CSE 331/503

Computer Organization

Homework 1

Due Date 25/10/2021 Monday 17:00

1. Consider comparing two different chip manufacturing processes.

	diameter	**Cost per wafer**	**Dies per wafer**	**Defects/cm^2**
Wafer_X	16cm	15	64	0.02
Wafer_Y	20cm	24	100	0.03

A) (10pt) Find wafer and die area for Wafer_X and Wafer_Y.

B) (15pt) Find yield and cost per die for Wafer_X and Wafer_Y.

C) (25pt) We assume that wafer cost decreases by 20% at each year while the number of dies per wafer is increased by 10% and the defects per area unit increases by 15%. Calculate again A, B and compare the cost per die according to the before year.

2. Consider two different implementations of the same instruction set architecture. The instructions can be divided into three classes according to their CPI as shown in the table. The clock rate of P1 is 3 GHz and P2 is 1.5 GHz.

Given a program that has one billion instructions divided into classes as follows: 30% R-type, 50% I-type, 20% J-type.

Required Cycles	**R type**	**I type**	**J type**
P1	2	4	3
P2	3	3	3

A) (10pt) Find clock cycles for P1 and P2.

B) (10pt) Find average clock cycles per instructions for P1 and P2.

C) (10pt) Find the execution time for P1 and P2.

D) (20pt) Which is faster and how many times?

Rules:

- Honor code: It is not a group project. Do not take any code from Internet. Any cheating means at least -100pt for both sides. Do not share your codes and design to any one in any circumstance. Be honest and uncorrupt not to win but because it is RIGHT!

Submission Rules:

- **Platform: Moodle** CSE 331 page ,
  - Link: https://bilmuh.gtu.edu.tr/moodle/course/view.php?id=481
- **Submission format must be as follows:**
  - StudentNo_hw1.pdf
  - Must be **handwritten, if it's not it's take -50pt**
- For this homework, **late submission is NOT available.**