

Exercise – Variables

This tutorial will be a series of questions that will give you lots of practice with variables, input and output. Though the basic concepts are quite simple there are many different edge cases and peculiarities that can be confusing, even for experienced developers.

1. Find the value of each of the following expressions, or explain why it is not a valid expression. Try this without coding it first.
 - a) $2/3 + 3/5$
 - b) $2\%3 + 3\%5$
 - c) $23\%15\%-2$
 - d) $25*1/2$
 - e) $25*1.0/2$
 - f) $25*(1/2)$
 - g) $235/8+7$
 - h) $235/8.0+7$
 - i) $((20+1)/2-2.0)/(23+3)*0.2$
2. Select suitable variable names you might use for:
 - a) The average height of students in your class
 - b) The tax rate for incomes over \$65000
 - c) The tax rate for incomes below \$5000
 - d) The total cost of all the games on your Steam library
3. Select suitable data types to hold the following values:
 - a) 121
 - b) 9.4
 - c) r
 - d) 100000
 - e) False
4. Create a program that swaps two numbers.
Ask the user for 2 numbers in the console window and store the result in variables called “a” and “b” print the result to screen. Write code that swaps the values for these variables, then print the variables “a” and “b” again.

Continues on next page

5. Consider the following code segment. **Note: Do not implement it yet.**

```
int i = 0;
float f = 0;
char ch = 'a';
std::cin >> i >> ch >> f;
std::cout << "i: " << i << "\nch: " << ch << "\nf: " << f << std::endl;
```

a) What will be the output when the input is:

- a) 1 A 45
- b) 1A45
- c) 1 9 45
- d) 1 945
- e) B 45.6
- f) 1BC5.6

a) Compile the code and check your answers.

6. Ask the user for 5 while numbers. Output the average of these numbers.

7. Write a program that determines the letter that lies halfway between two letters of the alphabet as input by the user. For example, if the user inputs 'A' and 'Z', the output should be 'M'. Do you know how to deal with upper vs. lower case letters? Does it matter if the letters are input in reverse order?

Note: Each character is assigned a value defined by the ASCII (American Standard Code for Information Interchange) character table.