

CS101- Algorithms and Programming I

Lab 03

Lab Objectives: Decisions (if/else)

- For all labs in CS 101, your solutions must conform to these [CS101 style guidelines](#) (rules!)
 - Create a Lab03 workspace (i.e. the folder H:\private\cs101\lab03). This assignment has parts a, b, and c, each of which should be placed in a separate project within the same Lab03 workspace. Note: only one project is active at a time. To work (Build/Run) a different project, right click on the project's name and select "Set as active project".
 - You can only use `if/else` statements for this lab assignment. You cannot use any repetition statements.
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- a. Create a new project Lab03a. Write a Java program that takes a real number, x , and calculates the result of the following function:

$$f(x) = \begin{cases} \sqrt{x^5+1}, & x > 10 \\ e^x+2, & 10 \geq x \geq 0 \\ \frac{x}{x+10}, & x < 0 \end{cases}$$

Note: `Math.sqrt(num)` calculates the square root of `num`, `Math.exp(num)` returns e^{num} and `Math.pow(num, power)` calculates `num` raised to `power`.

Sample runs:

```
> run Lab03a
Enter a real value for x: 
f(x) = 31.96
> run Lab03a
Enter a real value for x: 
f(x) = 3.00
> run Lab03a
Enter a real value for x: 
f(x) = 4.72
> run Lab03a
Enter a real value for x: 
f(x) = 498.83
> run Lab03a
Enter a real value for x: 
f(x) = 552.43
>
```

- b. Create a new project Lab03b. Your program will input three numbers and print “increasing” if they are in increasing order, “decreasing” if they are in decreasing order, and “neither” otherwise. Here, “increasing” means “strictly increasing”, with each value larger than its predecessor. The sequence 3 4 4 would not be considered increasing.

Sample runs:

```
> run Lab03b
Enter three numbers:
4.2 6 9.5
increasing
> run Lab03b
Enter three numbers:
9 2 0
decreasing
> run Lab03b
Enter three numbers:
4 4 4
neither
> run Lab03b
Enter three numbers:
9 4 6
neither
>
```

- c. Create a new project Lab03c. Your program prompts the user to enter four integers and prints “two pairs” if the input consists of two matching pairs (in some order) and “not two pairs” otherwise.

Sample runs:

```
> run Lab03c
Enter four numbers:
1 2 2 3
Not two pairs.
> run Lab03c
Enter four numbers:
3 3 3 3
Two pairs.
> run Lab03c
Enter four numbers:
2 3 3 2
Two pairs.
>
```