

Exam 2 Day



Numerical Algorithm

Polynomial Evaluation &
Brute Force Horner's
Method.

$$p(x) = a_n x^n + a_{n-1} x^{n-1} +$$

$$a_{n-2} x^{n-2} + \dots + a_1 x^1$$

$\Theta(n^2)$ + a_0
AKA $(n(n+1))/2$

i	mult	add
0	0	1
1	1	1
2	2	1
...
n	n	1

evaluate(double a[], double x)
sum = 0

for i = 0 to n
sum += a[i] *
pow(x, i)

n+1
column

Shortcut: Binary Composition

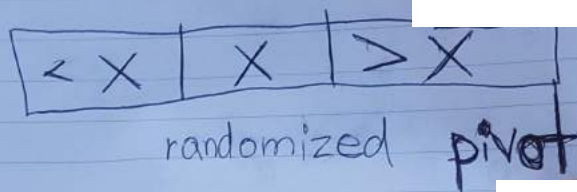
$$x(a_n x^{n-2} + a_{n-1} x^{n-3} + \dots + a_2)$$

$$+ a_1$$

$$\Rightarrow \dots + x(x(x(a_n x + a_{n-1}) + a_{n-2} + a_{n-3}))$$

Randomization

Quick Sort



$$A^{m \times n} \otimes \text{BIG} B^{n \times p} \stackrel{?}{=} C^{m \times p}$$

$m \times n \times p$
BIG

we randomly have certain amount of cells
(% PROBABLE RANGE)

C

Fermat.

$$x^{n-1} \equiv 1 \pmod{n}$$

n is prime

iff $x^{n-1} \equiv 1 \pmod{n}$
for all x .