

STAIR CLIMBING OLYMPICS

MATH 101: DR. MONKS

INSTRUCTIONS: Write up both your answer and your complete explanation of how you obtained it for the following questions.

In the Gnome Stair Climbing Olympics, each contestant must present their own stair climbing dance from the bottom of the stairs to the top. The staircase has 20 stairs in it numbered 1 thru 20. All contestants start on stair #1 and end on stair #20.

- (a) In the first round, participants jog from the bottom of the stairs to the top. They may climb stairs one at a time or two at a time. For instance, one way they might jog from the bottom to the top is to take the sequence of steps

1, 3, 4, 5, 7, 8, 9, 11, 13, 15, 16, 17, 18, 20

How many different ways can a participant jog from the bottom to the top in this round in accordance with the rules? (*HINT: Consider shorter staircases first.*)

- (b) In the second round, the contestants must only go up or down by 1 or 2 stairs on each step, and must start at stair 1 and end at stair n , stepping on every stair exactly once. For instance, they might step on the stairs in the order:

1, 2, 3, 5, 4, 6, 8, 7, 9, 10, 11, 12, 14, 13, 15, 17, 16, 18, 19, 20

How many different ways can a participant jog from the bottom to the top in this round? (*HINT: Consider shorter staircases first.*)