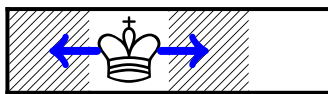


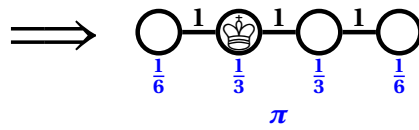
Do The Manual Calculations (Don't Try Monte Carlo)

Stage 0 (Practice boards)

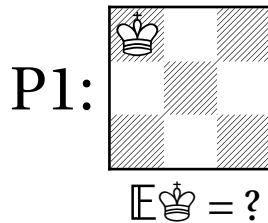
All moves reversible!



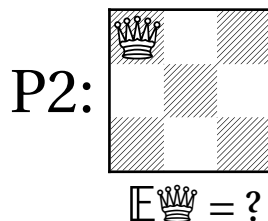
Proposals: Uniform
Acceptances: 100%



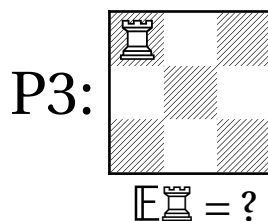
P0: Expected return: $\mathbb{E}_{\text{King}} = 3$



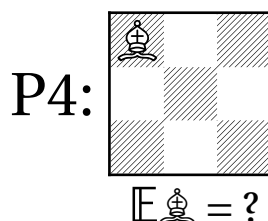
The King (♔ / ♚): moves one step horizontally or vertically (to a square with common boundary) or one step diagonally (to a square with common corner)



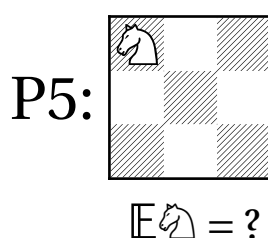
The Queen (♑ / ♙): moves a finite number of steps in the same direction, either horizontally or vertically (along a sequence of squares connected by common boundaries) or diagonally (along a sequence of squares connected by common corners)



The Rook (♖ / ♜): moves a finite number of steps in the same direction, either horizontally or vertically (along a sequence of squares connected by common boundaries)



The Bishop (♗ / ♝): moves a finite number of steps in the same direction diagonally (along a sequence of squares connected by common corners)

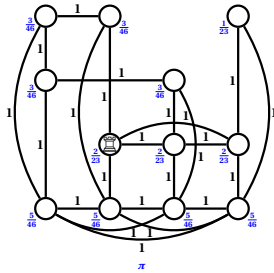
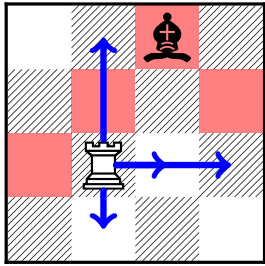


The Knight (♞ / ♟): moves two steps in the same direction horizontally or vertically and then one step in a perpendicular direction; or one step horizontally or vertically and then two steps in a perpendicular direction.

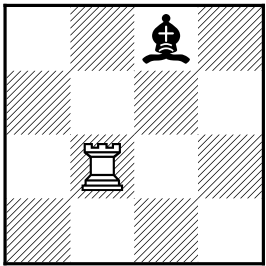
$$\{P1, P2, P3, P4, P5\} = \{6, 8, 9, \frac{28}{3}, \frac{40}{3}\}$$

Stage 1 (Simple boards)

All moves reversible (no captures)!



S1:



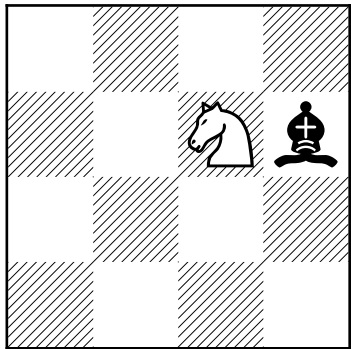
Proposals: Uniform

Acceptances: 100%

Expected return: $\mathbb{E} \text{Rook} = 11.5$

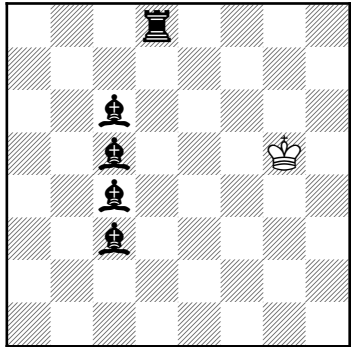
Answer format: 23/2

A:



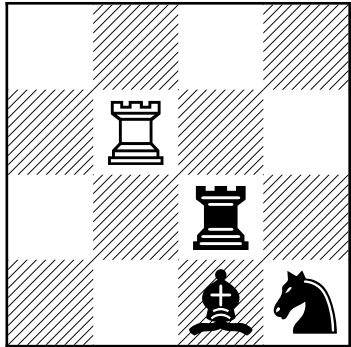
$\mathbb{E} \text{Knight} = ?$

B:



$\mathbb{E} \text{King} = ?$

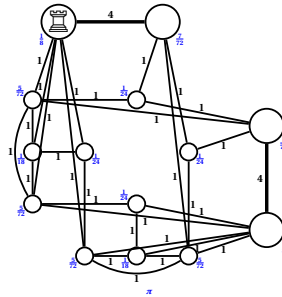
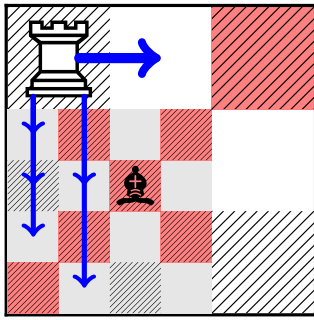
C:



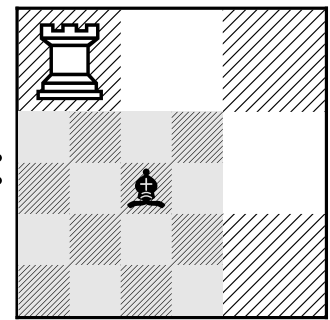
$\mathbb{E} \text{Rook} = ?$

Stage 2 (Composite boards)

All moves reversible (no captures)!



S2:



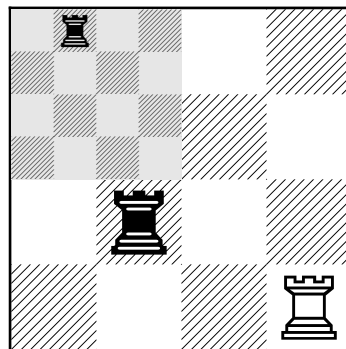
Proposals: Uniform

Expected return: $\mathbb{E}_{\text{Rook}} = 8$ (acceptances)

Acceptances: $\mathbb{P} = \min \left\{ 1, \frac{\text{Area}_{\text{end}}}{\text{Area}_{\text{start}}} \right\}$

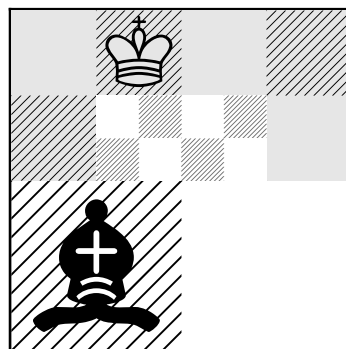
Answer format: 8/1

D:



$\mathbb{E}_{\text{Rook}} = ?$

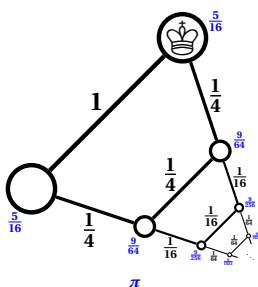
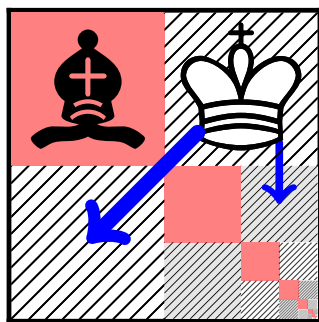
E:



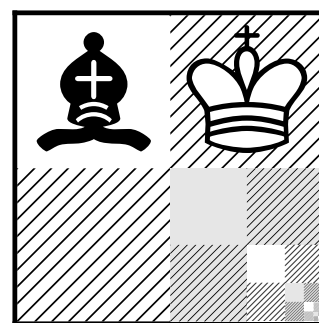
$\mathbb{E}_{\text{King}} = ?$

Stage 3 (Infinite boards)

All moves reversible (no captures)!



S3:



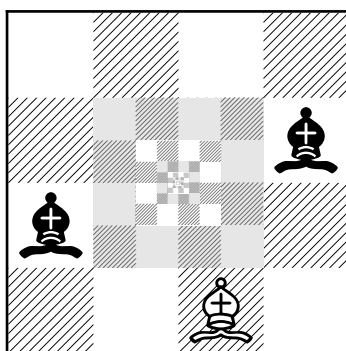
Proposals: $\mathbb{P} \propto \min \left\{ 1, \sqrt{\frac{\text{Area}_{\text{end}}}{\text{Area}_{\text{start}}}} \right\}$

Expected return: $\mathbb{E}_{\text{king}} = 3.2$ (acceptances)

Acceptances: $\mathbb{P} = \min \left\{ 1, \sqrt{\frac{\text{Area}_{\text{end}}}{\text{Area}_{\text{start}}}} \right\}$

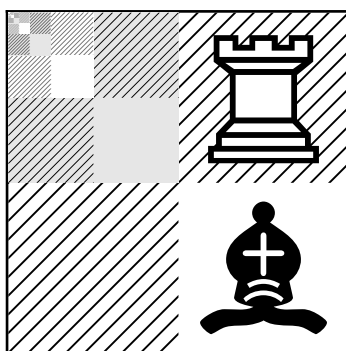
Answer format: 16/5

F:



$\mathbb{E}_{\text{king}} = ?$

G:

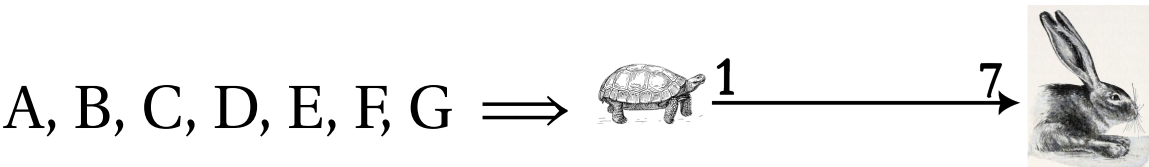


$\mathbb{E}_{\text{king}} = ?$

Intermezzo (Checker board)

[illegible]

Final Stage (Combined boards)



Proposals:

$$\mathbb{P} \propto \min \left\{ 1, \sqrt{\frac{\text{Area}_{\text{end}}}{\text{Area}_{\text{start}}}} \right\}$$

Acceptances:

$$\mathbb{P} = \min \left\{ 1, \sqrt{\frac{\text{Area}_{\text{end}}}{\text{Area}_{\text{start}}}} \right\}$$

5	7	
3	4	6
	1	2

Final stage expected returns:

