Class 09

Wednesday, March 30, 2022 9:10 PM

Q = 1

[0 ~ 4] → 0

[5 ~ 9] → 1

[10 ~ 14] → 2

[15 ~ 19] → 3

[20 ~ 24] → 4

[25 ~ 29] → 6

N	N!	notz(N!)
0	1	0
1	1	0
2	2	0
3	6	0
4	24	0
5	120	1
6	720	1
7	5040	1
8	40320	1
9	362880	1
10	3628800	2

Q = 13

$N = [55 \sim 55]$ $N_c = 55$

$2^{x_1} \cdot 3^{x_2} \cdot 5^{x_3} \cdot 7^{x_4} \cdot 11^{x_5} \ldots\ldots$

1328000

$2^{x_1} \cdot 5^{x_2}$

1328×1000

$1328 \times 10^3 \rightarrow 1328 \times (2 \times 5)^3$

$2^3 \times 5^3$

$5! = 1 \times 2 \times 3 \times 4 \times 5$

$6! = 1 \times 2 \times 3 \times 4 \times 5 \times 6$

$2^3 \times 5^1$ $\quad 2^{x_1} \times 5^{x_2}$

$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10$

$N!$ এর prime factorization এ কতগুলো p আছে?

$$count(p, N) = \left\lfloor \frac{N}{p} \right\rfloor + \left\lfloor \frac{N}{p^2} \right\rfloor + \left\lfloor \frac{N}{p^3} \right\rfloor + \cdots + \left\lfloor \frac{N}{p^k} \right\rfloor \to 0$$

$$count(5, 55) = \left\lfloor \frac{55}{5} \right\rfloor + \left\lfloor \frac{55}{25} \right\rfloor + \left\lfloor \frac{55}{125} \right\rfloor$$

$$= 11 + 2 + 0 = 13$$

$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 \times 11 \times 12 \times 13 \times 14 \times 15 \times 16 \times 17 \times 18 \times 19 \times 20$

2^{18}

$$\left\lfloor \frac{20}{2} \right\rfloor + \left\lfloor \frac{20}{4} \right\rfloor + \left\lfloor \frac{20}{8} \right\rfloor + \left\lfloor \frac{20}{16} \right\rfloor$$

(10) (5) (2) (1)

$n=3, k=4$

1 2 2 3 3 4 4 5 6 6 7 8 8 9 10 10 11

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

$f(16,3) = 16 - \left\lfloor \frac{16}{3} \right\rfloor = 11$

$k=10$

$k=14-4$

$k=11$

$[1,16] \to 8$

$[1,8] \to 4$

$[5,8] \to 6$

$8 - \left\lfloor \frac{8}{3} \right\rfloor$

$8-2=6$

$f(x,n) = x - \left\lfloor \frac{x}{n} \right\rfloor$

$6 - \left\lfloor \frac{6}{3} \right\rfloor = 6-2=4$

$f(14,3) = 14 - \left\lfloor \frac{14}{3} \right\rfloor = 14-4=10$

2, 2, 2, 5

$f(x,n)$

$f(x,n)$ ⇔ n

11

$f(x) = x - p^2 = 0$ $\quad y = \sqrt{x}$

$f(p) = x - p^2 = 0$ $\quad -2p$

$p = \sqrt{x}$

$x = 10$

$f(p) = 25 - p^2 = 0$

$= 25 - (5)^2$

$= 25 - 25$

$= 0$

$x_{n+1} = x_n - \dfrac{f(x)}{f'(x)}$

$10 - \dfrac{10 - (10)^2}{\quad}$

~~$f(x)$~~ $= x_n + \dfrac{N - (x_n)^2}{2x_n}$