Random walks

Before we go into the complexities of vectors and physics-based motion, let's think what it means for something to simply move around the screen. Let’s begin with one of the best-known and simplest simulations of motion—the random walk.

Imagine you are standing in the middle of a balance beam. Every ten seconds, you flip a coin. Heads, take a step forward. Tails, take a step backward. This is a random walk—a path defined as a series of random steps. Stepping off that balance beam and onto the floor, you could perform a random walk in two dimensions by flipping that same coin twice with the following results:

Flip 1	Flip 2	Result
Heads	Heads	Step forward.
Heads	Tails	Step right.
Tails	Heads	Step left.
Tails	Tails	Step backward.

Yes, this may seem like a particularly unsophisticated algorithm. Nevertheless, random walks can be used to model phenomena that occur in the real world, from the movements of molecules in a gas to the behaviour of a gambler spending a day at the casino. As for us, we begin this topic by studying a random walk with three goals in mind.