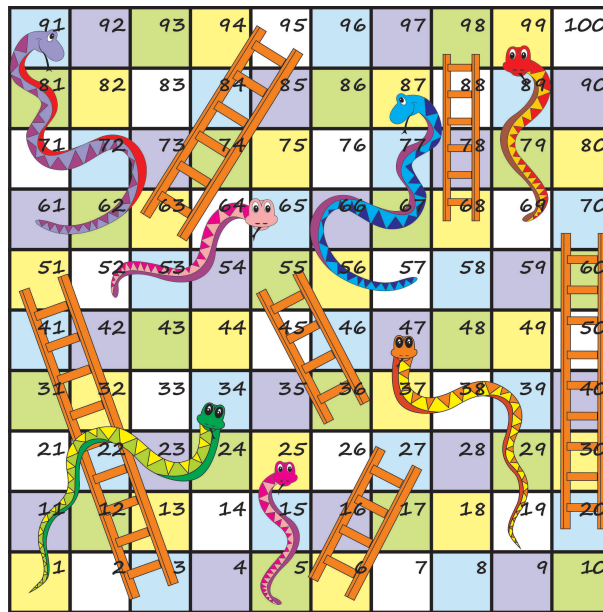


## HW5 - Snakes and Ladders

Your task is to create a PRISM DTMC model of the Snakes and Ladders game with the following board and an  $n$ -sided dice, where  $n$  is a PRISM constant, e.g. `const int n = 6;`, and the model is working correctly for all values  $n \in \{1, 2, \dots, 8\}$ .



<http://bentobits.com/wp/wp-content/uploads/2012/03/SnakeLaddersA4.jpg>

Let us simplify the rules as follows:

- There is only one player that starts at position "1" and aims to reach the position "100".
- In each turn, he rolls the  $n$ -sided dice and moves forward the obtained number of positions, following the numbers on the board.
- When he lands in the bottom of a ladder, he immediately moves to the top of the ladder, i.e. the turn landing on "20" ends on "70".
- When the player lands on the head of a snake, he immediately moves back to the snake's tail, i.e. the turn landing on "99" ends on "69".
- To finish the game, the player has to land exactly on the last square "100". If he rolls too high, he bounces off the last square and moves back, i.e. rolling a five on "98" bounces back to "97", rolling a six on "97" bounces back to "97", and rolling a five on "96" bounces back to "99" that (due to the previous item) ends on "69".

Express formulas which you use to compute:

- Expected number of tosses to finish the game.
- Probability of finishing the game without landing on a snake's head.
- Probability of finishing the game in at most 100 turns.