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The main method of AI applied to the ghosts was based on the idea of having at most 4 possible choices for their movement. The approach taken to getting the direction a ghost should choose it calculated using a random number generator working within a range 0 to Z (exclusive). The range is divided up into four sections: W,X,Y,Z. Where W<X<Y<Z and X += W, Y += X, Z += Y. If the random number arrived within the ranges of 0:W (up), W:X (right), X:Y (down), Y:Z (left), that direction would be chosen.

The values of directions were weighted by an equation defined as R \* A \* (D \* V + -1 \* P \* F), where:

R = 0 or 1 based on previous direction to prevent 180s (a general feel good rule of PacMan)

A = 0 or 1 based on which of the four directions are Possible (IE. Not a wall)

D = default weight of each direction, that is to say, likelihood of any direction to be chosen without any other influence. Higher number means other values will have less an effect on it

V = -1 or 1 depending on whether the difference between the current object’s position and its target is positive or negative

P = a weighted percent of which direction should be chosen, calculated by the distance in the axis divided by the total distance away from the target

F = -1 or 1 depending on whether or not the ghost is fleeing. If the ghost is, the number is subtracted from the total for each direction, making the choice of moving away from PacMan more likely, and moving toward him less likely.

A slight variation is made to the algorithm should D be 0, resulting in the flee behavior to be impossible (D=0 works for if you know exactly where you want to go, not the other way around) but allows for far less random movement.

Scene one is classic pacman with all four ghosts behaving with different AIs. Blinky will always try to path towards Pacman (with an error of about .000001 percent to handle corner cases), so if PacMan is lower and to the left, Blinky will move either down or to the left provided those options are possible. Pinky will path around and try to get to pacMan, but will have the chance to “flank” with a decent chance to turn in other directions. Inky is similar to pinky, but with a larger chance of going in random directions, and Clyde is going to wander around nearly completely randomly.

Scene two is Ms PacMan, where all of the ghosts share the same AI, and will behave in a way similar to Pinky in the first scene.

The state machines should be easily identifiable in code. Nevertheless, here is a diagram showing most of the logic behind what each entity is capable of. One additional state within active and before a movement option of note is the “choose” state, where when the options around the ghost have changed, they can choose a direction to travel in, possibly changing the other state they are in in their movement script.

