

DP algorithm for two-person game

Key observation: Player 1 has a winning strategy if and only if she can move to a condition where player 2 has a winning strategy (because she becomes player 2 after she moves).

Remember that each player picks a pile and then takes 1 or 2 rocks off the pile.

Hence, we should set $M[i, j]$ to 1 if and only if at least one of the following is set to 2:

- ▶ $M[i - 1, j]$
- ▶ $M[i - 2, j]$
- ▶ $M[i, j - 1]$
- ▶ $M[i, j - 2]$

Of course, you need to make sure to check if these value are out of bound or not.