Hint for Problem 52-c

What makes this part difficult is understanding how we are partitioning the paths. As an example, B_0 is the set of all paths that have no upsteps following the last absolute minimum. Can such a path have downsteps after the last absolute minimum? (The description we gave of B_0 is not succinct enough to be the answer to the second question of this part.) As another example B_1 is the set of all paths that have exactly one upstep and perhaps some downsteps after the last absolute minimum. Is it possible, though, for a path in B_1 to have any downsteps after the last absolute minimum? A path in B_2 has exactly two upsteps after its last absolute minimum. If is possible to have one downstep after the last absolute minimum, but it has to be in a special place. What place is that? Now to figure out how many parts our partition has, we need to know the maximum number of upsteps a path can have following its last absolute minimum. What is this maximum? It might help to draw some pictures with $n = 5$ or 6. In particular, is it possible that all upsteps occur after the last absolute minimum?