Homework

The following homework is designed to cover the course objectives for this unit.

Assignment 2.1:

Research the ITT Tech Virtual Library to find the difference between a byte stream and a character stream. Present your findings in the form of a list. Cite your sources using Chicago Manual of Style format. Submit your list and citations to your instructor at the beginning of Unit 3.

Assignment 2.2:

Research the ITT Tech Virtual Library to conduct research in the ITT Tech Virtual Library to find out what happens when you serialize or deserialize an object. Present your findings in the form of a report listing the consequences of serializing or deserializing an object. Cite your sources using Chicago Manual of Style format. Submit your report to your instructor at the beginning of Unit 3. Your report should be 1 to 2 pages in length and double-spaced.

Assignment 2.3:

Answer the following 20 questions. Submit your written answers to your instructor at the beginning of Unit 3. ***Note:*** Some questions go across multiple pages; be sure to read the entire question and all answer options.

1. Which of the following statements are true? (Hint: There are multiple answers.)

    a. To write an object, the object must be serializable.
    b. If all the elements in an array are serializable, the array is serializable too.
    c. The Serializable interface does not contain any methods. So it is a mark interface.
    d. ObjectInputStream/ObjectOutputStream enables you to perform I/O for objects in addition for primitive type values and strings.
    e. Since ObjectInputStream/ObjectOutputStream contains all the functions of DataInputStream/DataOutputStream, you can replace DataInputStream/DataOutputStream completely by ObjectInputStream/ObjectOutputStream.

2. Which of the following is the legal mode for creating a new RandomAccessFile stream?

    a. "rw"
    b. 'r'
    c. "rwx"
    d. "w"

3. Which of the following statements are true? (Hint: There are multiple answers.)

   a. Binary I/O does not require conversions.
   b. Binary files are independent of the encoding scheme on the host machine and thus are portable.
   c. Text I/O is built upon binary I/O to provide a level of abstraction for character encoding and decoding.
   d. Binary I/O is more efficient than text I/O, because binary I/O does not require encoding and decoding.
   e. Text I/O involves encoding and decoding.

4. What happens if the file test.dat does not exist when you attempt to compile and run the following code?

```
import java.io.*;

class Test {
   public static void main(String[] args) {
     try {
       RandomAccessFile raf =
         new RandomAccessFile("test.dat", "r");
       int i = raf.readInt();
     }
     catch(IOException ex) {
       System.out.println("runtime exception");
     }
}
```

   a. The program compiles, but throws IOException because the file test.dat doesn't exist. The program displays runtime exception.
   b. The program compiles and runs fine, but nothing is displayed on the console.
   c. The program does not compile because raf is not created correctly.
   d. The program does not compile because readInt() is not implemented in RandomAccessFile.

5. Which of the following statements are true? (Hint: There are multiple answers.)

   a. You can create a FileInputStream/FileOutputStream from a File object or a file name using FileInputStream/FileOutputStream constructors.
   b. The return value -1 from the read() method signifies the end of file.
   c. A java.io.FileNotFoundException would occur if you attempt to create a FileInputStream with a nonexistent file.
   d. All methods in FileInputStream/FileOutputStream are inherited from InputStream/OutputStream.
   e. A java.io.FileNotFoundException would occur if you attempt to create a FileOutputStream with a nonexistent file.

6. The Loan class given in the text does not implement java.io.Serializable. Analyze the following code.

```
public class Foo implements java.io.Serializable {
   private int v1;
   private static double v2;
   private Loan v3 = new Loan();
}
```

Which of the following statements is correct?

a. Both statements b and c are correct.
b. An instance of Foo cannot be serialized because Foo contains a non-serializable instance variable v3.
c. If you mark v3 as transient, an instance of Foo is serializable.
d. An instance of Foo can be serialized because Foo implements Serializable.

7. After the following program is finished, how many bytes are written to the file t.dat?

```
import java.io.*;

public class Test {
   public static void main(String[] args) throws IOException {
     DataOutputStream output = new DataOutputStream(
       new FileOutputStream("t.dat"));
     output.writeUTFString("ABCD");
     output.close();
   }
}
```

a. 2 bytes
b. 8 bytes
c. 6 bytes
d. 10 bytes
e. 4 bytes

8. To append data to an existing file, use _____ to construct a FileOutputStream for file out.dat.

a. `new FileOutputStream("out.dat")`
b. `new FileOutputStream("out.dat", true)`
c. `new FileOutputStream(true, "out.dat")`
d. `new FileOutputStream("out.dat", false)`

9. Which of the following statements are true? (Hint: There are multiple answers.)

a. An output object is also called an output stream.
b. An input object is also called an input stream.

c. You can use the PrintWriter class for outputting text to a file.
d. A File object encapsulates the properties of a file or a path, but does not contain the methods for reading/writing.
e. You can use the Scanner class for reading text from a file.

10. After the following program is finished, how many bytes are written to the file t.dat?

```
import java.io.*;
public class Test {
   public static void main(String[] args) throws IOException {
     DataOutputStream output = new DataOutputStream(
       new FileOutputStream("t.dat"));
     output.writeChar('A');
     output.close();
   }
}
```

a. 4 bytes
b. 2 bytes
c. 8 bytes
d. None of the above

11. Which method can you use to find out the number of the bytes in a file using InputStream?

a. `getSize()`
b. `available()`
c. `length()`
d. `size()`

12. Which of the following statements is correct to create a DataOutputStream to write to a file named out.dat?

a. `DataOutputStream outfile = new DataOutputStream(FileOutputStream("out.dat"));`
b. `DataOutputStream outfile = new DataOutputStream(new FileOutputStream("out.dat"));`
c. `DataOutputStream outfile = new DataOutputStream(new File("out.dat"));`
d. `DataOutputStream outfile = new DataOutputStream("out.dat");`

13. After the following program is finished, how many bytes are written to the file t.dat?

```
import java.io.*;

public class Test {
```

```
   public static void main(String[] args) throws IOException {
     DataOutputStream output = new DataOutputStream(
       new FileOutputStream("t.dat"));
     output.writeShort(1234);
     output.writeShort(5678);
     output.close();
   }
}
```

a. 8 bytes
b. 2 bytes
c. 4 bytes
d. None of the above

14. After the following program is finished, how many bytes are written to the file t.dat?

```
import java.io.*;

public class Test {
   public static void main(String[] args) throws IOException {
     DataOutputStream output = new DataOutputStream(
       new FileOutputStream("t.dat"));
     output.writeString("ABCD");
     output.close();
   }
}
```

a. 8 bytes
b. 2 bytes
c. 16 bytes
d. 4 bytes
e. 12 bytes

15. Which type of exception occurs when creating a DataInputStream for a nonexistent file?

a. FileNotExistException
b. FileNotFound
c. FileNotFoundException
d. FileNotExist

16. Which of the following statements is **not** true?

a. The methods in an object are serialized.
b. An object must be an instance of Serializable or Externalizable for it to be serialized.
c. A static variable is not serialized.
d. A transient variable is not serialized.

17. With which I/O class can you append or update a file?

    a. DataOutputStream()
    b. OutputStream()
    c. RandomAccessFile(),
    d. None of the above

18. To create a file, you can use _____.

    a. FileWriter
    b. FileOutputStream
    c. RandomAccessFile
    d. All of the above.

19. Which of the following statements are true? (Hint: There are multiple answers.)

    a. Text I/O is built upon binary I/O to provide a level of abstraction for character encoding and decoding.
    b. All files are stored in binary format. So, all files are essentially binary files.
    c. For binary input, you need to know exactly how data were written in order to read them in correct type and order.
    d. Encoding and decoding are automatically performed by text I/O.

20. What does the following code do?

```
FileInputStream fis = new FileInputStream("test.dat");
```

    a. It creates a new file named test.dat regardless of whether it exists or not and opens the file so you can write to it.
    b. It creates a new file named test.dat if it does not exist and opens the file so you can write to it.
    c. It creates a FileInputStream for test.dat if test.dat exists.
    d. It creates a new file named test.dat regardless of whether it exists or not and opens the file so you can write to it and read from it.
    e. It creates a new file named test.dat if it does not exist and opens the file so you can write to it and read from it.