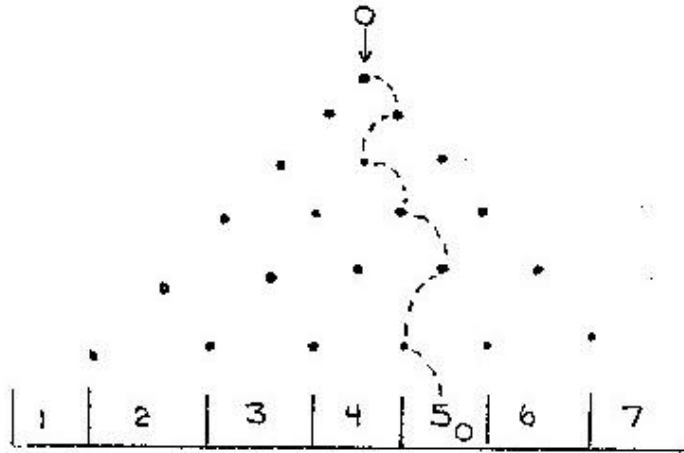# PINBALL SIMULATION

Our pinball machine has rigid (non-moving) pins on a slanted table, and pockets at the bottom.

The pinball machine drops ball in the opening indicated by the arrow. As each ball rolls down it strikes pins and bounces randomly to the left or right, finally landing in one of the pockets.

We would like to know how many balls end up in each pocket after a large number of trials. One way to ind out would be to build the pinball machine and spend days rolling balls and counting how many land in each pocket. But this would be expensive and time consuming. This is why a computer simulation is a good way to study the pinball process.

PROGRAM DEVELOPMENT

1.   The variable P for pointer will be used to describe where the ball is at any given time. That is, it points at the pocket position directly under the ball.
2.   At the beginning of the simulation, the ball would fall into pocket 4 if no pins were in the way, so we start by setting P=4.
3.   Since there are 6 levels of pins, we will need a for next loop to simulate the entire drop.
4.   At each level, the ball will hit a pin and bounce either to the left or to the right. This is a random process so we will use random numbers to decide the balls path. If the ball hits a pin we will assume it's knocked one-half pocket to either side, that is we'll assume the pins are always in the middle of the balls path.
      We set P=P+.5 or P=P-.5 depending on which direction the ball goes.
5.   When the ball finally lands in a pocket we will keep score by adding one to that pockets contents. Then we will drop the next ball. After all the balls have been dropped we will display a table of pockets and the corresponding number of balls that landed in each one.

SHOOTING GALLERY PROBLEM

A man runs a shooting gallery. He charges 25 cents for 3 shots at some clay plates which break when hit. If a person breaks 3 plates with his 3 shots he wins a prize which costs the man 1 dollar. Each broken plate costs the man 4 cents to replace. The probability that a person hits a plate on a single shot is ½. Write a program to simulate 1000 people playing the game and determine the average amount of money the man makes/loses per player.