Lab 1 – Exercises:

1. The U.S. Census Bureau projects population based on the following assumptions:
   a. One birth every 7 seconds
   b. One death every 13 seconds
   c. 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. Don't forget the decimal part.
   ***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**.

2. 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**.

   Here is a sample run:

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

3. Suppose you save **$100** *each* month into a savings account with the annual interest rate 5%. After the first month, the value in the account becomes

   100 * (1 + 0.00417) = 100.417

   After the second month, the value in the account becomes
   (100 + 100.417) * (1 + 0.00417) = 201.252

   After the third month, the value in the account becomes
   (100 + 201.252) * (1 + 0.00417) = 302.507

   and so on.

   Write a program that prompts the user to enter a monthly saving amount and displays the account value after the sixth month. You are going to need to figure the monthly interest rate as well.

   Here is a sample output,

```
Enter the monthly saving amount: 100 Enter
After the sixth month, the account value is $608.81
```

4. Write a program that randomly generates an integer between 1 and 12 and displays the English month name January, February, …, December for the number 1, 2, …, 12, accordingly. Use Math.Random to generate the random number for the month.

5. Suppose that the tuition for a university is $10,000 this year and increases 5% every year. In one year, the tuition will be $10,500. Write a program that computes the tuition in ten years and the total cost of four years' worth of tuition after the tenth year.

6. Write a nested **for** loop that prints the following output:

```
                    1
                  1 2 1
                1 2 4 2 1
              1 2 4 8 4 2 1
            1 2 4 8 16 8 4 2 1
          1 2 4 8 16 32 16 8 4 2 1
        1 2 4 8 16 32 64 32 16 8 4 2 1
      1 2 4 8 16 32 64 128 64 32 16 8 4 2 1
```