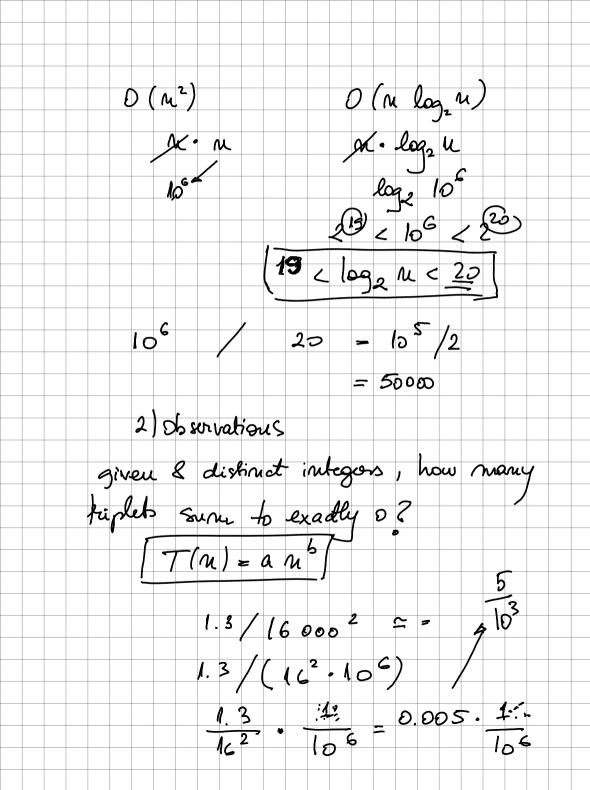
I.) Introduction opacheal heavou: avoid performance mugs eg: (FFT): from 0 (n2) - 20(n/00 m) enobled new technologie (DVD, JPGG, MKi. W- body simulation 0(m²) - 0 (m/og m) simulate gravitational interactions among a bodies Scientific method observe o by pothesize o predict o verify o validate



lg (T(X)) = b. lg x1+c => T(N) = a · X1 , where [a = 29] log 2 T(N) = 6 · log N + C 2 b. log2 X/+C = T(X) 25. (092 H 2 = 7(N) (2 log2 X/) b. 2 c = T(X/) Mb. a - 7(x1) => T(X) = a Nb) (1) Hathematical Hodels Total hunning time: sum of lost & figurary for all operations * Sking concatenation in Jave is not constant time but O(c.4) -0 O(4) Cost model ! use some basic operation as a pary for running time

• doop mon-dominant torms

•
$$f(X) \sim g(X) - \frac{1}{2} \lim_{X \to \infty} \frac{f(X)}{g(X)} = 1$$

• drop constants

(\frac{X}{3}) = \frac{X}{2} (\frac{X}{2} - \frac{X}{2}) \frac{X}{6} \frac{1}{3} \frac{1}{6} \frac{1}{3} \frac{1}{2} \frac

eg) for (i from o to m)

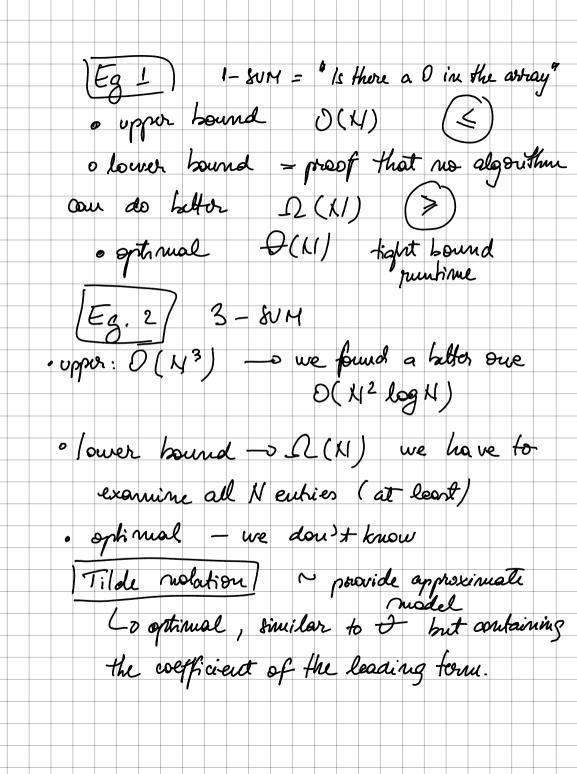
for (j from i+1 to m)

for (k from 0 to m, dep ::)

k=k*2 [1+2+...+(N-1)]/gN $= \left| \frac{(h-1)h}{2} \right| \frac{1}{g} \times \left| \frac{1}{g} \right| \times \left| \frac{1}{g} \right| = 3$ => 0 (3 17 lg /); \ \ TV) Order-of-Growth Classifications · small set of functions 1, log N, N, N. W. log N, N2, K/3, 2, N/ · Il log II = linearithmic (*) Binary search: mathematical analy sis

o bimary scarde uses at most 1+/g N compares to sourch in a sorted array of XI size · T(N) = # compare to binary search in a sorted subarray of size < x o sinary son ch recurrence T(X1) < T(X/2)+1 for NS1 splitting in half T(1)=1 $T(N) \in T(XI/2) + L$ < T(X1/4) +1 +1 < T(N/8) +1+1+1 < T(X/N)+4+1+1...+1 = 1 + /2 \/ => we can develop a N2 (og N algorithm for the 3- Sury problem

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