Introduction to Computer Programming - CST8110
Algonquin College - David Lareau

Lab 2 - Convert Time

Recommended due date: 3rd lab
(demonstrate your work to the instructor during lab hours)

Introduction

Today we will use variables and arithmetics to convert time from hours, minutes and seconds to time in seconds only, and vice-versa.

1 Convert hours, minutes and seconds to just seconds.

Example

- 2 hours 42 minutes and 31 seconds is 9751 seconds.

Hints

- There are 60 seconds in a minute.
- There are 3600 seconds in an hour.

Steps

1. Start from the program template from our first lab, but rename the class Lab2Part1 and save the file as Lab2Part1.java
2. Verify the code compiles without error.
3. Declare and initialize 3 variables.

```
int hours = 2;
int minutes = 42;
int seconds = 31;
```

4. Use the multiplication (*) and addition (+) operators to calculate the final number of seconds. You can store the result into a new variable, or overwrite *seconds*.
5. Verify the code still compiles without error.
6. Print the result with System.out.println().
7. Verify the code still compiles without error.
8. Run your program. You should expect the number 9751.

2 Convert seconds to hours, minutes and seconds.

Example

- 9751 seconds is 2 hours 42 minutes and 31 seconds.

Hints

- Integer division by 60 can give us the number of minutes.

```
40 seconds divided by 60 is 0 minutes.
64 seconds divided by 60 is 1 minute.
120 seconds divided by 60 is 2 minutes.
125 seconds divided by 60 is 2 minutes.
```

- Similarly, integer division by 3600 can give us the number of hours.
- The modulo (%) operator can be used to keep values cyclic within [0, 59].

```
0 % 60 is 0
1 % 60 is 1
2 % 60 is 2
58 % 60 is 58
59 % 60 is 59
60 % 60 is 0
61 % 60 is 1
62 % 60 is 2
```

Steps

1. Start from the program template from our first lab, but rename the class Lab2Part2 and save the file as Lab2Part2.java
2. Verify the code compiles without error.
3. Declare and initialize 1 variable.

```
int seconds = 9751;
```

4. Declare and initialize a variable for hours using the *seconds* variable and the division operator.
5. Verify the code still compiles without error.
6. Print the value for hours with System.out.println().
7. Verify the code still compiles without error.
8. Run your program. You should expect the number 2.
9. Declare and initialize a variable for minutes using the *seconds* variable and the division and modulo operator where appropriate.
10. Print the value for minutes with System.out.println().
11. Verify the code still compiles without error.
12. Run your program. You should expect the number 42.
13. Update the seconds variable using the modulo operator so that it cycles within [0, 59].
14. Print the value for seconds with System.out.println().
15. Verify the code still compiles without error.
16. Run your program. You should expect the number 31.

Extras

If you are done your lab early, and would like to practice a little more, here are some ideas on how you can improve your program. These ideas are optional, and are not worth any grades.

- Read the hours, minutes and second values from the Standard Input using the Scanner utility instead of hard-coding values for them.

  ```
  int hours = scanner.nextInt(); // instead of scanner.nextLine()
  ```

- Convert seconds to **days**, hours, minutes and seconds.

What to demonstrate

- Run your application with the lab instructor, and discuss your source code with him.