Program efficiency

What is efficiency?

↓

quality of program

performance — time — min

resources — min

Factors affecting performance of an algorithm

Internal

→ Time of running
→ Speed / Memory required to run

External

→ Size of input
→ Speed of computer
→ Quality of compiler

Estimating time complexity of a program

no of elementary instructions required to complete a program for a fixed input size (n).

Performance (P) — time

Efficiency (E)

$$P = \frac{1}{E}$$

$$\frac{P_x}{P_y} = \frac{E_y}{E_x}$$ of any 2 devices x, y

Q) If a particular desktop runs a program in 60 seconds and a laptop runs the same program in 90 seconds, how much faster is the desktop than the laptop?

$P_d = 60s$ $\quad P_l = 90s$

$$\frac{P_d}{P_l} = \frac{E_l}{E_d} \Rightarrow E_d = E_l \cdot \left(\frac{P_l}{P_d}\right)$$

$$= \frac{90}{60} = 1.5$$

∴ desktop is 1.5 times faster than laptop