Homework 1 - Java Software Solutions, Chapter 1 Review

1.3-1.7, 1.11, 1.14, 1.15, 1.17, 1.20

1.3 - How many unique items can be represented with each of the fol- lowing?

a. 1 bit - 1

b. 3 bits - 8

c. 6 bits - 64

d. 8 bits - 256

e. 10 bits - 1024

f. 16 bits - 65536

1.4 - If a picture is made up of 128 possible colors, how many bits would be needed to store each pixel of the picture? Why?

Seven bits are needed to represent each pixel if each pixel can have up to 128 possible colors. This is because there are 128 distinct permutations of 7 bits.

1.5 - If a language uses 240 unique letters and symbols, how many bits would be needed to store each character of a document? Why?

Eight bits are needed to store each character of a document written in a language of 240 unique characters and symbols. Seven bits would be sufficient if there were only 128 different characters to represent. Eight bits is sufficient for 256 different characters. Because 240 is greater than 128, but not greater than 256, at least 8 bits are needed if all characters are represented by the same number of bits.

1.6 - How many bits are there in each of the following? How many bytes are there in each?

a. 12KB

12 KB = 12 x 1024 bytes = 12,288 bytes = 98,304 bits

b. 5MB

5 MB = 5 x 1,048,576 bytes = 5,242,880 bytes = 41,943,040 bits

c. 3GB

3 GB = 3 x 1,703,741,824 bytes = 5,111,225,472 bytes = 40,889,803,776 bits

d. 2TB

2 TB = 2 x 1,099,511,627,776 bytes = 2,199,023,255,552 bytes = approximately 1.76 x 1013 bits

1.7 - Explain the difference between random-access memory (RAM) and read-only memory (ROM).

Both RAM and ROM are random access devices. RAM (Random Access Memory) can be written to and read from, but ROM (Read-Only Memory) can only be read from.

1.11 - What is the total number of communication lines needed for a fully connected point-to-point network of eight computers? Nine computers? Ten computers? What is a general formula for determining this result?

Eight computers: 28 communication lines

Nine computers: 36 communication lines

Ten computers: 45 communication lines

General formula for n computers: n(n-1)/2, which represents the sum of the numbers between 1 and n-1.

1.14 - Use a Web browser to access information through the Web about the following topics. For each one, explain the process you used to find the information and record the specific URLs you found.

the Philadelphia Phillies baseball team

"Philadelphia Phillies" —> "The Official Site of the Philadelphia Phillies" http://www.phillies.com/

wine production in California

"wine production in California" —> "The Wine Institute: The Voice for California Wines" http://www.wineinstitute.org/

the subway systems in two major cities

“subway map New York" —> The New York City Transit System Map page http://www.mta.nyc.ny.us/nyct/maps/

"subway map Boston" —> Massachusetts Bay Transportation Authority Online, Subway Service http://www.mbta.com/schedmaps/subway/

vacation opportunities in the Caribbean

"Caribbean vacation" —>“Caribbean Vacation Travel Guide,” <http://www.vacation-destinations.com/caribbean/>

1.15 - Give examples of the two types of Java comments and explain the differences between them.

One kind of comment begins with a double slash (//) and continues to the end of the line. A second kind of comment begins following an initiating slash-asterisk (/\*) and terminates immediately preceding a terminating asterisk-slash (\*/). The second type of comment can span multiple lines.

1.17 - Why are the following valid Java identifiers not considered good identifiers?

a. q - ?.

b. totVal - unnecessarily abbreviated

c. theNextValueInTheList - very lengthy

1.20 - Categorize each of the following situations as a compile-time error,run-time error, or logical error.

1. multiplying two numbers when you meant to add them - logic
2. dividing by zero - runtime
3. forgetting a semicolon at the end of a programming statement - compile-time
4. spelling a word wrong in the output - logic
5. producing inaccurate results - logic
6. typing a { when you should have typed ( - compile-time