

**Course Name: A Level (2nd Sem)**

**Topic : Multithreading in Java**

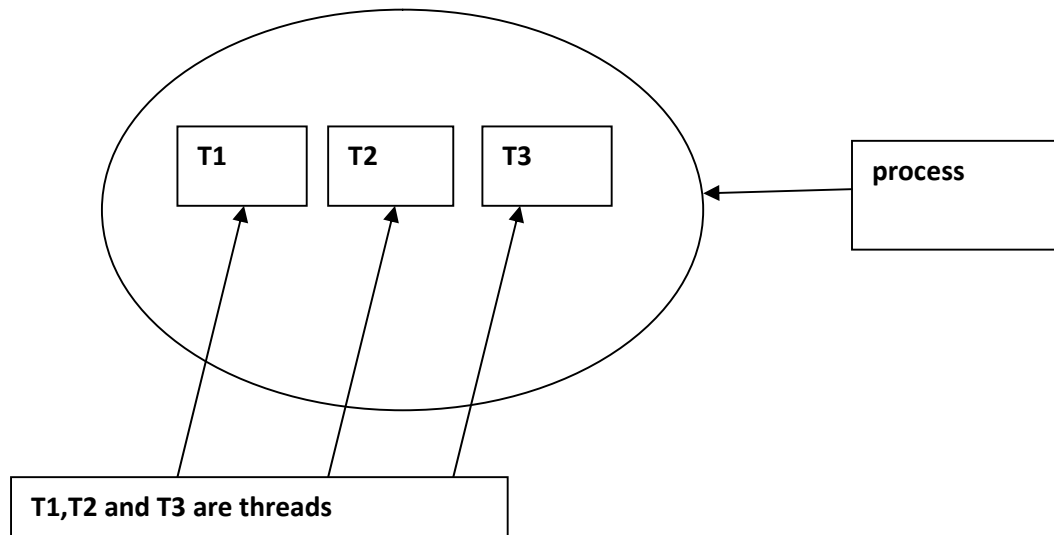
**Subject: JAVA**

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## **Multithreading in Java:**

A thread is a light-weight smallest part of a process that can run concurrently with the other threads of the same process. Threads are independent because they all have separate path of execution.

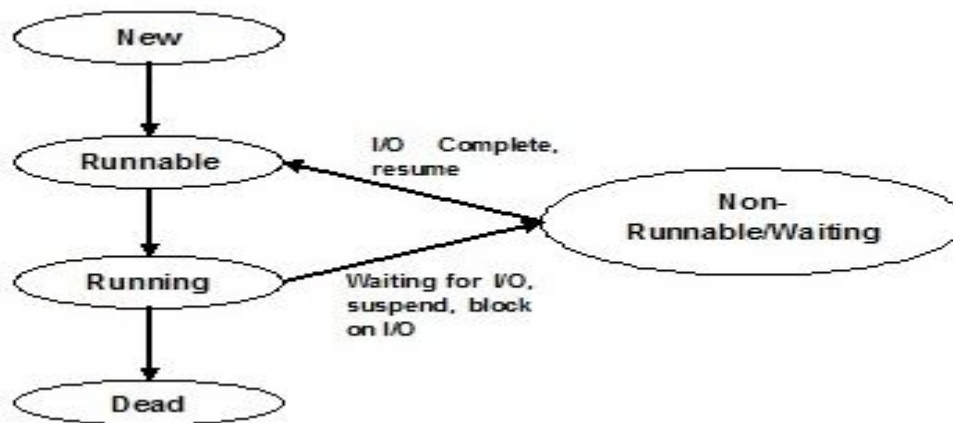
All threads of a process share the common memory. The process of executing multiple threads simultaneously is known as **multithreading**. Multithreading in java is a process of executing two or more threads simultaneously for maximum utilization of CPU. Java Multithreading is mostly used in games, animation, etc.



## **Advantages of threads in Java:**

- Better use of CPU resource
- Improvised GUI responsiveness
- Decreased cost of maintenance
- Used in server applications for improving high throughput and resource utilization.

## Life cycle of a Thread:



**The life cycle of the thread in java is controlled by JVM.**

### 1) New

In this phase, the thread is created using class "Thread class". It remains in this state till the program **starts** the thread. It is also known as born thread, but before the invocation of start() method.

### 2) Runnable

In this stage, the instance of the thread is invoked with a start method. The thread control is given to scheduler to finish the execution. It depends on the scheduler, whether to run the thread.

### 3) Running

When the thread starts executing, then the state is changed to "running" state. The scheduler selects one thread from the thread pool, and it starts executing in the application.

### 4) Non-Runnable

This is the state when a thread has to wait. As there are multiple threads running in the application, there is a need for synchronization between threads. Hence, one thread has to wait, till the other thread gets executed.

### 5) Dead(Terminated)

A thread can be terminated, which halts its execution immediately at any given time. Once a thread is terminated, it cannot be resumed.

## Exercise:

1. What is thread in Java? why is it important?
2. Explain life cycle of thread in java.