PROCESS VS PROGRAM

WHAT IS PROCESS

A process is a program in execution. The process executes continuously one by one. A programmer uses a text editor or an Integrated Development Environment (IDE) to write a program in a programming language. When a program is run, it transforms into a process. It executes all of the tasks specified in the program. In addition to execution, processes can be created, deleted, and scheduled. The process is loaded into the main memory when the program is executed. In main memory, a process has a stack, heap, data, and text.

It requires resources such as processing, memory, and input/output resources to complete management tasks. It may engage a processor or input/output during program execution, making a process different from a program.

FEATURES OF THE PROCESS

1. Each process contains a definite set of data linked to it. For example, its parent's name, the address of the allotted memory space, and security properties such as ownership credentials and rights.
2. A process contains a limited lifetime, i.e., only when a process is being executed.
3. Processes are allotted system resources. Network ports and file descriptors are two examples.
4. It is an active entity.
5. It contains high resources.
6. It needs resources including memory address, CPU, I/O during its working.
7. Each process may produce child processes. Furthermore, they may die or be killed.

WHAT IS THE PROGRAM

In simple words, a program is a type of system activity. A program is a collection of instructions that are used to complete a specific task. These are known as executing jobs in a batch processing system, but tasks or programs in a real-time operating system. When using a computer, a user can run many programs simultaneously. The operating system uses its techniques to allocate memory to programs. Other parameters could also be assigned using the operating system.

In the program, there are two categories of entities: active and passive. A program is classified as passive. For instance, a program is an executable file that has yet to be executed. It is in a running state, and it doesn't take any action. It is supposed to be executed to observe the activities that are linked with it. Each program has its address space that contains instructions, data, stacks, etc. The operating system is set the scheduling time using various methods, including FIFO (First In First Out), SJF (Shortest Job First), etc.

FEATURES OF THE PROGRAM

1. A single user may execute various programs.
2. The operating system is responsible for providing main memory for the storage of all program instructions.
3. It is a passive entity. It is simply a file containing a set of instructions that have yet to be executed.
4. It doesn't have a control block.
5. It is stored in the system's secondary memory.
6. Various processes may be connected to a single program. For instance, a browser may contain various tabs open simultaneously.

Features	Process	Program
Definition	A process is an example of an execution program.	A program has a collection of instructions designed to accomplish a certain task.
Nature	It is an active entity.	It is a passive entity.
Lifespan	It has a limited lifespan.	It has a much higher lifespan.
Resources	It has a high resources requirement, and it requires including CPU, memory address, disk, Input/output during its lifetime.	It doesn't have any resources requirements; it only needs memory space to store the instructions.
Creation	The new process needs duplication of the parent process.	No much duplication is needed.
Computation Time	The process takes a long time to access and compute a single fact.	It has no computation time and cost.
Required Process	It holds resources including CPU, disk, memory address, Input/Output etc.	The program is stored on a disk in a file and doesn't need any additional resources.
Overhead	It has considerable overhead.	It has no significant overhead cost.
Cache Data	It may use the cache to store the retrieve the data as it uses OS paging scheme and cache replacement policy like FCFS, LRU, RR, LIFO.	It has the instruction to use cache for its data.