Turnstile Streaming

- Initialize $x \leftarrow 0 \in \mathbb{R}^n$

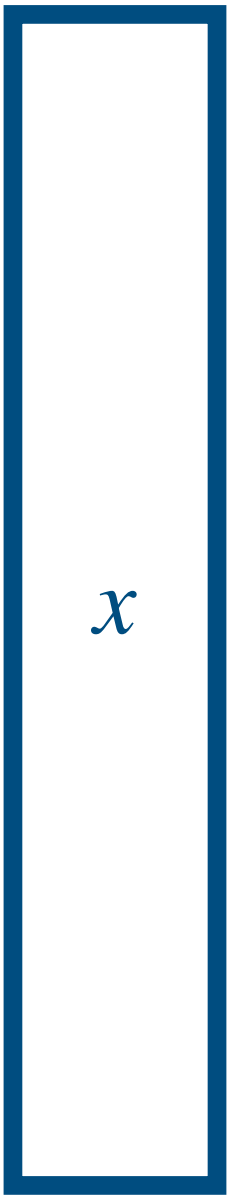
- On update (i, Δ) :

- Set $x[i] \leftarrow x[i] + \Delta$

- Answer queries about x using **small space**

- $\max_i |x[i]|$

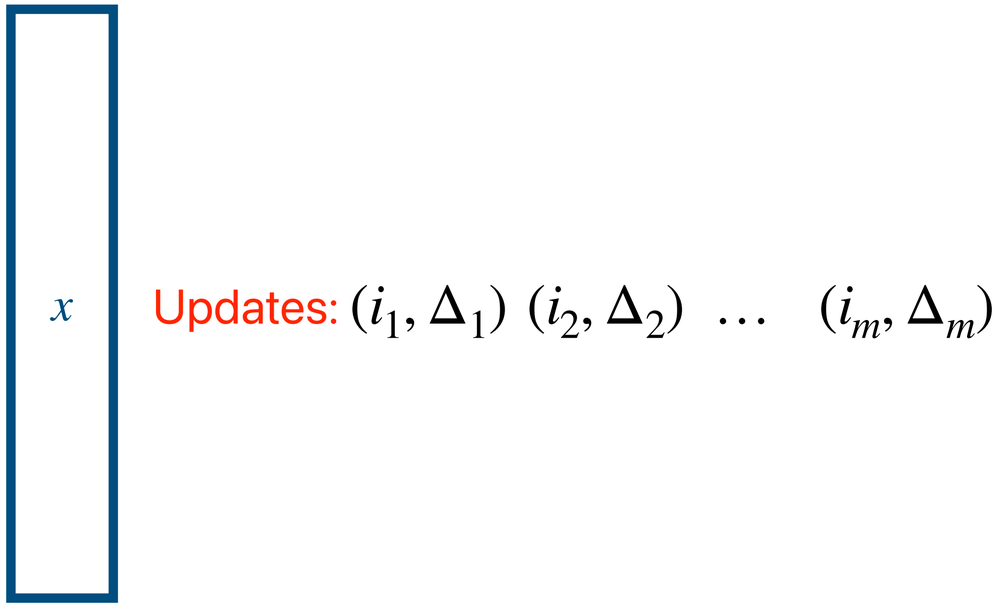
- $\sum_i |x[i]|^p$ (F_p moments)


x

Updates: $(i_1, \Delta_1)\ (i_2, \Delta_2)\ \ \ldots\ \ (i_m, \Delta_m)$

Turnstile Streaming

- Initialize $x \leftarrow 0 \in \mathbb{R}^n$
- On update (i, Δ) :
  - Set $x[i] \leftarrow x[i] + \Delta$
- Answer queries about x using **small space**
  - $\max_i |x[i]|$
  - $\sum_i |x[i]|^p$ (F_p moments)



How is Sketching Useful?

Turnstile Streaming