

**Program # 1** (Exercise 1.11 p.31 Population projection)

The U.S. Census Bureau projects population based on the following assumptions:

- One birth every 7 seconds
- One death every 13 seconds
- One new immigrant every 45 seconds

Write a program to display the population for each of the next five years. Assume the current population is 312,032,486 and one year has 365 days.

**Hint:** In Java, if two integers perform division, the result is an integer. The fractional part is truncated.

For example,  $5 / 4$  is 1 (not 1.25) and  $10 / 4$  is 2 (not 2.5). To get an accurate result with the fractional part, one of the values involved in the division must be a number with a decimal point.

For example,  $5.0 / 4$  is 1.25 and  $10 / 4.0$  is 2.5.

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**Program # 2** (Exercise 1.13 p.31 Algebra: solve 2 \* 2 linear equations)

You can use Cramer's rule to solve the following 2 \* 2 system of linear equation:

$$\begin{aligned} ax + by &= e \\ cx + dy &= f \end{aligned}$$

$$x = \frac{ed - bf}{ad - bc}$$

$$y = \frac{af - ec}{ad - bc}$$

Write a program that solves the following equation and displays the value for x and y:

$$\begin{aligned} 3.4x + 50.2y &= 44.5 \\ 2.1x + 0.55y &= 5.9 \end{aligned}$$

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**Program # 3** (Exercise 2.6 p.70 Sum the digits in an integer)

Write a program that reads an integer between 0 and 1000 and adds all the digits in the integer. For example, if an integer is 932, the sum of all its digits is 14.

**Hint:** Use the % operator to extract digits and use the / operator to remove the extracted digit. For instance,  $932 \% 10 = 2$  and  $932 / 10 = 93$ .

Here is a sample run:

Enter a number between 0 and 1000: 999 <Enter>  
The sum of the digits is 27

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**Program # 4** (Exercise 2.14 p.72 Health application: computing BMI)

Body Mass Index (BMI) is a measure of health on weight. It can be calculated by taking your weight in kilograms and dividing by the square of your height in meters. Write a program that prompts the user to enter a weight in pounds and height in inches and displays the BMI. Note that one pound is 0.45359237 kilograms, and one inch is 0.0254 meters.

Here is a sample run:

Enter weight in pounds: 95.5 <Enter>  
Enter height in inches: 50 <Enter>  
BMI is 26.8573