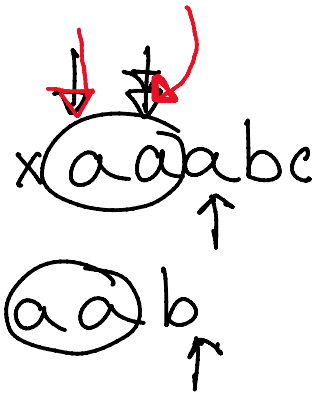
Class 07

Saturday, January 23, 2021 10:00 PM

$S_1 \rightarrow$

$S_2 \rightarrow$



$S_1 \rightarrow$ a b c d e

$S_2 \rightarrow$ c d

— o —

Complexity Analysis

i) Time

ii) Memory

— o —

Time Complexity Analysis

💡: 1 sec এ 10^8 সংখ্যক instruction execute করতে পারে।

$O(n)$

$f(n) = n$

$O(f(n)) = O(n)$

$O(f(n)) = O(n$

$O(n^2) \Rightarrow O(f(n)) \Rightarrow O(n^2)$

$f(n) = n^2$

$n = 16$

$1, 2, 4, 8, 16, 32, \ldots\ldots, 2^x$

$0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad x$

$2^x = n \Rightarrow 2^x = 16$

$\Rightarrow \log_2(2^x) = \log_2(n) \quad \therefore x = 4$

$\Rightarrow x \cdot \log_2(2) = \log_2(n)$

$\Rightarrow \boxed{x = \log_2(n)}$

—o—

$O(N \cdot \log_2 N)$

$(|S_1| - |S_2|)|S_2|$

$\rightarrow |S_1||S_2| - |S_2|^2$

$$\Rightarrow |S_1||S_2| \left\{ - |S_2|^2 \right.$$

$$\Rightarrow |S_1|\,|S_2|$$

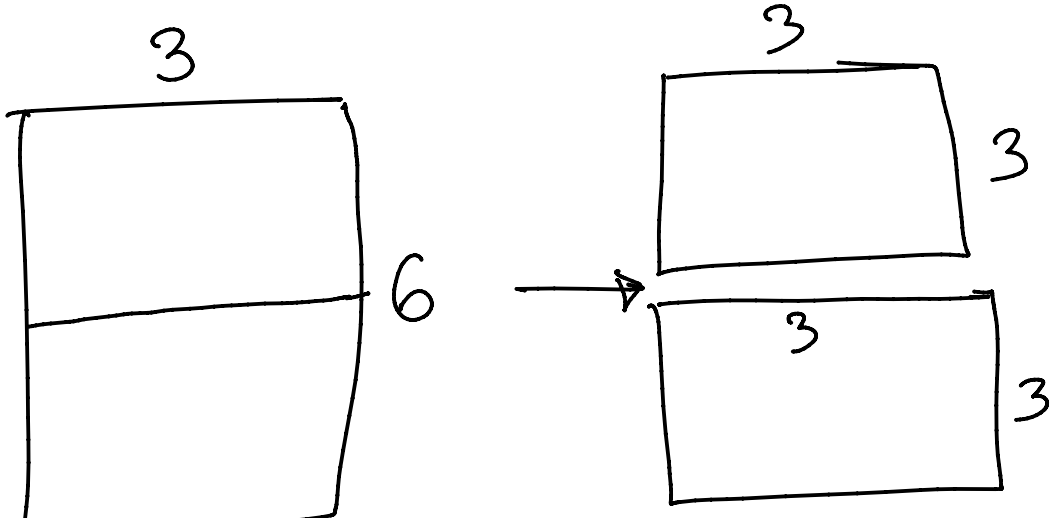
—o—

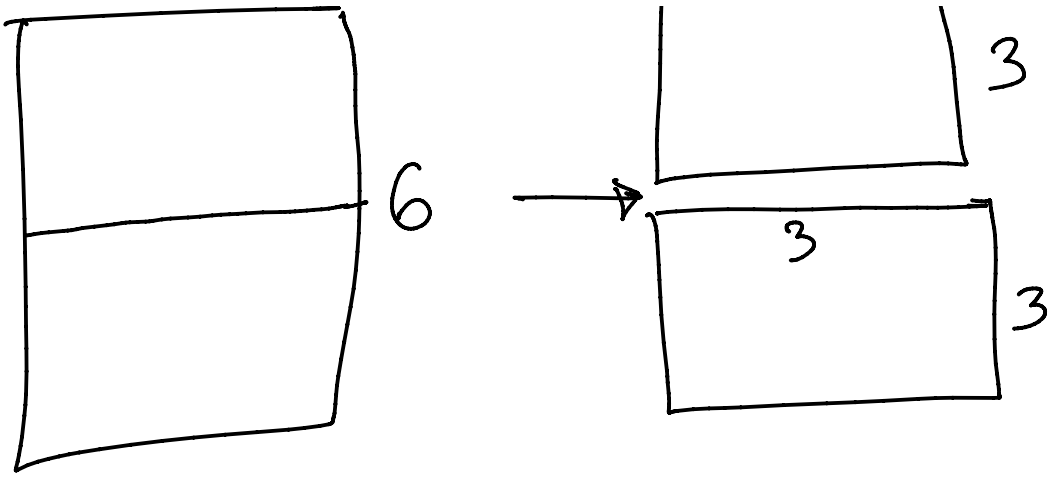
10^8 ——— 1 s

$\therefore$ 1 ——— $\frac{1}{10^8}$ s

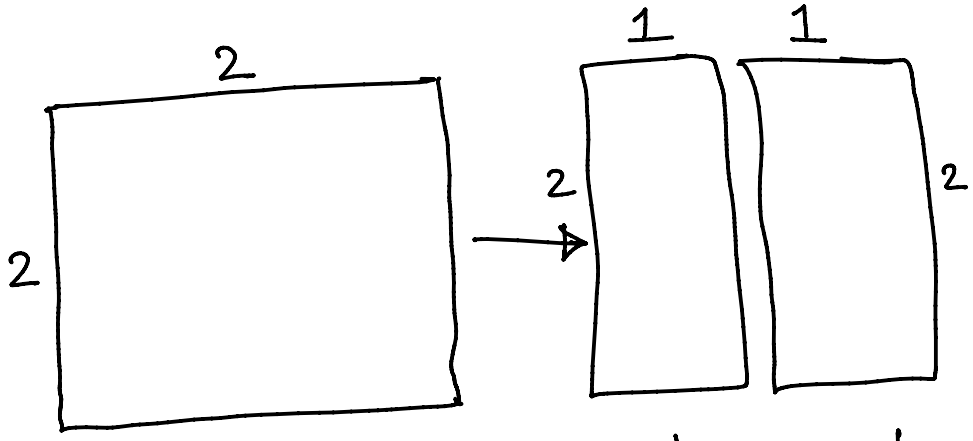
$\therefore$ T ——— $\frac{T}{10^8}$ s

$$\frac{10^{13}}{10^8} = 10^{13-8} = 10^5 \text{ s}$$

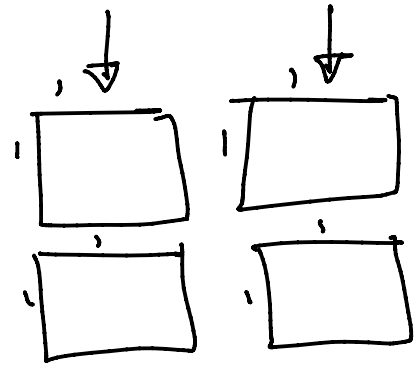




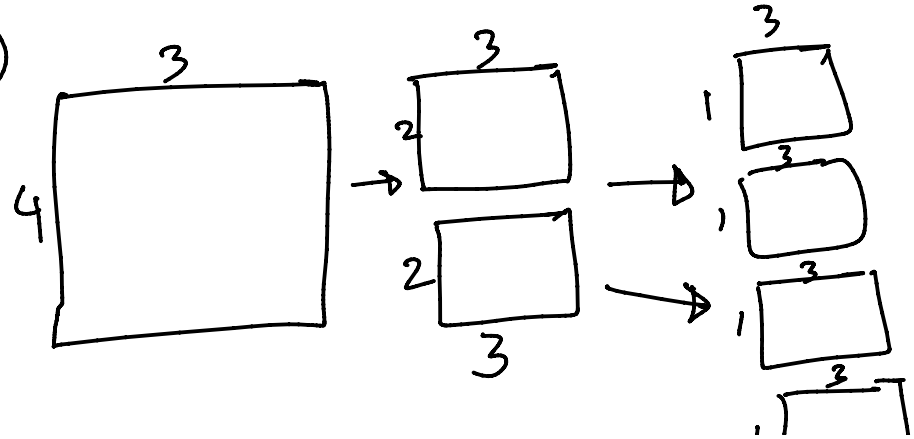
2 2 3
w h n

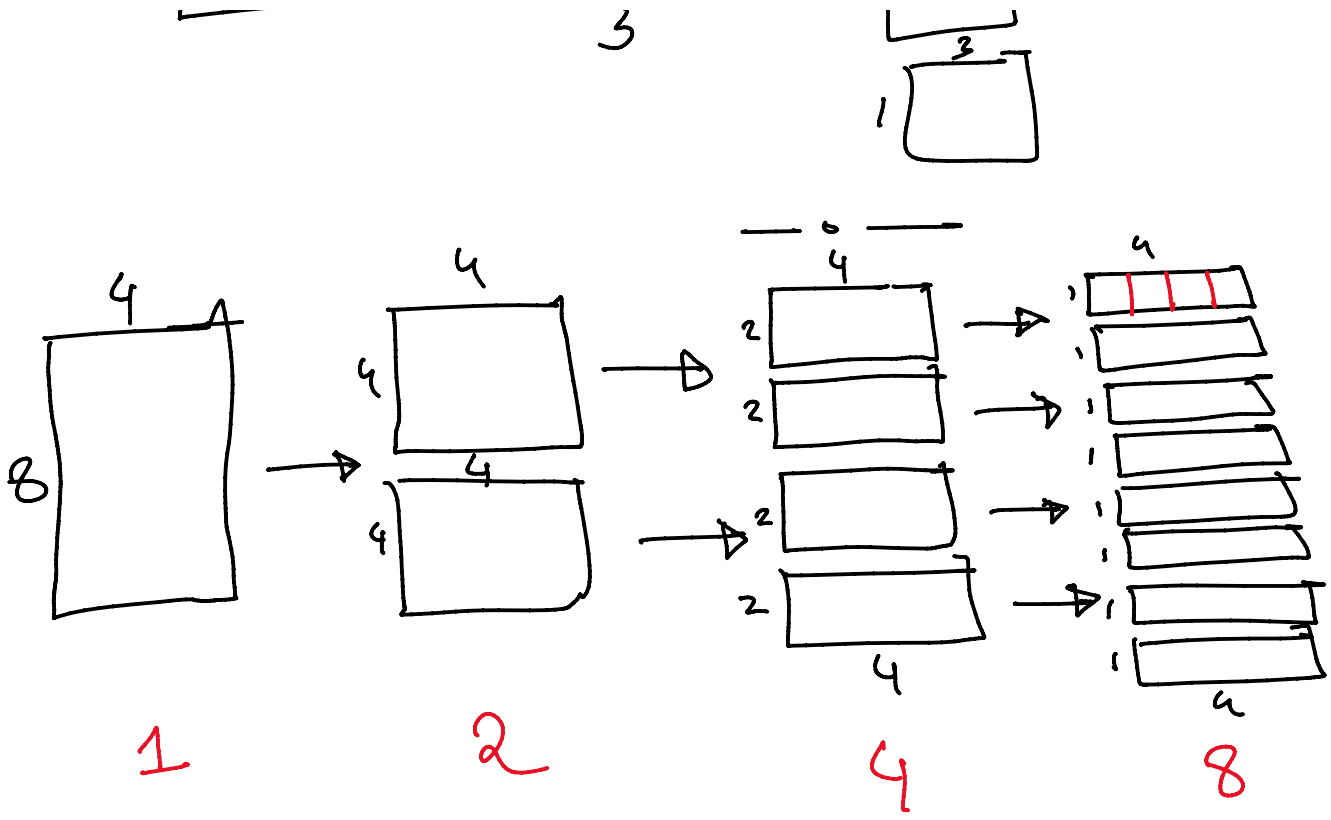


YES



n=2



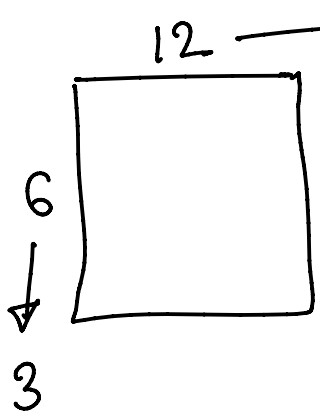


$$8 \times 4 = 32$$

8 কে কয়বার ভাগ $\rightarrow 3 \rightarrow 2^3$

4 কে " " $\rightarrow 2 \rightarrow 2^2$

$$2^3 \times 2^2$$



$$2^{\textcircled{2}} \times 2^{\textcircled{1}} = 2^{(2+1)}$$

$$n^3 > n$$

3

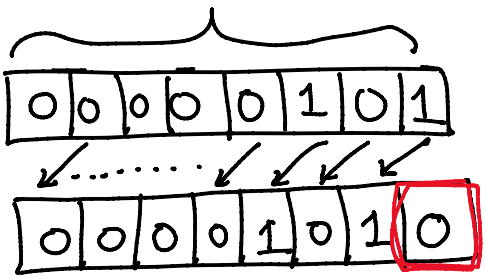
$= 2^3 \geq n$

<< = Left Shift

>> = Right Shift

$n = 5$;

$n = n << 1$;



↳ $n = 10$

$n = 5$ → 0000...101

$n = n << 2$ → 10100

↳ $n = 20$

$n = 5$

$n = n << 3$ → 101000

↳ $n = 40 = 5 \times 8 = 5 \times 2^3$

$n = 5$

$n = n << x$

$\hookrightarrow n = n \times 2^x$

00000001 = 1
00000010 = 2
00000100 = 4
00001000 = 8
00010000 = 16

$n = 1 << x$

$\hookrightarrow \boxed{n = 2^x}$