

# CS101- Algorithms and Programming I

## Lab 02

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**Lab Objectives:** user input and output, String manipulation.

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For all labs in CS 101, your solutions must conform to the CS101 style guidelines (rules!)

1. If you were to go to another planet, although your mass would remain the same, your weight would change because gravity on other planets is different. If you know your weight on Earth, you can calculate your weight on another planet using that planet's surface gravity.

Write a Java program (**Lab02\_Q1\_yourLastName.java**) that inputs the weights of two people on earth and calculates and displays their corresponding weights on 4 other planets. You can calculate for any 4 planets that you choose. Store the gravity multipliers as constant values. You should display the output formatted as shown below, using `printf()`. **Do not use loops in your solution.**

Source: [sciencenotes.org](http://sciencenotes.org)

**Sample Run:**

Enter weight of first earthling(kg): **55**

Enter weight of second earthling(kg): **115**

	MERCURY	VENUS	MARS	JUPITER
EARTHLING ONE( 55.0kg)	20.9	50.1	20.9	128.7
EARTHLING TWO(115.0kg)	43.7	104.7	43.7	269.1

2. Write a Java program (**Lab02\_Q2\_yourLastName.java**) that inputs a phone number from the user that includes the country code, city/area code and the 7-digit number. Using String methods, your program should output the phone number formatted as shown below. **You should not use arrays, loops, or if statements in your solutions.** You may ONLY make the following assumptions about the phone number input:
  - The country code is enclosed in parentheses.
  - The city code is between the closing parentheses of the country code and the first dash. There may be spaces between the parentheses/dash and the city code, but only spaces. You should remove the spaces.
  - The phone number follows the dash after the city code. There will be a dash (and 0 or more spaces) between the first 3 digits and the last 4 digits.
  - There will be no spaces/characters within country code, city code, first 3 digits or last 3 digits of the phone number. Ex: "312" never "3 1 2" .

**Sample Run:**

Enter phone number: ( 90) 312- 266 - 1234

Country Code: 90

City\Area Code: 312

Phone Number: 266 - 12 34

3. Write a Java program, **Lab02\_Q3\_yourLastName.java**, that calculates and displays the nutritional requirements (daily calories and macro grams required) for a user.
- The calories required depends on the user's weight, height, and age.
  - The required number of grams for each of the macros (protein, fats, carbs) depends on the user's calorie intake per day and their goal intake for each macro. Your program should input the required information and output the data shown in the table below.

**Useful Data and Formulas:**

**Basal metabolic rate:** base number of calories burned per day.

$$\text{bmr} = 10 * \text{weight}(\text{kg}) + 6.25 * \text{height}(\text{cm}) - 5 * \text{age}(\text{years}) - 161$$

**Calorie Expenditure:** number of calories burned per day assuming light exercise.

**Physical Activity Level:** constant value of 1.4 representing light exercise.

$$\text{calories} = \text{bmr} * \text{PAL}$$

**Target percent of daily calories from Carbs:** 45%

**Target percent of daily calories from Protein:** 25%

**Target percent of daily calories from Fat:** 30%

**Calories in 1 gram of FAT:** 9 calories

**Calories in 1 gram of CARBS or PROTEIN:** 4 calories

**Sample Run:**

Enter your weight(kg), height(cm) and age: **55 160 25**

Calories Required:	1769.60
GRAMS PROTEIN:	110.60
GRAMS FAT:	58.99
GRAMS CARBS:	199.08