Computer Architecture CIS 655/CSE661

Questions are equal weights

1. Research and Reading Assignment: [min two pages total of the whole summary]

Read and summarize the four papers located in the reading section of unit 1.

You can find the papers in the tool box page (same place of the syllabus). If you cannot find it, read my first course post.

If you find the four papers but you cannot open them, contact IT. The four papers are there and accessible but may be your PC settings need adjustment.

2.

Let us assume a wafer yield of 100% and use N = 13.5

The defect rate should be 0.03 defects per cm^2 (not 0.3)

There are many factors involved in the price of a computer chip. New, smaller technology gives a boost in performance and a drop in required chip area. In the smaller technology, one can either keep the small area or place more hardware on the chip in order to get more functionality. In this case study, we explore how different design decisions involving fabrication technology, area, and redundancy affect the cost of chips.

Chip	Die size (mm^2)	Estimated defect rate (per cm^2)	Manufacturing size (nm)	Transistors (millions)
IBM Power5	389	**0.03**	130	276
Sun Niagara	380	.75	90	279
AMD Opteron	199	.75	90	233

The figure above gives the relevant chip statistics that influence the cost of several current chips. In the next few exercises, you will be exploring the effect of different possible design decisions for the IBM Power5.
What is the yield for the IBM Power5?

3.

One critical factor in powering a server farm is cooling. If heat is not removed from the computer efficiently, the fans will blow hot air back onto the computer, not cold air. We will look at how different design decisions affect the necessary cooling, and thus the price, of a system. Use the figure below for your power calculations.

Component type	Product	Performance	Power
Processor	Sun Niagara 8-core	1.2 GHz	72–79 W peak
	Intel Pentium 4	2 GHz	48.9–66 W
DRAM	Kingston X64C3AD2 1 GB	184-pin	3.7 W
	Kingston D2N3 1 GB	240-pin	2.3 W
Hard drive	DiamondMax 16	5400 rpm	7.0 W read/seek, 2.9 W idle
	DiamondMax 9	7200 rpm	7.9 W read/seek, 4.0 W idle

A cooling door for a rack costs $4000 and dissipates 14 KW (into the room; additional cost is required to get it out of the room). How many servers with an Intel Pentium 4 processor, 1 GB 240-pin DRAM, and a single 7200 rpm hard drive can you cool with one cooling door?

FAQ:

1. What is the format of the summary of Q1?

Any format

2. Should I summarize each paper in two pages or all four papers in two pages?

All four papers in two pages or more

3. How I submit the answer for the three questions?

Kindly, submit one single PDF file that contains the answer for the three questions.