Quiz: Heavy Hitters
Practice Quiz, 5 questions

4/5 points (80.00%)

✓ **Congratulations! You passed!**

Next Item

✓   1 / 1
point

1.

What is the set of top 2 most frequent items in the following stream?

$$1\ 2\ 5\ 3\ 1\ 1\ 2\ 4\ 4\ 3\ 3\ 3$$

○   1 3

Correct
That's right!

○   1 2

○   4 5

✓   1 / 1
point

2.

Suppose that we would like to use Chebyshev's inequality to bound $\mathrm{Prob}[|X| \geq 3]$, where X is a normally distributed random variable with unit variance. Chevyshev's inequality gives

○   Chebyshev's inequality does not apply to this setting

○ $\mathrm{Prob}[|X| \geq 3] \leq 1/9$

Correct
That's right!

○ $\mathrm{Prob}[|X| \geq 3] \leq 1/3$

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1 / 1 point

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3.

Suppose that we would like to use Chebyshev's inequality to bound $\mathrm{Prob}[|X| \geq 3]$, where X is a random variable with the Cauchy distribution, i.e. the p.d.f. of X is $\frac{1}{\pi(1+x^2)}$. ~~Chevyshev's inequality gives~~

○ $\mathrm{Prob}[|X| \geq 3] \leq 1/9$

◉   Chebyshev's inequality does not apply to this setting

▲

Correct

Exactly! Chebyshev's inequality does not apply to this setting, as X does not have a finite variance.

○ $\mathrm{Prob}[|X| \geq 3] \leq 1/3$

---

1 / 1 point

4.

Suppose that the stream contains items 1 with frequency N^α for a constant $\alpha < 1/2$, and all other elements appear in the stream exactly once. How much space suffices for CountSketch to find the most frequent element in this stream?

○ $O(n^\alpha \log n)$

◉ $O(n^{1-2\alpha} \log n)$

▲

Correct

That's right! This is because $\sum_{i \in TAIL} f_i^2 \leq N$, and $f_1^2 = n^{2\alpha}$. So $b = O(n^{1-2\alpha})$ suffices.
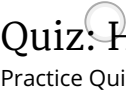
○ $O(n^{1-4\alpha^2} \log n)$

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0 / 1 point

5.

Suppose that we would like to use Markov's inequality to bound $\mathrm{Prob}[X \geq 3]$, where X is a normally distributed random variable with unit variance. Markov's inequality gives

○ $\mathrm{Prob}[X \geq 3] \leq 1/9$

◉ $\mathrm{Prob}[X \geq 3] \leq 1/3$

▲

This should not be selected

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Markov's inequality does not apply to this setting

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