

BRAC UNIVERSITY
Department of Computer Science and Engineering
Semester: Spring24

Quiz-1

Duration: 30 minutes

Full Marks: 20

CSE340: Computer Architecture

Name:

Sec:

ID:

Question 1

Consider two processors, X and Y, tasked with executing a Machine Learning model comprising 3.2 billion (3.2×10^9) instructions. X has the frequency of 3.5Ghz and INT has the frequency of 2.0 Ghz. Both processors utilize the same architecture, and the instruction set for the model is categorized into five types: A consisting 50% of the instructions and taking 1 clock cycle to execute each instruction, B taking 15% of the total instructions and 2 clock cycles each, C taking 15% of the instructions and 3 clock cycles each, D taking 10% of the instructions and 4 clock cycles each, and E taking the last remaining 10% with 5 clock cycles for each instruction.

- a) **Calculate** the Average CPI for both AMD and INT. [2]
- b) **Calculate** the total processing time needed to execute the ML model in both of the processors [3]
- c) According to the Standard Performance Evaluation Corp, running an ML model on an Intel Core i7 920 processor takes 8060 seconds. **Which** of the 2 processors performs better than the Core i7 920 processor? And by **how much**? Also among the 2 processors **which** one will be better? [5]

Question 2

Assume a 25 cm diameter wafer, has a cost of 20, contains 95 dies, and has 0.031 defects/cm². Consider $N = 1.5$.

- a) Find the yield for the wafer. [3]
- b) Find the cost per die for the wafer. [2]

Surprise quiz

Make sure to circle the answers to the surprise questions on the question paper

1. In a multiprocessor system, the primary challenge for software is to:
 - a. Handle input/output operations efficiently
 - b. Perform calculations sequentially
 - c. Implement parallel processing effectively
 - d. Increase memory size
2. In which of the following does the design principle 'Make the common case fast' play a crucial role?
 - a. Improving rarely used functionalities
 - b. Optimizing frequently executed instructions
 - c. Reducing memory capacity
 - d. Enhancing display resolution
3. What is the primary function of cache memory in a computer system?
 - a. To permanently store user files
 - b. To act as the main memory
 - c. To speed up access to frequently used data
 - d. To connect the CPU with the motherboard
4. The main function of abstraction in computer systems is to:
 - a. Speed up processing time
 - b. Provide faster I/O communication
 - c. Hide lower-level details and reduce complexity
 - d. Improve graphics processing
5. In CMOS IC technology, what is a major challenge as power consumption increases?
 - a. Increased data latency
 - b. Higher system cost
 - c. The 'Power Wall'
 - d. Reduced transistor count