

1. Use Limits & L'Hôpital rule

$\ln P_n$ grows slower than n^q for any $p, q > 0$, including $0 < q < 1$

2. $f(n) \in \Theta\left(\frac{n}{\log n}\right)$

3. Best efficiency class is $\Theta(\sqrt{n})$.

4. Algorithm $F(n)$

if $n = 0$

return 0

endif

if $n = 1$

$f = 1$

$n_1 = \lfloor n/2 \rfloor$, $n_2 = n_1 - 1$

$f_1 = F(n_1)$

$f_2 = F(n_2)$

if $(n \bmod 2) = 0$

$f = (f_1 + f_2) * (f_1 + f_2) - f_2 * f_2$

else

$f = (f_1 + f_2) * (f_1 + f_2) - f_1 * f_2$

endif

endif

return f

$$t(n) = 2t(n/2) + \Theta(n^{1.59})$$

$$\Rightarrow t(n) \in \Theta(n^{1.59})$$