

No	Characteristic	Multiprogramming	Multiprocessing	Multithreading	Multitasking
1	What it is:	The concurrent residency of more than one program in the <b>main memory</b> is called as multiprogramming.	The availability of more than one processor per system, which can execute several set of instructions in parallel is called as multiprocessing.	A process is divided into several different sub-processes called as threads, which has its own path of execution. This concept is called as multithreading.	The execution of more than one task simultaneously is called as multitasking.
2	Number of CPU:	One	More than one	Can be one or more than one	One
3	Job processing time:	More time is taken to process the jobs.	Less time is taken for job processing.	Moderate amount of time is taken for job processing.	Moderate amount of time.
4	Number of process being executed:	One process is executed at a time.	More than one process can be executed at a time	Various components of the same process are being executed at a time.	One by one job is being executed at a time.
5	Economical:	It is economical.	Is less economical.	Is economical.	It is economical.
6	Number of users:	One at a time.	Can be one or more than one.	Usually one.	More than one.
7	Throughput:	Throughput is less.	Throughput is maximum.	Moderate.	Throughput is moderate.
8	Efficiency:	Less	Maximum	Moderate	Moderate

9	Categories:	No further divisions	Symmetric & Asymmetric.	No further divisions.	Single User & Multiuser.
10	Advantages	CPU never becomes idle.  Efficient resources utilization.  Response time is shorter.  Short time jobs completed faster than long time jobs. Increased Throughput.		Enhanced performance by decreased development time.  Simplified and streamlined program coding.  Improved GUI responsiveness.  Simultaneous and parallelized occurrence of tasks.  Better use of cache storage by utilization of resources.	Better time-management.  Higher productivity. ... Better reaction to complex tasks. ...  Increased responsibilities. ... Lower efficiency. ...  Memory can become compromised. ... Greater risk of errors. ... Heightened stress levels.
		<b>Increased Utilization</b>  <b>Increased Throughput</b>  <b>Shorter Turn around Time</b>  <b>Improved Memory Utilization</b>  <b>Increased Resources Utilization</b>	<b>CPU</b>  <b>Increased Throughput</b>  <b>Cost_Saving</b>  <b>Increased Reliability</b>	<b>Resource Sharing</b>  <b>Responsiveness</b>  <b>utilization of Multiprocessor Architecture</b>  <b>Economy</b>	<p><b><u>Timesharing:</u></b></p> <p><b><u>Handle multiple users:</u></b></p> <p><b><u>Protected memory:</u></b></p> <p><b><u>Efficient virtual memory:</u></b></p> <p><b><u>Programs can run in the background:</u></b></p> <p><b><u>Increase reliability:</u></b></p>

		<b>Multiple Users</b>			<b><u>The user can use multiple programs:</u></b>
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