



## COMPUTER SCIENCE 11A (FALL, 2016) PROGRAMMING IN JAVA

### PROGRAMMING ASSIGNMENT 3

#### Overview:

This assignment tests your understanding of `printf()`, strings, `for` loops, parameters and methods that return values. **Modularity in your code is very important, YOU MUST USE STATIC METHODS.**

Write six programs to solve the following problems. Write each program in a different file with extension **.java**.

#### Problem 1

Write a program to find a baseball player's batting average. The program should ask the user to enter the number of times the player was at bat and the number of hits earned. It should then display the batting average to four decimal places.

#### Problem 2

Write a program that inputs two string variables, `first` and `last`, which the user should enter with his or her name. First, convert both strings to all lowercase. Your program should then create a new string that contains the full name in pig latin with the first letter capitalized for the first and last name. Use only the pig latin rule of moving the first letter to the end of the word and adding "ay". Output the pig latin name to the screen.

For example, if the user inputs "Antonella" for the first name and "Dilillo" for the last name, then the program should create a new string with the text "Ntonellaaay Ililloday" and print it.

#### Problem 3

Write a program that asks the user to enter an exponent. Then calculate and print 2 to the power of that exponent starting from  $2^0$  up to the user's number, inclusive. You may assume that the number entered by the user is 0 or greater than 0.

#### Problem 4

Write a program that inputs the name, quantity, and price of three items. The name should not contain spaces. Output a bill with a tax rate of 6.25%. All prices should be displayed with two decimal places. The bill should be formatted in columns with 30 characters for the name, 10 characters for the quantity, 10 characters for the price, and 10 characters for the total. Sample input and output is shown as follows:

Input name of item 1:  
**lollipops**  
 Input quantity of item 1:  
 10  
 Input price of item 1:  
 0.50  
 Input name of item 2:  
**diet\_soda**  
 Input quantity of item 2:  
 3  
 Input price of item 2:  
 1.25  
 Input name of item 3:  
**chocolate\_bar**  
 Input quantity of item 3:  
 20  
 Input price of item 3:  
 0.75

Your bill:

Item	Quantity	Price	Total
lollipops	10	0.50	5.00
diet_soda	3	1.25	3.75
chocolate_bar	20	0.75	15.00
Subtotal			23.75
6.25% sales tax			1.48
Total			25.23

## Problem 5

The factorial function is used frequently in probability problems. The factorial of a positive integer  $n$  (written  $n!$  and pronounced “ $n$  factorial”) is equal to the product of the positive integers from 1 to  $n$ . Write a program that asks for three integers, and displays the factorial of each of them. Print the result in a tabular format as shown here:

Enter the first number: 1  
 Enter the second number: 3  
 Enter the third number: 5  
 1! = 1  
 3! = 6  
 5! = 120

## Problem 6

The Fibonacci numbers are a sequence of integers in which the first two numbers are 0 and 1, and each following number is the sum of the previous two. For example, the first ten Fibonacci numbers are: 0 1 1 2 3 5 8 13 21 34

The mathematical definition of each  $k$ -th Fibonacci number is the following:

$$F_k = \begin{cases} F_{k-1} + F_{k-2}, & k > 1 \\ F_0 = 0, F_1 = 1 \end{cases}$$

Write a program that prompts the user for an integer n and then prints the first n Fibonacci numbers. The printing of the results should be happening in the main method.

### Problem 7

Write a program that prompts for two integers representing a number of rows and columns, and prints a grid of integers from 1 to (rows \* columns) in column major order.

For example, if the user enters 4 and 6, your program should produce the following output:

1	5	9	13	17	21
2	6	10	14	18	22
3	7	11	15	19	23
4	8	12	16	20	24

### Guidelines:

For this assignment you should limit yourself to the Java features covered in class so far (lecture 15).

### Grading:

You will be graded on

- **External Correctness:** The output of your program should match exactly what is expected. Programs that do not compile will not receive points for external correctness.
- **Internal Correctness:** Your source code should follow the stylistic guidelines shown in class. Also, remember to include the comment header at the beginning of your program.

### Submission:

Create a folder named PA3 containing all your java files, zip the folder, and submit it via Latte the day it is due, **Wed, Oct 5 at 6:00pm**.