(1) What are the four main OS functional components CS314 (Spring 2024) covers?

- Process management (= allocating CPU resource)
- Memory management
- I/O resource management
- User management

(2) What is “extended machine”? This question does not ask how we can use extended machine. A definition of “extended machine” is needed.

“An imaginary computer (as a hardware computer) that can be manipulated directly by high-level user commands by abstraction offered by an operating system”

Note: any similar solution is acceptable (as long as the underlined concepts are (well) described).

(3) What is “context switching”?

The act of switching a processor from a program (or “a process”) to another.
(4) What problem in “batch system” do “multi-programming (multitasking) OSes” fix and how?

**What:** Multitasking OSes improve (fix) the low processor utilization expected for batch systems.

**How:** When a currently-running process can not use (utilize) a processor when it waits for a user input (or for inputs from I/O devices), the processor will be context-switched to another process that needs a processor. Thus a processor is used more.

(5) What problem in “multi-programming (multitasking) OSes” do “multitasking timesharing OSes” fix and how?

Multitasking OSes are not interactive, while time-sharing OSes are interactive.