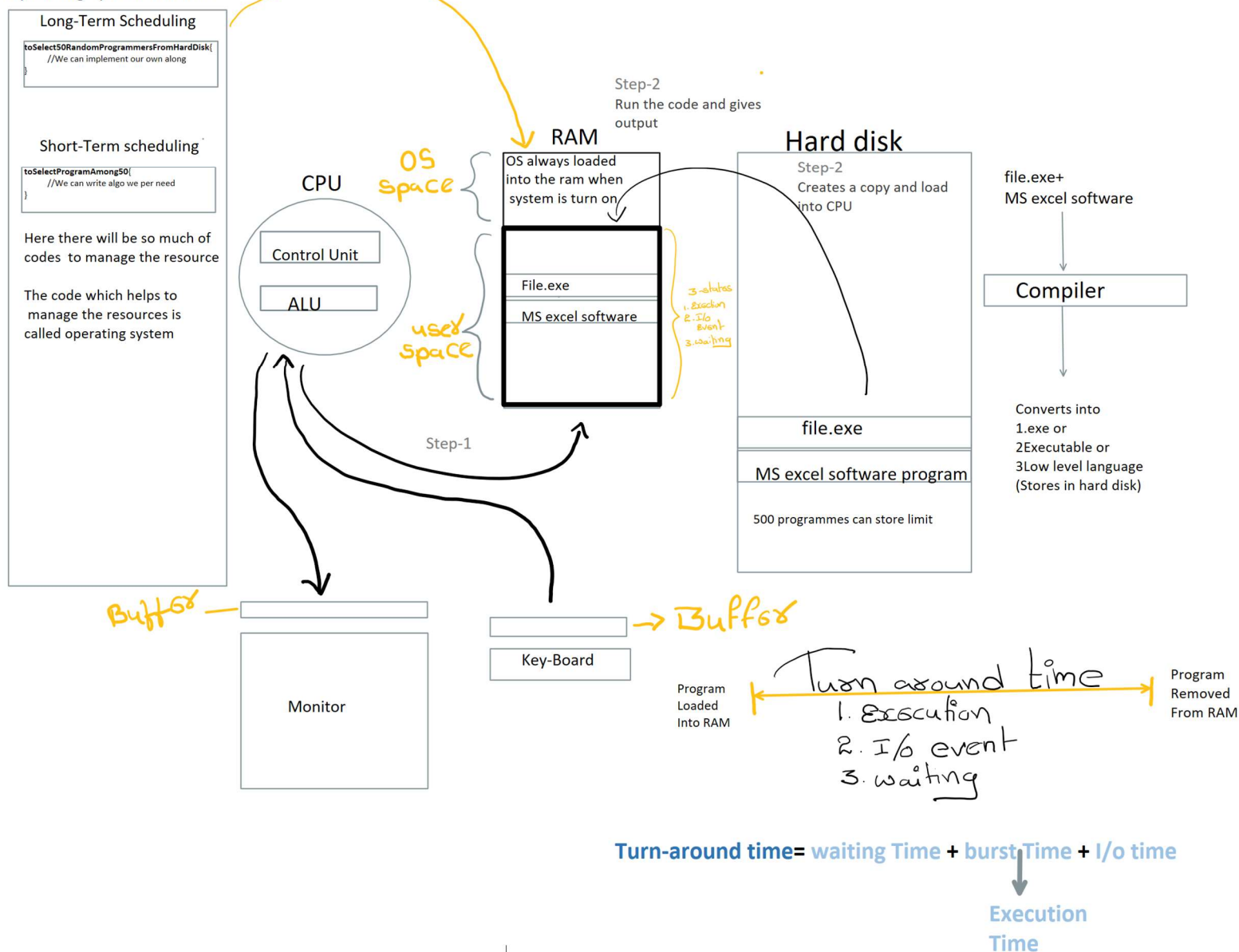


Operating System Software



Input & output (I/O devices): -

1. File when is needed to edit that file is loaded into the RM with appropriate software file
2. when we type anything in the keyboard that is stored in Buffer

Buffer: - Buffers in the context of keyboards and computer input refer to temporary storage areas where input data is stored before being processed or transmitted. These buffers play a crucial role in ensuring smooth and accurate communication between the keyboard and the computer system

The use of buffers in keyboard input helps maintain the accuracy, responsiveness, and efficiency of the input process, ensuring that keystrokes are processed in a way that aligns with the capabilities of the computer system.

3. Form the buffer that data is moved into the user space (binary format).
4. Then the CPU sends that data into monitor buffer after that it display in the monitor

When any program or data moved into RAM it will me in three States:

1. Execution
2. I/O event
3. Waiting

The sum of time taken by three states is called **Turnaround time**.

Turnaround Time:

1. Turnaround time, also known as process turnaround time,
2. This is a performance metric used in operating systems and computer scheduling algorithms.
3. It measures the total time taken to execute a particular process from the moment it enters the system to the moment it completes and exits the system.
3. Turnaround time includes both the execution time of the process and any time it spends waiting in the queue to be executed.

In the context of operating systems and process scheduling, the turnaround time consists of the following components:

Waiting Time:

The time a process spends in the ready queue, waiting to be assigned to the CPU for execution. Waiting time is a significant contributor to turnaround time, especially in cases of high CPU utilization.

Execution Time:

The time a process spends actually running on the CPU. This is the time during which the process's instructions are being executed.

I/O Time:

If a process performs input/output (I/O) operations, such as reading from or writing to a file or interacting with peripherals, the time spent waiting for these I/O operations to complete is also included in the turnaround time.

Mathematically, the turnaround time for a process can be calculated using the following formula:

$$\text{Turnaround Time} = \text{Completion Time} - \text{Arrival Time}$$

Where:

Completion Time: The time at which the process completes its execution and exits the system.

Arrival Time: The time at which the process enters the system and becomes available for execution.

- i. Turnaround time is an important metric because it reflects the total time a user or application has to wait to get the final result of a computation.
- ii. In systems where multiple processes are being managed concurrently, optimizing turnaround time is essential to ensure efficient resource utilization and provide a responsive user experience.

Different process scheduling algorithms and operating system designs aim to minimize the turnaround time of processes by effectively managing the allocation of CPU time and other resources.

Schedulers prioritize processes based on various criteria, such as priority levels, execution time, and I/O operations, to reduce waiting times and improve overall system performance.