

# Lab: Data Types and Variables

Problems for exercises and homework for the ["Programming Fundamentals" course @ SoftUni](#).

You can check your solutions in [Judge](#).

## I. Integer and Real Numbers

### 1. Convert Meters to Kilometers

You will be given an integer that will be a distance in meters. Write a program that converts meters to kilometers formatted to the second decimal point.

#### Examples

Input	Output
1852	1.85
798	0.80

### 2. Pounds to Dollars

Write a program that converts British pounds to US dollars formatted to the 3rd decimal point.

1 British Pound = 1.36 Dollars

#### Examples

Input	Output
80	108.800
39	53.040

### 3. Exact Sum of Real Numbers

Write a program to enter **n** numbers and calculate and print their **exact sum** (without rounding).

#### Examples

Input	Output
3 1000000000000000000 5 10	1000000000000000015
2 0.00000000003 33333333333.3	33333333333.30000000003

#### Hints

Use **BigDecimal** not to lose precision.

## II. Data Types and Type Conversion

### 4. Town Info

You will be given 3 lines of input. On the first line, you will be given the name of the town, on the second – the population, and on the third – the area. Use the correct data types and print the result in the following format:

"Town {town name} has population of {population} and area {area} square km."

#### Examples

Input	Output
Sofia 1286383 492	Town Sofia has population of 1286383 and area 492 square km.
Plovdiv 343424 101	Town Plovdiv has population of 343424 and area 101 square km.

### 5. Concat Names

Read two names and a delimiter. Print the names joined by the delimiter.

#### Examples

Input	Output
John Smith ->	John->Smith
Jan White <->	Jan<->White
Linda Terry =>	Linda=>Terry

### 6. Chars to String

Write a program that reads 3 lines of input. On each line, you get a single character. Combine all the characters into one string and print it on the console.

#### Examples

Input	Output
a b c	abc
% 2	%2o

o	
1 5 p	15p

## 7. Reversed Chars

Write a program that takes 3 lines of characters and prints them in reversed order with a space between them.

### Examples

Input	Output
A B C	C B A
1 L &	& L 1

## 8. Lower or Upper

Write a program that prints whether a given character is upper-case or lower-case.

### Examples

Input	Output
L	upper-case
f	lower-case

## 9. Centuries to Minutes

Write a program to enter an integer number of **centuries** and convert it to **years**, **days**, **hours**, and **minutes**.

### Examples

Input	Output
1	1 centuries = 100 years = 36524 days = 876581 hours = 52594877 minutes
5	5 centuries = 500 years = 182621 days = 4382906 hours = 262974384 minutes

### Hints

- Use appropriate data types to fit the result after each data conversion.
- Assume that a year has 365.2422 days on average ([the Tropical year](#)).

### Solution

You might help yourself with the code below:

```

Scanner scanner = new Scanner(System.in);
int centuries = Integer.parseInt(scanner.nextLine());

double years = centuries * 100;
double days = years * 365.2422;
double hours = days * 24;
double minutes = hours * 60;

System.out.printf("%d centuries = %.0f years = %.0f days = %.0f hours = %.0f minutes",
    centuries,
    years,
    days,
    hours,
    minutes);

```

## 10. Special Numbers

A **number** is **special** when its **sum of digits** is **5, 7, or 11**.

Write a program to read an integer **n** and for all numbers in the range **1...n** to print the number and if it is special or not (**True / False**).

### Examples

Input	Output
15	1 -> False 2 -> False 3 -> False 4 -> False 5 -> True 6 -> False 7 -> True 8 -> False 9 -> False 10 -> False 11 -> False 12 -> False 13 -> False 14 -> True 15 -> False
9	1 -> False 2 -> False 3 -> False 4 -> False 5 -> True 6 -> False 7 -> True 8 -> False 9 -> False

## Hints

To calculate the sum of digits of given number **num**, you might repeat the following: sum the last digit (**num % 10**) and remove it (**sum = sum / 10**) until the **num** reaches **0**.

## III. Variables

### 11. Refactor Volume of Pyramid

You are given a **working code** that finds the **volume of a pyramid**. However, you should consider that the variables exceed their optimum span and have improper naming. Also, search for variables that have **multiple purposes**.

#### Code

##### Sample Code

```
Scanner scanner = new Scanner(System.in);
double dul, sh, V = 0;
System.out.print("Length: ");
dul = Double.parseDouble(scanner.nextLine());
System.out.print("Width: ");
sh = Double.parseDouble(scanner.nextLine());
System.out.print("Height: ");
V = Double.parseDouble(scanner.nextLine());
V = (dul * sh * V) / 3;
System.out.printf("Pyramid Volume: %.2f", V);
```

## Hints

- **Reduce the span** of the variables by declaring them at the moment they receive a value, not before
- Rename your variables to **represent their real purpose** (example: "dul" should become length, etc.)
- Search for variables that have multiple purposes. If you find any, **introduce a new variable**.

### 12. Refactor Special Numbers

You are given a **working code** that is a solution to **Problem 9. Special Numbers**. However, the variables are **improperly named, declared before** they are needed, and some of them are used for multiple things. Without using your previous solution, **modify the code** so that it is **easy to read and understand**.

#### Code

##### Sample Code

```
Scanner scanner = new Scanner(System.in);
int kolkko = Integer.parseInt(scanner.nextLine());
int obshto = 0;
int takova = 0;
boolean toe = false;
for (int ch = 1; ch <= kolkko; ch++) {
    takova = ch;
    while (ch > 0) {
```

```
        obshto += ch % 10;
        ch = ch / 10;
    }
    toe = (obshto == 5) || (obshto == 7) || (obshto == 11);
    System.out.printf("%d -> %b%n", takova, toe);
    obshto = 0;
    ch = takova;
}
```

## Hints

- Reduce the span of the variables by declaring them at the moment they receive a value, not before
- Rename your variables to represent their real purpose (example: "toe" should become isSpecialNum, etc.)
- Search for variables that have multiple purposes. If you find any, introduce a new variable