ACM-ICPC Live Archive

2556 Four quarters

Four Quarters is a game of chance played with, well, four quarters. Two people, called A and B, each flip two quarters each round. They each gain or lose points each round based on the following tables:

		Player B		
		HH	HT	TT
Player A	HH	1	1	2
	HT	0	0	1
	TT	-1	0	0

Player A's payoff

		Player B		
		HH	HT	TT
Player A	HH	0	-1	-1
	HT	1	0	0
	TT	2	0	-1

Player B's payoff

There is no difference between Heads/Tails and Tails/Heads. As you can see, the odds are stacked in Player A's favor. At the beginning of the game, each player has 0 points, and points accumulate as the game progresses. At the end of the game, whichever player has the most points wins.

You must write a program that determines the probability that Player A will win, Player B will win, or they will tie, after a certain number of rounds. Assume that the coins are fair, i.e. that heads and tails are equally likely.

Input

There is no input file for this problem.

Output

Output a table that lists the probability that Player A will win, B will win, or they will tie, after each round for 1 to 20 rounds. The output for rounds 1 through 3 is given below.

Probabilities must be expressed as a percent, with 4 places after the decimal.

Sample Input

There is no sample input for this problem.

Sample Output

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Round   A wins     B wins     Tie
    1   43.7500%   18.7500%   37.5000%
    2   56.6406%   22.2656%   21.0938%
    3   62.3535%   22.7051%   14.9414%
```