Apriori Analysis

DATE 27/Aug/22
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1 Assignment.

1) $i = n$
while $i > 2$;
$i = i^{1/25}$
print (i)

find Time Complexity = ?

2) $i = 2^9$
while $i < n$;
$i = i^{23}$

find Time Complexity = ?

3) $i = 1$
while $i < n$;
$i = 2 \times i$
$i = 3 \times i$

find Time Complexity = ?

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(1) $i = n$
while $i > 2$;
$i = i^{1/25}$
print(i)

let $i = n$

$n^{1/25}$
$n^{1/25^2}$
$n^{1/25^3}$
⋮ ⟶ k times
$n^{1/25^k} = 2$

⇒ $n^{1/25^k} = 2$

$\log_2 n^{1/25^k} = \log_2 2$

$\frac{1}{25^k} \log_2 n = 1$

$\log_2 n = 25^k$

$\log_{25}(\log_2 n) = \log_{25} 25^k$

$$\log_{25}(\log_2 n) = k \log_{25} 25$$

$$\Rightarrow \log_{25}(\log_2 n) = k \qquad [\because \log_{25} 25 = 1]$$

Time Complexity = $O(\log(\log n))$

2.

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i = 29
while i < n;
    i = i^23
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$\Rightarrow (29)^{23^1}$

$\Rightarrow (29)^{23^2}$

$\vdots$

$\Rightarrow (29)^{23^k} = n$

$$29^{23^k} = n$$

$$\log_n (29)^{23^k} = \log_n n$$

$$\log_n (29)^{23^k} = 1$$

$$23^k \log_n 29 = 1$$

$$\log_n 29 = \frac{1}{23^k}$$

$$\log_{23} \log_n 29 = \log_{23} 1/23^k$$

③ i = 1

while i < n ;

{ i = 2 * i
  i = 3 * i
↳ i = 6 * i

1 < 50.
i = 2 × 1 = 2 ⇒ i = 6 × 1 = 6
i = 3 × 2 = 6.
6 < 50
i = 2 × 6 = 12 i = 6 × 6 = 36
i = 3 × 12 = 36

Whenever we multiflying i by any value, ith time complexity will be.

⇒ $\log_{(multiplyvalue)} n$

here we are multiflying by 6 so the time complexity will be.

⇒ $\log_6 n$