Lecture 12.2

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The median problem considers m distinct items in a vanilla model stream. The rank of an item is $1 +$ the number of items smaller than that item.
The median of σ is an item of rank $\left\lfloor \frac{m+1}{2} \right\rfloor$ or $\left\lceil \frac{m+1}{2} \right\rceil$. ***Note that, in this definition, there can be two medians!***

An approximate median has a rank close to the rank of the median. More formally, an ϵ-approximate median is an item a_i with $\left\lfloor \left(\frac{1}{2} - \epsilon\right)(m+1) \right\rfloor \leq rank(a_i) \leq \left\lceil \left(\frac{1}{2} + \epsilon\right)(m+1) \right\rceil$. This means that the error in the rank is at most $\epsilon(m+1)$.