

Due Oct 24, 25, 26

COURSE WEBSITE: "<http://www.cs.umd.edu/gasarch/652/652.html>"

1. (50 points) Let X and Y be random variables. Prove the following:

(a) $E(X + Y) = E(X) + E(Y)$

(b) Markov's Inequality: If X is non-negative $Pr(|X| \geq a) \leq \frac{E(|X|)}{a}$

(c) Chebychev's inequality.

WARNING- you may be asked to apply these to coin problems.

2. (50 points)

(a) Prove Chernoff's Bound (Look up Wikipedia 'Chernoff bounds')

(b) BPP is usually defined with prob of error $\leq 1/4$. Show that this is equivalent to prob of error $\leq 1/2^n$.

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