Congratulations! You passed!
TO PASS 80% or higher

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GRADE
100%

Quiz: Heavy Hitters

TOTAL POINTS 5

1. What is the set of top 2 most frequent items in the following stream? 1 / 1 point

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

- ○ 1 2
- ○ 4 5
- ◉ 1 3

✓ Correct
That's right!

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2. Suppose that we would like to use Chebyshev's inequality to bound $\text{Prob}[|X| \geq 3]$, where X is a normally distributed random variable with unit variance. Chevyshev's inequality gives 1 / 1 point

- ○ $\text{Prob}[|X| \geq 3] \leq 1/3$
- ◉ $\text{Prob}[|X| \geq 3] \leq 1/9$
- ○ Chebyshev's inequality does not apply to this setting

✓ Correct
That's right!

3. Suppose that we would like to use Chebyshev's inequality to bound $\text{Prob}[|X| \geq 3]$, 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 1 / 1 point

- ○ $\text{Prob}[|X| \geq 3] \leq 1/9$
- ○ $\text{Prob}[|X| \geq 3] \leq 1/3$
- ◉ Chebyshev's inequality does not apply to this setting

Quiz: Heavy Hitters

Practice Quiz • 50 min

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?

1 / 1 point

- (●) $O(n^{1-2\alpha}\log n)$
- ( ) $O(n^{\alpha}\log n)$
- ( ) $O(n^{1-4\alpha^2}\log n)$

✓ **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.

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

1 / 1 point

- ( ) $\text{Prob}[X \geq 3] \leq 1/9$
- ( ) $\text{Prob}[X \geq 3] \leq 1/3$
- (●) Markov's inequality does not apply to this setting