CSE 331 Computer Organizations

Homework 1

Due Date 30/10/2020 Friday 17:00

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Student number: 1801042103

1. Assume that, today, a wafer containing 120 processor dies costs 10000$. The yield decreases by 10% at each year while the wafer cost also decreases by 20% at each year. Then, what will be the cost of a single chip manufacturing after 4 years? Show your computations. Edit: Assume, today, there is a yield of 80%.

Answer:

Today

yield 80% 120 processor cost 10000$ yield decrease %10, cost decrease %20

One year later

yield 72% cost 8000$ yield decrease %10, cost decrease %20

two year later

yield 64,8% cost 6400$ yield decrease %10, cost decrease %20

three year later

yield 58,32% cost 5120$ yield decrease %10, cost decrease %20

four year later

yield 52,48% cost 4090$

total chip number = 120 x 52,48 %
= 62,98 wafer can be used now

the cost of a single chip = $\frac{4090\$}{62,98}$ = 65,03$

CamScanner ile tarandı

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2. A compiler designer wants to compare the performance of two different compilers he designed. The compilers are generating MIPS machine code from a C program. He compiles the same C program using the two compilers.

a. According to the tables below, find which compiler is better and by how many times it is better than the other?

	R-type ($\times 10^6$)	I-Type ($\times 10^6$)	J-Type ($\times 10^6$)
Compiler A	50	10	2
Compiler B	80	5	1

	R-type	I-Type	J-Type
Required Cycles	2	4	3

b. What must be the clock speed of the processor so that the program compiled with the better compiler executes in 100ms?

Answer:

a)

Clock Cycle Compiler A $= ((50\times10^6)\times2) + ((10\times10^6)\times4) + ((2\times10^6)\times3) = 146\times10^6$

Clock cycle Compiler B $= ((80\times10^6)\times2) + ((5\times10^6)\times4) + ((1\times10^6)\times3) = 183\times10^6$

$$\frac{183\times10^6}{146\times10^6} = 1{,}253$$

Compiler A is 1,253 times better than Compiler B

b)

$$\frac{146\times10^6}{(\text{clock speed})} = 0{,}1 \text{ sn}$$

$$\text{clock speed} = \frac{146\times10^6}{0{,}1} = 1{,}46 \text{ ghz.}$$