(1) What is “Moore’s Law” (a specific definition of “Moore’s Law” is needed)?

Moore’s Law is a prediction of a trend about how computer systems will improve. It predicts that the capacity of computer hardware components (such as the number of transistors in a processor, the capacity of a hard drive unit, the capacity of a RAM-memory stick, and etc.) doubles in every 18 months (approximately in one and half years).

Note 1: Some information sources in the Internet (mostly personal websites) say “the speed of computer components doubles” – it is not actually correct. It is NOT the speed that doubles, but the capacity.

Note 2: Some people answer this question by “the performance of a computer system doubles”. I believe we already discussed this in the classroom. Not much credit any such solutions, since the term, “performance” was not defined.

(2) What are the two primary advantages of learning “computer organization and architecture” by CS majors?

- You will learn the skills to develop efficient (faster, smaller, more reliable) programs.
- You will learn good debugging skills (especially those that let you understand what is (are) going (terribly) wrong when your programs are not working (or not producing the correct outputs).

(3) What are three different types of “program files”? Which format do processors understand?

- Source code files in high-level programming languages.
- Source code files in the assembly languages.
- Binary executable files.
  Computer processors understand (can execute) only the binary executable files.
(4) What is the software tool that translates “assembly source code files” into “binary executable files”?

- Assemblers

(5) What is the relation between “instructions” in assembly languages and “machine codes”? Select the best option that represents their relation in the following options.

(a) one (instruction)-to-one (machine code)
(b) one (instruction)-to-many (machine codes)
(c) many (instructions) to-one (machine code)
(d) many (instructions)-to-many (machine codes)
(e) none of the above

Solution: (a)