(1) What does “necessary condition” guarantee?

If a necessary condition is not satisfied, the necessary condition guarantees that the desired result will not be achieved.

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

By learning how computer hardware (especially processors executes programs and how memory space is used in the level of the assembly programming):

(a) Debugging skills for solving hard-to-solve (or hard-to-understand) software bugs.

(b) Code optimization skills (make programs run faster, develop programs that fit in smaller memory space, more reliable programs, etc.)

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

(a) Source-code files in high-level programming languages

(b) Assembly source-code files

(c) Binary executable files

(d) Processors understand only binary executable files.
(4) What is “Moore’s Law”?

The capacity of computer hardware components (memory, hard drives, and USB clip drives) doubles in every 18 months.

(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)