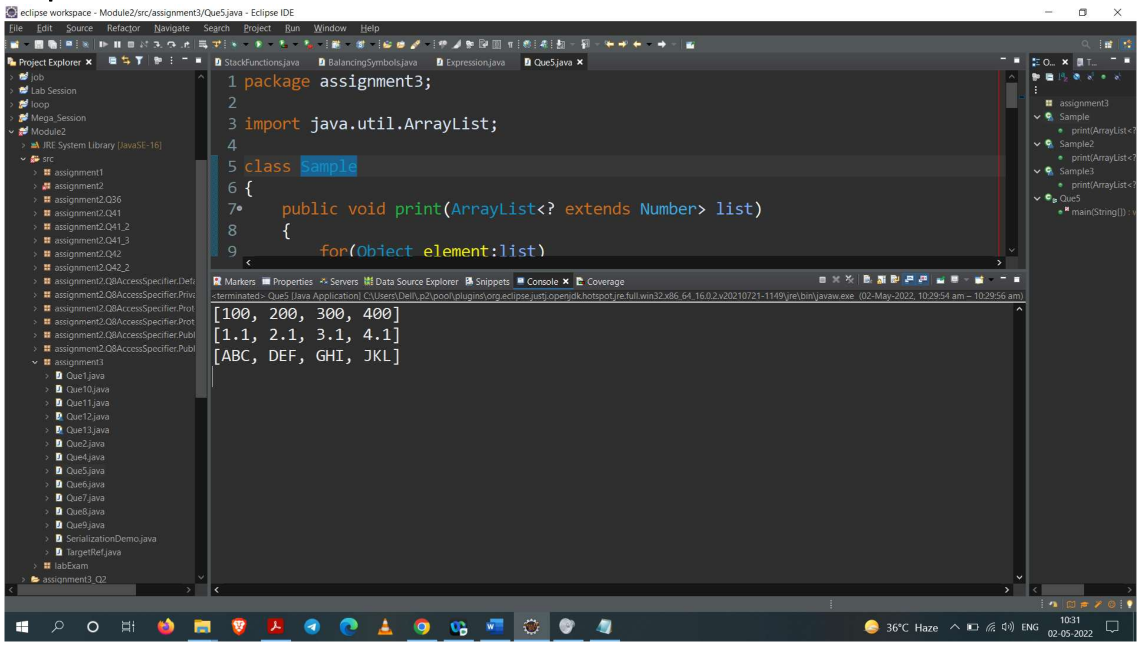


```
<terminated> Que4 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe (26-Apr-2022, 5:15:25 pm – 5:15:26 pm)
Employee [name=Sarang, id=1]
Employee [name=Deepak, id=2]
Employee [name=Deepak, id=2]
HashCode e1 = -1825672330
Hashcode e2 = 2043178549
Hashcode e3 = 2043178549
e1 and e3  : false
e2 and e3  : true
e2 and e3  : true
```

5. Create a Sample class to understand generic assignments using "? extends SomeClass", "? super someclass " and "?".
Code:

```java
package assignment3;

import java.util.ArrayList;

class Sample
{
        public void print(ArrayList<? extends Number> list)
        {
                for(Object element:list)
                {
                        System.out.println(element);
                }
        }
}
class Sample2
{
        public void print(ArrayList<? super Double> d)
        {
                for(Object ele : d)
                        System.out.println(ele);
        }
}
class Sample3
{
        public void print(ArrayList<?>al)
        {
                for(Object ob : al)
                        System.out.println(ob);
        }
}
public class Que5
{
        public static void main(String[] args)
        {
                ArrayList<Integer> intList = new ArrayList<Integer>();
                intList.add(100);
                intList.add(200);
                intList.add(300);
                intList.add(400);
                ArrayList<Double> dlist = new ArrayList<Double>();
                dlist.add(1.1);
                dlist.add(2.1);
                dlist.add(3.1);
                dlist.add(4.1);
                ArrayList<String> str = new ArrayList<String>();
str.add("ABC");
            str.add("DEF");
            str.add("GHI");
            str.add("JKL");
            System.out.println(intList);
            System.out.println(dlist);
            System.out.println(str);
      }

}
```

Output:



eclipse workspace - Module2/src/assignment3/Que5.java - Eclipse IDE

```
package assignment3;

import java.util.ArrayList;

class Sample
{
    public void print(ArrayList<? extends Number> list)
    {
        for(Object element:list)
```

```
<terminated> Que5 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe (02-May-2022, 10:29:54 am – 10:29:56 am)
[100, 200, 300, 400]
[1.1, 2.1, 3.1, 4.1]
[ABC, DEF, GHI, JKL]
```

6. Invoke private methods of some other class using reflection.
Code:

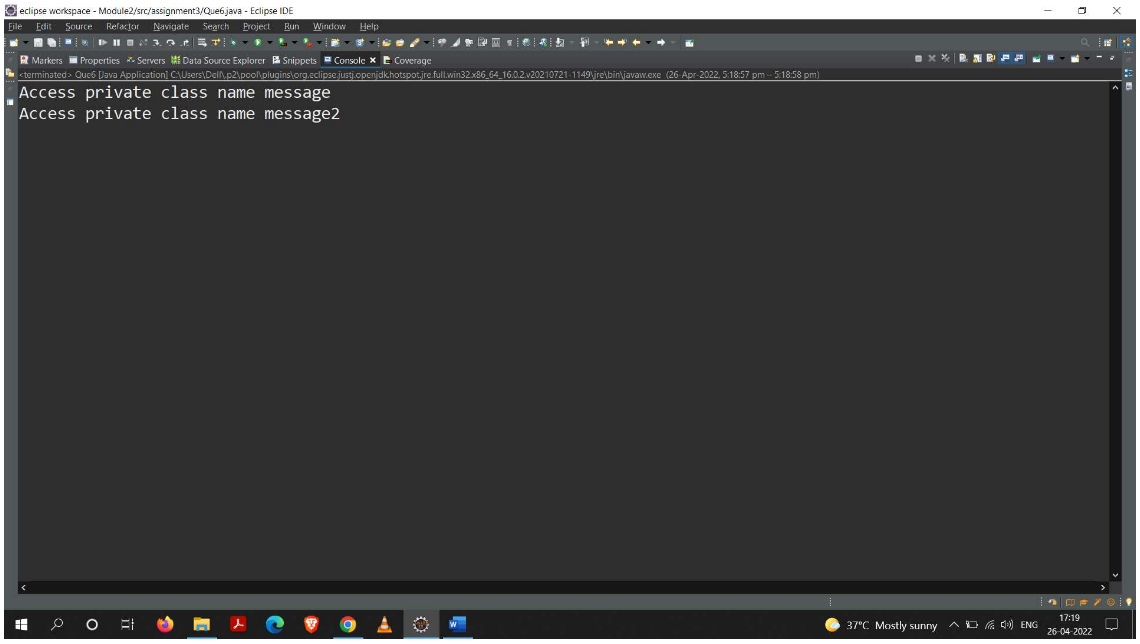
Que6

```
package assignment3;

import java.lang.reflect.Method;

public class Que6
{
	public static void main(String[] args) {
		try {
			TargetRef t = new TargetRef();
			Method[] m = TargetRef.class.getDeclaredMethods();
			for(int i = 0 ; i < m.length ; i++) {
				m[i].setAccessible(true);
				m[i].invoke(t);
			}
		}
		catch(Exception e) {
			e.printStackTrace();
		}
	}
}
```

TargetRef

```
package assignment3;

import java.lang.reflect.Method;

public class Que6
{
	public static void main(String[] args) {
		try {
			TargetRef t = new TargetRef();
			Method[] m = TargetRef.class.getDeclaredMethods();
			for(int i = 0 ; i < m.length ; i++) {
				m[i].setAccessible(true);
				m[i].invoke(t);
			}
		}
		catch(Exception e) {
			e.printStackTrace();
		}
	}
}
```

Output:


eclipse workspace - Module2/src/assignment3/Que6.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console Coverage

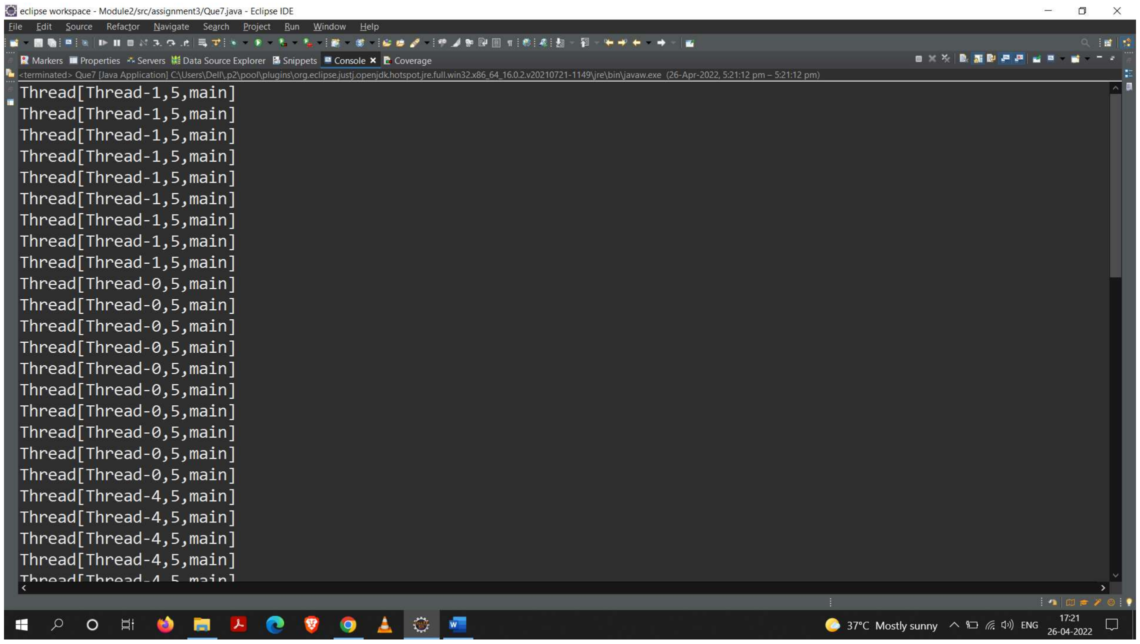
```
<terminated> Que6 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe (26-Apr-2022, 5:18:57 pm – 5:18:58 pm)
Access private class name message
Access private class name message2
```

7. Create multiple threads using Thread class and Runnable interfaces.
Code:

```
package assignment3;
class MyThread1 extends Thread
{
	public void run()
	{
		for(int i = 0 ; i < 10 ; i++)
			System.out.println(Thread.currentThread());
	}
}
class MyThread2 implements Runnable
{
	public void run()
	{
		for(int i = 0 ; i < 10 ; i++)
			System.out.println(Thread.currentThread());
	}
}
public class Que7
{
	public static void main(String[] args)
	{
		MyThread1 t1 = new MyThread1();
		MyThread1 t2 = new MyThread1();
		MyThread1 t3 = new MyThread1();

		t1.start();
		t2.start();
		t3.start();

		MyThread2 m1 = new MyThread2();
		MyThread2 m2 = new MyThread2();
		MyThread2 m3 = new MyThread2();

		Thread b1 = new Thread(m1);
		Thread b2 = new Thread(m2);
		Thread b3 = new Thread(m3);

		b1.start();
		b2.start();
		b3.start();
	}
}
```

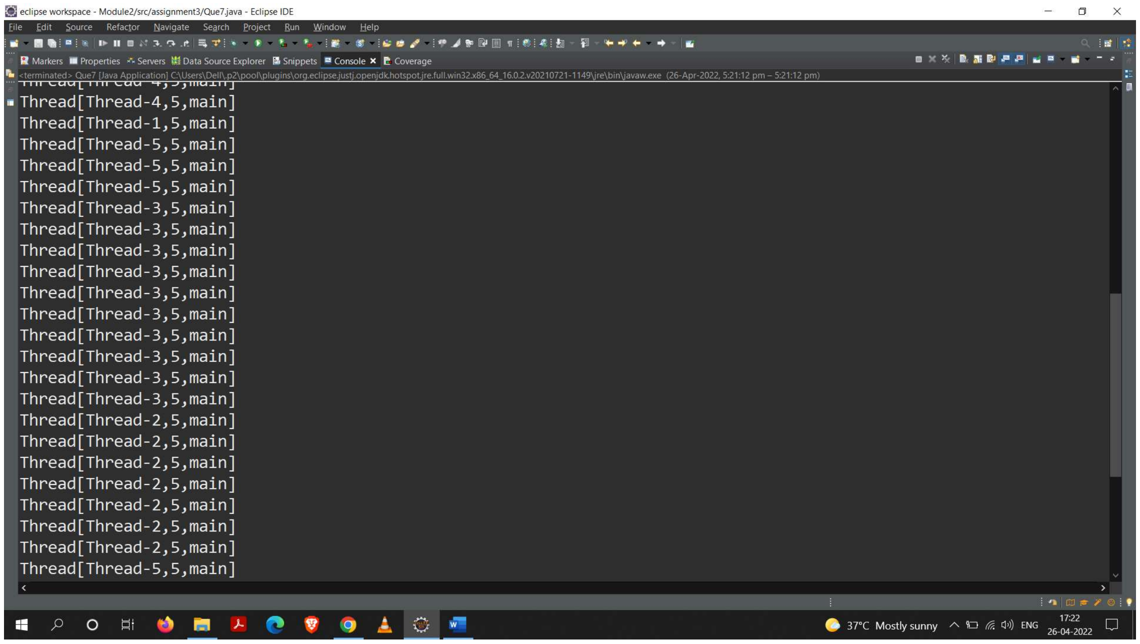
Output:

Part – A


eclipse workspace - Module2/src/assignment3/Que7.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console Coverage
37°C Mostly sunny
ENG
17:21
26-04-2022

```
<terminated> Que7 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe  (26-Apr-2022, 5:21:12 pm – 5:21:12 pm)
Thread[Thread-1,5,main]
Thread[Thread-1,5,main]
Thread[Thread-1,5,main]
Thread[Thread-1,5,main]
Thread[Thread-1,5,main]
Thread[Thread-1,5,main]
Thread[Thread-1,5,main]
Thread[Thread-1,5,main]
Thread[Thread-1,5,main]
Thread[Thread-0,5,main]
Thread[Thread-0,5,main]
Thread[Thread-0,5,main]
Thread[Thread-0,5,main]
Thread[Thread-0,5,main]
Thread[Thread-0,5,main]
Thread[Thread-0,5,main]
Thread[Thread-0,5,main]
Thread[Thread-0,5,main]
Thread[Thread-0,5,main]
Thread[Thread-4,5,main]
Thread[Thread-4,5,main]
Thread[Thread-4,5,main]
Thread[Thread-4,5,main]
Thread[Thread-4,5,main]
```

Part – B


eclipse workspace - Module2/src/assignment3/Que7.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console Coverage
37°C Mostly sunny
ENG
17:22
26-04-2022

```
<terminated> Que7 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe  (26-Apr-2022, 5:21:12 pm – 5:21:12 pm)
Thread[Thread-4,5,main]
Thread[Thread-4,5,main]
Thread[Thread-1,5,main]
Thread[Thread-5,5,main]
Thread[Thread-5,5,main]
Thread[Thread-5,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-5,5,main]
```

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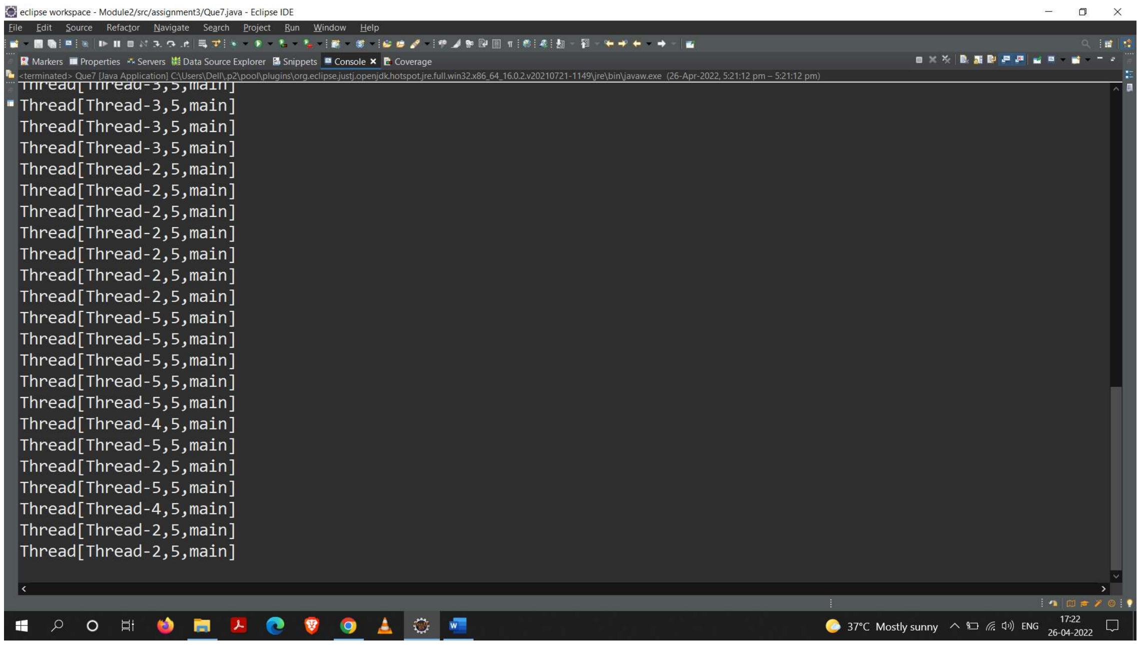
Part – C

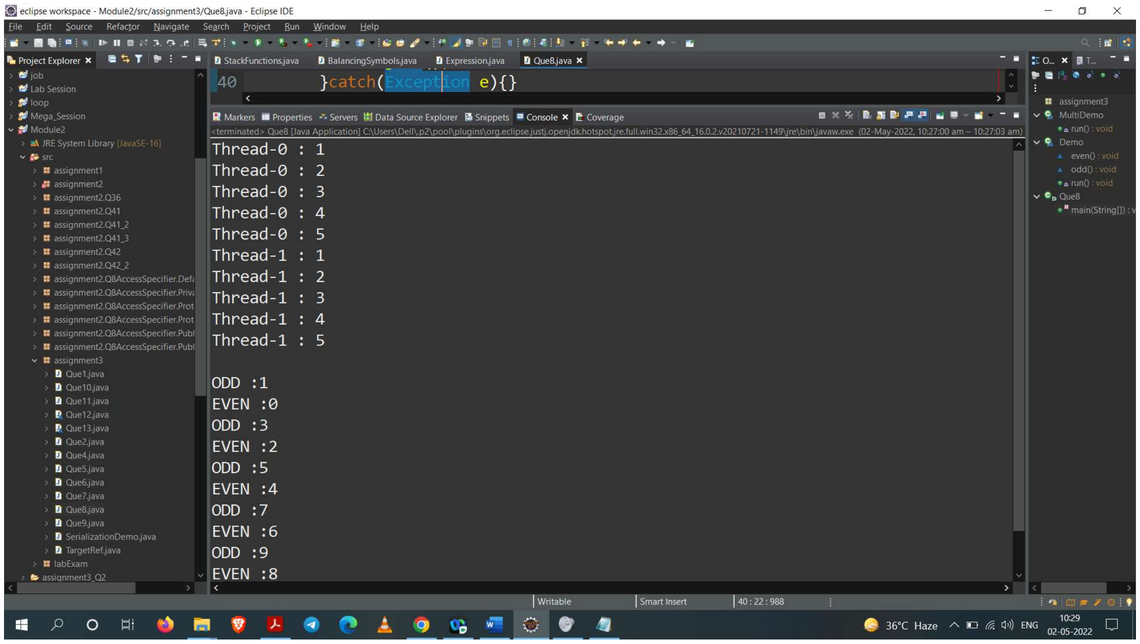

eclipse workspace - Module2/src/assignment3/Que7.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console Coverage
37°C Mostly sunny
ENG
17:22
26-04-2022

```
<terminated> Que7 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe (26-Apr-2022, 5:21:12 pm – 5:21:12 pm)
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-3,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
Thread[Thread-5,5,main]
Thread[Thread-5,5,main]
Thread[Thread-5,5,main]
Thread[Thread-5,5,main]
Thread[Thread-5,5,main]
Thread[Thread-4,5,main]
Thread[Thread-5,5,main]
Thread[Thread-2,5,main]
Thread[Thread-5,5,main]
Thread[Thread-4,5,main]
Thread[Thread-2,5,main]
Thread[Thread-2,5,main]
```

8. Assign same task and different task to multiple threads.
Code:

```
package assignment3;

class MultiDemo extends Thread {
     public void run() {
        for(int i=1;i<=5;i++)  {
            System.out.println(Thread.currentThread().getName()+" : "+i+"
");
            try{
                Thread.sleep(100);
            }
            catch(Exception e){}
        }
    }
}
class Demo extends Thread {
       void even() {
        for(int i=0;i<=10;i++)
            if(i%2==0)
            System.out.println("EVEN :"+i);
     }
     void odd(){
        for(int i=1;i<=10;i++)
            if(i%2!=0)
            System.out.println("ODD :"+i);
     }
    public void run() {
        if(Thread.currentThread().getName().equals("Even"))
            even();
        else
            odd();
    }
}
public class Que8{
    public static void main(String[] args)
    {
        MultiDemo t1=new MultiDemo();
        MultiDemo t2=new MultiDemo();
        t1.start();
        try{
            t1.join();
        }catch(Exception e){}
        t2.start();
        try{
            t2.join();
        }catch(Exception e){}
        System.out.println();
        Demo a=new Demo();
        Demo b=new Demo();
a.setName("Even");
          b.setName("Odd");
          a.start();
          b.start();
     }
}
```

Output:



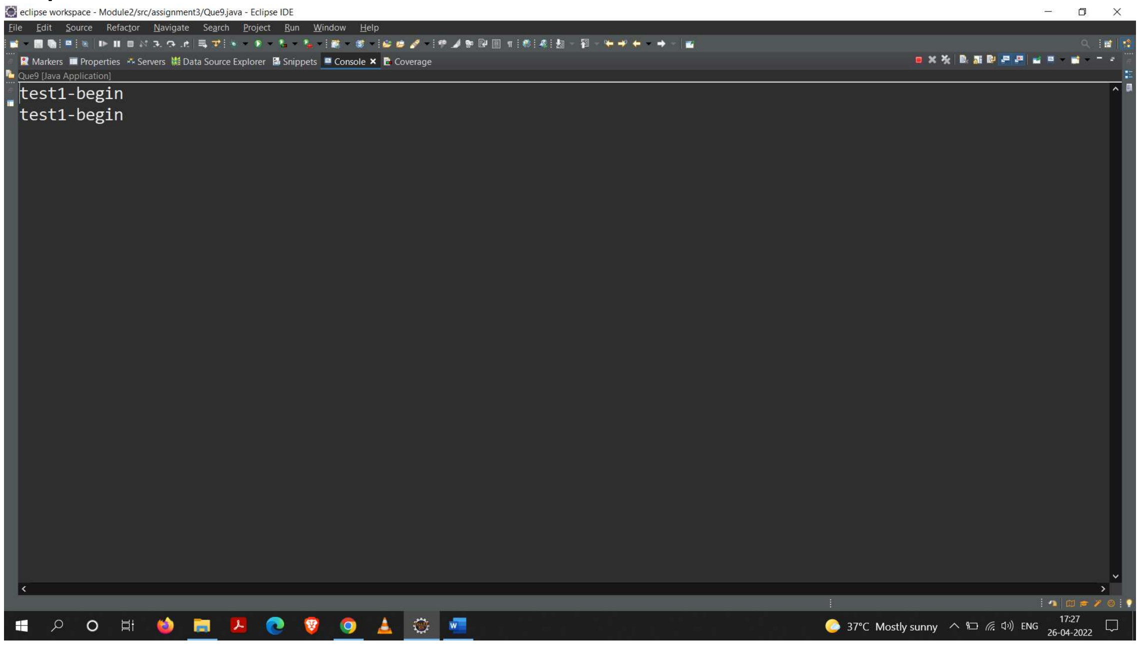
```
40          }catch(Exception e){}
```

```
<terminated> Que8 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe (02-May-2022, 10:27:00 am – 10:27:03 am)
Thread-0 : 1
Thread-0 : 2
Thread-0 : 3
Thread-0 : 4
Thread-0 : 5
Thread-1 : 1
Thread-1 : 2
Thread-1 : 3
Thread-1 : 4
Thread-1 : 5

ODD :1
EVEN :0
ODD :3
EVEN :2
ODD :5
EVEN :4
ODD :7
EVEN :6
ODD :9
EVEN :8
```

9. Create a Deadlock class to demonstrate deadlock in multithreading environment.
Code:

```java
package assignment3;

class Util{
      static void sleep(long millis)      {
            try {
                  Thread.sleep(millis);
            }catch (InterruptedException e) {
                  e.printStackTrace();
            }
      }
}
class Shared {
      synchronized void test1(Shared s2) {
            System.out.println("test1-begin");
            Util.sleep(1000);
            s2.test2();
            System.out.println("test1-end");
      }
      synchronized void test2() {
            System.out.println("test2-begin");
            Util.sleep(1000);
            System.out.println("test2-end");
      }
}

class Thread1 extends Thread {
      private Shared s1;
      private Shared s2;
      public Thread1(Shared s1, Shared s2) {
            this.s1 = s1;
            this.s2 = s2;
      }
      @Override
      public void run() {
            s1.test1(s2);
      }
}

class Thread2 extends Thread {
      private Shared s1;
      private Shared s2;
      public Thread2(Shared s1, Shared s2) {
            this.s1 = s1;
            this.s2 = s2;
      }
@Override
	public void run() {
		s2.test1(s1);
	}
}

public class Que9 {
	public static void main(String[] args) {
		Shared s1 = new Shared();
		Shared s2 = new Shared();
		Thread1 t1 = new Thread1(s1, s2);
		t1.start();
		Thread2 t2 = new Thread2(s1, s2);
		t2.start();
		Util.sleep(2000);
	}
}
```

Output:

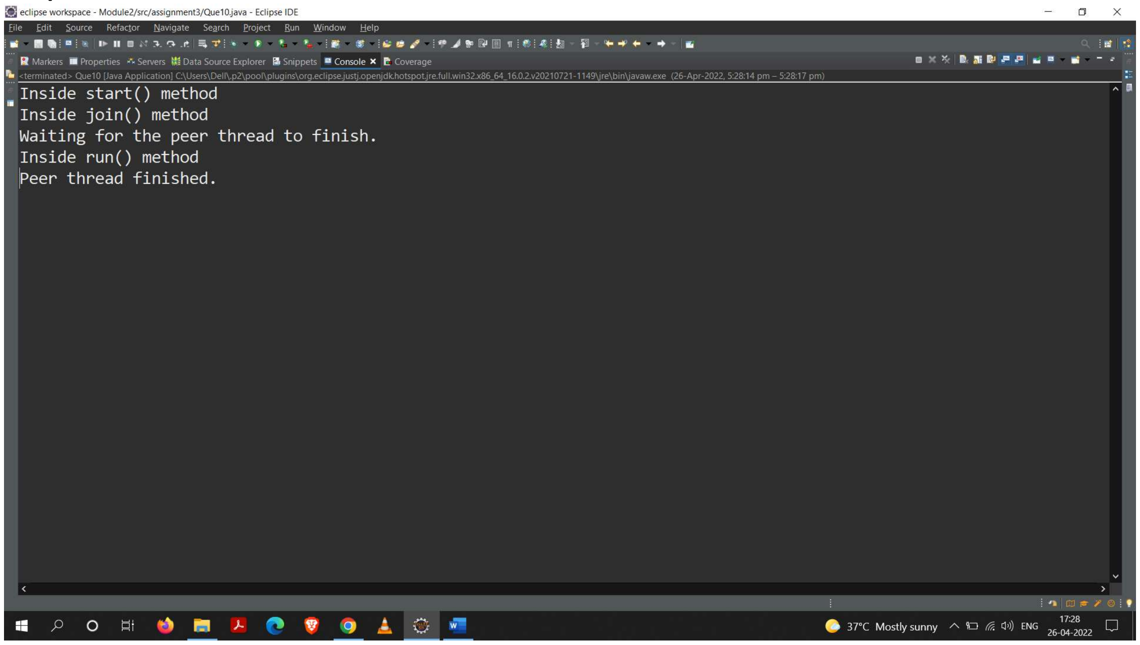

eclipse workspace - Module2/src/assignment3/Que9.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console Coverage
Que9 [Java Application]
37°C Mostly sunny ENG 17:27 26-04-2022

```
test1-begin
test1-begin
```

10. Implement wait, notify and notifyAll methods.
Code:

```java
package assignment3;

public class Que10 {
   private static final long SLEEP_INTERVAL = 3000;
   private boolean running = true;
   private Thread thread;
   public void start() {
      print("Inside start() method");
      thread = new Thread(new Runnable() {
         @Override
         public void run() {
            print("Inside run() method");
            try {
               Thread.sleep(SLEEP_INTERVAL);
            } catch(InterruptedException e) {
               Thread.currentThread().interrupt();
            }
            synchronized(Que10.this) {
               running = false;
               Que10.this.notify();
            }
         }
      });
      thread.start();
   }
   public void join() throws InterruptedException {
      print("Inside join() method");
      synchronized(this) {
         while(running) {
            print("Waiting for the peer thread to finish.");
            wait(); //waiting, not running
         }
         print("Peer thread finished.");
      }
   }
   private void print(String s) {
      System.out.println(s);
   }
   public static void main(String[] args) throws InterruptedException {
         Que10 test = new Que10();
      test.start();
      test.join();
   }
}
```

Output:



eclipse workspace - Module2/src/assignment3/Que10.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console Coverage
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ENG
17:28
26-04-2022

```
<terminated> Que10 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe  (26-Apr-2022, 5:28:14 pm – 5:28:17 pm)
Inside start() method
Inside join() method
Waiting for the peer thread to finish.
Inside run() method
Peer thread finished.
```

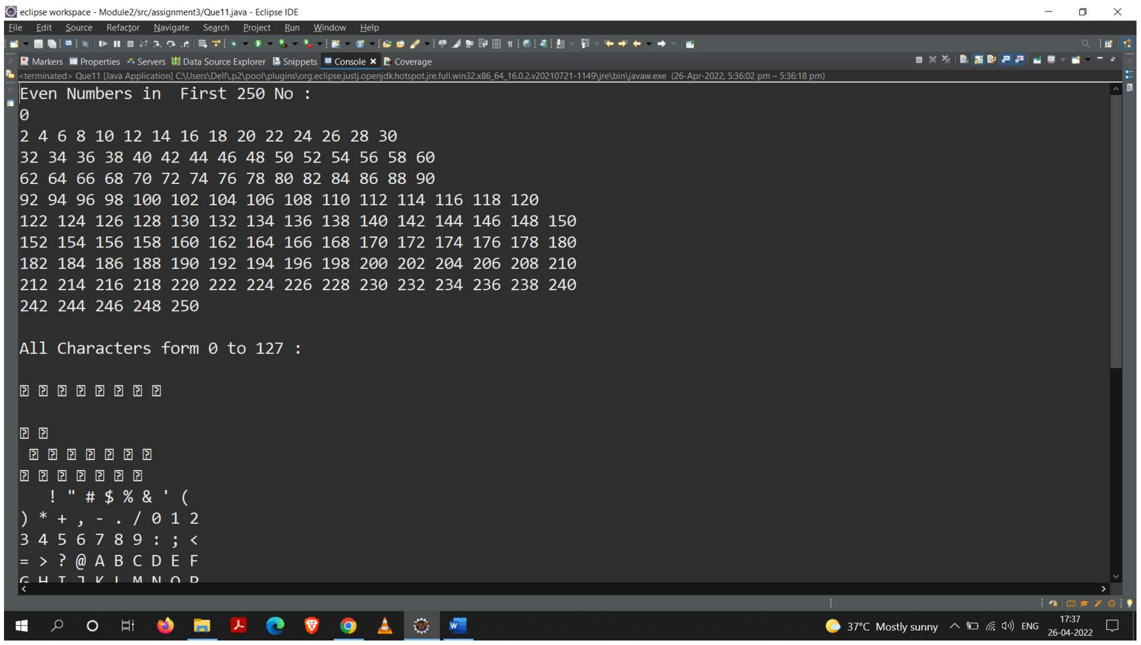
11. Create multiple threads using anonymous inner classes.
Code:

```
package assignment3;
class Conditions{
    synchronized public void dispNos(){
        System.out.println("Even Numbers in  First 250 No :");
        for(int i=0;i<=250;i=i+2){
            System.out.print(i+" ");
            try {
                Thread.sleep(50);
            } catch (Exception e) { }
        }
        System.out.println();
    }
    synchronized  public void PrintTable(int n){
        System.out.println("\nPrinting Table : ");
        for (int i=1;i<=10;i++)
        System.out.println(n+" * "+i+" = "+(n*i));
        try {
            Thread.sleep(50);
        } catch (Exception e) {}
            if(i%30==0)
                  System.out.println();

    }
    synchronized public void allchar(){
        System.out.println("\nAll Characters form 0 to 127 : ");
        for (int i = 0; i <=127; i++) {
            System.out.print((char)i+" ");
            try {
                Thread.sleep(50);
            } catch (Exception e) {}
            if(i%10==0)
                  System.out.println();
        }
    }
}
public class Que11 {
    public static void main(String[] args) {
        Conditions c=new Conditions();
        new Thread(){
            public void run(){
               c.dispNos();
            }
        }.start();
        new Thread(){
            public void run(){
                c.PrintTable(2);
            }
        }.start();
        new Thread(){
              public void run(){
                  c.allchar();
              }
          }.start();
      }
}
```

Output:

Part – A


eclipse workspace - Module2/src/assignment3/Que11.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console Coverage
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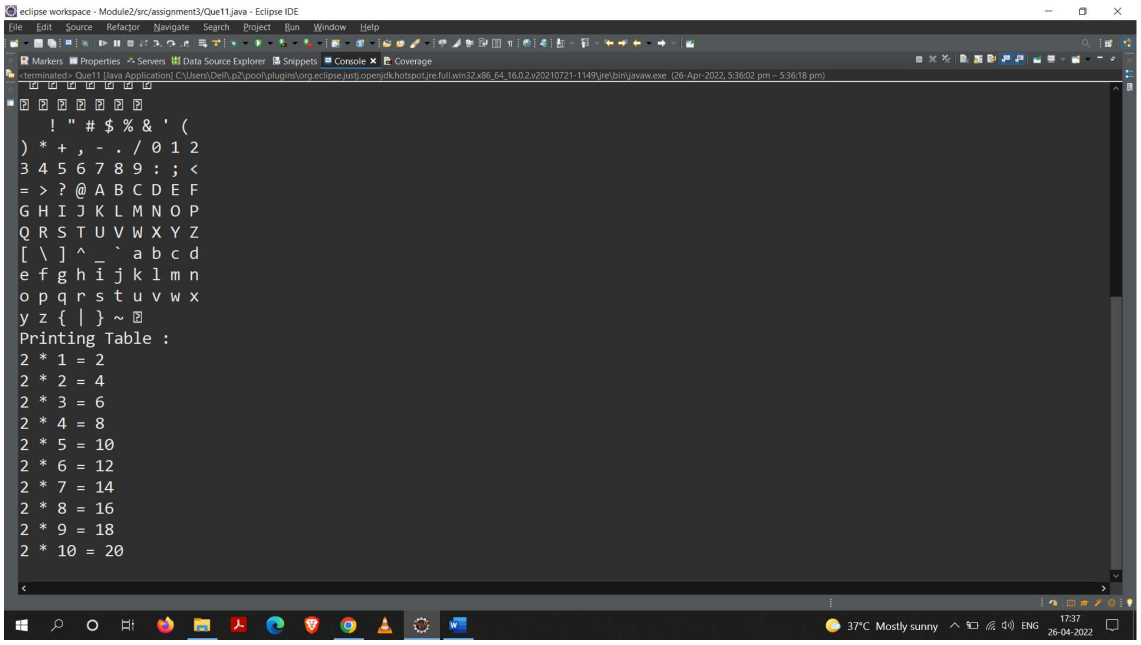
```
<terminated> Que11 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe  (26-Apr-2022, 5:36:02 pm – 5:36:18 pm)
Even Numbers in  First 250 No :
0
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
62 64 66 68 70 72 74 76 78 80 82 84 86 88 90
92 94 96 98 100 102 104 106 108 110 112 114 116 118 120
122 124 126 128 130 132 134 136 138 140 142 144 146 148 150
152 154 156 158 160 162 164 166 168 170 172 174 176 178 180
182 184 186 188 190 192 194 196 198 200 202 204 206 208 210
212 214 216 218 220 222 224 226 228 230 232 234 236 238 240
242 244 246 248 250

All Characters form 0 to 127 :

⍰ ⍰ ⍰ ⍰ ⍰ ⍰ ⍰ ⍰ ⍰

⍰ ⍰
 ⍰ ⍰ ⍰ ⍰ ⍰ ⍰ ⍰
⍰ ⍰ ⍰ ⍰ ⍰ ⍰ ⍰
   ! " # $ % & ' (
) * + , - . / 0 1 2
3 4 5 6 7 8 9 : ; <
= > ? @ A B C D E F
G H I J K L M N O P
```

Part – B


eclipse workspace - Module2/src/assignment3/Que11.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console Coverage
37°C Mostly sunny
ENG
17:37
26-04-2022

```
<terminated> Que11 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe  (26-Apr-2022, 5:36:02 pm – 5:36:18 pm)
⍰ ⍰ ⍰ ⍰ ⍰ ⍰ ⍰
   ! " # $ % & ' (
) * + , - . / 0 1 2
3 4 5 6 7 8 9 : ; <
= > ? @ A B C D E F
G H I J K L M N O P
Q R S T U V W X Y Z
[ \ ] ^ _ ` a b c d
e f g h i j k l m n
o p q r s t u v w x
y z { | } ~ ⍰
Printing Table :
2 * 1 = 2
2 * 2 = 4
2 * 3 = 6
2 * 4 = 8
2 * 5 = 10
2 * 6 = 12
2 * 7 = 14
2 * 8 = 16
2 * 9 = 18
2 * 10 = 20
```

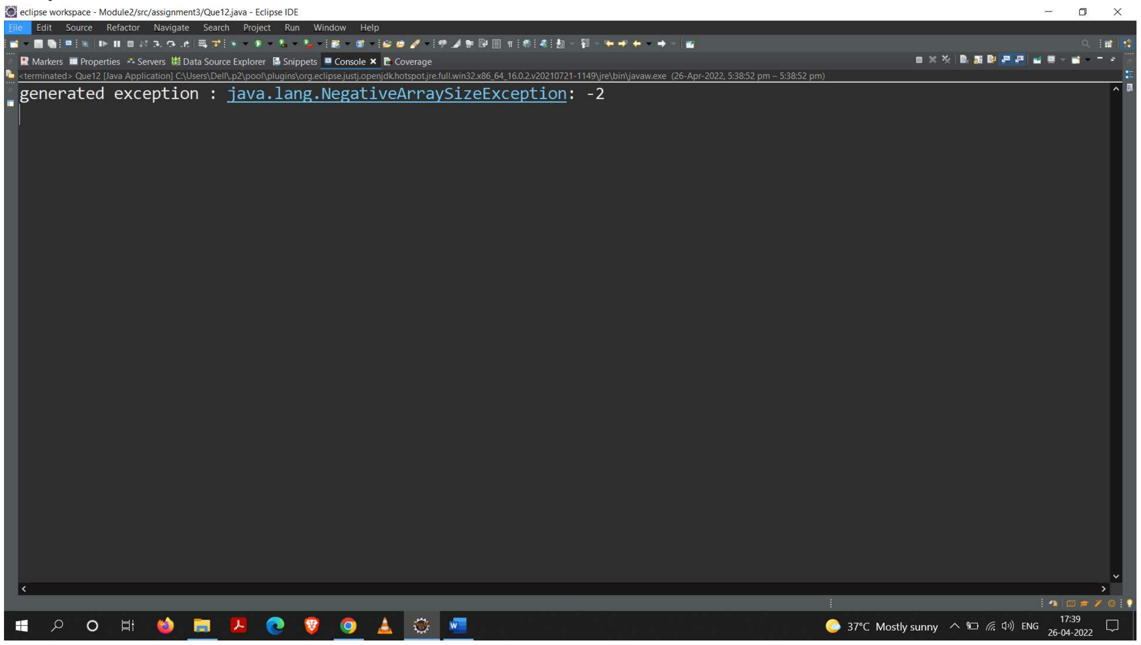
12.Write a program for example of try and catch block. In this check whether the given array size is negative or not

Code:

```java
package assignment3;

class Que12 {
	@SuppressWarnings("unused")
	public static void main(String a[])
	{
		try
		{
			int array[] = new int[-2];
		}
		catch(NegativeArraySizeException n)
		{
			System.out.println("generated exception : " + n);
		}
	}
}
```

Output:


eclipse workspace - Module2/src/assignment3/Que12.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Markers Properties Servers Data Source Explorer Snippets Console Coverage
37°C Mostly sunny ENG 17:39 26-04-2022

```
<terminated> Que12 [Java Application] C:\Users\Dell\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe  (26-Apr-2022, 5:38:52 pm – 5:38:52 pm)
generated exception : java.lang.NegativeArraySizeException: -2
```

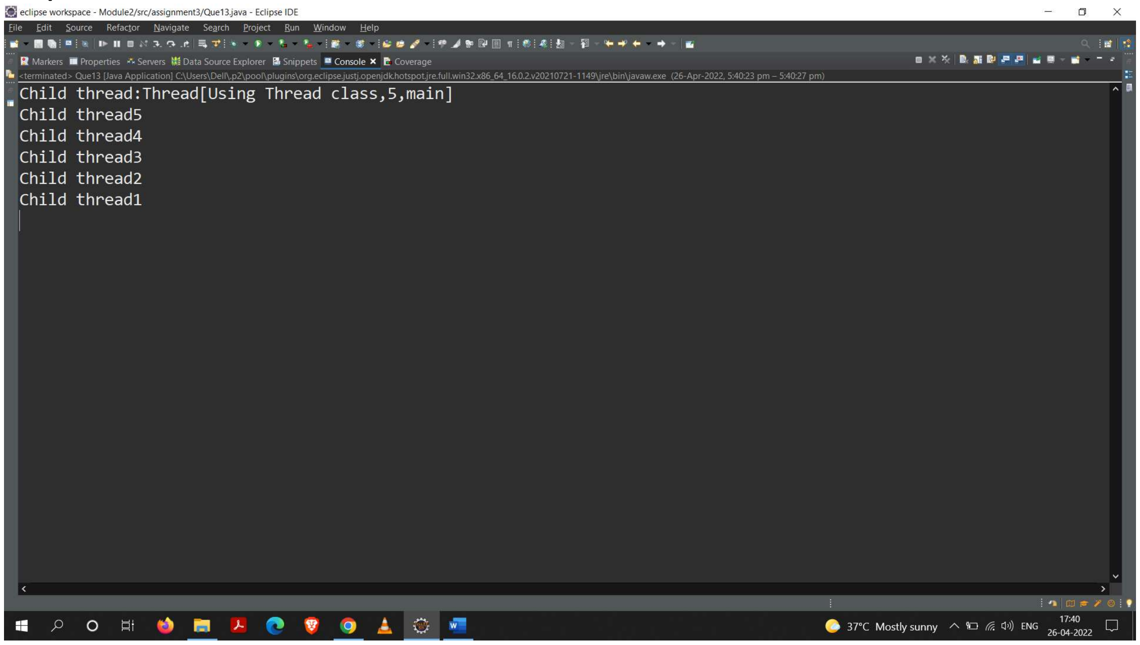
13.Write a program to create a class MyThread in this class a constructor, call the base class constructor, using super and starts the thread. The run method of the class starts after this. It can be observed that both main thread and created child thread are executed concurrently.
Code:

```java
package assignment3;

class MyThread extends Thread
{
	MyThread()
	{
		super("Using Thread class");
		System.out.println ("Child thread:" + this);

		start();
	}
	public void run()
	{
		try
		{
			int i;
			for (i = 5; i > 0; i--)
			{
				System.out.println ("Child thread" + i);
				Thread.sleep (500);
			}
		} catch (InterruptedException e) {
			System.out.println(e);
		}
	}
}
class Que13 {
	public static void main(String args[])
	{
		new MyThread();
		try {
			int k;
			for (k = 5; k < 0; k--)
			{
				Thread.sleep(1000);
			}
		}catch (InterruptedException e) {
			System.out.println(e);
		}
	}
}
```

Output:



```
Child thread:Thread[Using Thread class,5,main]
Child thread5
Child thread4
Child thread3
Child thread2
Child thread1
```