Note: Consider the following before starting the assignment:

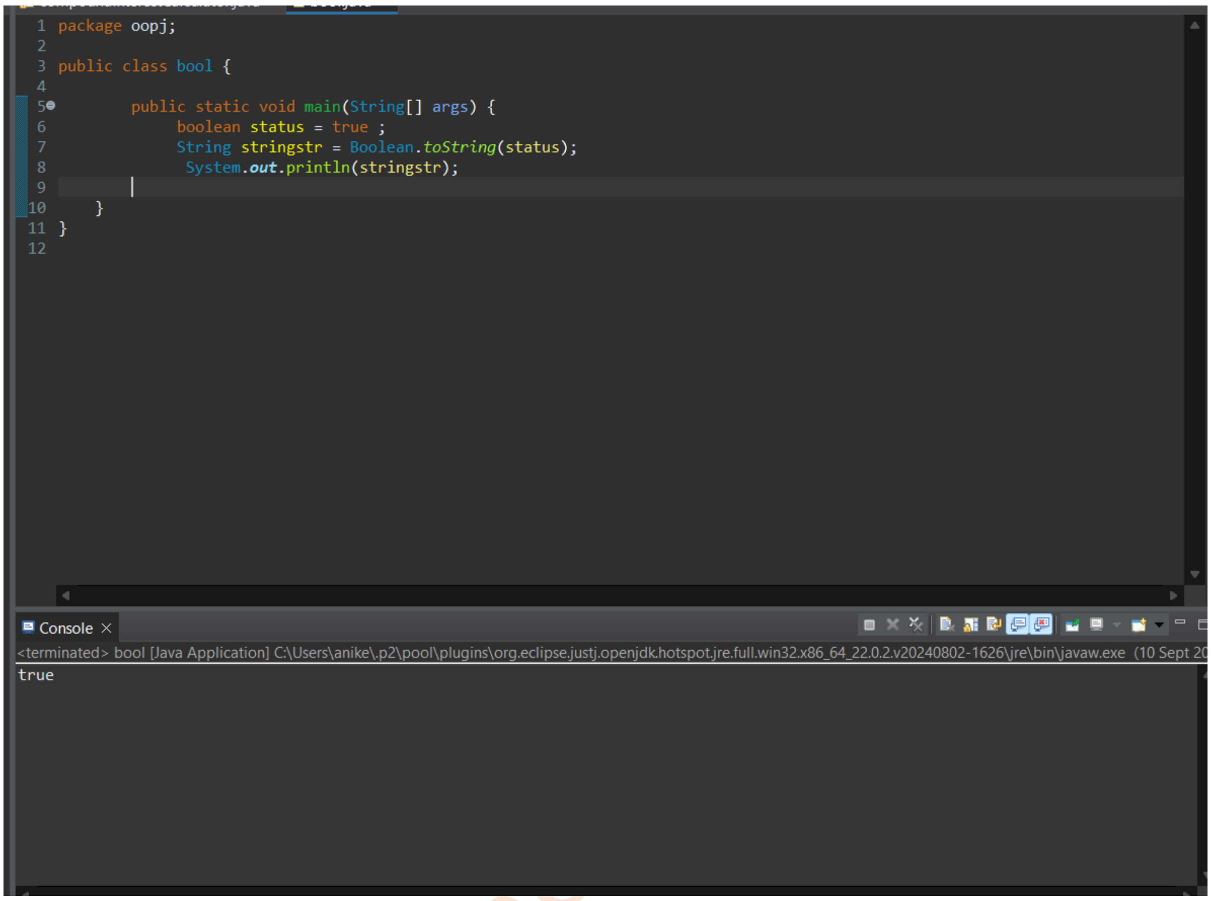
- A **static field** declared inside a class is called a **class-level variable**. To access this variable, use the class name and the dot operator (e.g., `Integer.MAX_VALUE`).
- A **static method** defined inside a class is called a **class-level method**. To access this method, use the class name and the dot operator (e.g., `Integer.parseInt()`).
- When accessing static members within the same class, you do not need to use the class name.

1. Working with `java.lang.Boolean`

a. Explore the Java API documentation for `java.lang.Boolean` and observe its modifiers and super types.

b. Declare a method-local variable `status` of type `boolean` with the value `true` and convert it to a `String` using the `toString` method. (Hint: Use `Boolean.toString(Boolean)`).

```
public class bool {

    public static void main(String[] args) {

        boolean status = true ;

        String stringstr = Boolean.toString(status);

         System.out.println(stringstr);

    }

}
```



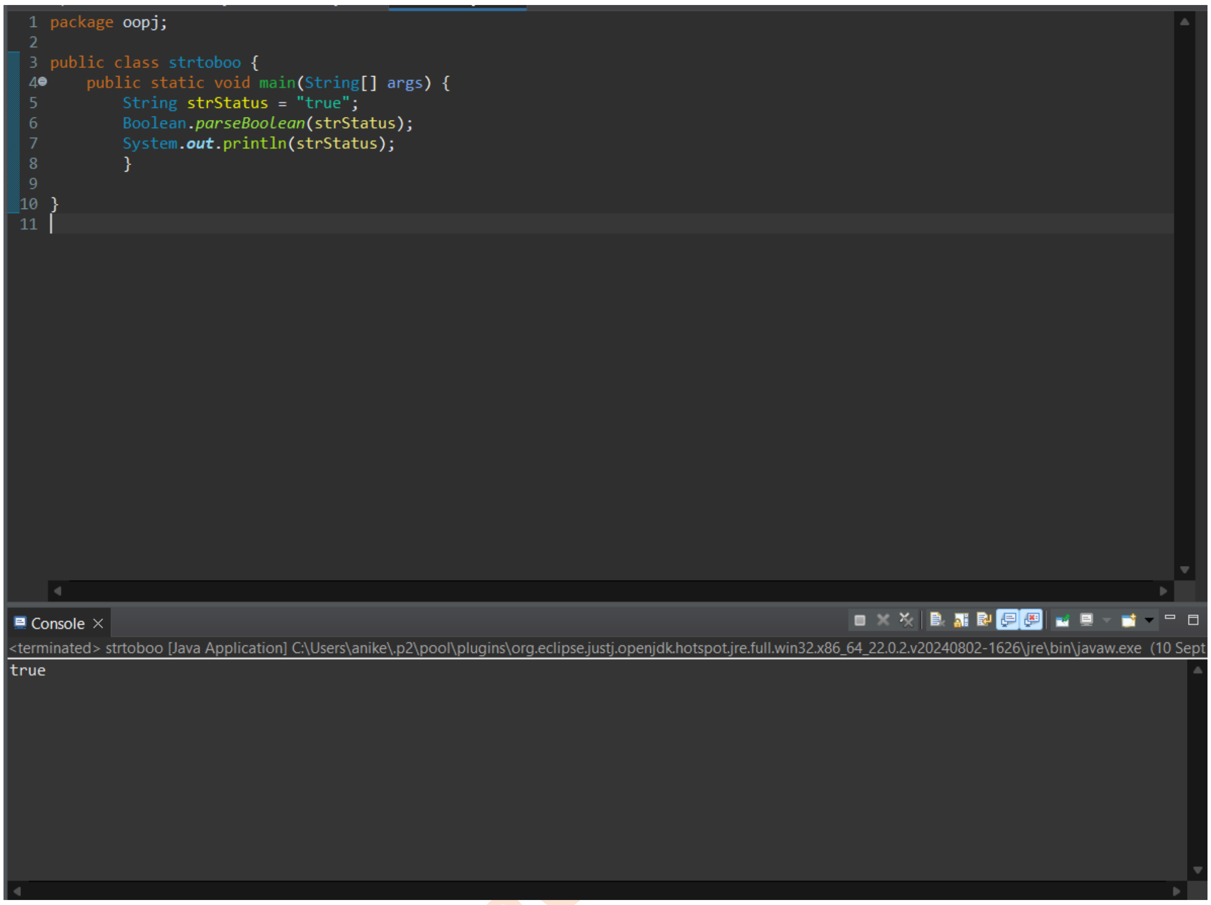
```
package oopj;

public class bool {

	public static void main(String[] args) {
		boolean status = true ;
		String stringstr = Boolean.toString(status);
		 System.out.println(stringstr);
		
	}
}
```

Console

```
<terminated> bool [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (10 Sept 20
true
```

c. Declare a method-local variable `strStatus` of type `String` with the value `"true"` and convert it to a `boolean` using the `parseBoolean` method. (Hint: Use `Boolean.parseBoolean(String)`).

```
public class strtoboo {

	public static void main(String[] args) {

		String strStatus = "true";

		Boolean.parseBoolean(strStatus);

		System.out.println(strStatus);

		}


}
```



```
package oopj;

public class strtoboo {
    public static void main(String[] args) {
        String strStatus = "true";
        Boolean.parseBoolean(strStatus);
        System.out.println(strStatus);
        }

}

```

```
<terminated> strtoboo [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (10 Sept
true
```

d. Declare a method-local variable `strStatus` of type `String` with the value `"1"` or `"0"` and attempt to convert it to a `boolean`. (Hint: `parseBoolean` method will not work as expected with `"1"` or `"0"`).

public class strtoboo1 {

public static void main(String[] args) {

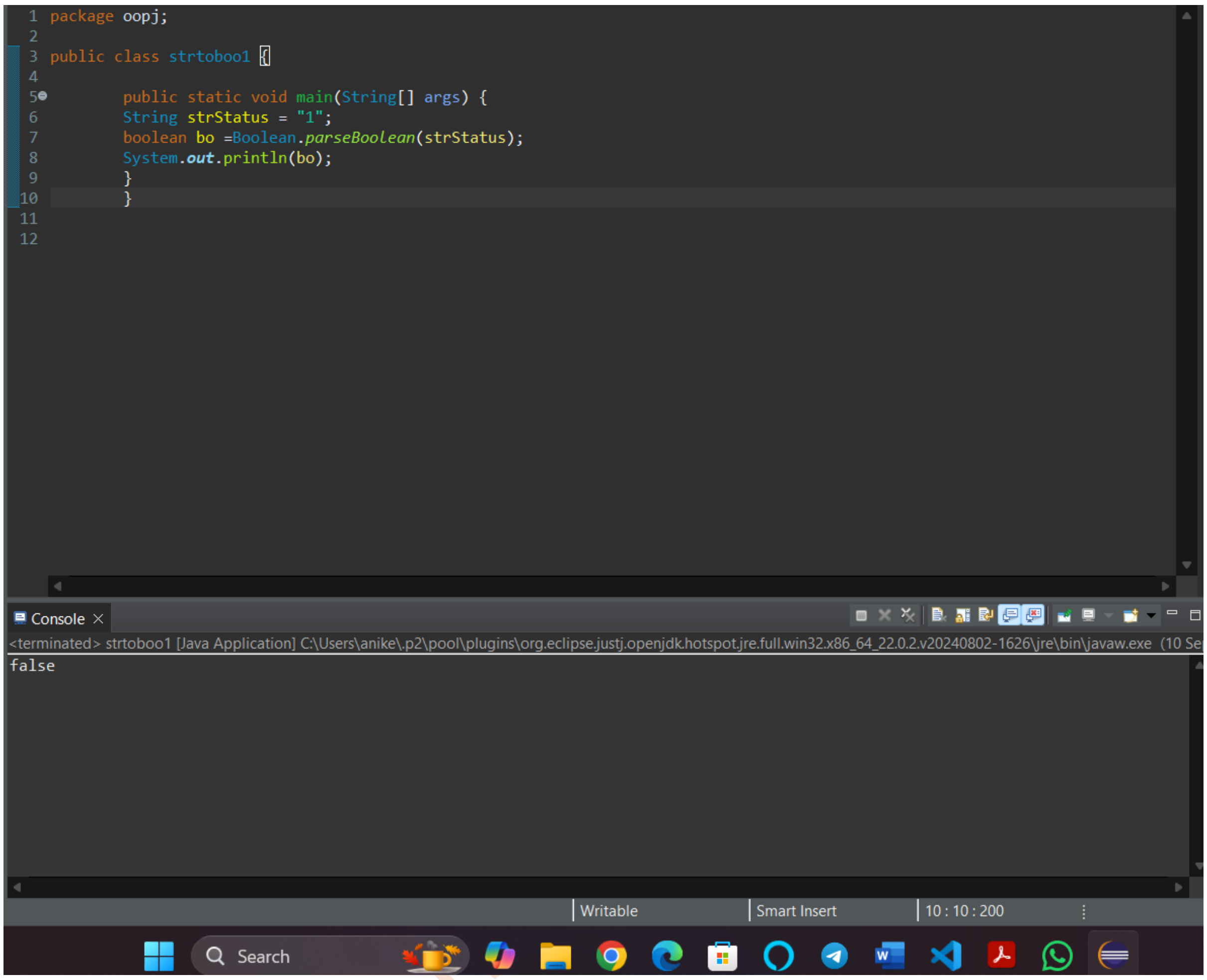
String strStatus = "1";

boolean bo =Boolean.*parseBoolean*(strStatus);

System.***out***.println(bo);

}

}



```java
package oopj;

public class strtoboo1 {

	public static void main(String[] args) {
	String strStatus = "1";
	boolean bo =Boolean.parseBoolean(strStatus);
	System.out.println(bo);
	}
	}

```

```
<terminated> strtoboo1 [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe (10 Se
false
```

e. Declare a method-local variable `status` of type `boolean` with the value `true` and convert it to the corresponding wrapper class using `Boolean.valueOf()`. (Hint: Use `Boolean.valueOf(boolean)`).

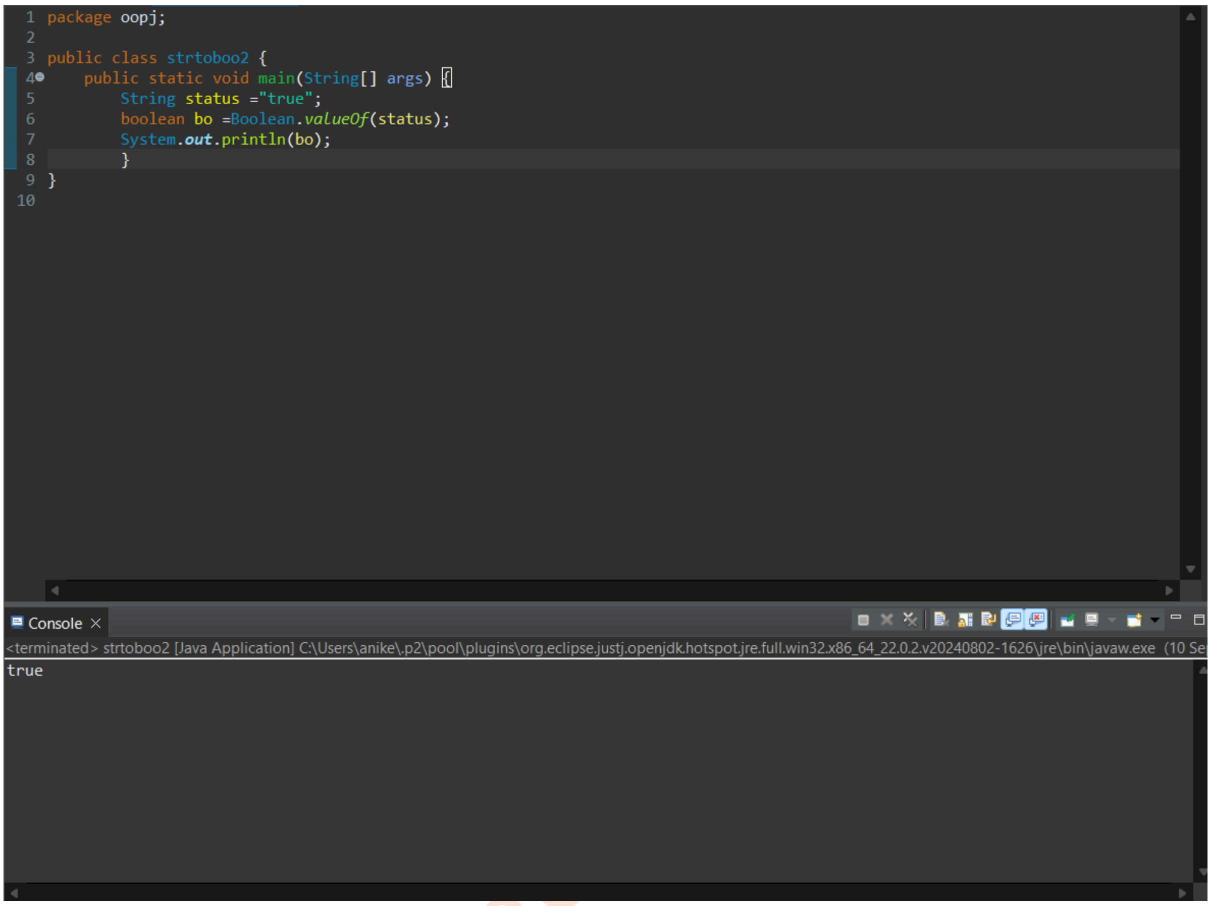
public static void main(String[] args) {

String status ="true";

boolean bo =Boolean.valueOf(status);

System.out.println(bo);

}



```
package oopj;

public class strtoboo2 {
    public static void main(String[] args) {
        String status ="true";
        boolean bo =Boolean.valueOf(status);
        System.out.println(bo);
        }
}

```

```
<terminated> strtoboo2 [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe (10 Se
true
```

f. Declare a method-local variable `strStatus` of type `String` with the value `"true"` and convert it to the corresponding wrapper class using `Boolean.valueOf()`. (Hint: Use `Boolean.valueOf(String)`).

public class Strtoboo3{

public static void main(String[] args) {

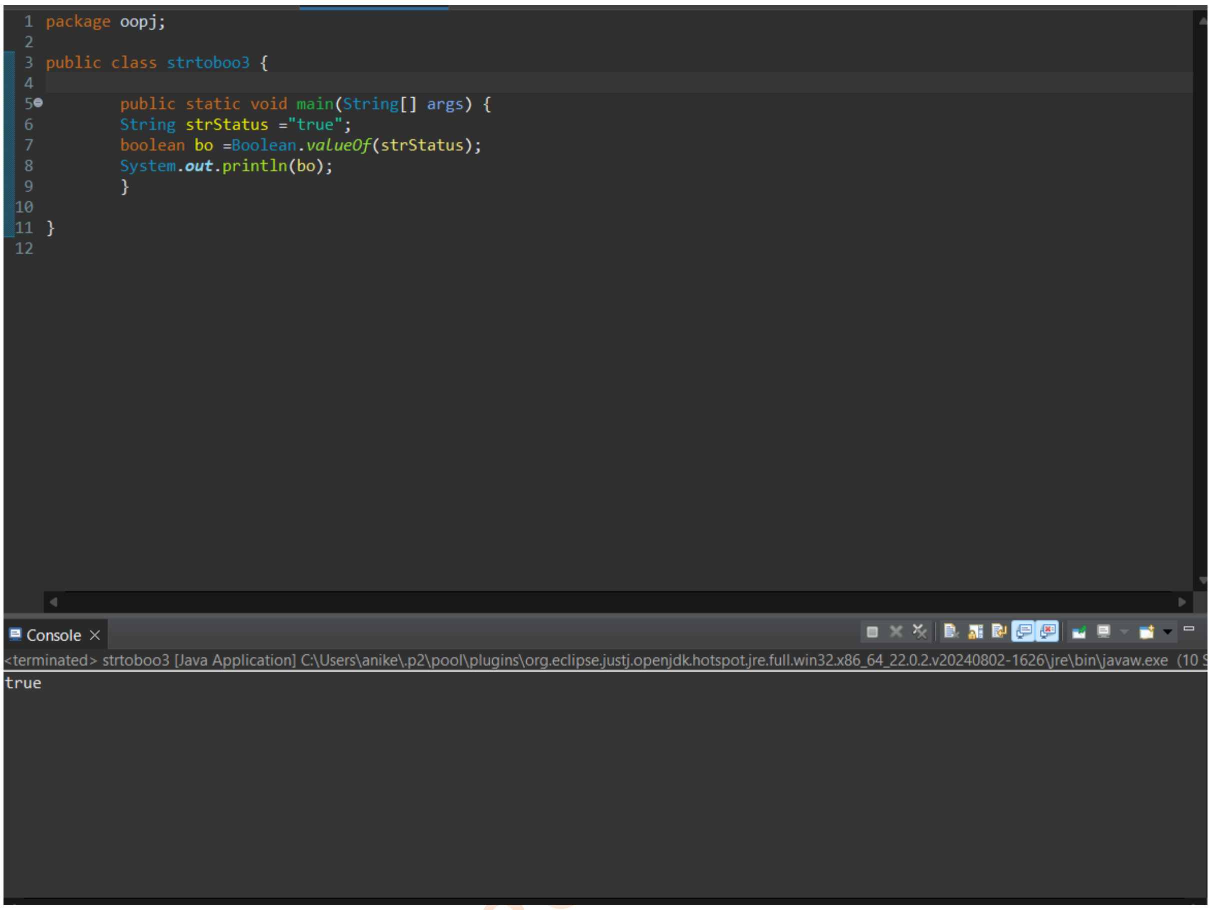
String strStatus ="true";

boolean bo =Boolean.valueOf(strStatus);

System.out.println(bo);

}

}



```java
package oopj;

public class strtoboo3 {

	public static void main(String[] args) {
	String strStatus ="true";
	boolean bo =Boolean.valueOf(strStatus);
	System.out.println(bo);
	}

}
```

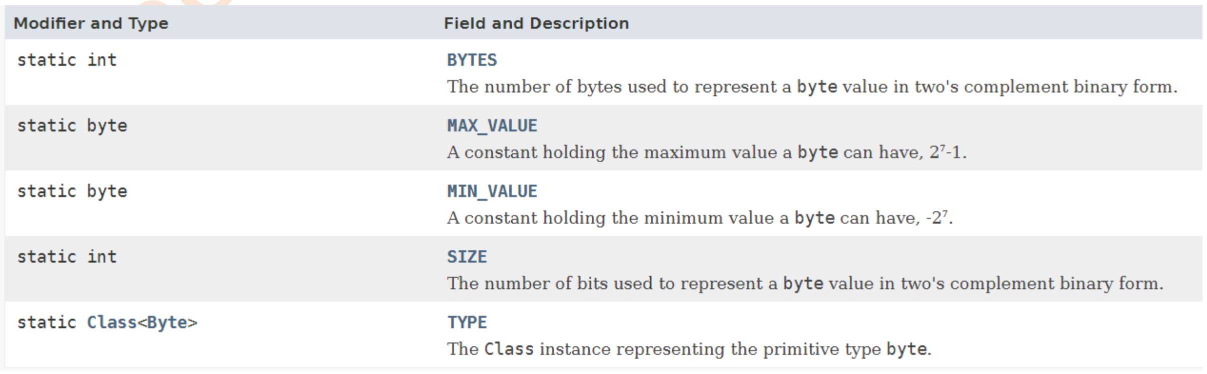
Console

```
<terminated> strtoboo3 [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (10
true
```

g. Experiment with converting a `boolean` value into other primitive types or vice versa and observe the results.

2. Working with `java.lang.Byte`

a. Explore the [Java API documentation for `java.lang.Byte`] and observe its modifiers and super types.

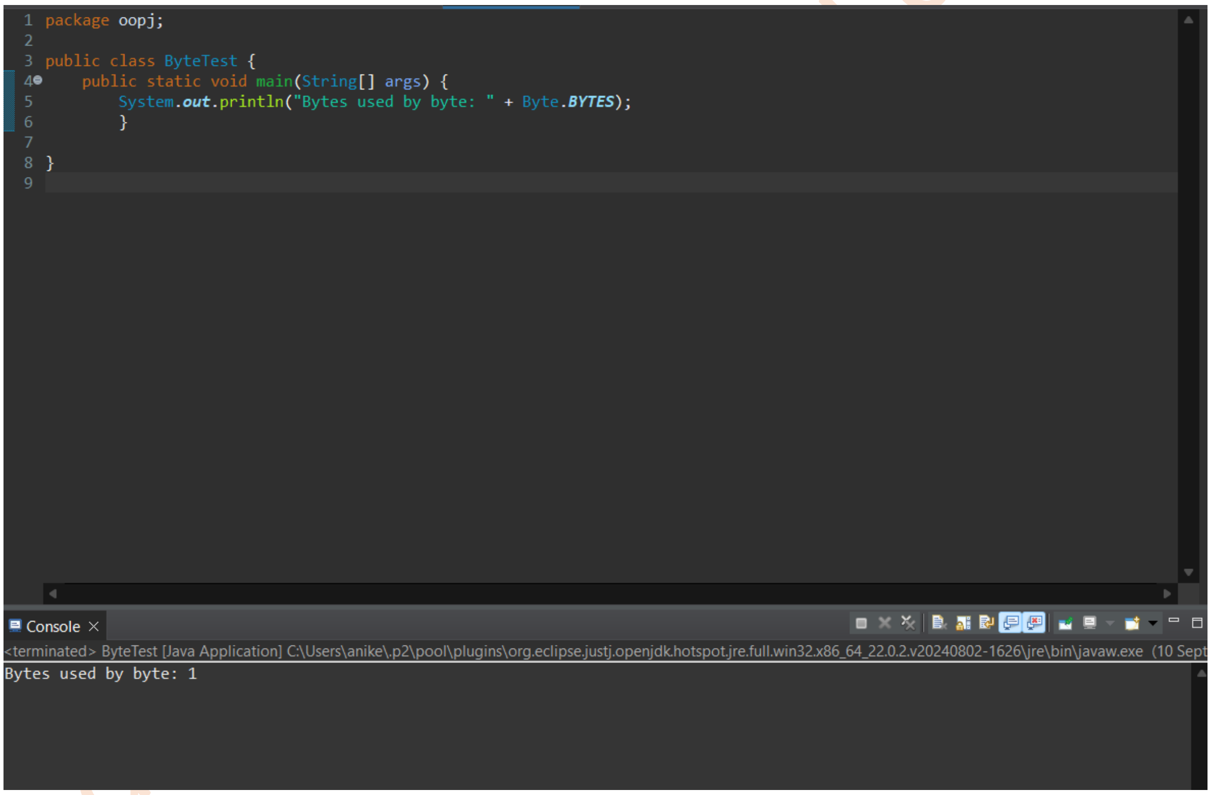


Modifier and Type	Field and Description
`static int`	`BYTES` The number of bytes used to represent a `byte` value in two's complement binary form.
`static byte`	`MAX_VALUE` A constant holding the maximum value a `byte` can have, 2^7-1.
`static byte`	`MIN_VALUE` A constant holding the minimum value a `byte` can have, -2^7.
`static int`	`SIZE` The number of bits used to represent a `byte` value in two's complement binary form.
`static Class<Byte>`	`TYPE` The `Class` instance representing the primitive type `byte`.

b. Write a program to test how many bytes are used to represent a `byte` value using the `BYTES` field. (Hint: Use `Byte.BYTES`).

package oopj;

```
public class ByteTest {

        public static void main(String[] args) {

                System.out.println("Bytes used by byte: " + Byte.BYTES);

                }



}
```



```
package oopj;

public class ByteTest {
    public static void main(String[] args) {
        System.out.println("Bytes used by byte: " + Byte.BYTES);
        }

}
```

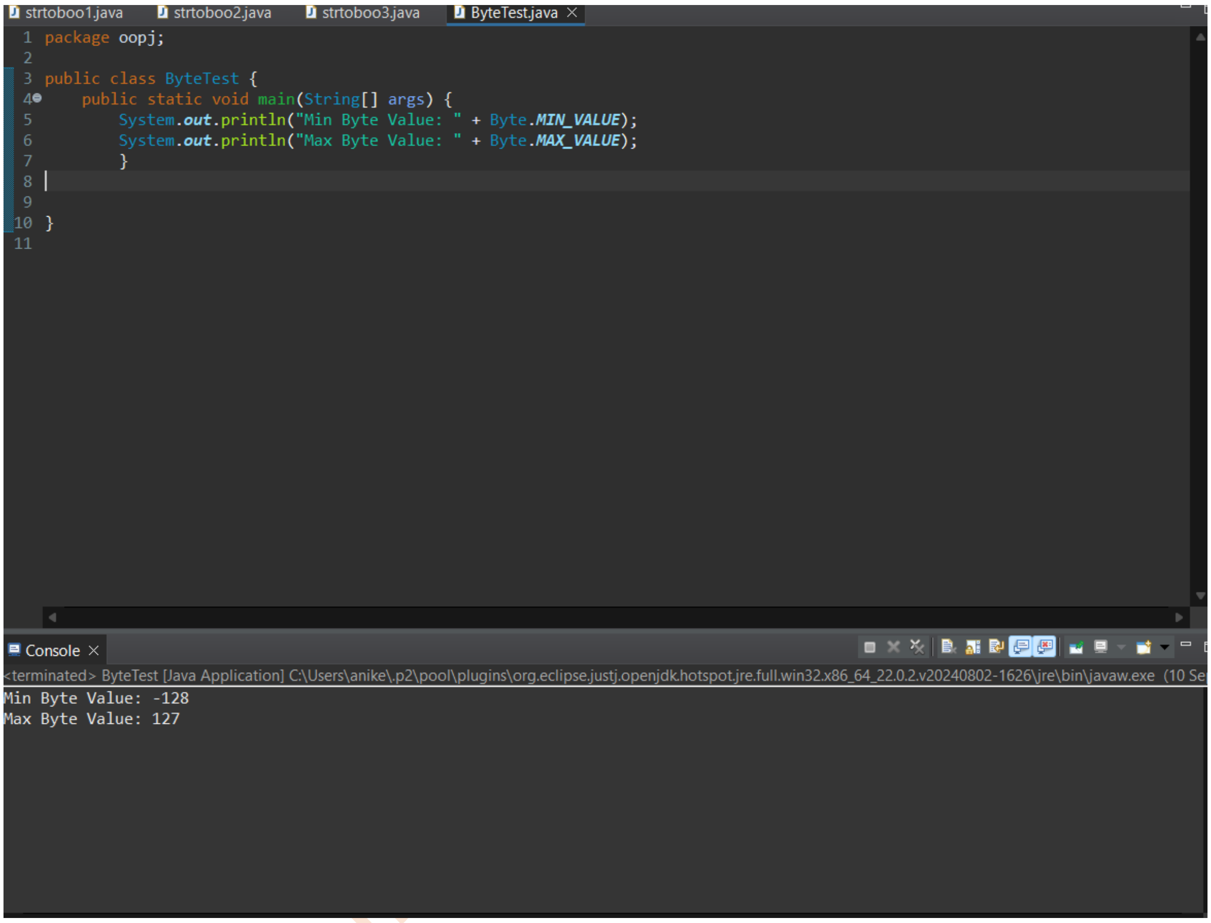
```
<terminated> ByteTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (10 Sept
Bytes used by byte: 1
```

c. Write a program to find the minimum and maximum values of `byte` using the `MIN_VALUE` and `MAX_VALUE` fields. (Hint: Use `Byte.MIN_VALUE` and `Byte.MAX_VALUE`).

```
public class ByteTest {

public static void main(String[] args) {

System.out.println("Min Byte Value: " + Byte.MIN_VALUE);

System.out.println("Max Byte Value: " + Byte.MAX_VALUE);
```

}

}



```
package oopj;

public class ByteTest {
    public static void main(String[] args) {
        System.out.println("Min Byte Value: " + Byte.MIN_VALUE);
        System.out.println("Max Byte Value: " + Byte.MAX_VALUE);
        }


}
```

```
<terminated> ByteTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe (10 Se
Min Byte Value: -128
Max Byte Value: 127
```

d. Declare a method-local variable `number` of type `byte` with some value and convert it to a `String` using the `toString` method. (Hint: Use `Byte.toString(byte)`).

public class ByteTest {

public static void main(String[] args) {

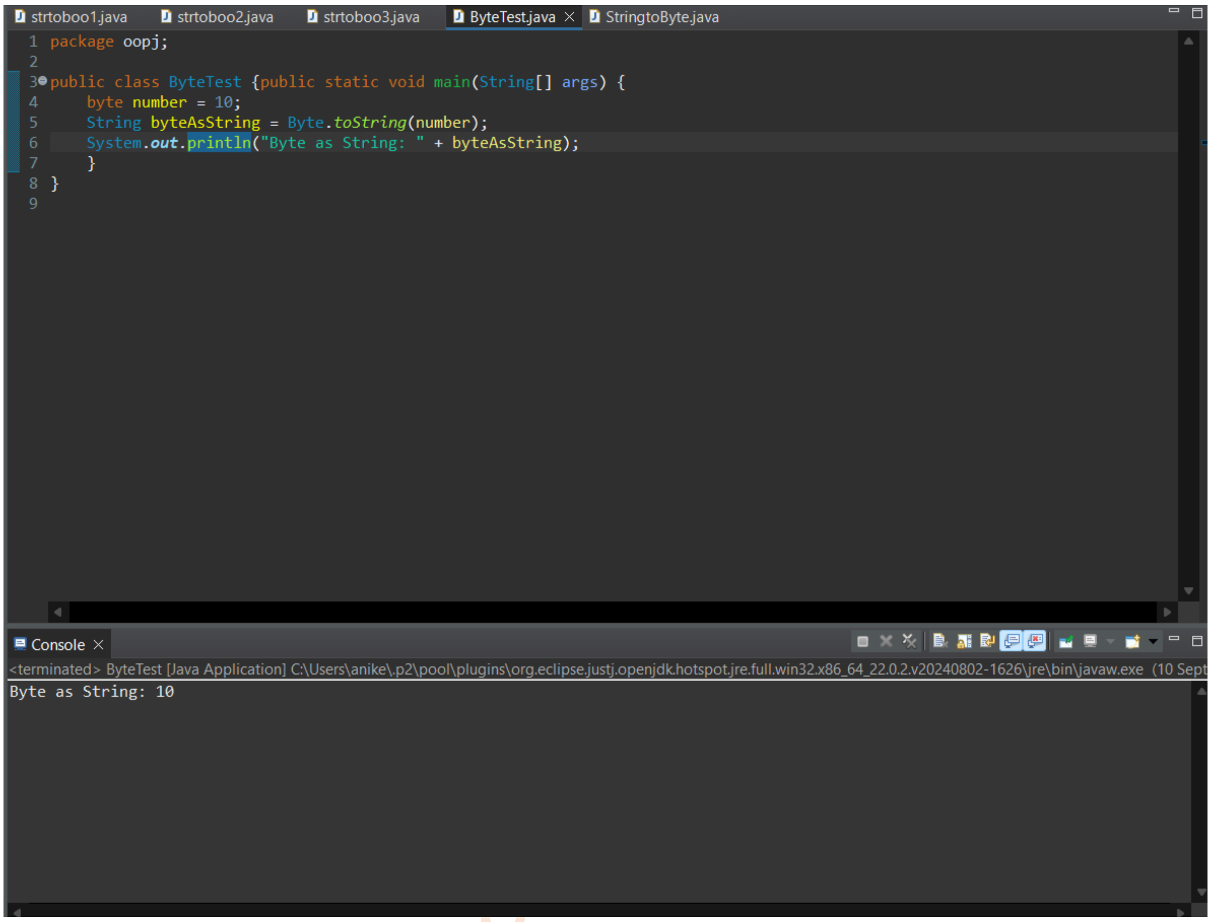
byte number = 10;

String byteAsString = Byte.toString(number);

System.out.println("Byte as String: " + byteAsString);

}

}

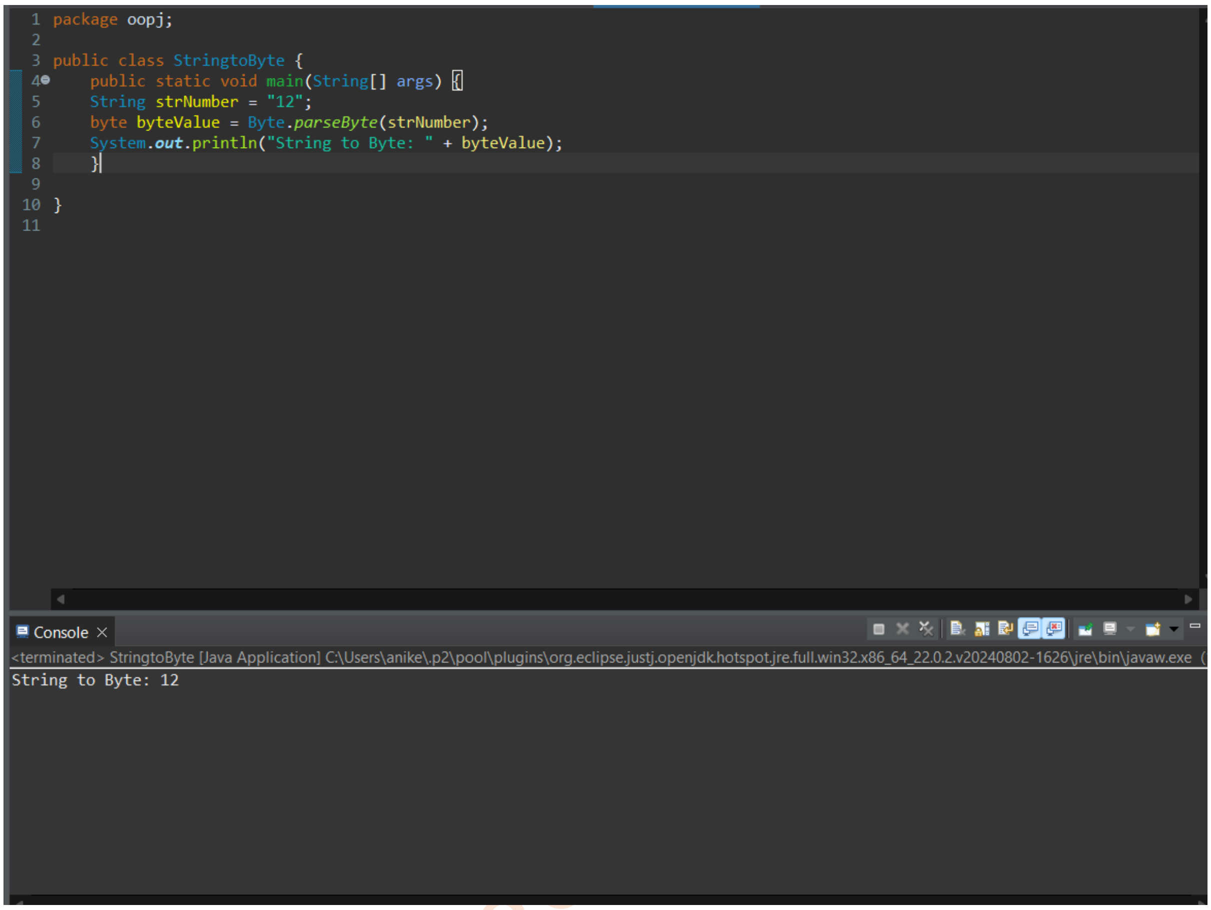


```
package oopj;

public class ByteTest {public static void main(String[] args) {
    byte number = 10;
    String byteAsString = Byte.toString(number);
    System.out.println("Byte as String: " + byteAsString);
    }
}

```

```
<terminated> ByteTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (10 Sept
Byte as String: 10
```

e. Declare a method-local variable `strNumber` of type `String` with some value and convert it to a `byte` value using the `parseByte` method. (Hint: Use `Byte.parseByte(String)`).

```
public class StringtoByte {

        public static void main(String[] args) {

        String strNumber = "12";

        byte byteValue = Byte.parseByte(strNumber);

        System.out.println("String to Byte: " + byteValue);

        }



}
```



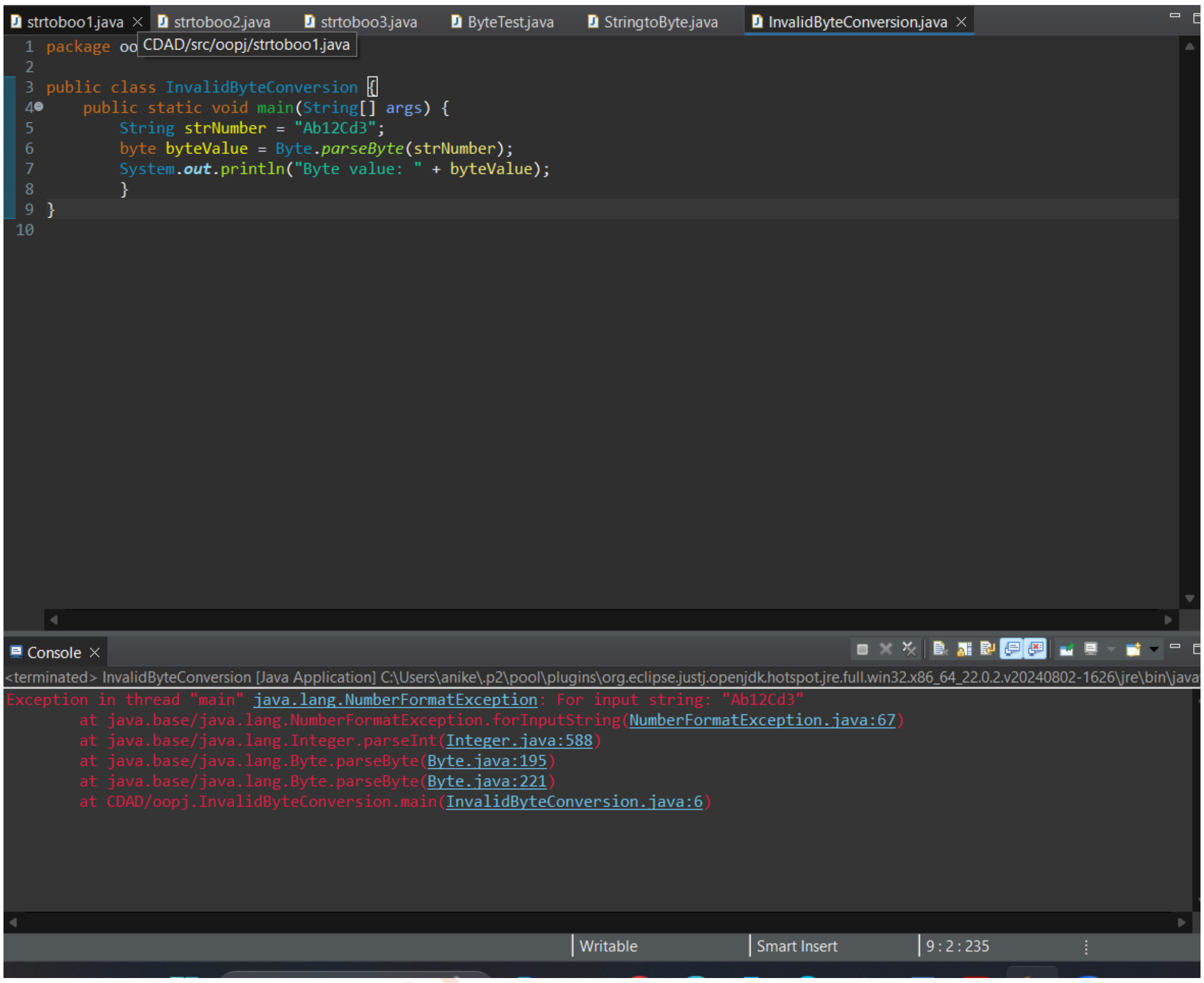
```
package oopj;

public class StringtoByte {
    public static void main(String[] args) {
    String strNumber = "12";
    byte byteValue = Byte.parseByte(strNumber);
    System.out.println("String to Byte: " + byteValue);
    }

}
```

Console

```
<terminated> StringtoByte [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe (
String to Byte: 12
```

f. Declare a method-local variable `strNumber` of type `String` with the value `"Ab12Cd3"` and attempt to convert it to a `byte` value. (Hint: `parseByte` method will throw a `NumberFormatException`).

```
public class InvalidByteConversion {

        public static void main(String[] args) {

                String strNumber = "Ab12Cd3";

                byte byteValue = Byte.parseByte(strNumber);

                System.out.println("Byte value: " + byteValue);

                }

}
```

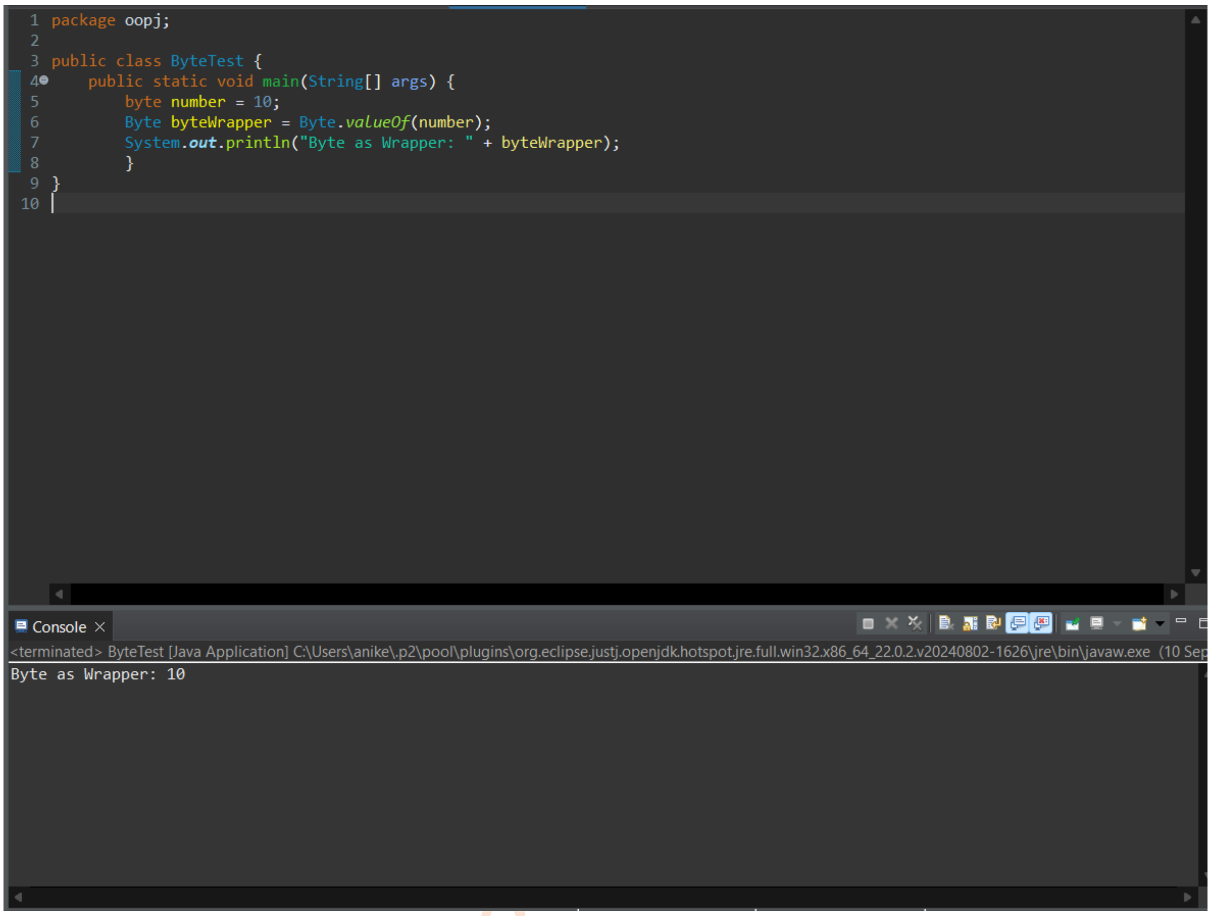


```
package oo CDAD/src/oopj/strtoboo1.java

public class InvalidByteConversion {
    public static void main(String[] args) {
        String strNumber = "Ab12Cd3";
        byte byteValue = Byte.parseByte(strNumber);
        System.out.println("Byte value: " + byteValue);
        }
}
```

```
<terminated> InvalidByteConversion [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\java
Exception in thread "main" java.lang.NumberFormatException: For input string: "Ab12Cd3"
	at java.base/java.lang.NumberFormatException.forInputString(NumberFormatException.java:67)
	at java.base/java.lang.Integer.parseInt(Integer.java:588)
	at java.base/java.lang.Byte.parseByte(Byte.java:195)
	at java.base/java.lang.Byte.parseByte(Byte.java:221)
	at CDAD/oopj.InvalidByteConversion.main(InvalidByteConversion.java:6)
```

g. Declare a method-local variable `number` of type `byte` with some value and convert it to the corresponding wrapper class using `Byte.valueOf()`. (Hint: Use `Byte.valueOf(byte)`).

```
public class ByteTest {

        public static void main(String[] args) {

                byte number = 10;

                Byte byteWrapper = Byte.valueOf(number);

                System.out.println("Byte as Wrapper: " + byteWrapper);

                }

}
```

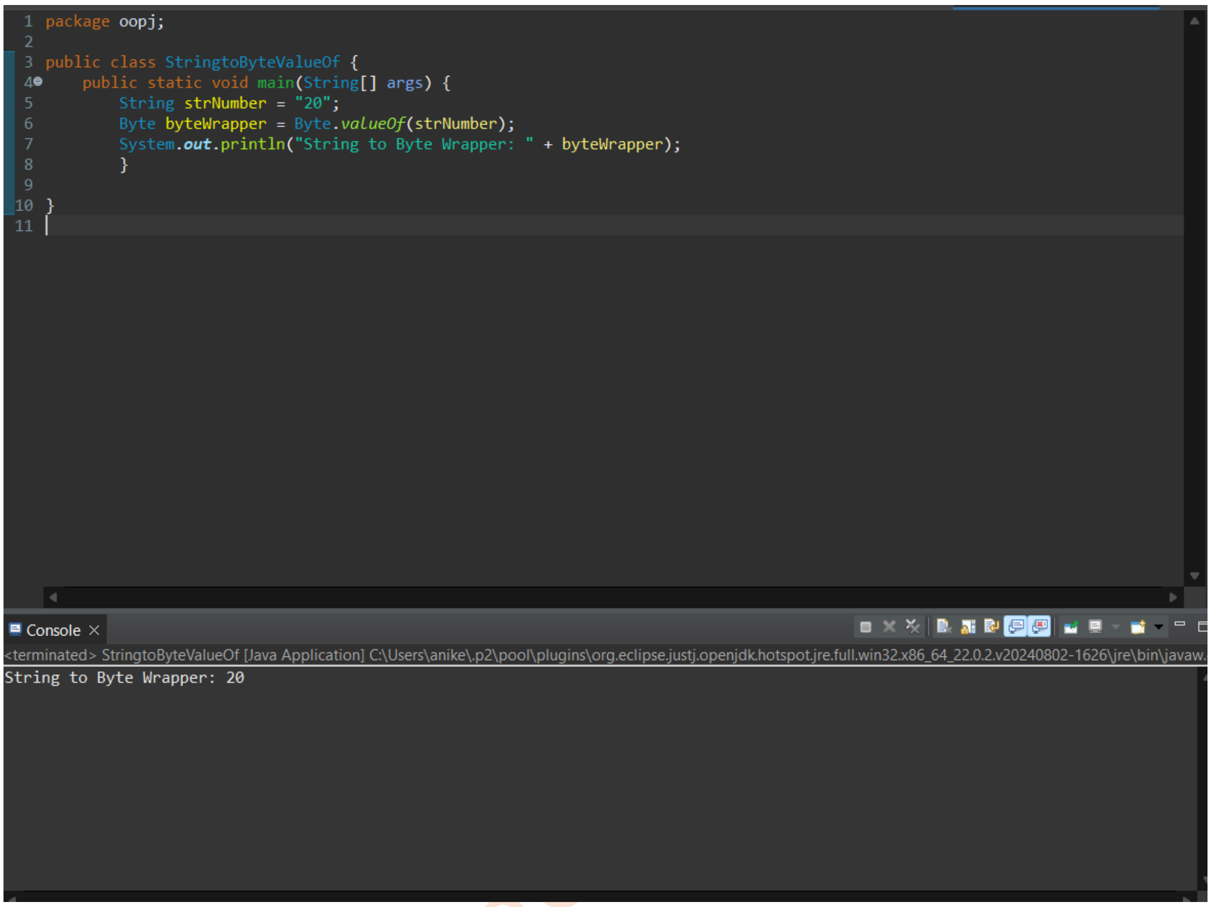


```
package oopj;

public class ByteTest {
    public static void main(String[] args) {
        byte number = 10;
        Byte byteWrapper = Byte.valueOf(number);
        System.out.println("Byte as Wrapper: " + byteWrapper);
        }
}

```

```
<terminated> ByteTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (10 Sep
Byte as Wrapper: 10
```

h. Declare a method-local variable `strNumber` of type `String` with some `byte` value and convert it to the corresponding wrapper class using `Byte.valueOf()`. (Hint: Use `Byte.valueOf(String)`).

```
public class StringtoByteValueOf {

        public static void main(String[] args) {

                String strNumber = "20";

                Byte byteWrapper = Byte.valueOf(strNumber);

                System.out.println("String to Byte Wrapper: " + byteWrapper);

                }



}
```



```java
package oopj;

public class StringtoByteValueOf {
    public static void main(String[] args) {
        String strNumber = "20";
        Byte byteWrapper = Byte.valueOf(strNumber);
        System.out.println("String to Byte Wrapper: " + byteWrapper);
        }

}

```

```
<terminated> StringtoByteValueOf [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.
String to Byte Wrapper: 20
```

i. Experiment with converting a `byte` value into other primitive types or vice versa and observe the results.

public class ByteConversion {

public static void main(String[] args) {

    byte number = 50;

    int intValue = number;

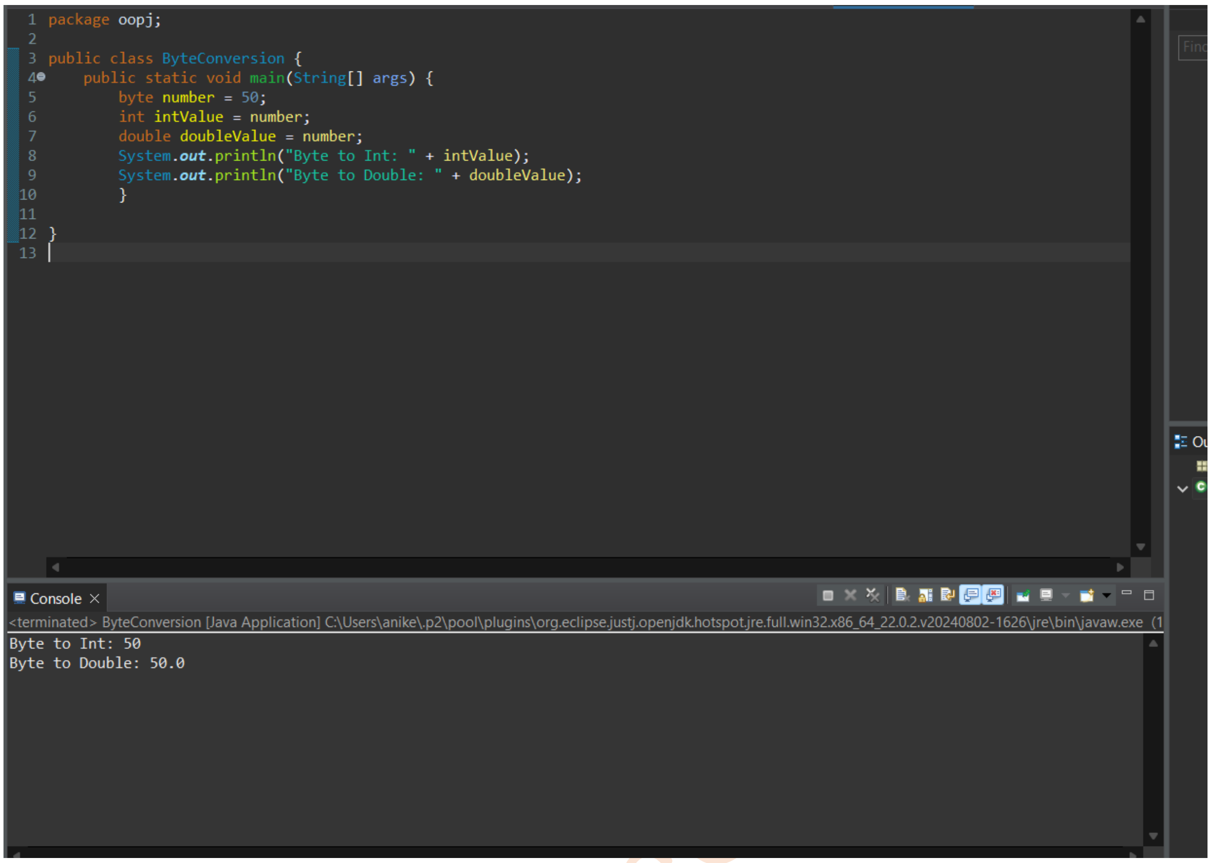
    double doubleValue = number;

    System.***out***.println("Byte to Int: " + intValue);

    System.***out***.println("Byte to Double: " + doubleValue);

    }

}

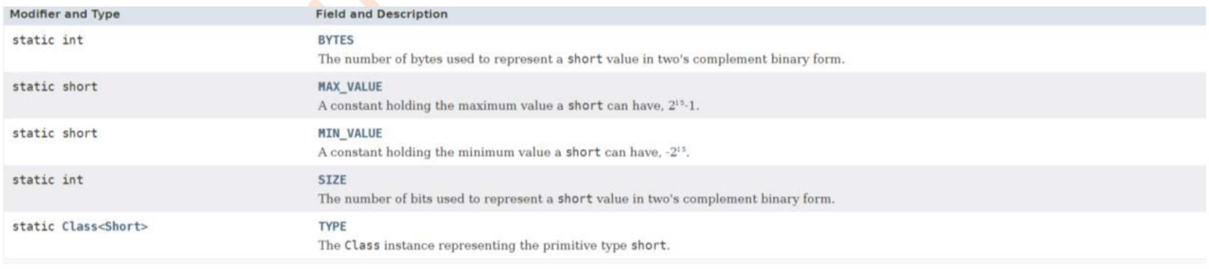


```java
package oopj;

public class ByteConversion {
    public static void main(String[] args) {
        byte number = 50;
        int intValue = number;
        double doubleValue = number;
        System.out.println("Byte to Int: " + intValue);
        System.out.println("Byte to Double: " + doubleValue);
        }

}

```

```
<terminated> ByteConversion [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (1
Byte to Int: 50
Byte to Double: 50.0
```

3. Working with `java.lang.Short`

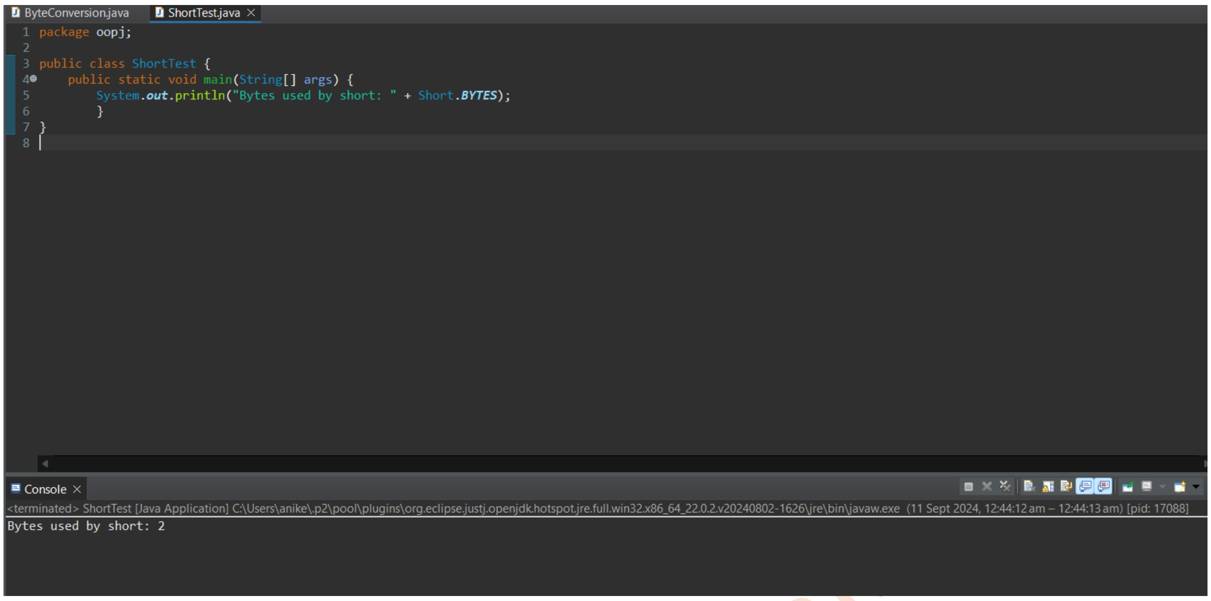
a. Explore the Java API documentation for `java.lang.Short` and observe its modifiers and super types.



Modifier and Type	Field and Description
`static int`	`BYTES` The number of bytes used to represent a `short` value in two's complement binary form.
`static short`	`MAX_VALUE` A constant holding the maximum value a `short` can have, 2^{15}-1.
`static short`	`MIN_VALUE` A constant holding the minimum value a `short` can have, -2^{15}.
`static int`	`SIZE` The number of bits used to represent a `short` value in two's complement binary form.
`static Class<Short>`	`TYPE` The `Class` instance representing the primitive type `short`.

b. Write a program to test how many bytes are used to represent a `short` value using the `BYTES` field. (Hint: Use `Short.BYTES`).

```java
public class ShortTest {

        public static void main(String[] args) {

                System.out.println("Bytes used by short: " + Short.BYTES);

                }

}
```



ByteConversion.java   ShortTest.java

```
package oopj;

public class ShortTest {
    public static void main(String[] args) {
        System.out.println("Bytes used by short: " + Short.BYTES);
        }
}
```

Console

```
<terminated> ShortTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (11 Sept 2024, 12:44:12 am – 12:44:13 am) [pid: 17088]
Bytes used by short: 2
```

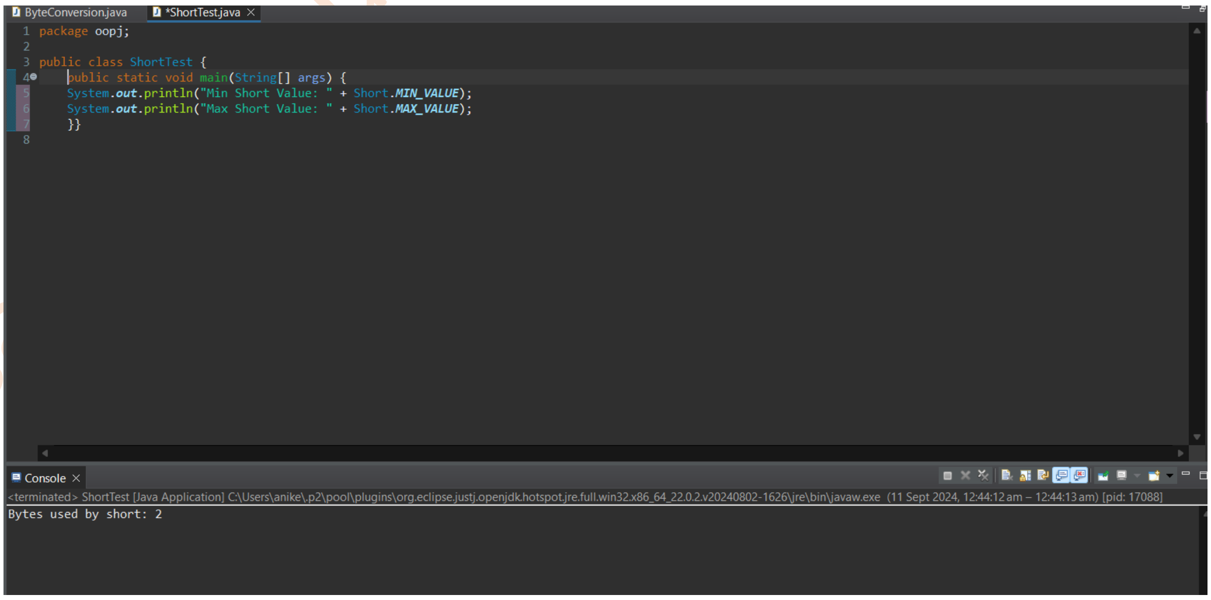
c. Write a program to find the minimum and maximum values of `short` using the `MIN_VALUE` and `MAX_VALUE` fields. (Hint: Use `Short.MIN_VALUE` and `Short.MAX_VALUE`).

public static void main(String[] args) {

System.out.println("Min Short Value: " + Short.MIN_VALUE);

System.out.println("Max Short Value: " + Short.MAX_VALUE);

}



ByteConversion.java   *ShortTest.java

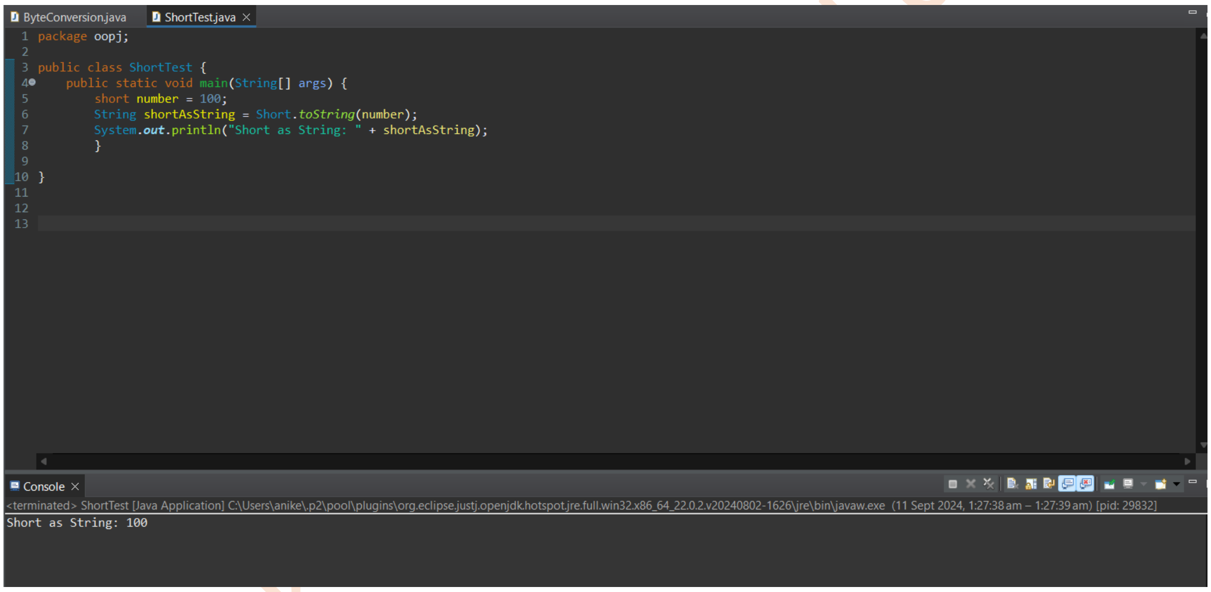
```
package oopj;

public class ShortTest {
    public static void main(String[] args) {
    System.out.println("Min Short Value: " + Short.MIN_VALUE);
    System.out.println("Max Short Value: " + Short.MAX_VALUE);
    }}
```

Console

```
<terminated> ShortTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (11 Sept 2024, 12:44:12 am – 12:44:13 am) [pid: 17088]
Bytes used by short: 2
```

d. Declare a method-local variable `number` of type `short` with some value and convert it to a `String` using the `toString` method. (Hint: Use `Short.toString(short)`).

```
public class ShortTest {

	public static void main(String[] args) {

		short number = 100;

		String shortAsString = Short.toString(number);

		System.out.println("Short as String: " + shortAsString);

		}

	}
```

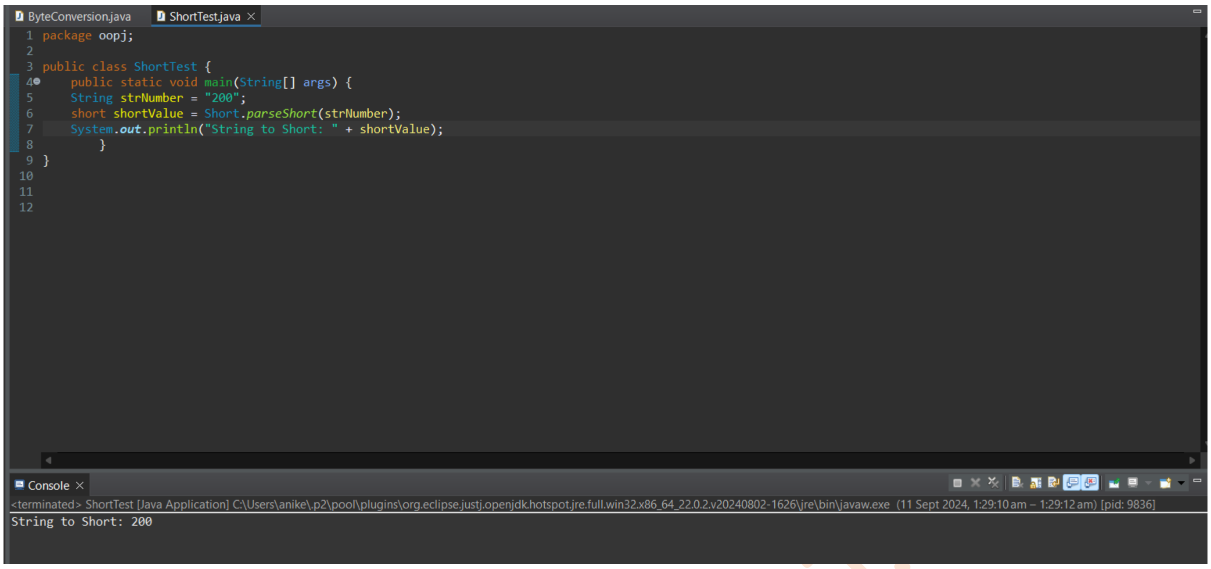


```
package oopj;

public class ShortTest {
    public static void main(String[] args) {
        short number = 100;
        String shortAsString = Short.toString(number);
        System.out.println("Short as String: " + shortAsString);
        }

}
```

```
<terminated> ShortTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (11 Sept 2024, 1:27:38 am – 1:27:39 am) [pid: 29832]
Short as String: 100
```

e. Declare a method-local variable `strNumber` of type `String` with some value and convert it to a `short` value using the `parseShort` method. (Hint: Use `Short.parseShort(String)`).

```
public class ShortTest {

	public static void main(String[] args) {

	String strNumber = "200";

	short shortValue = Short.parseShort(strNumber);

	System.out.println("String to Short: " + shortValue);

		}

}
```

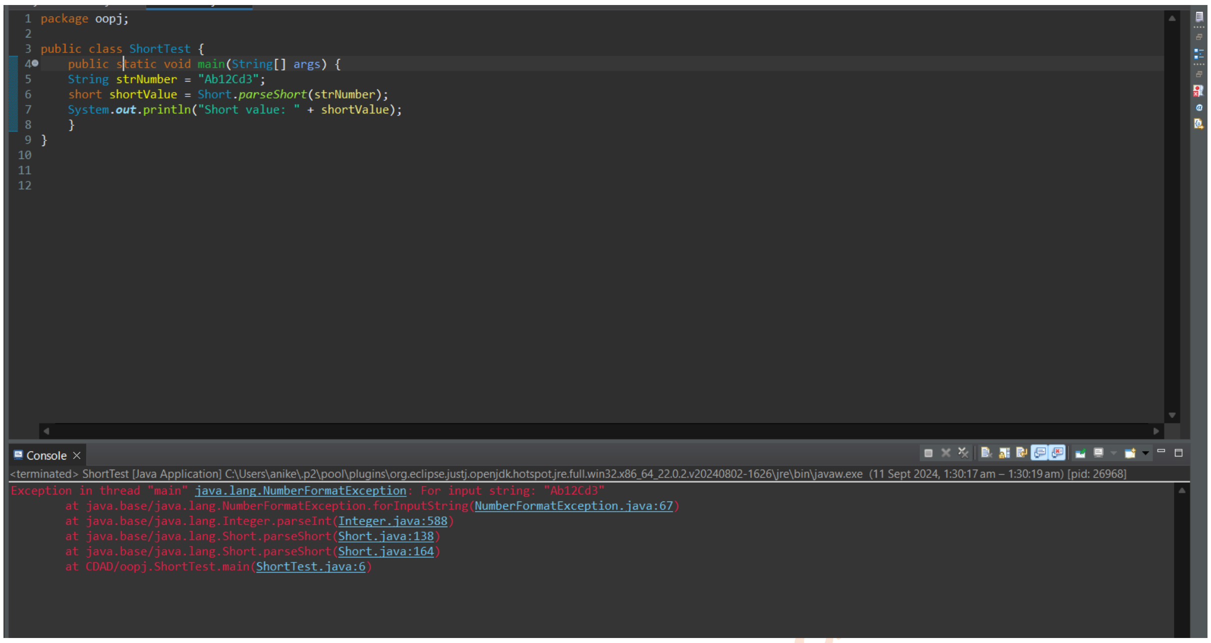


```java
package oopj;

public class ShortTest {
    public static void main(String[] args) {
    String strNumber = "200";
    short shortValue = Short.parseShort(strNumber);
    System.out.println("String to Short: " + shortValue);
        }
}
```

```
<terminated> ShortTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (11 Sept 2024, 1:29:10 am – 1:29:12 am) [pid: 9836]
String to Short: 200
```

f. Declare a method-local variable `strNumber` of type `String` with the value `"Ab12Cd3"` and attempt to convert it to a `short` value. (Hint: `parseShort` method will throw a `NumberFormatException`).

```java
public class ShortTest {

        public static void main(String[] args) {

        String strNumber = "Ab12Cd3";

        short shortValue = Short.parseShort(strNumber);

        System.out.println("Short value: " + shortValue);

        }

}
```



```
package oopj;

public class ShortTest {
    public static void main(String[] args) {
        String strNumber = "Ab12Cd3";
        short shortValue = Short.parseShort(strNumber);
        System.out.println("Short value: " + shortValue);
    }
}
```

Console

```
<terminated> ShortTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (11 Sept 2024, 1:30:17 am – 1:30:19 am) [pid: 26968]
Exception in thread "main" java.lang.NumberFormatException: For input string: "Ab12Cd3"
	at java.base/java.lang.NumberFormatException.forInputString(NumberFormatException.java:67)
	at java.base/java.lang.Integer.parseInt(Integer.java:588)
	at java.base/java.lang.Short.parseShort(Short.java:138)
	at java.base/java.lang.Short.parseShort(Short.java:164)
	at CDAD/oopj.ShortTest.main(ShortTest.java:6)
```

g. Declare a method-local variable `number` of type `short` with some value and convert it to the corresponding wrapper class using `Short.valueOf()`. (Hint: Use `Short.valueOf(short)`).

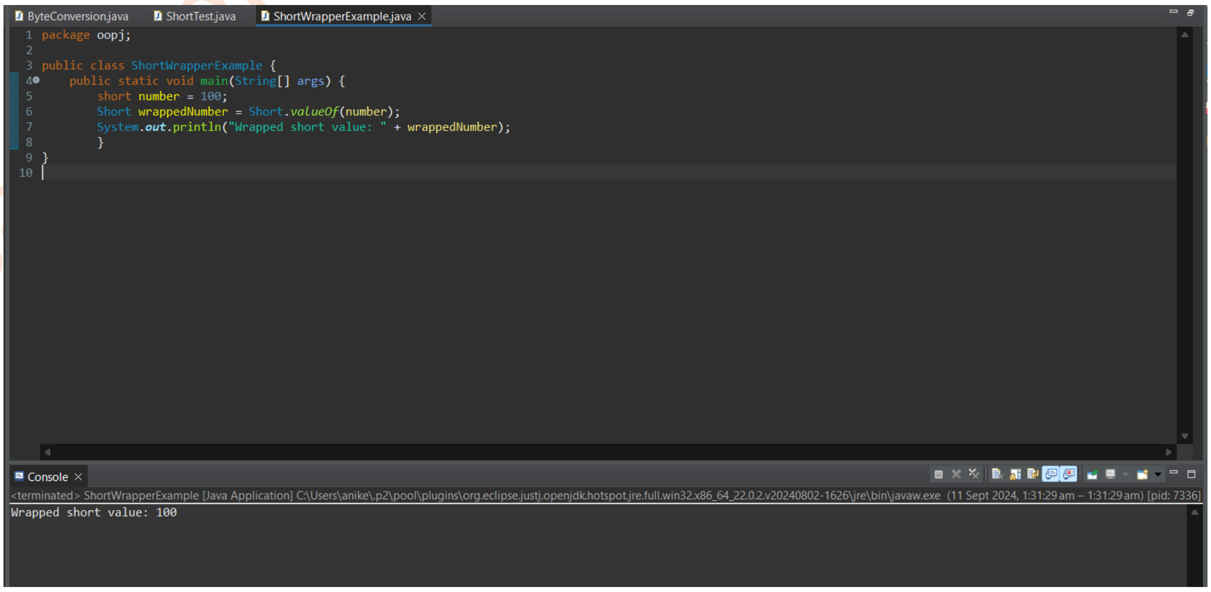
public static void main(String[] args) {

short number = 100;

Short wrappedNumber = Short.valueOf(number);

System.out.println("Wrapped short value: " + wrappedNumber);

}



ByteConversion.java ShortTest.java ShortWrapperExample.java

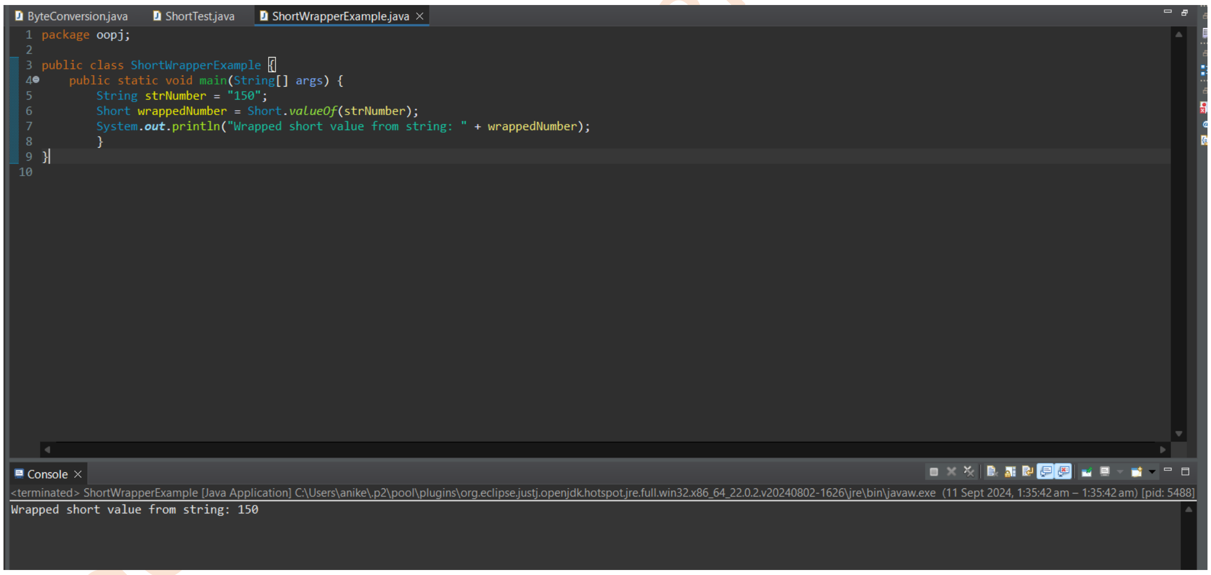
```
package oopj;

public class ShortWrapperExample {
    public static void main(String[] args) {
        short number = 100;
        Short wrappedNumber = Short.valueOf(number);
        System.out.println("Wrapped short value: " + wrappedNumber);
    }
}
```

Console

```
<terminated> ShortWrapperExample [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (11 Sept 2024, 1:31:29 am – 1:31:29 am) [pid: 7336]
Wrapped short value: 100
```

h. Declare a method-local variable `strNumber` of type `String` with some `short` value and convert it to the corresponding wrapper class using `Short.valueOf()`. (Hint: Use `Short.valueOf(String)`).

```
public class ShortWrapperExample {

        public static void main(String[] args) {

                String strNumber = "150";

                Short wrappedNumber = Short.valueOf(strNumber);

                System.out.println("Wrapped short value from string: " + 
wrappedNumber);

                }

}
```

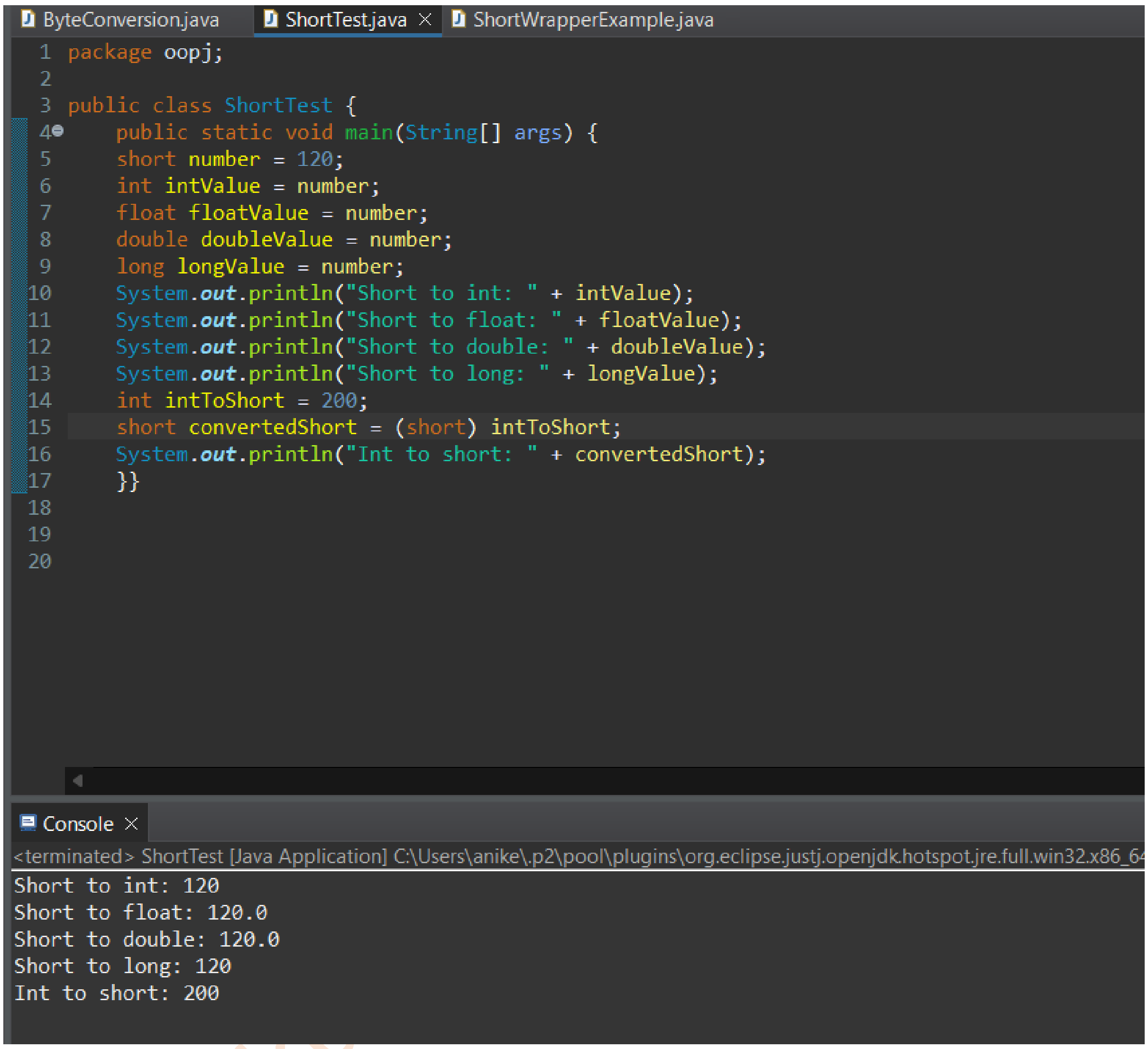


```
package oopj;

public class ShortWrapperExample {
    public static void main(String[] args) {
        String strNumber = "150";
        Short wrappedNumber = Short.valueOf(strNumber);
        System.out.println("Wrapped short value from string: " + wrappedNumber);
        }
}
```

```
<terminated> ShortWrapperExample [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (11 Sept 2024, 1:35:42 am – 1:35:42 am) [pid: 5488]
Wrapped short value from string: 150
```

i. Experiment with converting a `short` value into other primitive types or vice versa and observe the results.

```
public class ShortTest {

        public static void main(String[] args) {

        short number = 120;

        int intValue = number;

        float floatValue = number;
double doubleValue = number;

long longValue = number;

System.out.println("Short to int: " + intValue);

System.out.println("Short to float: " + floatValue);

System.out.println("Short to double: " + doubleValue);

System.out.println("Short to long: " + longValue);

int intToShort = 200;

short convertedShort = (short) intToShort;

System.out.println("Int to short: " + convertedShort);

}}
```

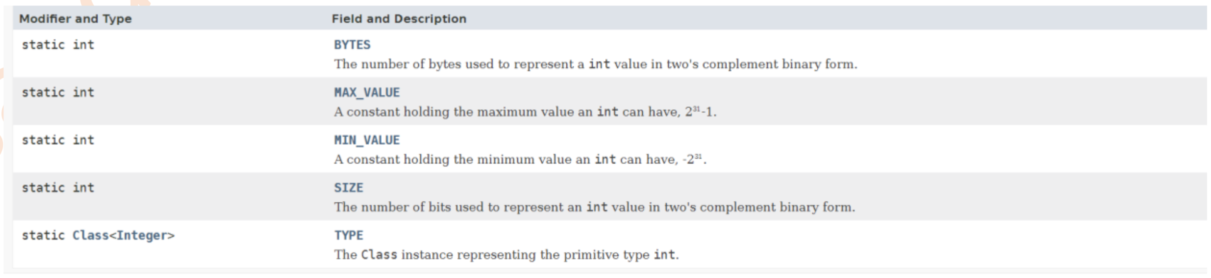


```java
package oopj;

public class ShortTest {
    public static void main(String[] args) {
    short number = 120;
    int intValue = number;
    float floatValue = number;
    double doubleValue = number;
    long longValue = number;
    System.out.println("Short to int: " + intValue);
    System.out.println("Short to float: " + floatValue);
    System.out.println("Short to double: " + doubleValue);
    System.out.println("Short to long: " + longValue);
    int intToShort = 200;
    short convertedShort = (short) intToShort;
    System.out.println("Int to short: " + convertedShort);
    }}
```

```
<terminated> ShortTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64
Short to int: 120
Short to float: 120.0
Short to double: 120.0
Short to long: 120
Int to short: 200
```

4. Working with `java.lang.Integer`

a. Explore the Java API documentation for `java.lang.Integer` and observe its modifiers and super types.



Modifier and Type	Field and Description
`static int`	`BYTES` The number of bytes used to represent a `int` value in two's complement binary form.
`static int`	`MAX_VALUE` A constant holding the maximum value an `int` can have, 2^{31}-1.
`static int`	`MIN_VALUE` A constant holding the minimum value an `int` can have, -2^{31}.
`static int`	`SIZE` The number of bits used to represent an `int` value in two's complement binary form.
`static Class<Integer>`	`TYPE` The `Class` instance representing the primitive type `int`.

b. Write a program to test how many bytes are used to represent an `int` value using the `BYTES` field. (Hint: Use `Integer.BYTES`).

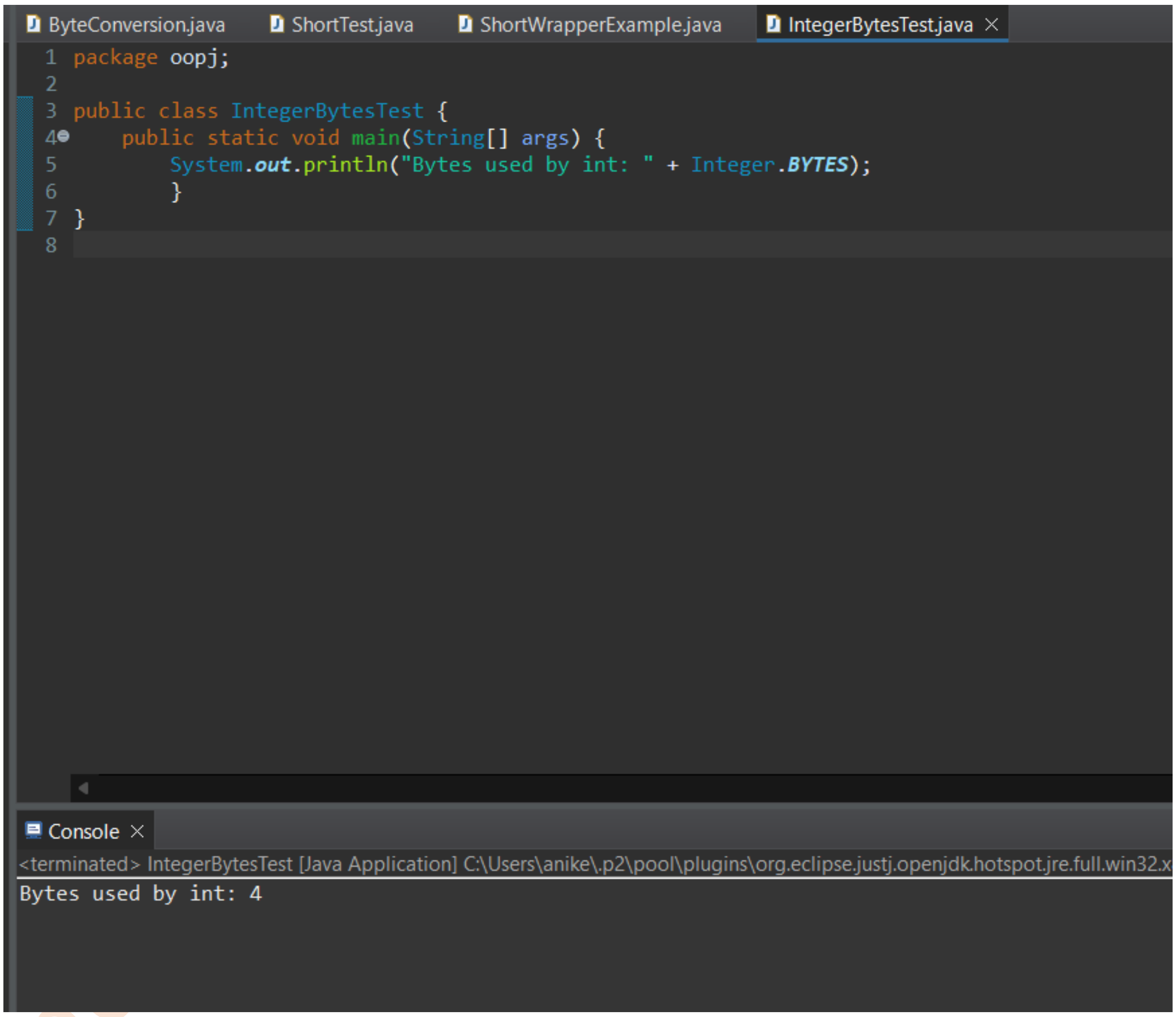
public class IntegerBytesTest {

public static void main(String[] args) {

System.***out***.println("Bytes used by int: " + Integer.***BYTES***);

}

}



ByteConversion.java | ShortTest.java | ShortWrapperExample.java | IntegerBytesTest.java

```
package oopj;

public class IntegerBytesTest {
    public static void main(String[] args) {
        System.out.println("Bytes used by int: " + Integer.BYTES);
    }
}

```

Console

```
<terminated> IntegerBytesTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x
Bytes used by int: 4
```

c. Write a program to find the minimum and maximum values of `int` using the `MIN_VALUE` and `MAX_VALUE` fields. (Hint: Use `Integer.MIN_VALUE` and `Integer.MAX_VALUE`).

public class IntTest {

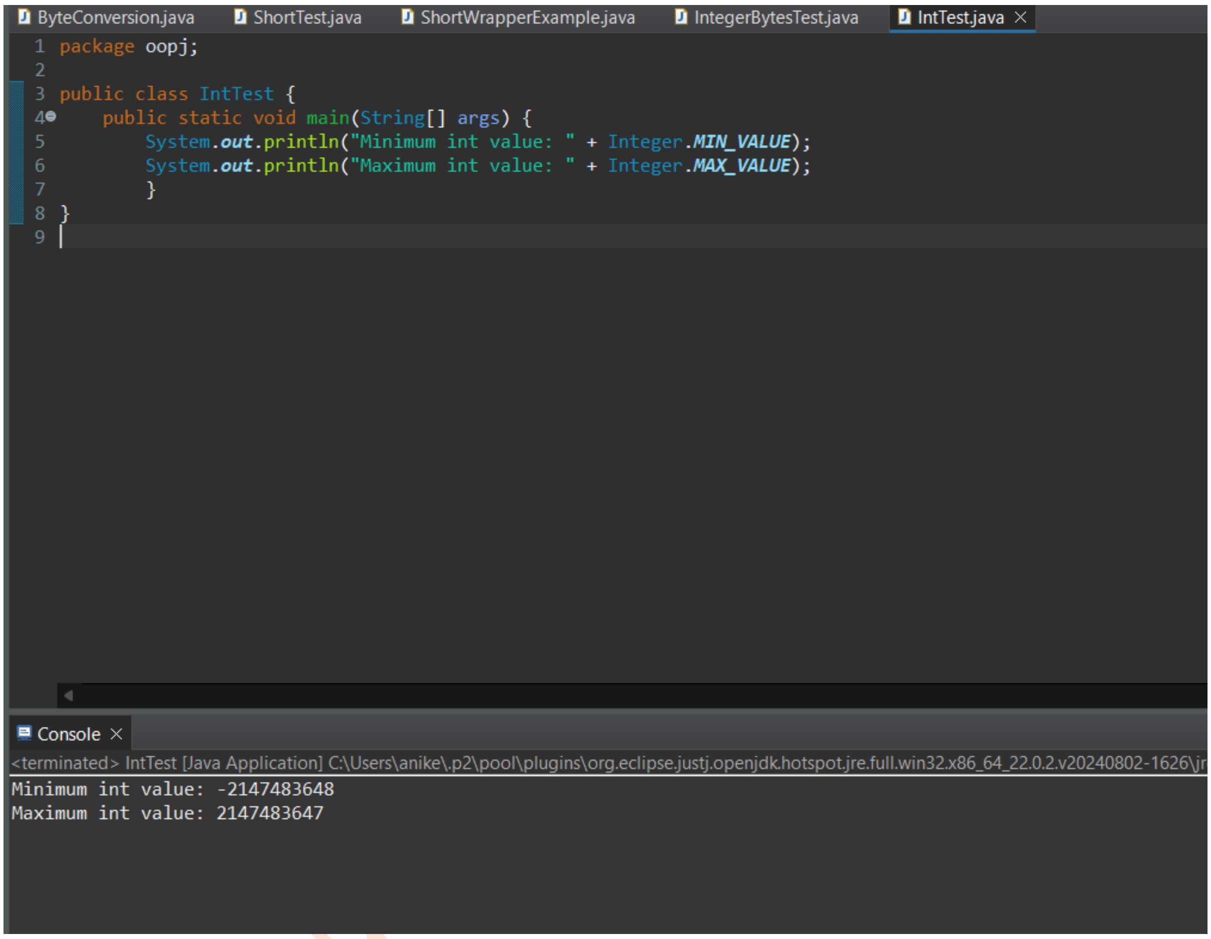
public static void main(String[] args) {

System.out.println("Minimum int value: " + Integer.MIN_VALUE);

System.out.println("Maximum int value: " + Integer.MAX_VALUE);

}

}



ByteConversion.java ShortTest.java ShortWrapperExample.java IntegerBytesTest.java IntTest.java

```
package oopj;

public class IntTest {
    public static void main(String[] args) {
        System.out.println("Minimum int value: " + Integer.MIN_VALUE);
        System.out.println("Maximum int value: " + Integer.MAX_VALUE);
        }
}

```

```
<terminated> IntTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jr
Minimum int value: -2147483648
Maximum int value: 2147483647
```

d. Declare a method-local variable `number` of type `int` with some value and convert it to a `String` using the `toString` method. (Hint: Use `Integer.toString(int)`).

public class IntTest {

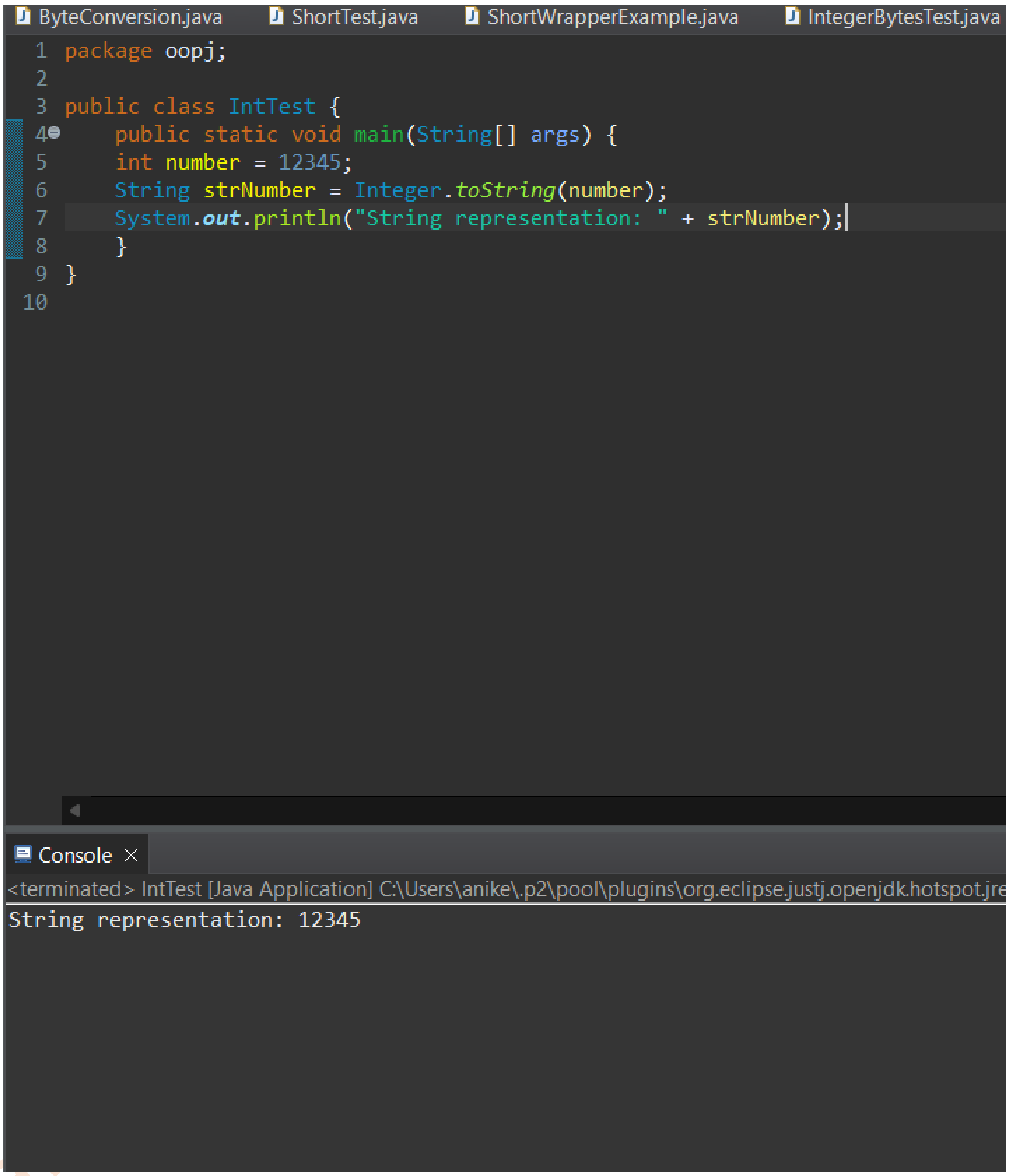
public static void main(String[] args) {

int number = 12345;

String strNumber = Integer.toString(number);

System.out.println("String representation: " + strNumber);

}



```java
package oopj;

public class IntTest {
    public static void main(String[] args) {
    int number = 12345;
    String strNumber = Integer.toString(number);
    System.out.println("String representation: " + strNumber);
    }
}

```

```
<terminated> IntTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre
String representation: 12345
```

e. Declare a method-local variable `strNumber` of type `String` with some value and convert it to an `int` value using the `parseInt` method. (Hint: Use `Integer.parseInt(String)`).

public class IntTest {

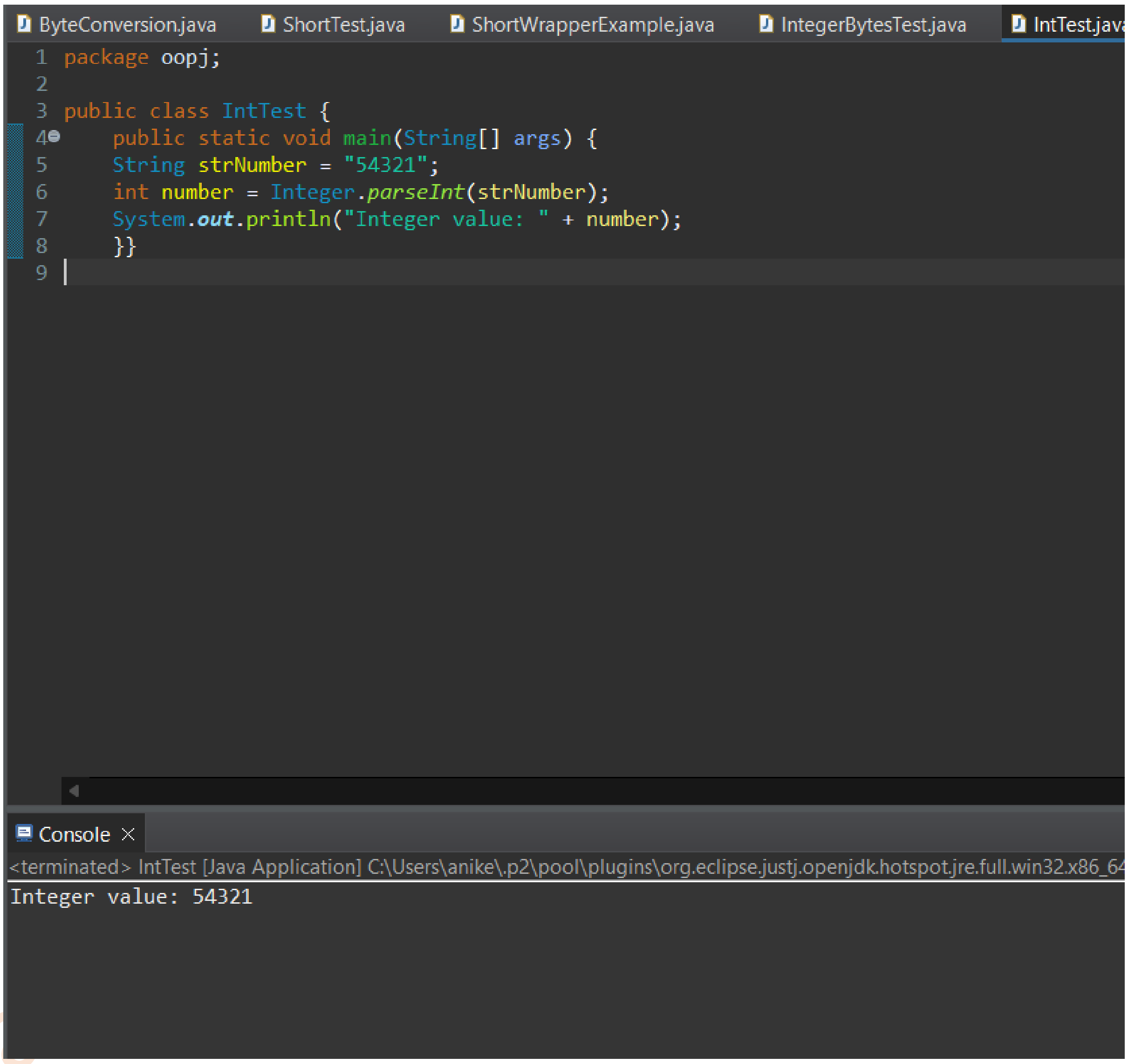
    public static void main(String[] args) {

String strNumber = "54321";

int number = Integer.*parseInt*(strNumber);

System.***out***.println("Integer value: " + number);

}}



ByteConversion.java ShortTest.java ShortWrapperExample.java IntegerBytesTest.java IntTest.java

```
package oopj;

public class IntTest {
    public static void main(String[] args) {
    String strNumber = "54321";
    int number = Integer.parseInt(strNumber);
    System.out.println("Integer value: " + number);
    }}

```

Console

```
<terminated> IntTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64
Integer value: 54321
```

f. Declare a method-local variable `strNumber` of type `String` with the value `"Ab12Cd3"` and attempt to convert it to an `int` value. (Hint: `parseInt` method will throw a `NumberFormatException`).

public class IntTest {

public static void main(String[] args) {

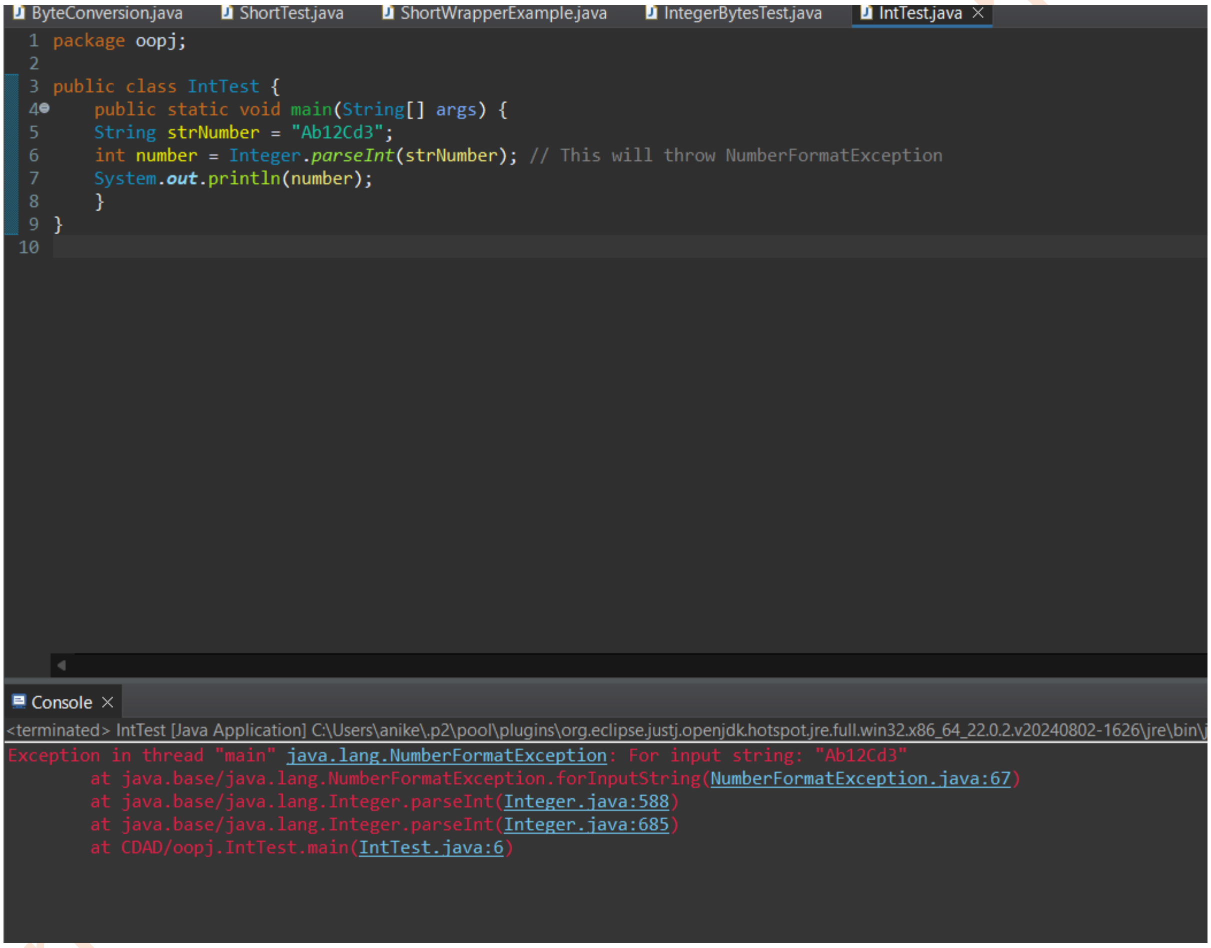
String strNumber = "Ab12Cd3";

int number = Integer.*parseInt*(strNumber); // This will throw NumberFormatException

System.***out***.println(number);

}

}



ByteConversion.java ShortTest.java ShortWrapperExample.java IntegerBytesTest.java IntTest.java

```
package oopj;

public class IntTest {
    public static void main(String[] args) {
    String strNumber = "Ab12Cd3";
    int number = Integer.parseInt(strNumber); // This will throw NumberFormatException
    System.out.println(number);
    }
}
```

Console

```
<terminated> IntTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\j
Exception in thread "main" java.lang.NumberFormatException: For input string: "Ab12Cd3"
	at java.base/java.lang.NumberFormatException.forInputString(NumberFormatException.java:67)
	at java.base/java.lang.Integer.parseInt(Integer.java:588)
	at java.base/java.lang.Integer.parseInt(Integer.java:685)
	at CDAD/oopj.IntTest.main(IntTest.java:6)
```

g. Declare a method-local variable `number` of type `int` with some value and convert it to the corresponding wrapper class using `Integer.valueOf()`. (Hint: Use `Integer.valueOf(int)`).

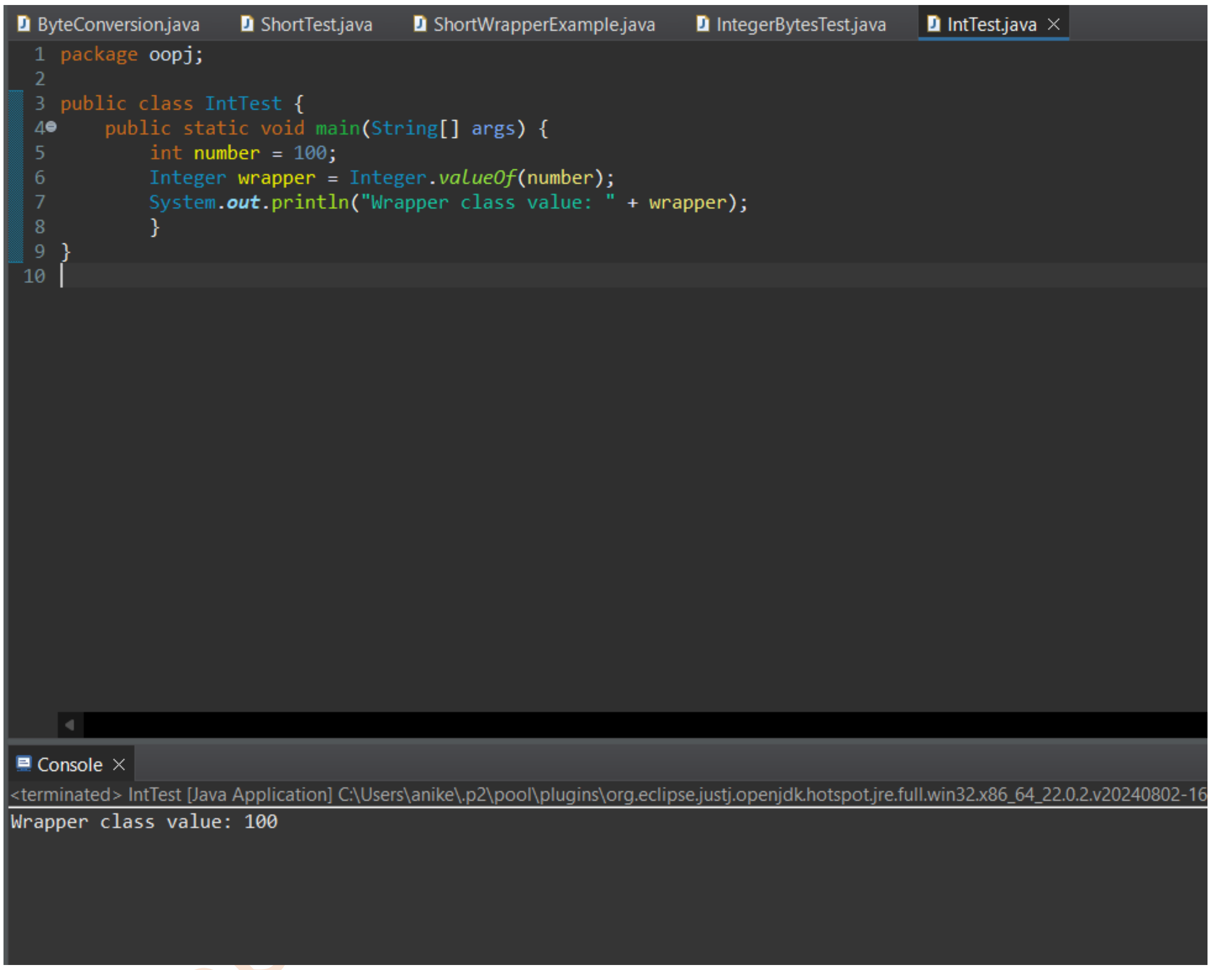
public class IntTest {

public static void main(String[] args) {

int number = 100;

Integer wrapper = Integer.*valueOf*(number);

```
        System.out.println("Wrapper class value: " + wrapper);

        }

}
```



ByteConversion.java ShortTest.java ShortWrapperExample.java IntegerBytesTest.java IntTest.java

```
package oopj;

public class IntTest {
    public static void main(String[] args) {
        int number = 100;
        Integer wrapper = Integer.valueOf(number);
        System.out.println("Wrapper class value: " + wrapper);
        }
}

```

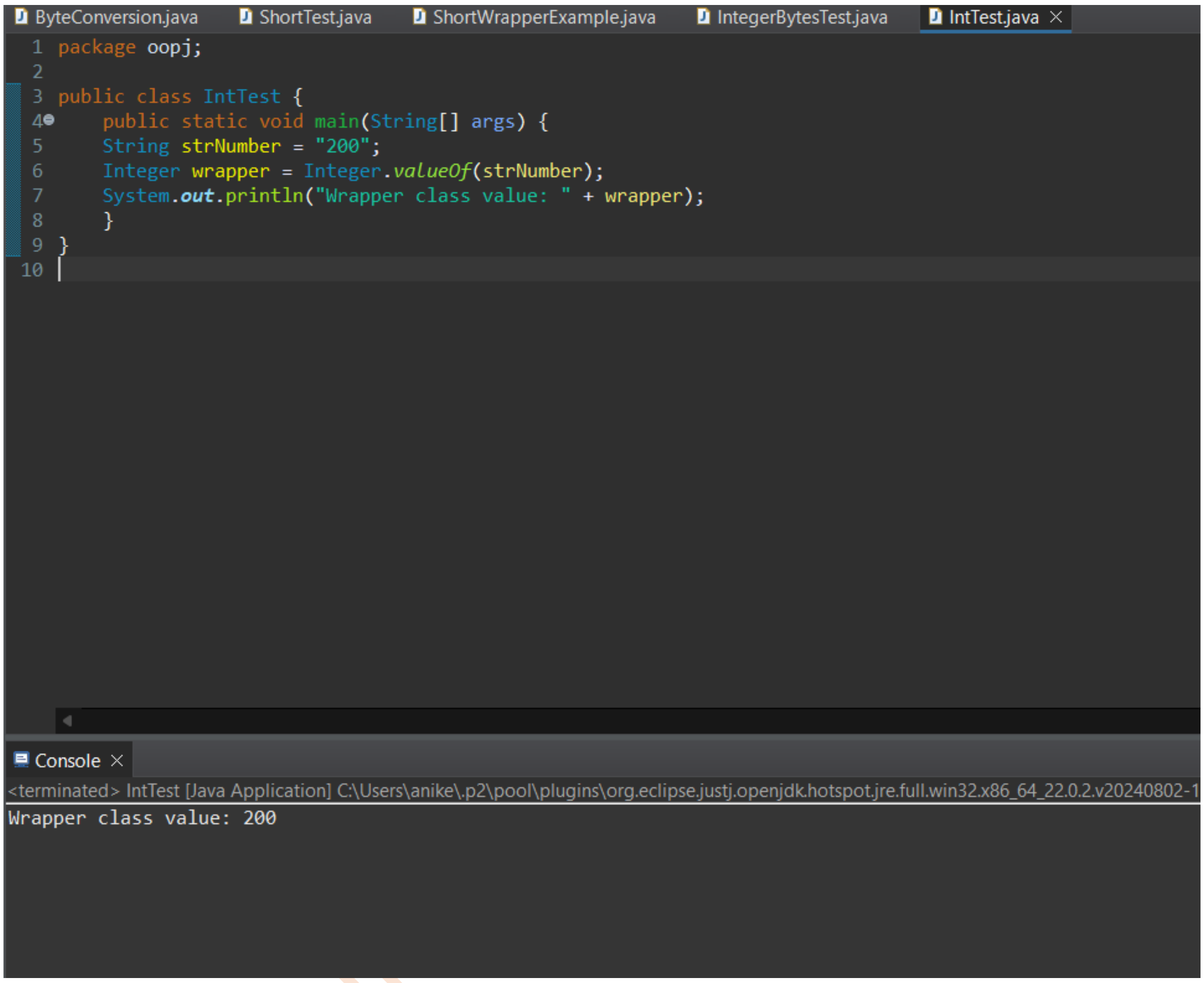
Console

```
<terminated> IntTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-16
Wrapper class value: 100
```

h. Declare a method-local variable `strNumber` of type `String` with some integer value and convert it to the corresponding wrapper class using `Integer.valueOf()`. (Hint: Use `Integer.valueOf(String)`).

```
public class IntTest {

        public static void main(String[] args) {

        String strNumber = "200";

        Integer wrapper = Integer.valueOf(strNumber);

        System.out.println("Wrapper class value: " + wrapper);

        }
```

}


ByteConversion.java ShortTest.java ShortWrapperExample.java IntegerBytesTest.java IntTest.java

```
package oopj;

public class IntTest {
    public static void main(String[] args) {
    String strNumber = "200";
    Integer wrapper = Integer.valueOf(strNumber);
    System.out.println("Wrapper class value: " + wrapper);
    }
}

```

Console

```
<terminated> IntTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1
Wrapper class value: 200
```

i. Declare two integer variables with values `10` and `20`, and add them using a method from the `Integer` class. (Hint: Use `Integer.sum(int, int)`).

public class IntTest {

public static void main(String[] args) {

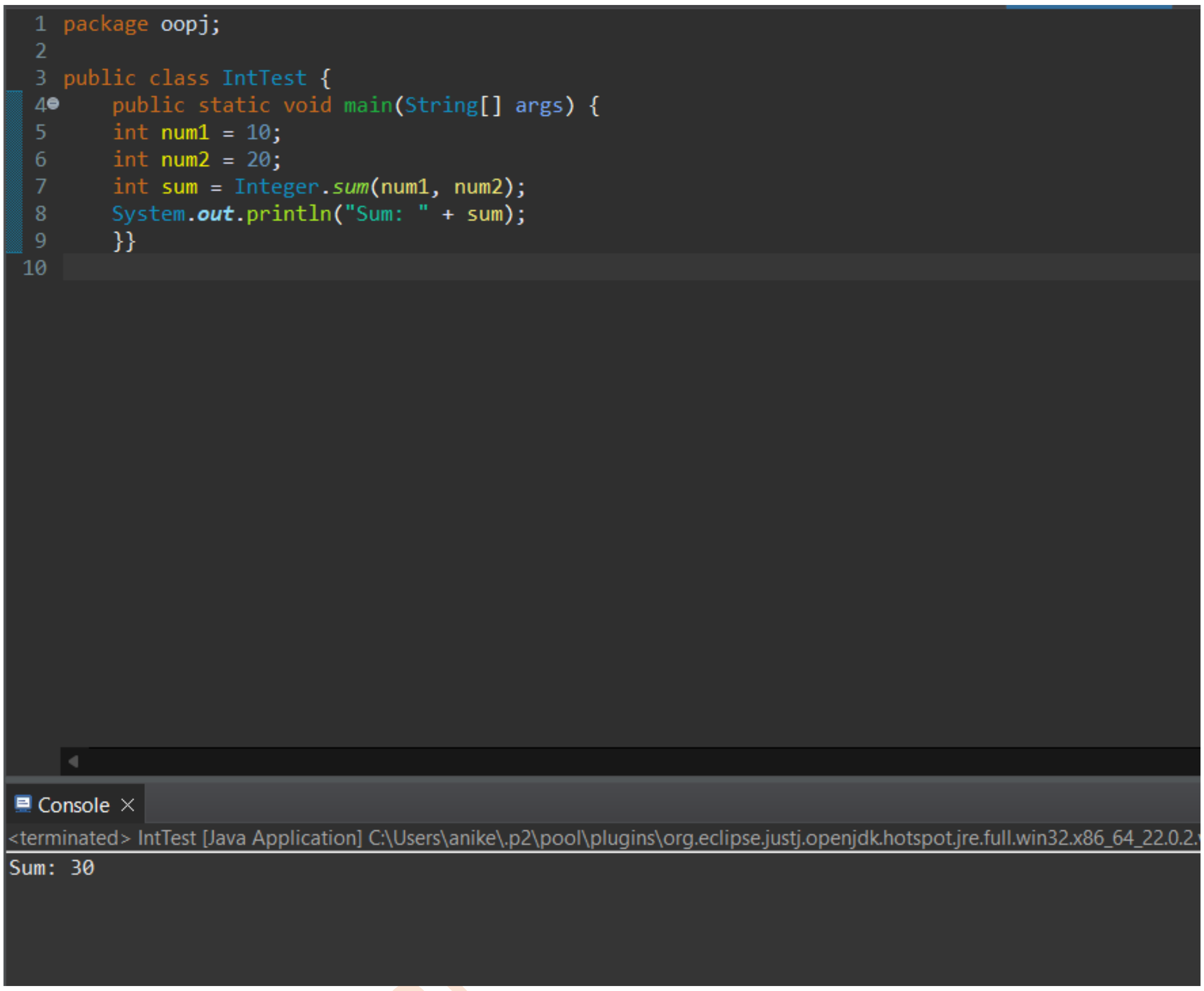
int num1 = 10;

int num2 = 20;

int sum = Integer.*sum*(num1, num2);

System.***out***.println("Sum: " + sum);

}}

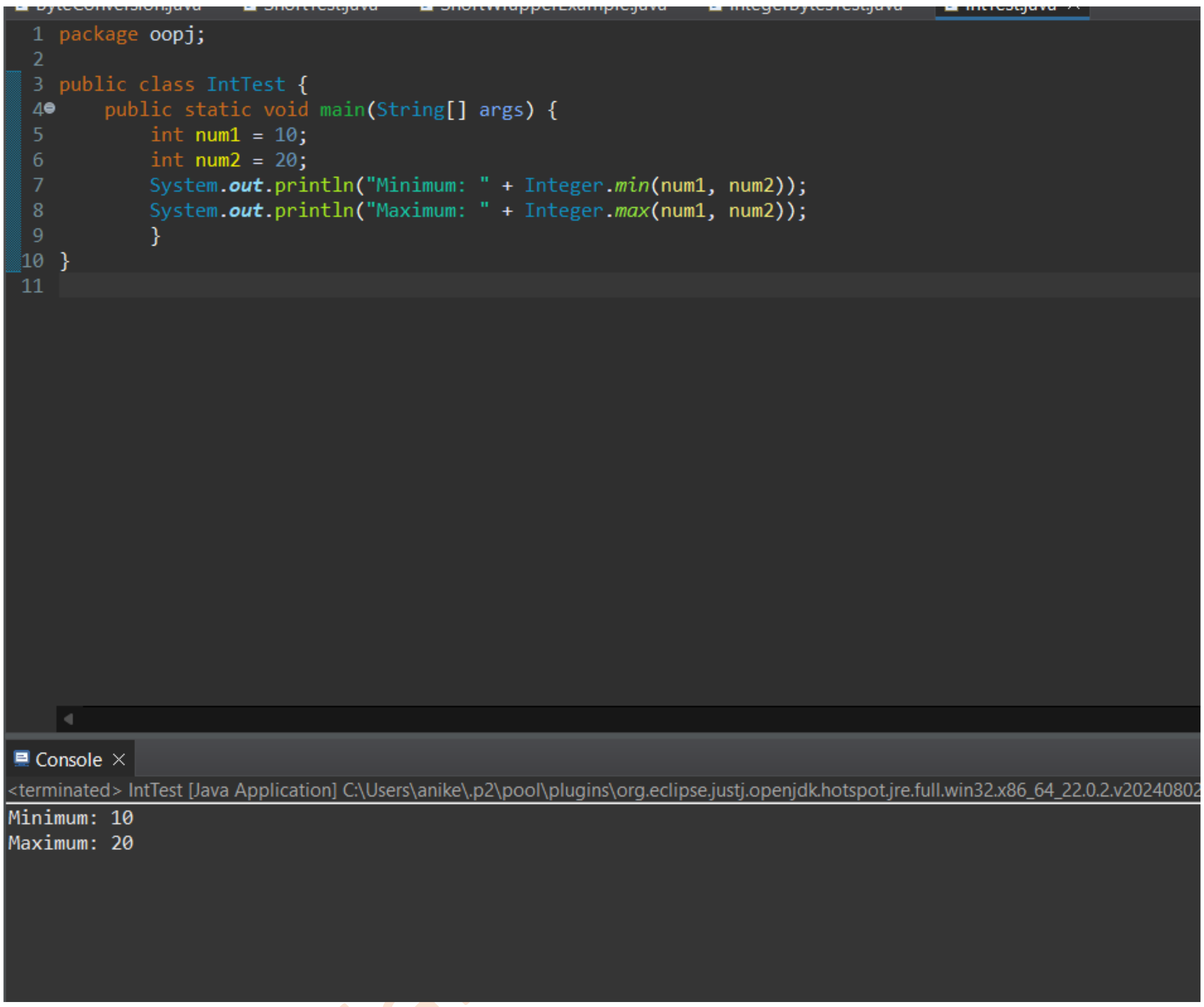


```
package oopj;

public class IntTest {
    public static void main(String[] args) {
    int num1 = 10;
    int num2 = 20;
    int sum = Integer.sum(num1, num2);
    System.out.println("Sum: " + sum);
    }}

```

```
<terminated> IntTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2
Sum: 30
```

j. Declare two integer variables with values `10` and `20`, and find the minimum and maximum values using the `Integer` class. (Hint: Use `Integer.min(int, int)` and `Integer.max(int, int)`).

```
public class IntTest {

        public static void main(String[] args) {

                int num1 = 10;

                int num2 = 20;

                System.out.println("Minimum: " + Integer.min(num1, num2));

                System.out.println("Maximum: " + Integer.max(num1, num2));

                }

}
```



```
package oopj;

public class IntTest {
    public static void main(String[] args) {
        int num1 = 10;
        int num2 = 20;
        System.out.println("Minimum: " + Integer.min(num1, num2));
        System.out.println("Maximum: " + Integer.max(num1, num2));
        }
}
```

```
<terminated> IntTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802
Minimum: 10
Maximum: 20
```

k. Declare an integer variable with the value `7`. Convert it to binary, octal, and hexadecimal strings using methods from the `Integer` class. (Hint: Use `Integer.toBinaryString(int)`, `Integer.toOctalString(int)`, and `Integer.toHexString(int)`).

public class IntTest {

public static void main(String[] args) {

int number = 7;

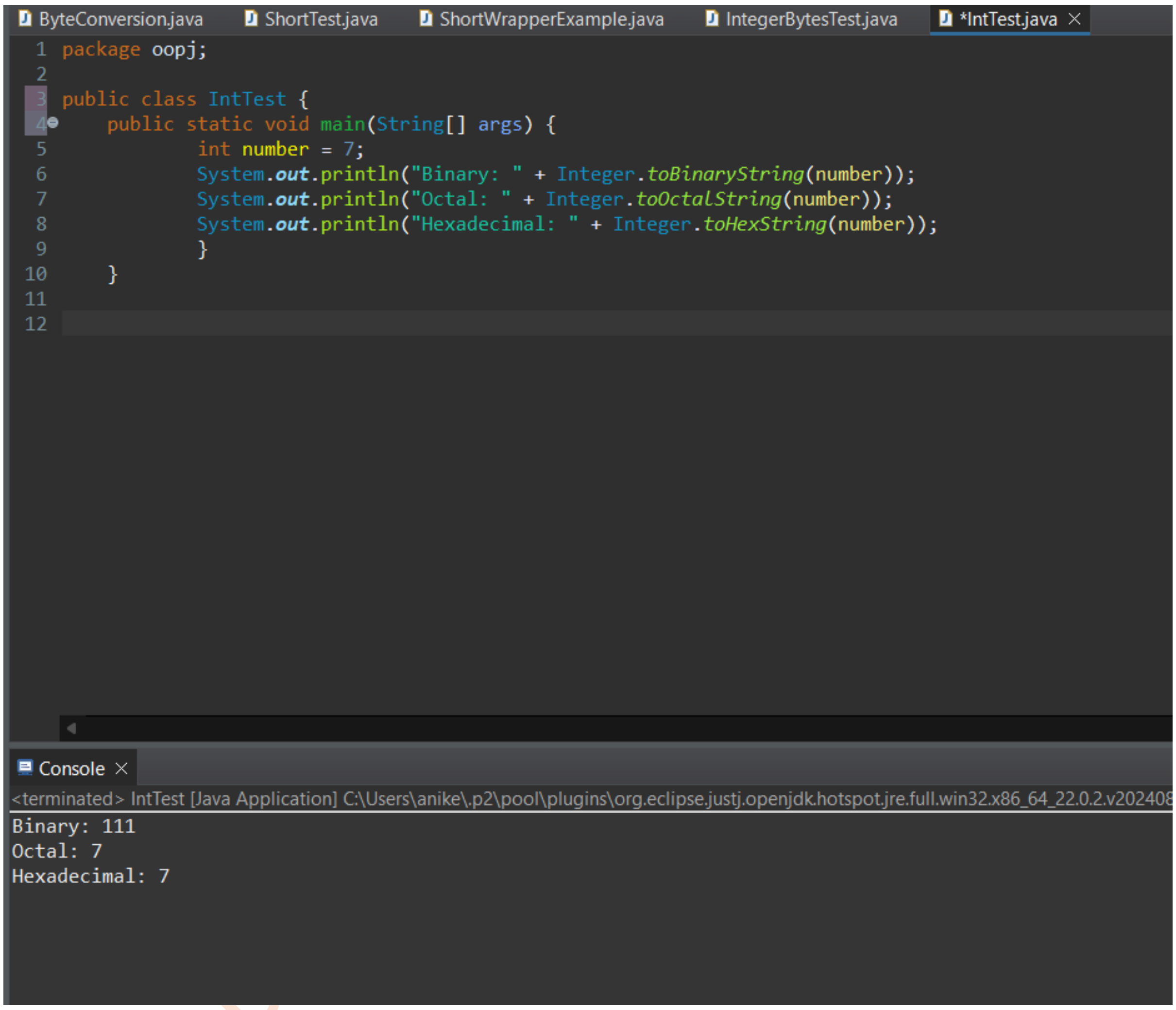
System.***out***.println("Binary: " + Integer.*toBinaryString*(number));

System.***out***.println("Octal: " + Integer.*toOctalString*(number));

System.***out***.println("Hexadecimal: " + Integer.*toHexString*(number));

}

}



ByteConversion.java ShortTest.java ShortWrapperExample.java IntegerBytesTest.java *IntTest.java

```
package oopj;

public class IntTest {
    public static void main(String[] args) {
            int number = 7;
            System.out.println("Binary: " + Integer.toBinaryString(number));
            System.out.println("Octal: " + Integer.toOctalString(number));
            System.out.println("Hexadecimal: " + Integer.toHexString(number));
            }
    }

```

Console

```
<terminated> IntTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v202408
Binary: 111
Octal: 7
Hexadecimal: 7
```

I. Experiment with converting an `int` value into other primitive types or vice versa and observe the results.

```
public class IntTest {

        public static void main(String[] args) {

                int number = 100;

                // Convert int to long

                long longValue = (long) number;

                System.out.println("Long value: " + longValue);

                // Convert int to double
```

double doubleValue = (double) number;

System.*out*.println("Double value: " + doubleValue);

// Convert int to float

float floatValue = (float) number;

System.*out*.println("Float value: " + floatValue);

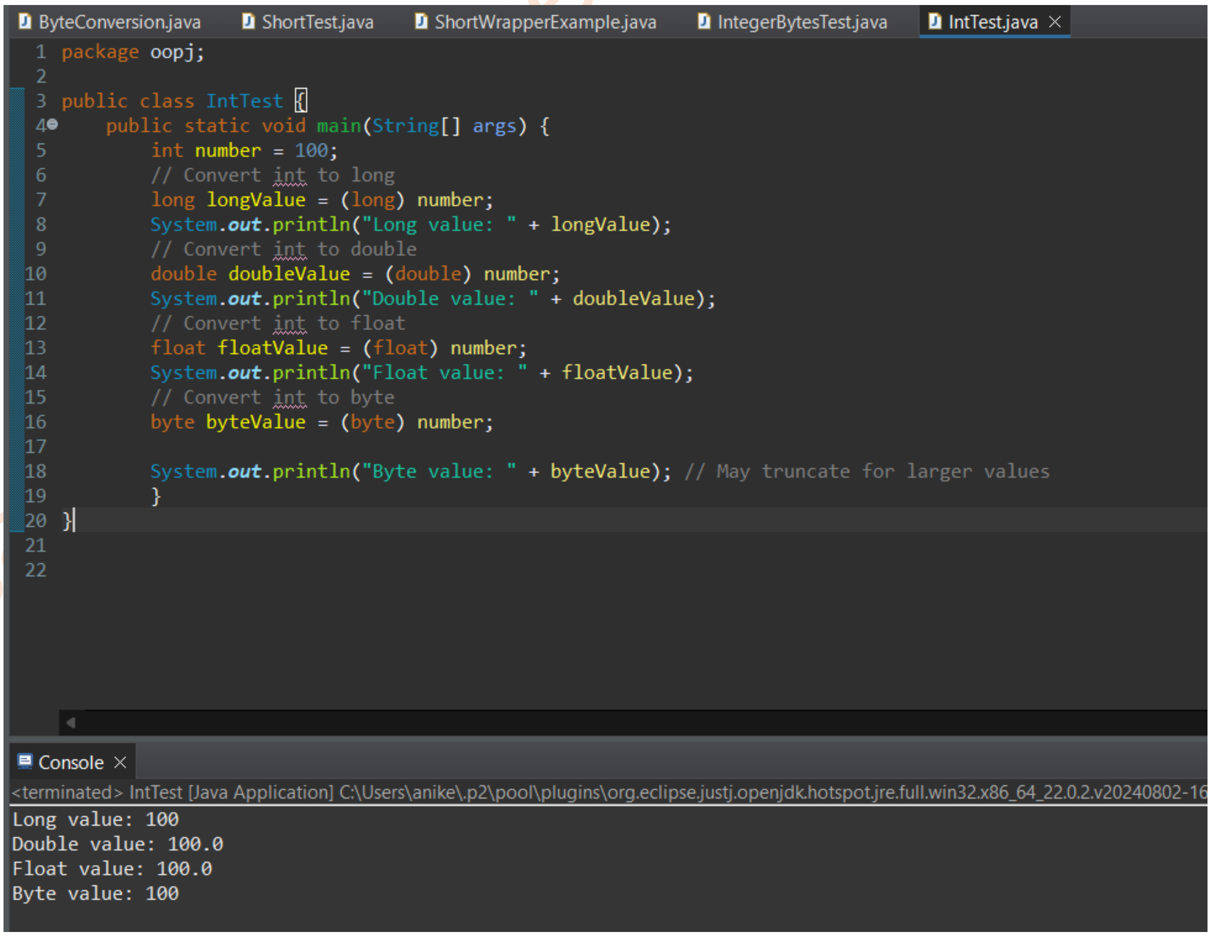
// Convert int to byte

byte byteValue = (byte) number;

System.*out*.println("Byte value: " + byteValue); // May truncate for larger values

}

}



ByteConversion.java ShortTest.java ShortWrapperExample.java IntegerBytesTest.java IntTest.java

```
package oopj;

public class IntTest {
    public static void main(String[] args) {
        int number = 100;
        // Convert int to long
        long longValue = (long) number;
        System.out.println("Long value: " + longValue);
        // Convert int to double
        double doubleValue = (double) number;
        System.out.println("Double value: " + doubleValue);
        // Convert int to float
        float floatValue = (float) number;
        System.out.println("Float value: " + floatValue);
        // Convert int to byte
        byte byteValue = (byte) number;

        System.out.println("Byte value: " + byteValue); // May truncate for larger values
        }
}
```

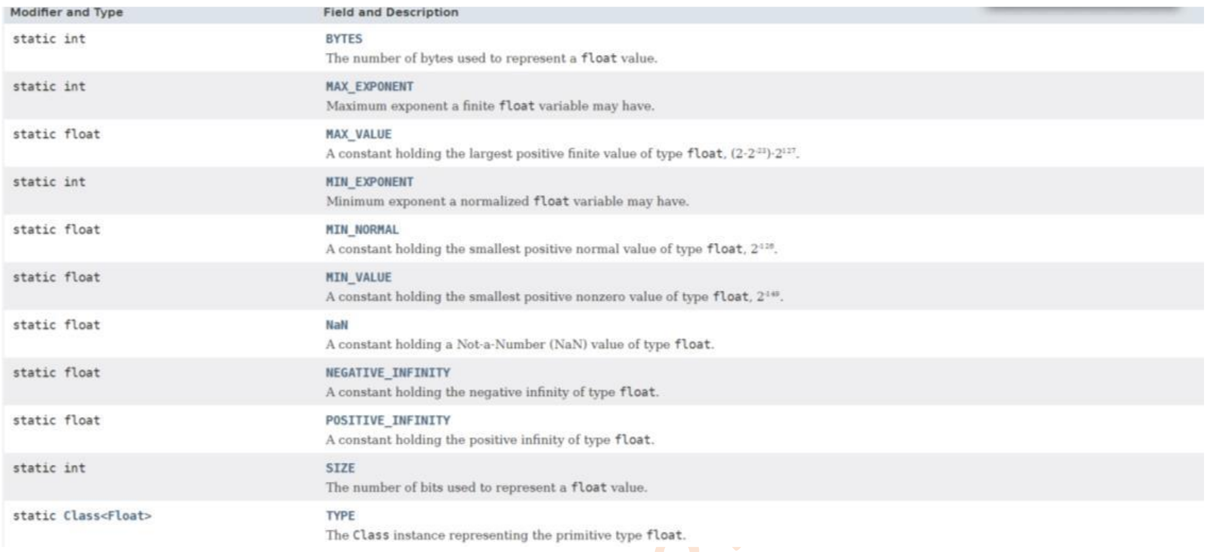
Console

<terminated> IntTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-16

```
Long value: 100
Double value: 100.0
Float value: 100.0
Byte value: 100
```

5. Working with `java.lang.Long`

a. Explore the Java API documentation for `java.lang.Long` and observe its modifiers and super types.



Modifier and Type	Field and Description
`static int`	`BYTES` The number of bytes used to represent a `float` value.
`static int`	`MAX_EXPONENT` Maximum exponent a finite `float` variable may have.
`static float`	`MAX_VALUE` A constant holding the largest positive finite value of type `float`, $(2-2^{-23})\cdot 2^{127}$.
`static int`	`MIN_EXPONENT` Minimum exponent a normalized `float` variable may have.
`static float`	`MIN_NORMAL` A constant holding the smallest positive normal value of type `float`, 2^{-126}.
`static float`	`MIN_VALUE` A constant holding the smallest positive nonzero value of type `float`, 2^{-149}.
`static float`	`NaN` A constant holding a Not-a-Number (NaN) value of type `float`.
`static float`	`NEGATIVE_INFINITY` A constant holding the negative infinity of type `float`.
`static float`	`POSITIVE_INFINITY` A constant holding the positive infinity of type `float`.
`static int`	`SIZE` The number of bits used to represent a `float` value.
`static Class<Float>`	`TYPE` The `Class` instance representing the primitive type `float`.

b. Write a program to test how many bytes are used to represent a `long` value using the `BYTES` field. (Hint: Use `Long.BYTES`).

c. Write a program to find the minimum and maximum values of `long` using the `MIN_VALUE` and `MAX_VALUE` fields. (Hint: Use `Long.MIN_VALUE` and `Long.MAX_VALUE`).

d. Declare a method-local variable `number` of type `long` with some value and convert it to a `String` using the `toString` method. (Hint: Use `Long.toString(long)`).

e. Declare a method-local variable `strNumber` of type `String` with some value and convert it to a `long` value using the `parseLong` method. (Hint: Use `Long.parseLong(String)`).

f. Declare a method-local variable `strNumber` of type `String` with the value `"Ab12Cd3"` and attempt to convert it to a `long` value. (Hint: `parseLong` method will throw a `NumberFormatException`).

g. Declare a method-local variable `number` of type `long` with some value and convert it to the corresponding wrapper class using `Long.valueOf()`. (Hint: Use `Long.valueOf(long)`).

h. Declare a method-local variable `strNumber` of type `String` with some `long` value and convert it to the corresponding wrapper class using `Long.valueOf()`. (Hint: Use `Long.valueOf(String)`).

i. Declare two long variables with values `1123` and `9845`, and add them using a method from the `Long` class. (Hint: Use `Long.sum(long, long)`).

j. Declare two long variables with values `1122` and `5566`, and find the minimum and maximum values using the `Long` class. (Hint: Use `Long.min(long, long)` and `Long.max(long, long)`).

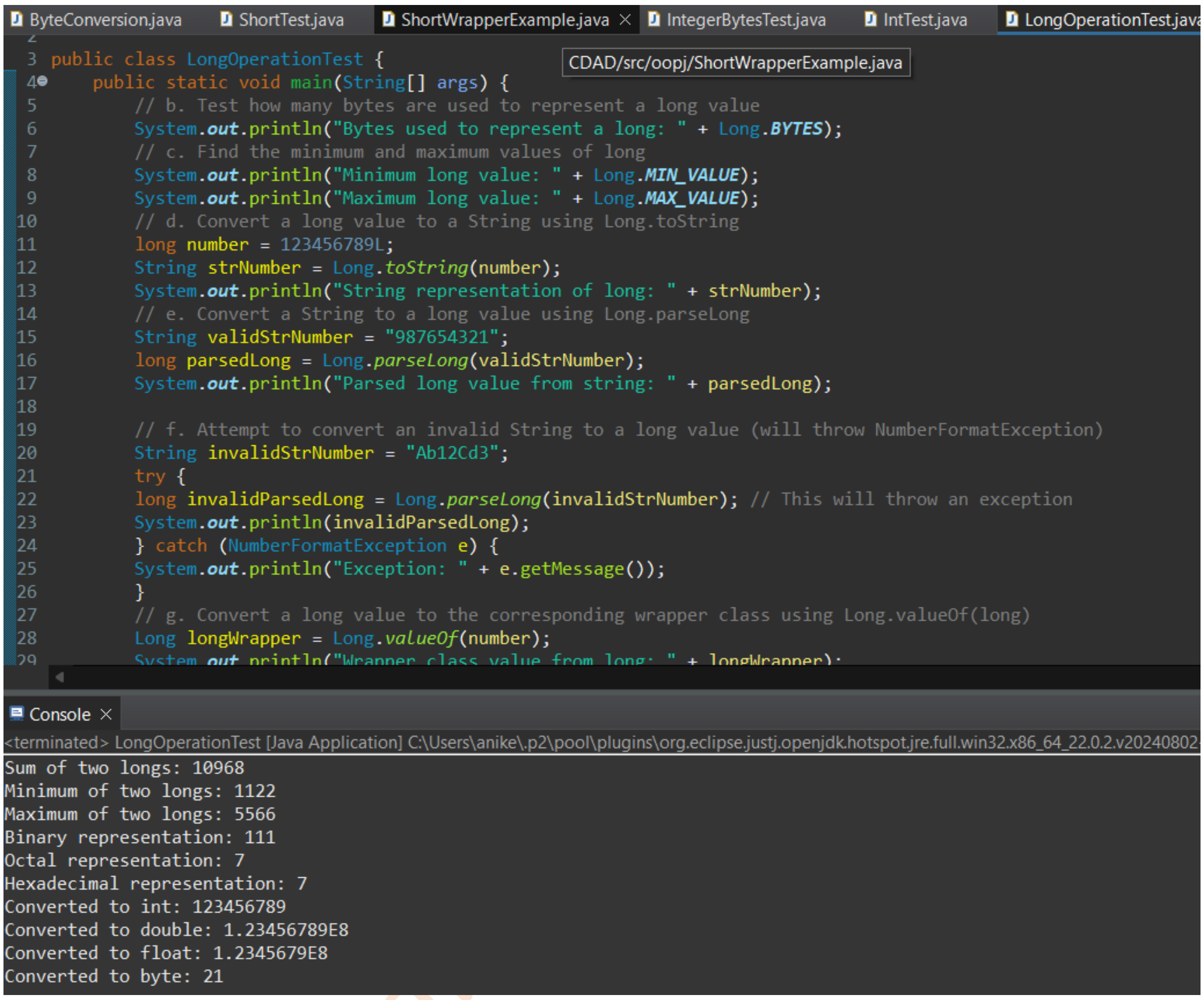
k. Declare a long variable with the value `7`. Convert it to binary, octal, and hexadecimal strings using methods from the `Long` class. (Hint: Use `Long.toBinaryString(long)`, `Long.toOctalString(long)`, and `Long.toHexString(long)`).

l. Experiment with converting a `long` value into other primitive types or vice versa and observe the results.

```
public class LongOperationTest {

        public static void main(String[] args) {

                // b. Test how many bytes are used to represent a long value

                System.out.println("Bytes used to represent a long: " + Long.BYTES);

                // c. Find the minimum and maximum values of long

                System.out.println("Minimum long value: " + Long.MIN_VALUE);

                System.out.println("Maximum long value: " + Long.MAX_VALUE);

                // d. Convert a long value to a String using Long.toString

                long number = 123456789L;

                String strNumber = Long.toString(number);

                System.out.println("String representation of long: " + strNumber);

                // e. Convert a String to a long value using Long.parseLong

                String validStrNumber = "987654321";

                long parsedLong = Long.parseLong(validStrNumber);

                System.out.println("Parsed long value from string: " + parsedLong);



                // f. Attempt to convert an invalid String to a long value (will throw
NumberFormatException)

                String invalidStrNumber = "Ab12Cd3";
```

```
                    try {

                    long invalidParsedLong = Long.parseLong(invalidStrNumber); // This
          will throw an exception

                    System.out.println(invalidParsedLong);

                    } catch (NumberFormatException e) {

                    System.out.println("Exception: " + e.getMessage());

                    }

                    // g. Convert a long value to the corresponding wrapper class using
          Long.valueOf(long)

                    Long longWrapper = Long.valueOf(number);

                    System.out.println("Wrapper class value from long: " + longWrapper);

                    // h. Convert a String to the corresponding wrapper class using
          Long.valueOf(String)

                    Long wrapperFromString = Long.valueOf(validStrNumber);

                    System.out.println("Wrapper class value from string: " +
          wrapperFromString);

                    // i. Add two long values using Long.sum

                    long num1 = 1123L;

                    long num2 = 9845L;

                    long sum = Long.sum(num1, num2);

                    System.out.println("Sum of two longs: " + sum);

                    // j. Find the minimum and maximum of two long values using
          Long.min and Long.max

                    long num3 = 1122L;

                    long num4 = 5566L;

                    System.out.println("Minimum of two longs: " + Long.min(num3,
          num4));
```

```
                    System.out.println("Maximum of two longs: " + Long.max(num3, 
num4));

                    // k. Convert a long value to binary, octal, and hexadecimal strings

                    long value = 7L;

                    System.out.println("Binary representation: " + 
Long.toBinaryString(value));

                    System.out.println("Octal representation: " + 
Long.toOctalString(value));

                    System.out.println("Hexadecimal representation: " + 
Long.toHexString(value));

                    // l. Experiment with converting a long value into other primitive 
types

                    // Convert long to int

                    int intValue = (int) number;

                    System.out.println("Converted to int: " + intValue);

                    // Convert long to double

                    double doubleValue = (double) number;

                        System.out.println("Converted to double: " + doubleValue);

                    // Convert long to float

                    float floatValue = (float) number;

                    System.out.println("Converted to float: " + floatValue);

                    // Convert long to byte (might truncate if too large)

                    byte byteValue = (byte) number;

                    System.out.println("Converted to byte: " + byteValue);

                    }

}
```



```java
public class LongOperationTest {
    public static void main(String[] args) {
        // b. Test how many bytes are used to represent a long value
        System.out.println("Bytes used to represent a long: " + Long.BYTES);
        // c. Find the minimum and maximum values of long
        System.out.println("Minimum long value: " + Long.MIN_VALUE);
        System.out.println("Maximum long value: " + Long.MAX_VALUE);
        // d. Convert a long value to a String using Long.toString
        long number = 123456789L;
        String strNumber = Long.toString(number);
        System.out.println("String representation of long: " + strNumber);
        // e. Convert a String to a long value using Long.parseLong
        String validStrNumber = "987654321";
        long parsedLong = Long.parseLong(validStrNumber);
        System.out.println("Parsed long value from string: " + parsedLong);

        // f. Attempt to convert an invalid String to a long value (will throw NumberFormatException)
        String invalidStrNumber = "Ab12Cd3";
        try {
        long invalidParsedLong = Long.parseLong(invalidStrNumber); // This will throw an exception
        System.out.println(invalidParsedLong);
        } catch (NumberFormatException e) {
        System.out.println("Exception: " + e.getMessage());
        }
        // g. Convert a long value to the corresponding wrapper class using Long.valueOf(long)
        Long longWrapper = Long.valueOf(number);
        System.out.println("Wrapper class value from long: " + longWrapper);
```

```
<terminated> LongOperationTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802
Sum of two longs: 10968
Minimum of two longs: 1122
Maximum of two longs: 5566
Binary representation: 111
Octal representation: 7
Hexadecimal representation: 7
Converted to int: 123456789
Converted to double: 1.23456789E8
Converted to float: 1.2345679E8
Converted to byte: 21
```

6. Working with `java.lang.Float`

a. Explore the [Java API documentation for `java.lang.Float`] and observe its modifiers and super types.

b. Write a program to test how many bytes are used to represent a `float` value using the `BYTES` field. (Hint: Use `Float.BYTES`).

c. Write a program to find the minimum and maximum values of `float` using the `MIN_VALUE` and `MAX_VALUE` fields. (Hint: Use `Float.MIN_VALUE` and `Float.MAX_VALUE`).

d. Declare a method-local variable `number` of type `float` with some value and convert it to a `String` using the `toString` method. (Hint: Use `Float.toString(float)`).

e. Declare a method-local variable `strNumber` of type `String` with some value and convert it to a `float` value using the `parseFloat` method. (Hint: Use `Float.parseFloat(String)`).

f. Declare a method-local variable `strNumber` of type `String` with the value `"Ab12Cd3"` and attempt to convert it to a `float` value. (Hint: `parseFloat` method will throw a `NumberFormatException`).

g. Declare a method-local variable `number` of type `float` with some value and convert it to the corresponding wrapper class using `Float.valueOf()`. (Hint: Use `Float.valueOf(float)`).

h. Declare a method-local variable `strNumber` of type `String` with some `float` value and convert it to the corresponding wrapper class using `Float.valueOf()`. (Hint: Use `Float.valueOf(String)`).

i. Declare two float variables with values `112.3` and `984.5`, and add them using a method from the `Float` class. (Hint: Use `Float.sum(float, float)`).

j. Declare two float variables with values `112.2` and `556.6`, and find the minimum and maximum values using the `Float` class. (Hint: Use `Float.min(float, float)` and `Float.max(float, float)`).

k. Declare a float variable with the value `-25.0f`. Find the square root of this value. (Hint: Use `Math.sqrt()` method).

l. Declare two float variables with the same value, `0.0f`, and divide them. (Hint: Observe the result and any special floating-point behavior).

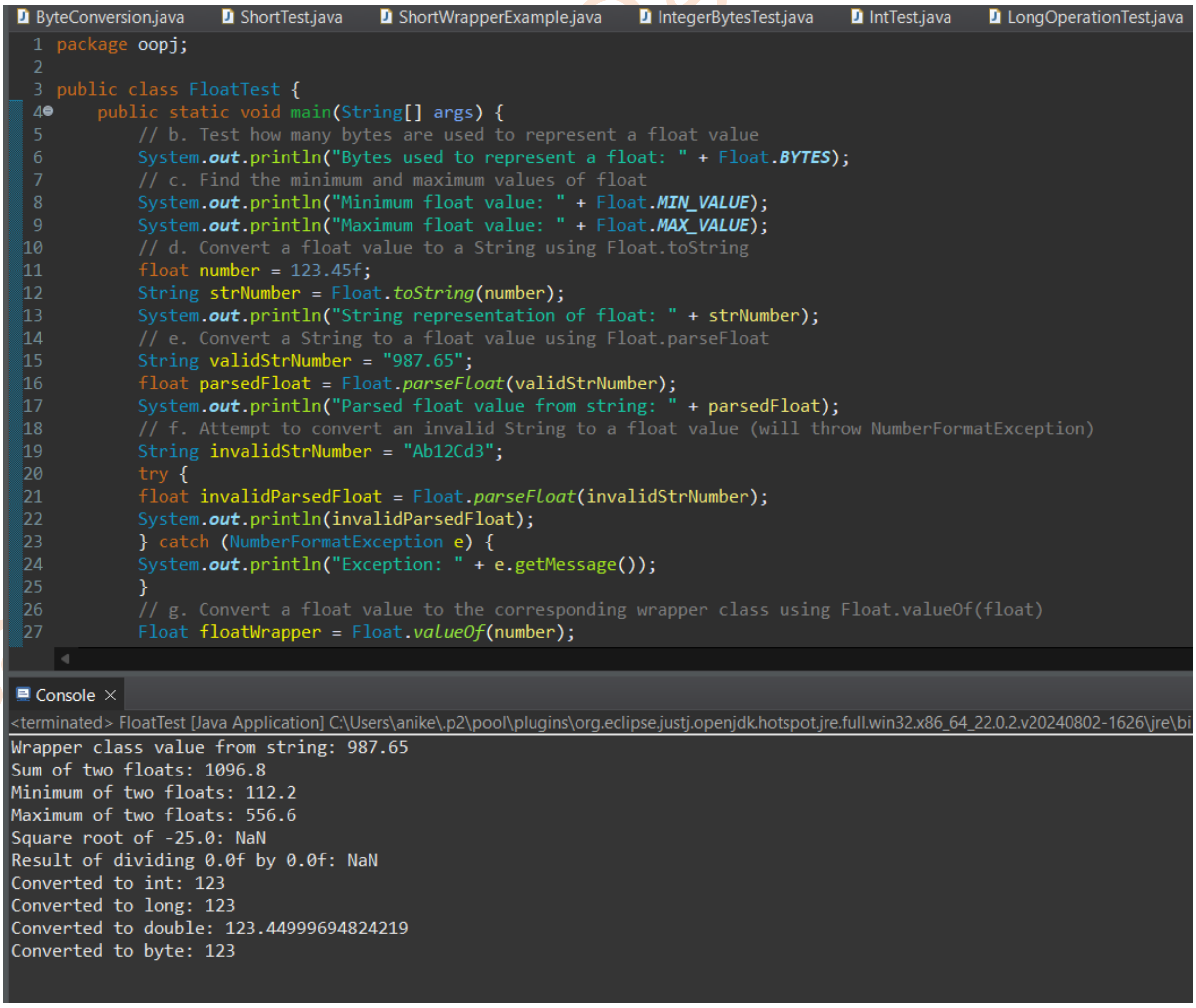
m. Experiment with converting a `float` value into other primitive types or vice versa and observe the results.

```
public class FloatTest {

        public static void main(String[] args) {

                // b. Test how many bytes are used to represent a float value

                System.out.println("Bytes used to represent a float: " + Float.BYTES);

                // c. Find the minimum and maximum values of float

                System.out.println("Minimum float value: " + Float.MIN_VALUE);

                System.out.println("Maximum float value: " + Float.MAX_VALUE);

                // d. Convert a float value to a String using Float.toString

                float number = 123.45f;

                String strNumber = Float.toString(number);
```

```
		System.out.println("String representation of float: " + strNumber);

		// e. Convert a String to a float value using Float.parseFloat

		String validStrNumber = "987.65";

		float parsedFloat = Float.parseFloat(validStrNumber);

		System.out.println("Parsed float value from string: " + parsedFloat);

		// f. Attempt to convert an invalid String to a float value (will throw
NumberFormatException)

		String invalidStrNumber = "Ab12Cd3";

		try {

		float invalidParsedFloat = Float.parseFloat(invalidStrNumber);

		System.out.println(invalidParsedFloat);

		} catch (NumberFormatException e) {

		System.out.println("Exception: " + e.getMessage());

		}

		// g. Convert a float value to the corresponding wrapper class using
Float.valueOf(float)

		Float floatWrapper = Float.valueOf(number);

		System.out.println("Wrapper class value from float: " +
floatWrapper);

		// h. Convert a String to the corresponding wrapper class using
Float.valueOf(String)

		Float wrapperFromString = Float.valueOf(validStrNumber);

		System.out.println("Wrapper class value from string: " +
wrapperFromString);

		// i. Add two float values using Float.sum

		float num1 = 112.3f;

		float num2 = 984.5f;
```

```
            float sum = Float.sum(num1, num2);

            System.out.println("Sum of two floats: " + sum);

            // j. Find the minimum and maximum of two float values using
Float.min and Float.max

            float num3 = 112.2f;

            float num4 = 556.6f;

            System.out.println("Minimum of two floats: " + Float.min(num3,
num4));

            System.out.println("Maximum of two floats: " + Float.max(num3,
num4));

            // k. Find the square root of a negative float value

            float negativeValue = -25.0f;

            double sqrtValue = Math.sqrt(negativeValue); // Math.sqrt returns a
double

            System.out.println("Square root of " + negativeValue + ": " +
sqrtValue);

            // l. Divide two float variables with the same value of 0.0f and observe
the result

            float zero1 = 0.0f;

            float zero2 = 0.0f;

            float divisionResult = zero1 / zero2;

            System.out.println("Result of dividing 0.0f by 0.0f: " + divisionResult);

            // m. Experiment with converting a float value into other primitive
types

            // Convert float to int

            int intValue = (int) number;

            System.out.println("Converted to int: " + intValue);

            // Convert float to long
```

```
        long longValue = (long) number;

        System.out.println("Converted to long: " + longValue);

        // Convert float to double

        double doubleValue = (double) number;

        System.out.println("Converted to double: " + doubleValue);

        // Convert float to byte (may truncate)

        byte byteValue = (byte) number;

        System.out.println("Converted to byte: " + byteValue);

        }

}
```



```
package oopj;

public class FloatTest {
    public static void main(String[] args) {
        // b. Test how many bytes are used to represent a float value
        System.out.println("Bytes used to represent a float: " + Float.BYTES);
        // c. Find the minimum and maximum values of float
        System.out.println("Minimum float value: " + Float.MIN_VALUE);
        System.out.println("Maximum float value: " + Float.MAX_VALUE);
        // d. Convert a float value to a String using Float.toString
        float number = 123.45f;
        String strNumber = Float.toString(number);
        System.out.println("String representation of float: " + strNumber);
        // e. Convert a String to a float value using Float.parseFloat
        String validStrNumber = "987.65";
        float parsedFloat = Float.parseFloat(validStrNumber);
        System.out.println("Parsed float value from string: " + parsedFloat);
        // f. Attempt to convert an invalid String to a float value (will throw NumberFormatException)
        String invalidStrNumber = "Ab12Cd3";
        try {
        float invalidParsedFloat = Float.parseFloat(invalidStrNumber);
        System.out.println(invalidParsedFloat);
        } catch (NumberFormatException e) {
        System.out.println("Exception: " + e.getMessage());
        }
        // g. Convert a float value to the corresponding wrapper class using Float.valueOf(float)
        Float floatWrapper = Float.valueOf(number);
```

```
<terminated> FloatTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bi
Wrapper class value from string: 987.65
Sum of two floats: 1096.8
Minimum of two floats: 112.2
Maximum of two floats: 556.6
Square root of -25.0: NaN
Result of dividing 0.0f by 0.0f: NaN
Converted to int: 123
Converted to long: 123
Converted to double: 123.44999694824219
Converted to byte: 123
```

7. Working with `java.lang.Double`

a. Explore the Java API documentation for `java.lang.Double` and observe its modifiers and super types.

b. Write a program to test how many bytes are used to represent a `double` value using the `BYTES` field. (Hint: Use `Double.BYTES`).

c. Write a program to find the minimum and maximum values of `double` using the `MIN_VALUE` and `MAX_VALUE` fields. (Hint: Use `Double.MIN_VALUE` and `Double.MAX_VALUE`).

d. Declare a method-local variable `number` of type `double` with some value and convert it to a `String` using the `toString` method. (Hint: Use `Double.toString(double)`).

e. Declare a method-local variable `strNumber` of type `String` with some value and convert it to a `double` value using the `parseDouble` method. (Hint: Use `Double.parseDouble(String)`).

f. Declare a method-local variable `strNumber` of type `String` with the value `"Ab12Cd3"` and attempt to convert it to a `double` value. (Hint: `parseDouble` method will throw a `NumberFormatException`).

g. Declare a method-local variable `number` of type `double` with some value and convert it to the corresponding wrapper class using `Double.valueOf()`. (Hint: Use `Double.valueOf(double)`).

h. Declare a method-local variable `strNumber` of type `String` with some `double` value and convert it to the corresponding wrapper class using `Double.valueOf()`. (Hint: Use `Double.valueOf(String)`).

i. Declare two double variables with values `112.3` and `984.5`, and add them using a method from the `Double` class. (Hint: Use `Double.sum(double, double)`).

j. Declare two double variables with values `112.2` and `556.6`, and find the minimum and maximum values using the `Double` class. (Hint: Use `Double.min(double, double)` and `Double.max(double, double)`).

k. Declare a double variable with the value `-25.0`. Find the square root of this value. (Hint: Use `Math.sqrt()` method).

l. Declare two double variables with the same value, `0.0`, and divide them. (Hint: Observe the result and any special floating-point behavior).

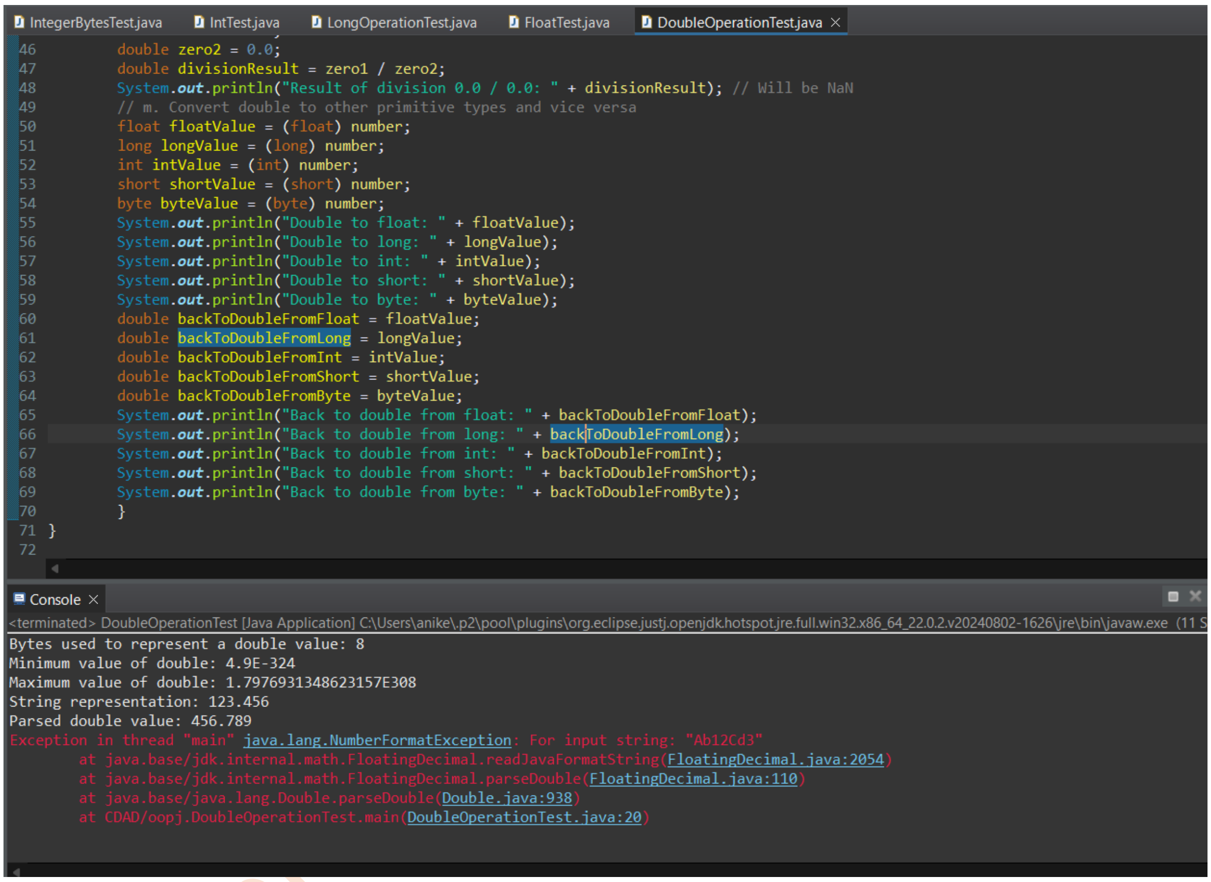
m. Experiment with converting a `double` value into other primitive types or vice versa and observe the results.

```
public class DoubleOperationTest {

        public static void main(String[] args) {

                // b. Bytes used to represent a double value

                System.out.println("Bytes used to represent a double value: " +
Double.BYTES);

                // c. Minimum and Maximum values of double

                System.out.println("Minimum value of double: " +
Double.MIN_VALUE);

                System.out.println("Maximum value of double: " +
Double.MAX_VALUE);

                // d. Convert double to String

                double number = 123.456;

                String strNumber = Double.toString(number);

                System.out.println("String representation: " + strNumber);

                // e. Convert String to double

                String strDouble = "456.789";

                double parsedNumber = Double.parseDouble(strDouble);

                System.out.println("Parsed double value: " + parsedNumber);

                // f. Attempt to convert invalid String to double (will cause a
NumberFormatException, but not caught here)

                String invalidStrNumber = "Ab12Cd3";

                System.out.println("Attempt to parse invalid string to double: " +
Double.parseDouble(invalidStrNumber)); // May throw exception

                // g. Convert double to Wrapper class

                Double wrapper = Double.valueOf(number);

                System.out.println("Wrapper class value: " + wrapper);

                // h. Convert String to Wrapper class
```

```
                    String strWrapper = "234.567";

                    Double wrapperFromString = Double.valueOf(strWrapper);

                    System.out.println("Wrapper class value from string: " +
wrapperFromString);

                    // i. Add two doubles using Double.sum

                    double num1 = 112.3;

                    double num2 = 984.5;

                    double sum = Double.sum(num1, num2);

                    System.out.println("Sum: " + sum);

                    // j. Find minimum and maximum of two doubles

                    double num3 = 112.2;

                    double num4 = 556.6;

                    double min = Double.min(num3, num4);

                    double max = Double.max(num3, num4);

                    System.out.println("Minimum: " + min);

                    System.out.println("Maximum: " + max);

                    // k. Find square root of a double value

                    double negativeNumber = -25.0;

                    double sqrtResult = Math.sqrt(negativeNumber);

                    System.out.println("Square root of negative number: " + sqrtResult);
// Will be NaN

                    // l. Divide two doubles with value 0.0

                    double zero1 = 0.0;

                    double zero2 = 0.0;

                    double divisionResult = zero1 / zero2;
```

```
                System.out.println("Result of division 0.0 / 0.0: " + divisionResult); //
Will be NaN

                // m. Convert double to other primitive types and vice versa

                float floatValue = (float) number;

                long longValue = (long) number;

                int intValue = (int) number;

                short shortValue = (short) number;

                byte byteValue = (byte) number;

                System.out.println("Double to float: " + floatValue);

                System.out.println("Double to long: " + longValue);

                System.out.println("Double to int: " + intValue);

                System.out.println("Double to short: " + shortValue);

                System.out.println("Double to byte: " + byteValue);

                double backToDoubleFromFloat = floatValue;

                double backToDoubleFromLong = longValue;

                double backToDoubleFromInt = intValue;

                double backToDoubleFromShort = shortValue;

                double backToDoubleFromByte = byteValue;

                System.out.println("Back to double from float: " +
backToDoubleFromFloat);

                System.out.println("Back to double from long: " +
backToDoubleFromLong);

                System.out.println("Back to double from int: " +
backToDoubleFromInt);

                System.out.println("Back to double from short: " +
backToDoubleFromShort);
```

```
                    System.out.println("Back to double from byte: " +
backToDoubleFromByte);

                    }

}
```



```
        double zero2 = 0.0;
        double divisionResult = zero1 / zero2;
        System.out.println("Result of division 0.0 / 0.0: " + divisionResult); // Will be NaN
        // m. Convert double to other primitive types and vice versa
        float floatValue = (float) number;
        long longValue = (long) number;
        int intValue = (int) number;
        short shortValue = (short) number;
        byte byteValue = (byte) number;
        System.out.println("Double to float: " + floatValue);
        System.out.println("Double to long: " + longValue);
        System.out.println("Double to int: " + intValue);
        System.out.println("Double to short: " + shortValue);
        System.out.println("Double to byte: " + byteValue);
        double backToDoubleFromFloat = floatValue;
        double backToDoubleFromLong = longValue;
        double backToDoubleFromInt = intValue;
        double backToDoubleFromShort = shortValue;
        double backToDoubleFromByte = byteValue;
        System.out.println("Back to double from float: " + backToDoubleFromFloat);
        System.out.println("Back to double from long: " + backToDoubleFromLong);
        System.out.println("Back to double from int: " + backToDoubleFromInt);
        System.out.println("Back to double from short: " + backToDoubleFromShort);
        System.out.println("Back to double from byte: " + backToDoubleFromByte);
        }
}
```

```
<terminated> DoubleOperationTest [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.2.v20240802-1626\jre\bin\javaw.exe  (11 S
Bytes used to represent a double value: 8
Minimum value of double: 4.9E-324
Maximum value of double: 1.7976931348623157E308
String representation: 123.456
Parsed double value: 456.789
Exception in thread "main" java.lang.NumberFormatException: For input string: "Ab12Cd3"
	at java.base/jdk.internal.math.FloatingDecimal.readJavaFormatString(FloatingDecimal.java:2054)
	at java.base/jdk.internal.math.FloatingDecimal.parseDouble(FloatingDecimal.java:110)
	at java.base/java.lang.Double.parseDouble(Double.java:938)
	at CDAD/oopj.DoubleOperationTest.main(DoubleOperationTest.java:20)
```

8. Conversion between Primitive Types and Strings

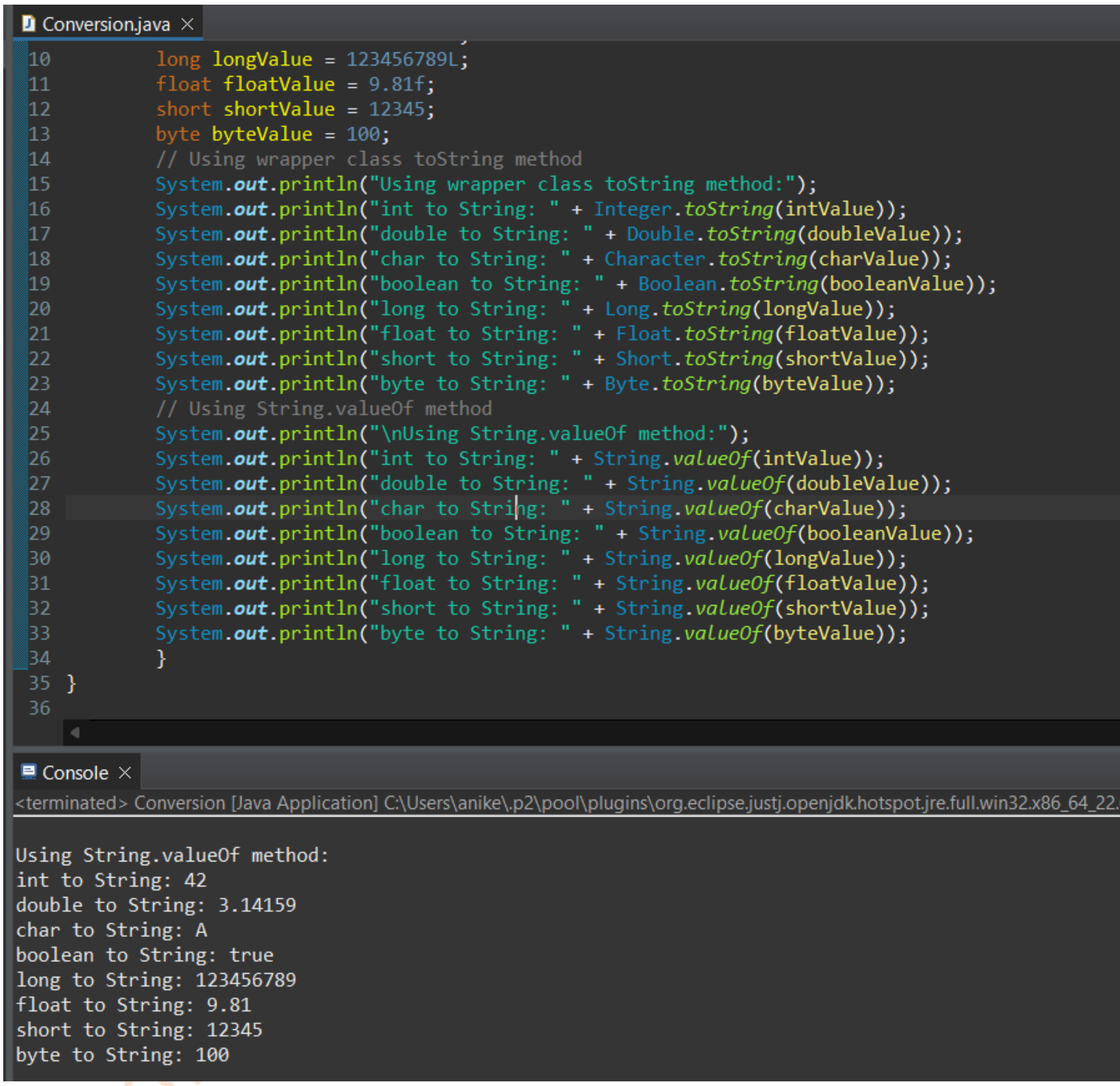
Initialize a variable of each primitive type with a user-defined value and convert it into `String`:

- First, use the `toString` method of the corresponding wrapper class. (e.g., `Integer.toString()`).
- Then, use the `valueOf` method of the `String` class. (e.g., `String.valueOf()`).

```
public class Conversion {

        public static void main(String[] args) {

                // Primitive types and their user-defined values

                int intValue = 42;
```

```
                    double doubleValue = 3.14159;

                    char charValue = 'A';

                    boolean booleanValue = true;

                    long longValue = 123456789L;

                    float floatValue = 9.81f;

                    short shortValue = 12345;

                    byte byteValue = 100;

                    // Using wrapper class toString method

                    System.out.println("Using wrapper class toString method:");

                    System.out.println("int to String: " +
Integer.toString(intValue));

                    System.out.println("double to String: " +
Double.toString(doubleValue));

                    System.out.println("char to String: " +
Character.toString(charValue));

                    System.out.println("boolean to String: " +
Boolean.toString(booleanValue));

                    System.out.println("long to String: " +
Long.toString(longValue));

                    System.out.println("float to String: " +
Float.toString(floatValue));

                    System.out.println("short to String: " +
Short.toString(shortValue));

                    System.out.println("byte to String: " +
Byte.toString(byteValue));

                    // Using String.valueOf method

                    System.out.println("\nUsing String.valueOf method:");

                    System.out.println("int to String: " + String.valueOf(intValue));
```

```
            System.out.println("double to String: " +
String.valueOf(doubleValue));

            System.out.println("char to String: " +
String.valueOf(charValue));

            System.out.println("boolean to String: " +
String.valueOf(booleanValue));

            System.out.println("long to String: " +
String.valueOf(longValue));

            System.out.println("float to String: " +
String.valueOf(floatValue));

            System.out.println("short to String: " +
String.valueOf(shortValue));

            System.out.println("byte to String: " +
String.valueOf(byteValue));

            }

}
```



```
        long longValue = 123456789L;
        float floatValue = 9.81f;
        short shortValue = 12345;
        byte byteValue = 100;
        // Using wrapper class toString method
        System.out.println("Using wrapper class toString method:");
        System.out.println("int to String: " + Integer.toString(intValue));
        System.out.println("double to String: " + Double.toString(doubleValue));
        System.out.println("char to String: " + Character.toString(charValue));
        System.out.println("boolean to String: " + Boolean.toString(booleanValue));
        System.out.println("long to String: " + Long.toString(longValue));
        System.out.println("float to String: " + Float.toString(floatValue));
        System.out.println("short to String: " + Short.toString(shortValue));
        System.out.println("byte to String: " + Byte.toString(byteValue));
        // Using String.valueOf method
        System.out.println("\nUsing String.valueOf method:");
        System.out.println("int to String: " + String.valueOf(intValue));
        System.out.println("double to String: " + String.valueOf(doubleValue));
        System.out.println("char to String: " + String.valueOf(charValue));
        System.out.println("boolean to String: " + String.valueOf(booleanValue));
        System.out.println("long to String: " + String.valueOf(longValue));
        System.out.println("float to String: " + String.valueOf(floatValue));
        System.out.println("short to String: " + String.valueOf(shortValue));
        System.out.println("byte to String: " + String.valueOf(byteValue));
        }
}
```

```
<terminated> Conversion [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.

Using String.valueOf method:
int to String: 42
double to String: 3.14159
char to String: A
boolean to String: true
long to String: 123456789
float to String: 9.81
short to String: 12345
byte to String: 100
```

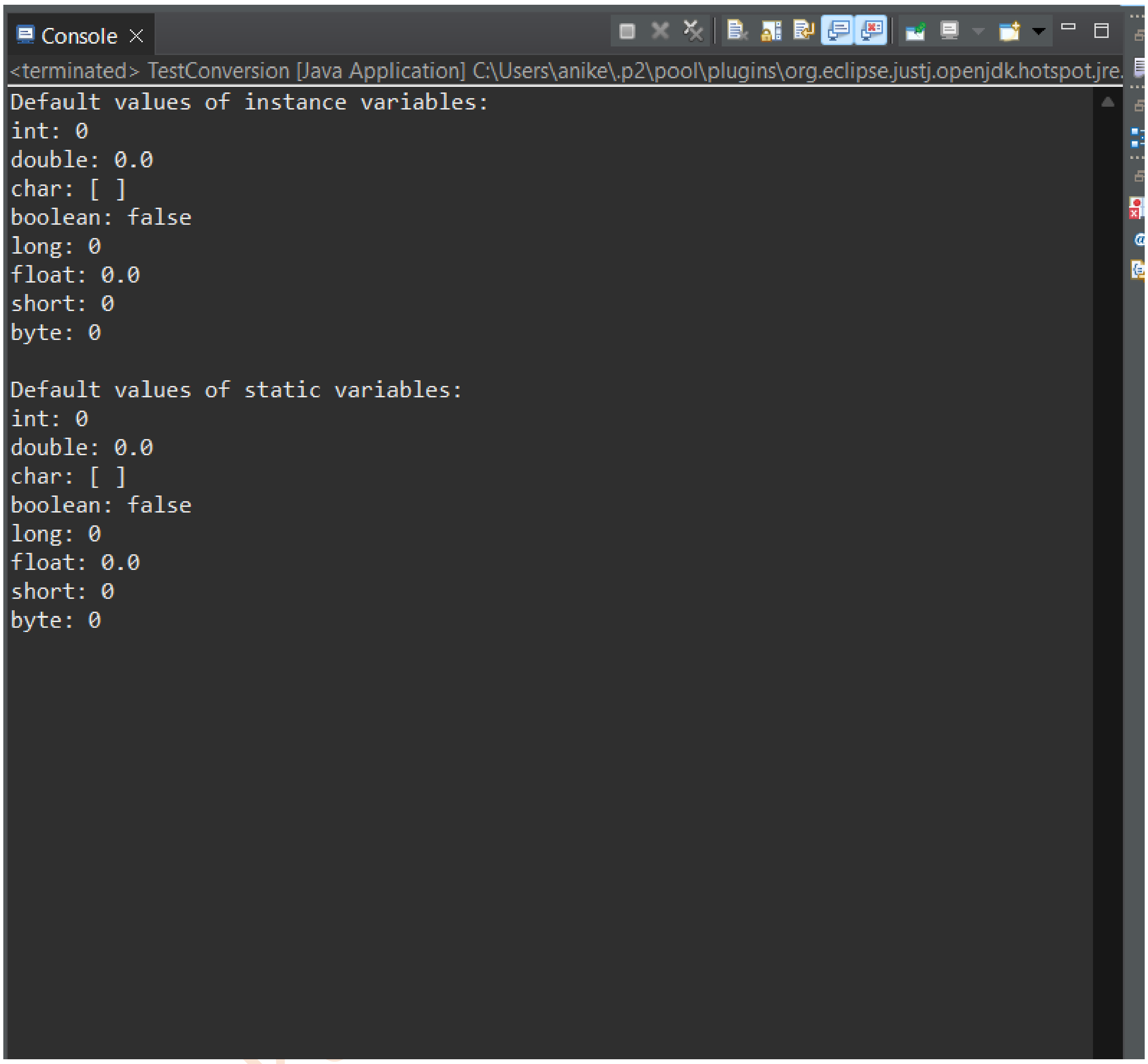
9. Default Values of Primitive Types

Declare variables of each primitive type as fields of a class and check their default values. (Note: Default values depend on whether the variables are instance variables or static variables).

```
public class TestConversion {

    // Instance variables (fields)

    int instanceInt;

    double instanceDouble;

    char instanceChar;

    boolean instanceBoolean;
```

```
long instanceLong;

float instanceFloat;

short instanceShort;

byte instanceByte;

// Static variables

static int staticInt;

static double staticDouble;

static char staticChar;

static boolean staticBoolean;

static long staticLong;

static float staticFloat;

static short staticShort;

static byte staticByte;

public static void main(String[] args) {

// Create an instance of DefaultValuesTest

TestConversion test = new TestConversion();

// Print default values of instance variables

System.out.println("Default values of instance variables:");

System.out.println("int: " + test.instanceInt);

System.out.println("double: " + test.instanceDouble);

System.out.println("char: [" + test.instanceChar + "]");

System.out.println("boolean: " + test.instanceBoolean);

System.out.println("long: " + test.instanceLong);

System.out.println("float: " + test.instanceFloat);
```

```
        System.out.println("short: " + test.instanceShort);

        System.out.println("byte: " + test.instanceByte);

        // Print default values of static variables

        System.out.println("\nDefault values of static variables:");


        System.out.println("int: " + staticInt);

        System.out.println("double: " + staticDouble);

        System.out.println("char: [" + staticChar + "]");

        System.out.println("boolean: " + staticBoolean);

        System.out.println("long: " + staticLong);

        System.out.println("float: " + staticFloat);

        System.out.println("short: " + staticShort);

        System.out.println("byte: " + staticByte);

        }

    }
```



```
<terminated> TestConversion [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.
Default values of instance variables:
int: 0
double: 0.0
char: [ ]
boolean: false
long: 0
float: 0.0
short: 0
byte: 0

Default values of static variables:
int: 0
double: 0.0
char: [ ]
boolean: false
long: 0
float: 0.0
short: 0
byte: 0
```

10. Arithmetic Operations with Command Line Input

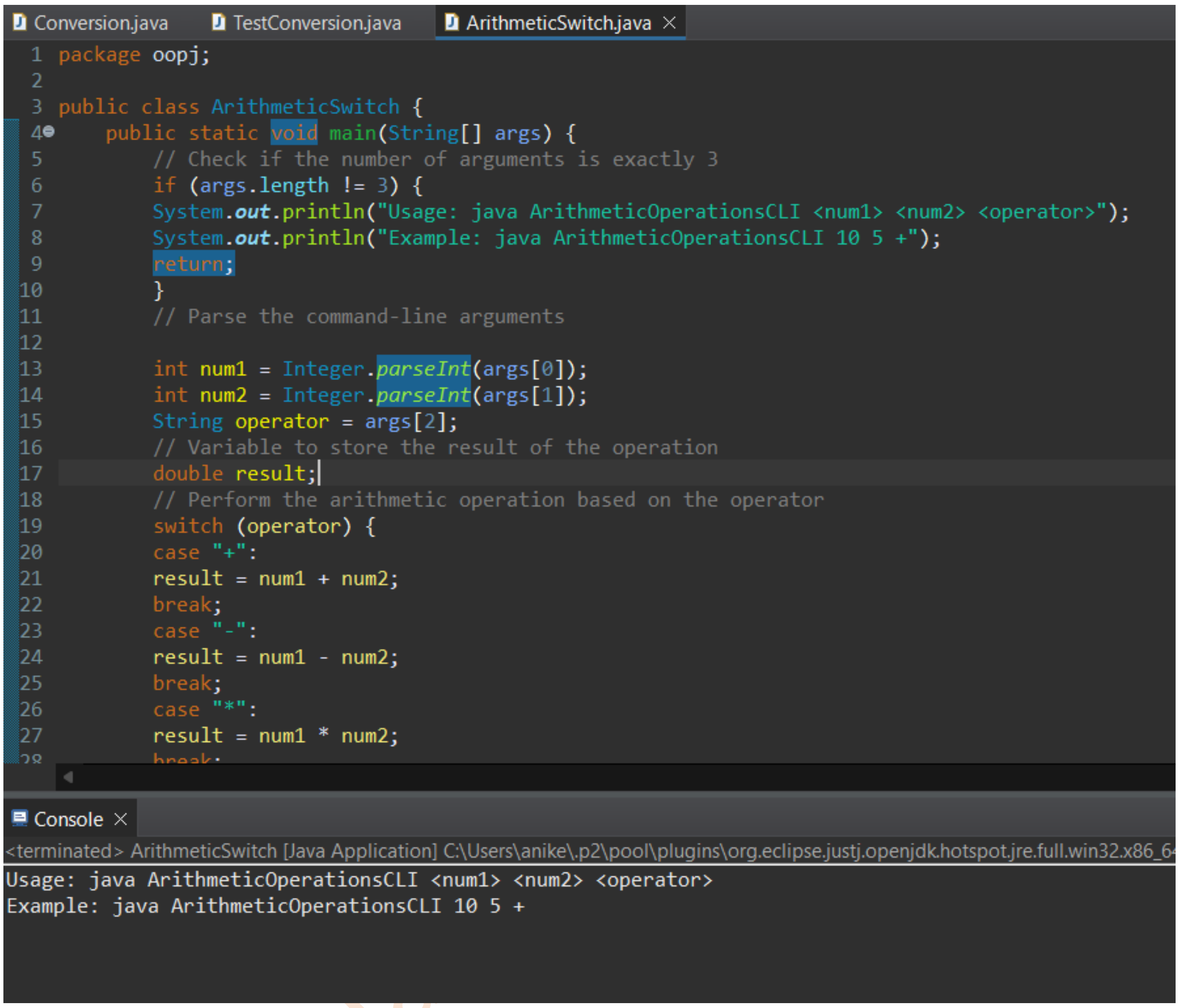
Write a program that accepts two integers and an arithmetic operator (`+`, `-`, `*`, `/`) from the command line. Perform the specified arithmetic operation based on the operator provided. (Hint: Use `switch-case` for operations).

```
public class ArithmeticSwitch {

        public static void main(String[] args) {

                // Check if the number of arguments is exactly 3

                if (args.length != 3) {

                System.out.println("Usage: java ArithmeticOperationsCLI <num1>
<num2> <operator>");

                System.out.println("Example: java ArithmeticOperationsCLI 10 5 +");
```

```
return;

}

// Parse the command-line arguments


int num1 = Integer.parseInt(args[0]);

int num2 = Integer.parseInt(args[1]);

String operator = args[2];

// Variable to store the result of the operation

double result;

// Perform the arithmetic operation based on the operator

switch (operator) {

case "+":

result = num1 + num2;

break;

case "-":

result = num1 - num2;

break;

case "*":

result = num1 * num2;

break;

case "/":

// Handle division by zero

if (num2 == 0) {

System.out.println("Error: Division by zero is not allowed.");
```

```
                return;
                }
                result = (double) num1 / num2;
                break;
                default:
                System.out.println("Error: Invalid operator. Use +, -, *, or /.");
                return;
                }
                // Print the result
                System.out.println("Result: " + result);
                }
    }
```

ASSIGNMENT NO.2



```java
package oopj;

public class ArithmeticSwitch {
    public static void main(String[] args) {
        // Check if the number of arguments is exactly 3
        if (args.length != 3) {
        System.out.println("Usage: java ArithmeticOperationsCLI <num1> <num2> <operator>");
        System.out.println("Example: java ArithmeticOperationsCLI 10 5 +");
        return;
        }
        // Parse the command-line arguments

        int num1 = Integer.parseInt(args[0]);
        int num2 = Integer.parseInt(args[1]);
        String operator = args[2];
        // Variable to store the result of the operation
        double result;
        // Perform the arithmetic operation based on the operator
        switch (operator) {
        case "+":
        result = num1 + num2;
        break;
        case "-":
        result = num1 - num2;
        break;
        case "*":
        result = num1 * num2;
```

```
<terminated> ArithmeticSwitch [Java Application] C:\Users\anike\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64
Usage: java ArithmeticOperationsCLI <num1> <num2> <operator>
Example: java ArithmeticOperationsCLI 10 5 +
```