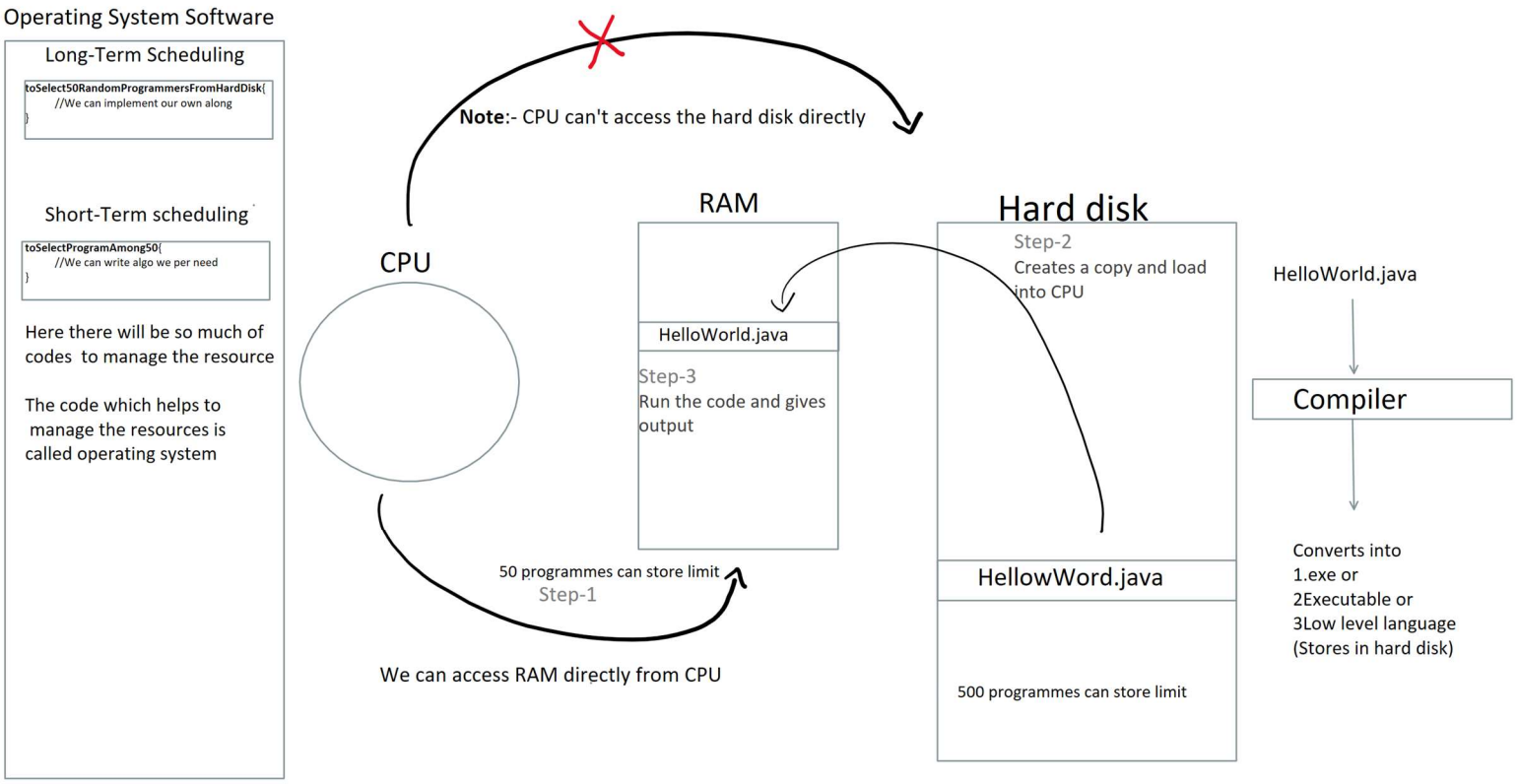
Operating System:- An operating system (OS) is a software that acts as an intermediary between computer hardware and user applications. It provides a platform for running applications and managing hardware resources effectively.



1. In scenarios where we need to execute 500 programs from the hard disk, but the RAM has a capacity to accommodate only 50 programs...
2. The system comes up with a strategy: the RAM and hard disk will work together. The RAM will load a subset of programs randomly from the disk and execute them. Afterward, it will replace those with other programs from the hard disk, managing this swapping process efficiently.
3. The orchestration of these tasks, such as selecting programs, managing their execution, and swapping them, is collectively handled by the operating system—a crucial component that ensures the coordination of hardware resources and the smooth functioning of the computer.
4. This system employs a function known as "***Long-term scheduling***." It's responsible for determining which programs to load into RAM from the hard disk, managing the allocation of limited memory resources effectively.
5. Moreover, the operating system also relies on another function, known as "**Short-term scheduling**," which assigns priority to programs already in RAM. This function determines which program gets CPU time when there are multiple programs ready to execute.

In essence, the operating system orchestrates the execution of programs, ensuring efficient memory utilization and balanced execution through long-term and short-term scheduling mechanisms.