(1) Describe how processes differ from programs by mentioning at least three differences between them.

- Programs are stored in permanent storage devices (e.g., hard drives and USB drives) while processes are stored in memory.
- Programs exist as static objects (i.e., as “files”), while processes are dynamic (they continuously change themselves).
- Programs are mostly program codes (binary machine codes), while processes are codes plus data structures, such as PCB.

(2) What is “thrashing”?

Thrashing is a situation in which a processor uses most of its resources just for performing a large number of context switching, instead of running processes (thus processes run slowly) even though the processor utilization is extremely high (close to 100%). This happens when the degree of multitasking is too large.

(3) In the following sentence: “The long-term scheduler is the main component that controls __________ in multitasking operating systems”, fill out the blank by a word that best fits to the blank.

“degree” (of multitasking)
(4) What is “Ready” state in “the short-term process scheduling”?

The ready state in the short-term memory is that a process is in memory, available for execution, and waiting for a processor to be assigned to the process.

(5) What is “the medium-term process scheduling”?

The medium-term process scheduling is the one that is responsible for controlling the degree of multitasking (i.e., when there is not enough resources) by removing processes in the short-term scheduling and resuming the blocked processes back to the short-term scheduling (when there is enough resources).