CSE2312 Computer Organization & Assembly Language Programming
QUIZ 1 (Chapter 1)

Student Name: .

Student ID: .

TRUE OR FALSE (1 pts per)

Q:	1	2	3	4	5	6	7	8	9	10
T/F										

1. Computer Architecture is to study how to design parts of a computer system that are visible to the programmers.
2. An interpreter converts programs in one language to another, while a translator carries out a program instruction by instruction.
3. Hardware and software are functionally equivalent. Any function done by one can, in principle, be done by the other.
4. Hardware and software are not equivalent in the sense that to make the machine really run, the bottom level must be hardware, not software. They also differ in performance.
5. L1 language is less convenient for people to use than those in built-in machine instructions.
6. Clock rate is the only factor that determines the performance of a CPU.
7. Keep other factors the same, running the same program in a computer with 2 CPUs will get at least 2x acceleration compared to running it on a computer with only 1 CPU.
8. The response time is defined as the amount of time that a given computer takes to do a specific task.
9. ISA is the interface between software and hardware.
10. Amdahl's law predicts the capacity of disk will increase 2x every year.

Multiple Choices (2 pts per)

1. **Which of following is true for Translation and Interpretation?** [   ]
   (a) In both of them, the computer carried out instructions in L1 by executing equivalent sequences of instructions in L0
   (b) In translation, the entire L1 program is converted to a L0 program.
   (c) In interpretation, after each L1 instruction is examined and decoded, it is carried out immediately.
   (d) Interpretation is more efficient than Translation

2. **Which of following can be stored in the memory?** [   ]
   (a) Data only
   (b) Program only
   (c) Both data and program
   (d) None of them

3. **Which of following may affect the execution time?** [   ]
   (a) Algorithm: determine the number of operations executed
   (b) Programming language, compiler, architecture: determine the number of machine instructions executed per operation (IC)
   (c) Processor and memory system: determine how fast instructions are executed (CPI) and increase it.
   (d) I/O system (including OS): determines how fast I/O operations are executed

4. **Which of following is true in Multilevel Machines?** [   ]
   (a) Instruction Set Architecture Level lay between Digital Logic Level and Microarchitecture Level.
   (b) Assembly Language Level lay between Instruction Set Architecture Level and Operating System Level
   (c) Operating System Level lay between Assembly Language Level and Instruction Set Architecture Level
   (d) Microarchitecture Level lay between Digital Logic Level and Instruction Set Architecture Level

5. **Which of following is true based on Moore Law:** [   ]
   (a) 2X processor speed increment every 8 months.
   (b) 2X processor speed increment every 18 months.
   (c) 4X processor speed increment every 8 months.
   (d) 4X processor speed increment every 18 months.

6. **Consider a computer with identical interpreters at levels 1, 2, and 3. It takes an interpreter n instructions to fetch, examine and execute one instruction. A level 1 instruction takes k nanoseconds to execute. How long does it take for an instructions at levels 3** [   ]
(a) k nanoseconds.
(b) kn nanoseconds.
(c) kn^2 nanoseconds.
(d) kn^3 nanoseconds.

7. **What factors could account for the performance discrepancy of computers:**
[   ]
(a) Cycle time.
(b) The number of bytes fetched per cycle.
(c) Memory speed.
(d) I/O architecture.

8. **Which of following is not I/O device?** [   ]
(a) Keypad.
(b) Mouse.
(c) Printer.
(d) CPU.

9. **In computer architecture, which of the following use ISA:** [   ]
(a) Operating System.
(b) Compiler.
(c) Memory.
(d) Disk.

10. **Which of following is not a computer of Von Neumann Architecture:**
[   ]
(a) iPhone.
(b) iPad.
(c) Dell Desktop PC.
(d) Babbage's difference engine.

Fill in the Blanks and Short Answer (5 pts per)

1. Please draw a diagram for the Contemporary 6-level Machines

2. Please draw a diagram for the Von Neumann Machine

3. What factors affect the execution time? How to reduce the execution time correspondingly?

4. If computer A and Computer B are 8Mhz and 3Ghz respectively, what is their clock times respectively?

5. What is the key gap in computer design? How to bridge this gap?

Computation and Short Answer (15 pts per)

1. There are 4 classes of instructions, A, B, C, D. Suppose compiler has two choices: Sequence 1 and Sequence 2, as described below:

Class	A	B	C	D
CPI for class	1	2	1	3
IC in sequence 1	3	1	5	1
IC in sequence 2	2	4	1	3

Which choice will be better? Why?

2. Computer A has 5GHz clock. It takes 100s CPU time to finish one given task.

We want to design Computer B to finish the same task within 20s CPU time. The clock cycle number for computer B is 2 times as that of Computer A.

So, what clock rate should be designed for Computer B?

3. There are two computers: A and B.

- Computer A: Cycle Time = 500ps, CPI = 4.0

- Computer B: Cycle Time = 200ps, CPI = 5.0

If they have the same ISA, which computer is faster? How many times it is faster than another?