Part I:

For faster shipping of letters, the U.S. Postal service encourages companies that send large volumes of mail to use a bar code denoting the ZIP code (see below).

The encoding scheme for a five-digit ZIP code is shown below. There are full-height frame bars on each side. The five encoded digits are followed by a check digit, which is computed as follows:

- Add up all digits
- Choose the check digit that makes the sum a multiple of 10.

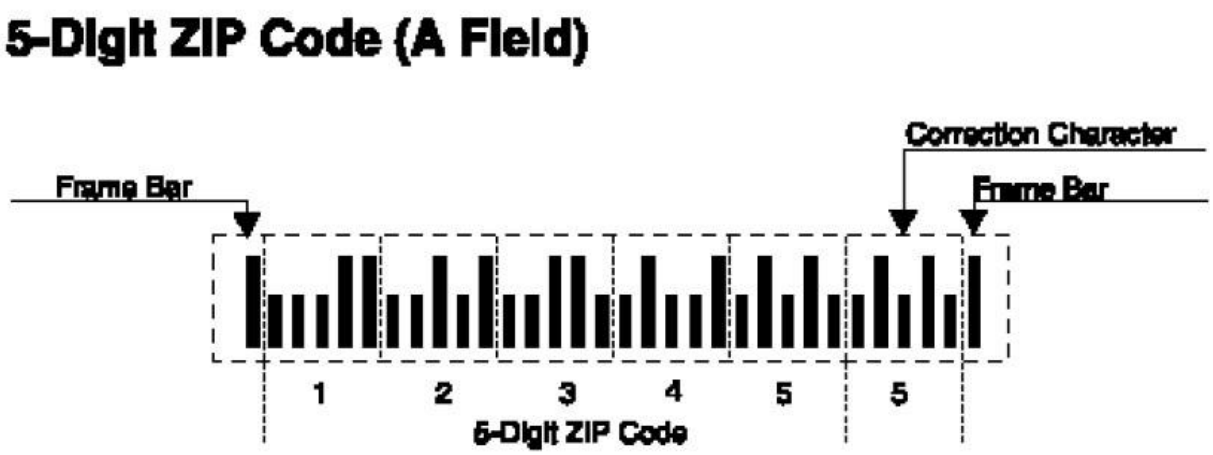
For example, the sum of the digits in the ZIP code 95014 is 19, so the check digit is 1 to make the sum equal to 20.

Each digit of the ZIP code, and the check digit, is encoded according to the table below. Note that they represent all combinations of two full and three half bars. The digit can be computed easily from the bar code using the column weights 7, 4, 2, 1, 0. For example, 01100 is 0 x 7 + 1 x 4 + 1 x 2 + 0 x 1 + 0 x 1 = 6
The only exception is 0 which would yield 11 according to the weight formula.

Write a java application that asks the user for a ZIP cod and prints the bar code. Use a colon : for half bars, and | for full bars.

P
SEP

	7	4	2	1	0
1	half	half	half	full	full
2	half	half	full	half	full
3	half	half	full	full	half
4	half	full	half	half	full
5	half	full	half	full	half
6	half	full	full	half	half
7	full	half	half	half	full
8	full	half	half	full	half
9	full	half	full	half	half
0	full	full	half	half	half



Part II:

The colored bands on a resistor indicate the resistor's resistance in ohms and the resistor's tolerance. For example a resistor rated at 6.2K ohms +-5 percent could have a resistance as small as 5.89K ohms ore 6.51K ohms (-5% and +5%). In this case the 6.2K ohms is the resistor's nominal value of the resistance and that the actual value of the resistance can by any value between 5.89K ohms and 6.51K ohms.

Write a Java application that represents a resistor as a class. Provide a single constructor that accepts values for the nominal resistance and tolerance and the determines the actual value randomly. The class should provide public methods to get the nominal resistance, tolerance, and the actual resistance.

Write a separate class with a main method that demonstrates that the resistor class works properly by displaying actual resistance for ten 330 ohm +- 10 percent resistors.

Next, add a method that returns a string containing the color bands describing the resistor. The color bands of a resistor show its nominal resistance and tolerance. Every resistor has four color bands as follows:

- The first band is the fist significant digit of the nominal resistance value
- The second band is the second significant digit of the nominal resistance value
- The third band is the decimal multiplier
- The fourth band indicates the tolerance

For example (using the values from the table as a key), a resistor with red, violet, greens and gold bands (left to right) will have 2 as the first digit, 7 as the second digit, a multiplier of 10 to the power of 5 and a tolerance of +- 5 percent, for a nominal resistance of 2,700K ohms plus or minus 5 percent.

Color	Digit	Multiplier	Tolerance
Black	0	10 power 0	N/A
Brown	1	10 power 1	1%
Red	2	10 power 2	2%
Orange	3	10 power 3	N/A
Yellow	4	10 power 4	N/A
Green	5	10 power 5	0.5%
Blue	6	10 power 6	0.25%
Violet	7	10 power 7	0.1%
Gray	8	10 power 8	0.05%
White	9	10 power 9	N/A
Gold	N/A	10 power -1	5%
Silver	N/A	10 power -2	10%
None	N/A	N/A	20%