

4. [5 points] Suppose one plays a lottery in which a fair coin is tossed, and one's payoff increases with the number of times "heads" ("H") comes up before the first "tail" ("T") is tossed, at which point the game ends. Use Table 1 to argue that most people do not use "expected value" to value a lottery, but they might use "expected utility" to value a lottery.

#H before first T	Prob.	payoff	Prob. * payoff	$\sqrt{\text{payoff}}$	Prob. * $\sqrt{\text{payoff}}$
0	1/2	2	1	1.41	0.71
1	1/4	4	1	2.00	0.50
2	1/8	8	1	2.83	0.35
3	1/16	16	1	4.00	0.25
4	1/32	32	1	5.66	0.18
5	1/64	64	1	8.00	0.13
⋮	⋮	⋮	⋮	⋮	⋮
column's sum			infinity		$1 + \sqrt{2} \approx 2.41$

Table 1.