Computer Organization
Homework 1

(1) A wafer contain 120 → cost 10.000

Yield ↓ %10
Cost ↓ %20 } After 4 years ?

Today %80 yield

Yield ⇒ $y1 = 80 - 8 = 72$
$y2 = 72 - 7{,}2 = 64{,}8$
$y3 = 64{,}8 - 6{,}48 = 58{,}32$
$y4 = 58{,}32 - 5{,}832 = 52{,}488$

Cost ⇒ $C1 = 10000 - 2000 = 8000$
$= 8000 - 1600 = 6400$
$= 6400 - 1280 = 5120$
$= 5120 - 1024 = 4096$

100	120
52,488	x

$x = 62{,}98$
(product)

62,98	4096
1	x

$x = 65{,}03$ (a single chip's cost)

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(2)

a)

$A = 50 \times 2 + 10 \times 4 + 2.3 = 146 \times 10^6$ (CPU clock cycle)

$B = 80 \times 2 + 5 \times 4 + 3 \times 1 = 183 \times 10^6$ (CPU clock cycle)

$\text{Execution time} = \dfrac{\text{CPU CC}}{\text{Clock rate}} \Rightarrow \dfrac{183 \times 10^6}{146 \times 10^6} = 1{,}25$

clock rate same

So that A is 1,25 times better than B

b)

$\text{CPU time } A = 100\text{ ms} = 0{,}1s = \dfrac{146.10^6}{\text{Clock rate } A}$

$\text{Clock Rate}A = \dfrac{146.10^6}{0{,}1} = 146.10^7 \text{ cycle/second}$

$= 1460 \text{ MHZ}.$

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