

Rock-Paper-Scissors Bots

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1 Bots

- **Bot 1** - This bot makes moves randomly regardless of opponent moves.
- **Bot 2** - This bot uses frequency analysis to make a move based on what move they made the most in previous moves.
- **Bot 3** - This bot uses a Markov chain model to predict what move they will make based on their previous moves.
- **Bot 4** - This bot is a slightly more sophisticated version than **Bot 3** as it predicts based on their opponents previous 3 moves.
- **Bot 5** - This bot uses conditional reaction to predict the opponents move based on both theirs and their opponents previous 2 moves.

2 Bots vs Bots

We will compare how the bots perform against each other in 1000 games of 11 rounds, 101 rounds, and 1001 rounds to examine how the bots begin to learn each other's techniques and to account for the different loops we may encounter.

2.1 11 Rounds

Game Wins and Losses

Bot_j vs Bot_i	Bot 1	Bot 2	Bot 3	Bot 4	Bot 5
Bot 1	443 - 557	422 - 578	418 - 582	435 - 565	402 - 598
Bot 2		425 - 575	0 - 1000	134 - 866	245 - 755
Bot 3			406 - 594	410 - 590	393 - 607
Bot 4				413 - 587	408 - 592
Bot 5					410 - 590

Win Percentage

Bot_j vs Bot_i	Bot 1	Bot 2	Bot 3	Bot 4	Bot 5
Bot 1	33.94%	33.57%	32.97%	32.89%	32.84%
Bot 2		32.82%	28.86%	30.87%	30.17%
Bot 3			12.37%	32.80%	31.28%
Bot 4				32.52%	32.40%
Bot 5					33.46%

Draw Percentage

Bot _j vs Bot _i	Bot 1	Bot 2	Bot 3	Bot 4	Bot 5
Bot 1	33.30%	33.29%	33.99%	33.83%	32.86%
Bot 2		34.30%	14.35%	23.95%	30.04%
Bot 3			75.86%	32.84%	35.42%
Bot 4				34.00%	33.81%
Bot 5					33.07%

2.2 101 Rounds

Game Wins and Losses

Bot _j vs Bot _i	Bot 1	Bot 2	Bot 3	Bot 4	Bot 5
Bot 1	476 - 524	467 - 533	472 - 528	483 - 517	466 - 534
Bot 2		483 - 517	0 - 1000	0 - 1000	0 - 1000
Bot 3			443 - 557	0 - 1000	65 - 935
Bot 4				457 - 543	418 - 582
Bot 5					460 - 540

Win Percentage

Bot _j vs Bot _i	Bot 1	Bot 2	Bot 3	Bot 4	Bot 5
Bot 1	33.26%	33.21%	33.28%	33.34%	33.37%
Bot 2		34.37%	22.54%	23.59%	23.25%
Bot 3			1.29%	11.25%	27.29%
Bot 4				34.43%	30.61%
Bot 5					33.10%

Draw Percentage

Bot _j vs Bot _i	Bot 1	Bot 2	Bot 3	Bot 4	Bot 5
Bot 1	33.87%	33.64%	33.70%	33.76%	33.82%
Bot 2		33.25%	45.80%	45.35%	45.46%
Bot 3			21.04%	47.08%	36.78%
Bot 4				33.38%	36.13%
Bot 5					34.73%

2.3 1001 Rounds

Win Loss	Bot _j vs Bot _i	Bot 1	Bot 2	Bot 3	Bot 4	Bot 5	Win Per-
	Bot 1	499 - 501	497 - 503	511 - 489	477 - 523	496 - 504	
	Bot 2		310 - 690	0 - 1000	0 - 1000	0 - 1000	
	Bot 3			398 - 602	0 - 1000	1 - 999	
	Bot 4				504 - 496	356 - 644	
	Bot 5					498 - 502	
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Bot _j vs Bot _i	Bot 1	Bot 2	Bot 3	Bot 4	Bot 5
Bot 1	33.34%	33.35%	33.34%	33.36%	33.37%
Bot 2		31.90%	22.16%	22.57%	20.82%
Bot 3			0.13%	2.22%	17.63%
Bot 4				37.75%	32.37%
Bot 5					33.47%

Draw Percentage

Bot_j vs Bot_i	Bot 1	Bot 2	Bot 3	Bot 4	Bot 5
Bot 1	33.30%	33.36%	33.36%	33.29%	33.32%
Bot 2		36.10%	0.25%	0.58%	2.04%
Bot 3			99.73%	4.22%	20.05%
Bot 4				24.54%	33.98%
Bot 5					33.09%