

## Exercises

The self-executing tasks in this section will help you put into practice what you have learned in this chapter. Although they will be small code fragments, they should be an important step towards the full-fledged programs you will write in the future.

### Exercise 1. Mailing address

( 9 lines) Write a few lines of code that displays your name and mailing address. Write the address in the format accepted in your country. Your first program will not accept any input from the user, only output and nothing else.

### Exercise 2. Greetings

(9 lines) Write a program that prompts a user for his or her name. In response to the input, a greeting should appear on the screen, addressing the user by the name entered from the keyboard earlier.

### Exercise 3. The area of the room

(13 lines) Write a program that asks the user for the length and width of a room. After entering the values, the area of the room should be calculated and displayed on the screen. The length and width of the room should be entered in floating point number format. Supplement the input and output with the units of measurement accepted in your country. These can be feet or meters.

### Exercise 4. Garden plot area

(15 lines) Create a program that asks the user for the length and width of a garden plot in feet. Display the area of the plot in acres.

Hint. One acre contains 43,560 square feet.

### Exercise 5. Handing in the bottles

(15 lines) In many countries, a deposit is built into the price of glassware to encourage beverage buyers to turn in empty bottles. For example, bottles of 1 liter or less cost \$0.10 and larger bottles cost \$0.25.

Write a program that asks the user for the number of bottles of each size. The screen should display the amount of money that could be raised if all of the available bottles were turned in. Format the output so that the amount includes two decimal places and is followed by a dollar symbol on the left.

## Exercise 6: Taxes and tips

(17 lines) The program you will write should start by asking the user for the amount of the restaurant order. This should be followed by calculating the tax and tip for the waiter. You can use the tax rate accepted in your region to calculate the amount of charges. As a tip we will leave 18 % of the order value without tax. The program output should display separately the tax, the tip amount, and the total including both components. Format the output so that all numbers are displayed with two decimal places.

## Exercise 7. Sum of the first n positive numbers

(11 lines) Write a program that asks the user for a number and calculates the sum of natural positive numbers from 1 to the value entered by the user. The sum of the first n positive numbers can be calculated using the formula:

$$\text{sum} = \frac{(n)(n + 1)}{2}.$$

## Exercise 8. Souvenirs and trinkets

(15 lines) The online store sells various souvenirs and trinkets. Each souvenir weighs 75 g and each trinket weighs 112 g. Write a program that asks the user for number of these and other purchases, and then display the total weight of the parcel.

## Exercise 9. Complex percentages

(19 lines) Imagine that you have opened a savings account with a bank at 4% interest per annum. The bank calculates the interest at the end of the year and adds it to the account amount. Write a program that asks the user for the amount of the initial deposit, then calculates and displays the amount in the account at the end of the first, second, and third years. All amounts must be rounded to two decimal places.

## Exercise 10. Arithmetic

(22 lines) Create a program that asks the user for two integers a and b, then displays the results of the following mathematical operations:

- the sum of a and b;
- the difference between a and b;
- the product of a and b;
- the quotient of a divided by b;
- the remainder from dividing a by b;
- the decimal logarithm of a;
- is the result of raising a to the power of b.

Hint. You can find the  $\log_{10}$  function in the math module.

## **Exercise 11. Fuel consumption**

(13 lines) In the United States, vehicle fuel consumption is measured in miles-per-gallon (MPG). In Canada, however, it is usually expressed in liters-per-hundred kilometers (L/100 km). Use your research skills to determine the formula for converting the first units of calculation to the last. Then write a program that asks the user for the vehicle's fuel consumption in U.S. units and displays it in Canadian units.

## **Exercise 12. Exchange**

Imagine that you are writing software for an automatic cash register in a self-service store. One of the functions of the cash register is to calculate the change when a customer pays in cash. Write a program that will ask the user for the amount of change in cents. It should then calculate and display how many and what kind of coins will be needed to dispense the specified amount, provided that the minimum possible number of coins is used. Suppose we have in our possession coins of 1, 5, 10, 25 cents, and 1 (loonie) and 2 (toonie) Canadian dollars.

Note. The \$1 coin was issued in Canada in 1987. It derives its nickname (loonie) from the image of a loon on it. A two-dollar coin issued nine years later was nicknamed toonie, a combination of the words two and loonie.