
CMSC 201 Fall 2016

GRS Worksheet – Week 1 – “Cookie Jar” Algorithm

The Problem:

You have just baked a batch of cookies, and have put them in a cookie jar in the common room of the apartment you share with your three roommates. Your first roommate comes home at 11 PM and eats half the cookies. Your second roommate comes home at midnight and eats half of the remaining cookies. Your last roommate comes home at 1 AM and eats half of the remaining cookies. When you wake up in the morning, there are only three cookies left in the jar. How many cookies did you bake to begin with?

The Solution:

This is a word problem like the kind you’ve probably seen in math class. Write the mathematical solution below.

Switching it Up:

How would you change your mathematical solution if you had four roommates? How many cookies did you bake in that scenario?

What if you had three roommates, but there were two and a half cookies left in the morning? How many cookies in that case?

What you’ve been doing so far has been solving the specific problem for each scenario. But you can also create a generic solution, called an **algorithm**, which will work with any number of roommates or cookies left in the morning.

Mathematical Algorithm:

You can use variables to represent values, just like you do in math. Instead of using “x” or “y” we can use meaningful names (like “`cookiesLeft`”) in computer science. Create an equation that contains variables and can be used to solve any possible cookie jar problem.

Using Your Words:

You’ve now created a mathematical algorithm! But if we want to solve this problem using Python code, we need to be able to break it down into steps (and then we’ll turn those steps into code). Brainstorm using a whiteboard what needs to happen, and in what order. Once you’ve got an idea of what needs to happen, you can write it down here. Make sure to number your steps! The first two steps have been done for you (but they’re the easiest).

1. Ask the baker how many roommates they have, and assign the number to a variable called _____.
2. Ask the baker how many cookies were left in the morning, and assign the number to a variable called _____.