Description

For this assignment, you will modify/extend your Assignment 3 program. I encourage you to extend your own code so that you can think about how flexible your original design was, and rework it where necessary.

Copy your assignment3/ code to an assignment4/ directory in your Github repository, just to make it really clear where the new code is.

This assignment will be due **Tuesday, October 12th at midnight Pacific Time.**

The program will be extended in the following ways:

1. Two new command line arguments will be added: a skip per unit step probability, and the position of the particle source on the track. The new syntax is: **./mc1d [track length] [starting position] [absorption prob] [skip prob] [n particles]**
2. Particles will be generated from the position specified, which can be anywhere along the length of the track.
3. Particles will be able to go either direction on the track. They have a 50/50 chance to go either direction.
4. A new physics process will be added: **skipping**
    1. When a particle skips, its position gets incremented (or decremented, if going the other way) by 1, effectively skipping a unit on the track.
    2. A skip still counts as a **Hit** - so your **Hit** will need to carry information about the process that occurred. **A skip does not kill the particle!** Make sure to record the position of where the skip occurred, and not where it skipped to.
    3. You'd intuitively think to add an additional dice roll to check the skip, but be careful about how you do this, so as not to accidentally bias the result (e.g. if you do them in sequence, one after the other, the second roll depends on the failure of the first. You'll want to do something like this:

        1. Add a check on the program's input arguments: Pabs + Pskip <= 1
        2. Roll the dice once, then check the result
            1. If <= Pabs: absorbed
            2. Else If <= (Pabs + Pskip): skip
        3. Else: keep moving

5. Your output **.csv** file will now need 2 columns: the first is the position, and the second is the letter **a** if it was an absorption, or the letter **s** if it was a skip.

Deliverables

Submit your code to Github as usual, this time in the **assignment4/** directory.

Run your program with the following commands:

./mc1d 50 22 0.6 0.1 100000

./mc1d 75 6 0.01 0.7 100000

./mc1d 90 75 0.3 0.3 100000

Make plots containing absorption and skip histograms for each run, then save the images (.jpg, .png, etc) of your the **images/** directory and commit them to your repo. These should be e.g. **run1.png, run2.png, run3.png**. You do not need to save the hits.csv files that produced the histograms. Note that you should have **two** histograms in each plot, one for absorption hits, and one for skip hits.