

### Exercise 3.6.1

We model the location of the rat with a DTRW.

a) Here we have the standard model with  $p = q = \frac{1}{2}$ . Note that the ~~rat~~ rat starts in room 3.

By applying eq. (3.48) we find

$$u_3 = 1 - \frac{3}{5}.$$

Since we are interested in the complementary case, we have

$$1 - u_3 = 1 - (1 - \frac{3}{5}) = \frac{3}{5}.$$

b) In the standard model with  $p \neq q$ , eq. (3.48) yields

$$\begin{aligned} 1 - u_3 &= 1 - \left( 1 - \frac{1 - (q/p)^3}{1 - (q/p)^5} \right) \\ &= \frac{1 - (q/p)^3}{1 - (q/p)^5}. \end{aligned}$$