

## EEEC161, Applied Probability for Electrical & Computer Engineers

### Project 1

In this project, we will simulate the plinko game of the “Price is Right” played on the plinko board shown. To learn about the plinko game, go to:  
<https://priceisright.fandom.com/wiki/Plinko>

You can watch some plinko games in the Price of Right such as:  
<https://www.youtube.com/watch?v=ZisUkbR8ZkU>  
<https://www.youtube.com/watch?v=TOzeAT8gsHU>

Write a MATLAB program to estimate the probability  $p_{i,j}$  that a chip dropped in slot  $i$  at level  $t = 1$  ends in slot  $j$  at level  $t = 7$  for each  $i$  and each  $j$ . Summarize the results in a  $9 \times 9$  table with rows indexed by the slots in which chips are dropped at level  $t = 1$  at the top of the board and the columns indexed by the slots in which the chips land at level  $t = 7$  at the bottom of the board. This is done by simulating the game a large number of times. Then,  $p_{i,j}$  is the number of times a chip dropped in slot  $i$  ends up in slot  $j$  divided by the number of times the chip is dropped in slot  $i$ . For accuracy, you have to drop a chip at least 100,000 times in each slot.

Assume the following: When a chip hits a peg, it is equally probable to go to the left or to the right and in either case it falls in the first available space.

If a chip hits a wall, it has only one direction to go to and it falls in the first available space.

In particular, this means that the chip does not move horizontally.

Compute the expected win in \$ of each slot at level  $t = 1$  based on the table you generated using MATLAB. In particular, the expected win of slot  $i$  at level  $t = 1$  is  $100p_{i,1} + 500p_{i,2} + 1000p_{i,3} + 0p_{i,4} + 10000p_{i,5} + 0p_{i,6} + 1000p_{i,7} + 500p_{i,8} + 100p_{i,9}$ .