

Today's agenda b Ispoine b Sieve of eratosthenes b Smallest Poine factor of all numbers 1 ton b factors for multiple queries co-Poine
Å AlgoPrep



a) istoine
4 Check whether a given number is Poime 00 not.
N=10; Not Prime
N=7: Poime
llidea
-> Count of Jactors == 2 -> Poime no.
: i → 1 to fr → T.c: o(170)
2
W:100 DID
Lxioo
2 r 50
20×5
<u>25 y 4</u>
50 x 2
100 x 1



	6 Point all Poimes from 1-N.
	En: M:10: 2 3 5 7
An .	
llidea	6 iterate from 2 to 1 and for every number the
	istoime().
0	
	7.e: o(~A) S.c:o()
	AIGOPICO



11idea2 -> [] > Poinc -> tace N=SO Not Prime > falle 2 3 4 5 6 7 8 9 10 12 14 15 16 17 18 19 20 12 23 24 25 26 27 28 29 30 22 33 34 35 34 37 38 39 40 42 43 44 45 46 41 48 49 50 N:50 -> J50:7 2*2 3*2 243 3*3 344 244 2+5 3+5 4+5 5*5 2#6 546 (247 547 1



void	allformes (int N) (
	boolean [] P: new boolean [N+1];
	Aways. fill (P, toue);
	P[o]: P[1]: palse;
7.CI O(nloglogn)=o(n)	iricen
s-c: o(h)	for (i=29 icen; i++)(
	if (Pli]== toue? (for lind j: 200; jein; jein) {
	P[j]: false;
	3
	3
	3
	Hamilton to the second
	for lint ins i en it) { if (Pli):= true) { Print (i); }
3	



boolean [] P: new boolean [m.];	
Acrays. fill (P, toue);	→ [] → Poine → true
P[o]: P[1] = false;	M->Not Prime -> falle
* * · · · · · · · · · · · · · · · · · ·	∑
	14 15 16 19 19 20 19 19 19 19 19 19 19 19 19 19 19 19 19
jos lint j: 2000 jen; jen)	1 21 26 27 28 19 30
	35 34 37 38 33 40
	14 14 14 14 14 15 10 14 14 14 14 14 14 14 14 14 14 14 14 14
3	14 45 46 41 48 49 50
3	
13	
for lind int icen; it) (if (Pli):= true) (Prind (i); }	Prep
T.C: $\frac{2}{2} + \frac{2}{3} + \frac{2}{5} + \frac{2}{7}$	• • • •
$\frac{N\left(\frac{1}{2}+\frac{1}{3}+\frac{1}{5}+\frac{1}{4}\right)}{N\left(\frac{1}{2}+\frac{1}{3}+\frac{1}{5}+\frac{1}{4}\right)}$	logn
2+3+5+	
U) Conve	igence / divergence
= N loglogn =N	10 ⁹ = 2 ³ °
N:109 -> loglogn: log loglogis	2 log202 = 5



Q) Smalleli	Poime	Lactors								
Q) Smallel1	la lind	Smallest	Prime	lac	tor	lore	alı	numl	ers 1	+N.
	<i>b</i>	Oncodes	101111	b				/ (curre		
N=10		2								
	-7	2	3 2	5	2	7	2	3	2	
			7	V'C	2					
	2 2				3	[a]				
		. .	.							
	2 12	14 15	7		19	2				
PIT	12 13	। । । इ	16	18	19	10				
2	2	10.5		2 2		2				
21	23	24 25	22 2		29	20				
21	12 23	24 23	26	14 28	25	30				
	2 3		2		3	2				
31	22 33	2 2 2 2 3 3 3 3 3 3 5	36 3	38	39	40				
पा	प्रत्र प	3 44 45	पर्छ ।		1	40				
41	42 Y	3 44 45	46	41 48	49	30				

119 Suedo Code

ind [] Smollest Pointegood ind N) {
int [] SPJ = new int [n+1];
SP[6]: SP[17:-1;
SPLJJ= min (sPLJ);
Altum SPJ9
T.c: Olneoglogn) S.c: O(N)



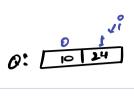
a) Poime jactors jor multiple quesies
4 Given ~ and multiple queries of integers
in the hange 1-N, you have to Poime Joctobie Jos
every query.
Q: 10 → 2 5
24 → 2 2 2 3
Nideal
to Check for Poince factors for every query.
T·c: 0(fi * 8)
C. Olivina de la companya del companya de la companya del companya de la companya

11idea2	N:50
	10 -> 25
	24 → 2 2 2 2
11 12 12 14 15 16 17 18 19 19 19 19 19 19 19 19 19 19 19 19 19	2 24
	2 12
31 22 23 23 23 23 23 23 29 40	2 6
43 44 45 46 47 48 49 50	3 3

119suedo Code

Noid	Prime Jackorization (int N, int [] R) { int [] SPJ = Smallest Prime Jackor (N);
	Jos (ind i=0; i<0.length; i+1) { int n = a (i); Print (sp. in); n = n/sp. in); System.our.print(n(); }

T·c: O(Nloglogn) + O(QHlogn) S·c: O(N)





or line 1=0; 1< 0. length; 1+1) \	
While (>> 1) {	
Point (SPIN);	1 12 23 1 1 1 1 2 2 2 2 3 2 3 2 3 3 2 3 3 3 3
	31 22 27 27 28 27 28 29 40 31 22 33 34 37 38 39 40
System.out.poinfln();	대 년 대 대 대 대 대 대 대 대 대 대 대 대 대 대 대 대 대 대
	N=2/A/EB3 L
2 5 2 2 3	oPrep
	int = a (i]; while (=> 1) { Point (septen); an = an/septen]; System.our.pointln();



Co-Poime
4 Two number (a,6) is a co-Pointe if gcd(o,6)=1.
- A Co-Poine
en: (2,3) = 1
(5,7) -> co-Paine
(7,20) -> Co-Poine
(9, 10) -> Co-Prine
(9, 10) -> Co-Prine
MALAGOPIAN

