

Chapter 3 Assignment B

This assignment consists of a series of problems that can be solved with a computer program. Your objective is to create a program for each problem presented below. Use RubyMine to create a project that contains a source file for each problem. When finished, you will compress the project folder into a single file and submit that file within Blackboard. The assignment consists of 4 problems, each worth 25 points, for a total of 100 points possible.

Getting Started

To begin, open RubyMine and create a new project named `Asg3b`. For each problem, add a file to the project named `Asg3bEx $n$ .rb`, where n is the problem number. For example, the first problem should be represented by `Asg3bEx1.rb`. Within the file, add a comment block at the top that contains the program's name, your name, date, the course title, your instructor's name, the assignment number, the problem number, and a brief description of the program's purpose.

Below the comment header block, enter in the algorithm, which should consist of a series of steps that, when followed in the order presented, solve the problem. Each step should be a comment within the program. Once the algorithm steps exist, implement each of the steps using actual Ruby code. Run your program using a variety of inputs and make sure you get the expected results based on the data provided.

Problem 1

A physics class is conducting experiments and needs a program to calculate how long it takes a rock to hit the ground when dropped off a cliff of a particular height. The answer can be calculated using the following equation

$$t = \sqrt{\frac{2y}{a}}$$

where t is the time, y is the height of the cliff (in meters), and a is the acceleration constant (9.81 m/s²). The program should begin by asking the user for the height of the cliff, in feet.

Since the formula needs the height in meters, the program must then convert the value from feet to meters (1 meter is approximately 3.28 feet) in order to determine the time using the equation. Display the solution in a well-formatted statement. Note: Use `Math.sqrt()` in Ruby to get the square root of a number, i.e. `puts Math.sqrt(2)`

Problem 2

A family is planning a trip, and needs to find out how much gas they will need, and their fuel costs for a round trip to their destination and back home. You will take entry of the distance from their home to the destination, vehicle miles per gallon, and the cost per gallon of gas. Your program will then print out the **total round trip distance**, the **number of gallons of gas needed to make the round trip**, and the **cost of gas for the round trip**.

Problem 3

Write a program that takes a temperature in Fahrenheit and prints the Celsius equivalence. You can look up the formula to accomplish this on the Internet.

Problem 4

It is late night and as a college student we are hungry and decide to order a pizza. We want a program to figure out the best deal based on the area of the pizza. Write a program where a person enters the size of a pizza which is input as the diameter and the price. You will then return the area of the pizza using the following formula:

$$A=\pi r^2$$

Notes:

- When the size is entered it is input as the diameter, you must convert it to the radius.
- For pi(π) you can use the value **3.14**.

If you don't remember how to do this, here is a video from Khan Academy showing how to compute the area: <https://www.khanacademy.org/math/basic-geo/basic-geo-area-and-perimeter/area-circumference-circle/v/area-of-a-circle>

You will also return the price per inch squared which is computed by dividing the price of the pizza by the area.

Your output should show both the **Area** and **Price Per Inch Squared**.