Apple Bread Challenge[1]

Challenge 1: *Due date: March 16th, 2024, 10pm (via email, in pdf format)*

A random walk on $\mathbb{Z}^2$, can be thought of as a position of particle, at time n, denoted by S_n which is defined inductively below. Let $x \in \mathbb{Z}^2, n \geq 1$.

- Let $S_0 = x$
- Suppose we have defined $S_1, S_2, \ldots S_{n-1}$.
- At time n, the particle chooses one of the four neighbours of the vertex S_{n-1} at random and moves to that neighbour which we denote by S_n.

Simulate and plot the range of the random walk on Z^2 for:

(a) $n = 10$ and $x = 0$ (origin)

(b) $n = 100$ and $x = 0$ (origin)

(c) $x = 0$ and till the first time the walk hits a point at a distance 55 from the origin.

(d) $x = (55, 0)$ and till the first time the walk hits the origin.

[1]This will be a multi-part challenge each with a specific due date. If I get a complete solution to the multi-part challenge [From 5 students] by due dates then I will bake apple bread for everyone in class who has 90% attendance.