CHAPTER 8

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Working with Archive Files

QUESTIONS AND EXERCISES

1. What is an archive file?

   Answer:

   An archive file consists of one or more files and metadata.

2. What is the difference between lossless and lossy data compression? Name one algorithm of each type.

   Answer:

   In lossless data compression, there is no loss of data when compressed data is decompressed. Run Length Encoding and Huffman coding are lossless compression algorithms. In lossy data compression, some data is lost during compression process. So original data cannot be fully recovered when the data is decompressed. Discrete Cosine Transform and Vector Quantization are lossy compression algorithms.

3. What is use of the `Deflater` and `Inflater` classes?

   Answer:

   `Deflater` and `Inflater` are two classes in the `java.util.zip` package that support general-purpose data compression/decompression functionality in Java.

4. What is checksum? Name three algorithms to compute checksum and their corresponding Java classes.

Answer:

A checksum is an integer that is computed by applying an algorithm on a stream of bytes. Sometimes, the algorithm to compute an integer from a stream of bytes is also known as checksum. Typically, it is used to check for errors during data transmission.

Adler-32, CRC-32, and CRC-32C are three algorithms to compute checksum. The corresponding Java classes in the `java.util.zip` package are named `Adler32`, `CRC32`, and `CRC32C`.

5. What do instances of the following classes represent: `ZipEntry`, `ZipFile`, `ZipInputStream`, and `ZipOutputStream`?

Answer:

A `ZipEntry` object represents an entry in an archive file in a ZIP file format. `ZipInputStream` is a concrete decorator class in the `InputStream` class family. It can be used to read data from a ZIP file. `ZipOutputStream` is a concrete decorator class in the `OutputStream` class family. This can be used to write data to a ZIP file for each entry. `ZipFile` is a utility class to read the entries from a ZIP file.

6. What is the difference between a ZIP file and a JAR file?

Answer:

A JAR file is a special kind of ZIP file with a MANIFEST.MF file in its MET-INF directory. Contents of a JAR file can be digitally signed to provide security.

7. What types of content are stored in the `versions` directory of a JAR file?

Answer:

It contains files specific to a JDK versions in a multi-release JAR file.

8. What is a manifest file and how do you represent a manifest file in a Java program?

Answer:

The manifest file contains information about the JAR file and its entries. It can contain information about the CLASSPATH setting for the JAR file. An object of the `java.util.jar.Manifest` class represents a manifest file.

9. What is the name of the command-line tool that is used to work with JAR files?

Answer:

The name of the command-line tool to work with JAR files is `jar`.

10. Name the options that you use with the `jar` tool to create a new JAR and to update an existing JAR.

Answer:

You use the `--create` and `--update` options to create and update a JAR file using the `jar` tool.

11. Write the command to list the table of contents for a JAR file named `test.jar`.

Answer:

Use the `--list` option with the `jar` tool to list the table of contents of a JAR file.

12. What do instances of the following classes represent: `JarEntry`, `JarFile`, `JarInputStream`, and `JarOutputStream`?

Answer:

- `JarEntry`: It represents an entry in a JAR file.
- `JarFile`: It is a utility class to read the entries from a JAR file
- `JarInputSream`: It is a concrete decorator class in the `InputStream` class family. This is used to read data from a JAR file.
- `JarOutputStream`: It is a concrete decorator class in the `OutputStream` class family. This is used to write data to a JAR file for each entry.