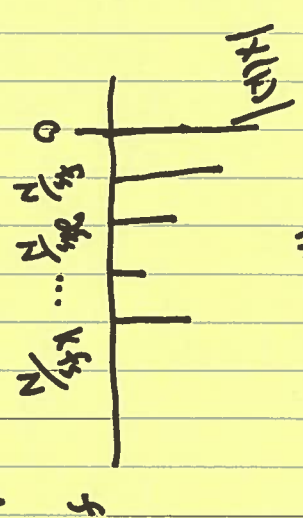


$$X(k) = \sum_{n=0}^{N-1} x(n) e^{-j2\pi kn/N}$$



(1) reduce the number of multiply/adds
 Reason: $O(N^2)$ } saves!

(2) how to compute in fixed point
 why?
 less precise less cost

why is fixed point a challenge?

multiply 2 4 bit numbers \rightarrow 8 bits
 is $x(n)$ range limited? for 16-bit
 data, $x(n) \in [-32767, 32767]$

$$e^{ix} \Rightarrow |e^{ix}| = 1$$

fixed point performance is good!