Apriori Analysis

1) $i = n$

```
while(i>2):
    i = i^(1/25)
    Print(i)
```

$i = n$

$n^{1/25}$ —— ① $\quad \log_2 2 = 1$

$n^{1/25^2}$

$n^{1/25^3}$ $\longrightarrow \left(\left(n^{1/25}\right)^{1/25}\right)^{1/25}$

⋮ k times

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

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

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

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

$\log_2 n = 25^k$

$\log_{25}(\log_2 n) = k \log_{25} 25$ $\quad \log_{25} 25 = 1$

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

$$\Longrightarrow O(\log(\log n))$$

2) $i = 29$ $\quad [n < n$ — false$]$

```
while (i<n):
    i = i^23
```

$(29)^{23^1}$

$(29)^{23^2}$

$(29)^{23^3}$

⋮

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

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

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

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

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

$$\boxed{k = \log_{23}(\log_{29} n)}$$

$$\Longrightarrow O(\log(\log n))$$

3) $i = 1$

while ($i < n$):

$i = 2 * i$

$i = 3 * i$

$i = 6 * i$

$n = 40$

$i = 6 * i$

$i = 6 * 6$

$i = 6 * 36$

$\log_6 n \Rightarrow O(\log n)$