

**8.14)**

- a) If  $P_w$  and  $P_b$  are the probability that the champion will win if white and black respectively,  $P(g,i)$  is the probability of winning with  $g$  games and  $i$  games to win. Therefore  $P(g,i) = \text{likelihood of winning} * P(g-1,i-1) + \text{likelihood of drawing} * P(g-1,i-1/2) + \text{likelihood of losing} * P(g-1,i)$
- b) By looking at the probability of  $P_w(0,24)$ , since there are 24 games, we can determine the probability that the champion wins and retains their title
- c) Quadratic running time since  $O(g*i)$  where  $g$  is the total games and  $i$  is the required amount to win