

CS2026 ASSIGNMENT 6 (Due Date: April 17, 2026)

Instructions: You have to answer all of them. Put your answers in a MS WORD file, or other word processing file, and then submit the file to the course Gmail account.

Question 1

- (a) Before the release and popularization of desktop/personal computers in the 1980s, two electronic devices were made and released in the 1960s and 1970s to ease the office works. What are they?
- (b) In the 1970s and 1980s, which technology firms made desktop computers? State three of them.
- (c) Ethernet is the name of the local area network (LAN) developed by Xerox PARC. What is the full name of PARC?
- (d) With Ethernet, what a Xerox Alto could do in 1982?

Question 2

- (a) What is the name of the founder of Wang Lab?
- (b) In which year, the Wang Lab was founded?
- (c) Why the founder registered his technology firm as a laboratory instead of a corporation or company limited?
- (d) What were the early products released by Wang Lab? State two of them?
- (e) In which year, Wang Lab released her first computer for sell? What was the name for this computer?

Question 3

- (a) Once a computer has been power-on, the CPU will get an instruction from a specialized memory device. What is the name of this memory device?
- (b) Is this memory device writable?
- (c) Does this memory device exist in a smartphone, like iPhone and Android phone?

- (d) Once the CPU has completed the first instruction, how does it get the second instruction to execute?
- (e) In a computer or a smartphone, which component is the key controller for the device?

Question 4

- (a) In the lecture, I have mentioned three factors determining the performance of a CPU. What are they?
- (b) In the modern CPU, the memory address is specified by 64 bits. What is the maximum size (in term of bytes) of memory space a CPU can access?
- (c) What is the largest memory space of a hard drive in the modern personal computer?
- (d) What is the largest memory space of a hard drive in the modern computer for enterprise?
- (e) RAM is a memory device in every computer today. Once the computer has been power-off, will the data in the RAM be stored and be recalled in the next time when the computer is power-on?
- (f) What is the name of the temporary storage in a processor?
- (g) In the 1990s, Apple had to re-design her MacOS for the Mackintosh computer simply because the CPU of the Mac computer needed to switch from Motorola processor to Intel processor. State the reason(s) why Apple needed to re-design the MacOS?
- (h) In the 1990s, what were the market shares of Windows, MacOS and Linux?

Question 5

- (a) In the 1990s, two personal computer operating systems dominated the desktop computer market. What are they?
- (b) In which year, Microsoft released her WORD software?
- (c) In which year, Microsoft released her Excel software?

- (d) In which year, Microsoft released her Access software?
- (e) In which year, Microsoft released her PowerPoint software?
- (f) In the 1980s and 1990s, which technology firms made and sold printers?

Question 6

- (a) What is the full name of CU in a CPU and what is its function?
- (b) What is the full name of ALU and what are its functions?
- (c) In the lectures and the lecture materials, it has mentioned that the CPU and the memory devices are connected with a clock circuit. What is the purpose this clock circuit? Without this clock circuit, will the computer perform without problem?
- (d) Without power supply, will the CPU perform as usual?
- (e) Today, we can have hard drive (HD) and solid-state drive (SSD) to be the non-volatile memory device. That is to say, the data/information/file stored in these memory devices will not be gone even the computer power is off. State three old devices for data storage.

Question 7

For an eight-bit sign-magnitude fix-point number specified as $xxxx.yyy$, s is the sign-bit, $xxxx$ represents the integer part of the number and yyy represents the fractional part of the number. If $s = 0$, the number is positive. If $s = 1$, the number is negative. Give your answers in decimal.

- (a) What is the value of the number specified as 11111111?
- (b) What is the value of the number specified as 01111111?
- (c) What is the value of the number specified as 11111000?
- (d) What is the value of the number specified as 01111000?
- (e) What is the value of the number specified as 01010100?
- (f) What is the value of the number specified as 00000001?
- (g) What is the value of the number specified as 10000000?
- (h) What is the value of the number specified as 00000000?