

Analysis of Algorithms - CS 323

Lecture #12 - May 4, 2016

Notes by: Amir Gul

Exam Second

Second Exam 5/4/2016
Numerical Algorithm
Polynomial Evaluation

Brute - Force

$$P(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x^1 + a_0$$

input ↓

Evaluate (double a[], double x)

Sum = 0

for i = 0 to n

Sum += a[i] * pow(x, i)

i	mult	add
0	1	1
1	1	1
2	2	1
3	3	1
⋮	⋮	⋮
n	n	1
$\frac{n(n+1)}{2}$		n+1

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

$$\underbrace{x(a_n x^{n-2} + a_{n-1} x^{n-3} + \dots + a_2) + a_1}_{x(a_n x^{n-1} + a_{n-1} x^{n-2} + \dots + a_1 x^0) + a_0}$$

Randomized Algorithm

Back to chapter 7:- QuickSort

< x	x	> x
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Randomized pivot $m \times n \times p$

② Matrix $A^{m \times n}$ $B^{n \times p}$ $\stackrel{?}{=} C^{m \times p}$ $\nearrow c()$
is a good way to verify something

③ $x^{n-1} \equiv 1 \pmod n$
 n is prime
iff $x^{n-1} \equiv 1 \pmod n$
for all x