Statistics Lab, Homework 2
Probabilistic Modeling

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Problem Description: In this project you will write a code that simulates (in a simplified way) the game of baseball. This is the first part of a multi-week project in which we will see how to build probabilistic models, how to build regression models, and how to visualize data. At the end of this project we will be able to answer the following question: "If we improve one of our player's performance by a specified amount, how many more wins can we expect on average in a season?" This question would be quite hard to answer in general, but using a probabilistic model we will be able to answer the question accurately.

This week, we will write an **R** program which simulates a single inning. Assume that the hitters on your team have the following chances of getting a hit:

1	2	3	4	5	6	7	8	9
.280	.310	.330	.270	.265	.240	.250	.220	.180

Further assume that, if a player gets a hit, there is 50% chance of it being for one base (single), a 20% chance of two bases (double), a 10% chance of 3 bases (triple) and a 20% chance of four bases (home-run). Lastly, if a runner is on first base and the next hitter hits a single, the runner on first advances to third. In each other scenario assume that a runner on base scores due to any type of hit.

Notes: Since many of you are beginning programmers and this is quite a bit harder than previous assignments, I will get you started. Your code should contain the following things. First, a while-loop so your code runs while there are fewer than 3 outs. In each iteration of the loop you should

generate random numbers to determine if the current batter got a hit and, if so, how many bases he gets (remember, if the player doesn't hit, he gets an out). Then you should check to see which runners who are currently on base score due to the at-bat and add their runs to the run total. Then you want to update which runners are on what base. The program should run in about 2 seconds or less so if it takes longer there is an error in your loop.

To turn in: Either a text-file or a picture of your code and the output you get when running it.