Probability and Computing - HW1

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1 Problem1

Deduce the expected run time of Quick-Sort, using conditional expectation.

2 Problem2

Why does the probability that the second door hides a car changes after Monty Hall opens the third door? An intuitive interpretation is preferred.

3 Problem3

The proof of Jensen's Inequality in the text book assumes that the convex function f is twice differentiable. Present a convex function that is not differentiable, and show that Jensen's Inequality holds even if the convex function is not differentiable. Only discrete probability is considered.

4 Problem4

Do Bernoulli experiment for 20 trials, using a new 1-Yuan coin. Send the result to advanced_algorithm@163.com in a string $s_1 s_2 \cdots s_i \cdots s_{20}$, where s_i is 1 if the i^{th} trial gets Head, and otherwise is 0.

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