

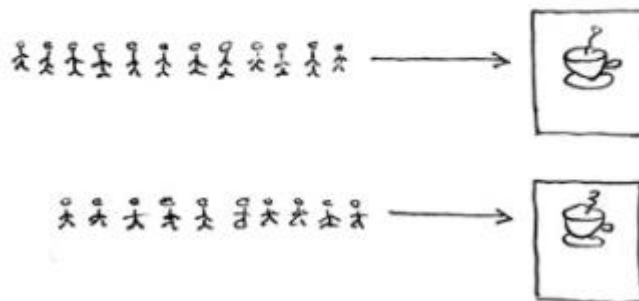
- 1) In concurrent programming, one task can occur before or after another, and some or all tasks can be performed at the same time.

In parallel programming means, there can be simultaneous execution of concurrent tasks on different CPU's. That's why, we can say that all parallel programming is concurrent, but not all concurrent programming is parallel.

Concurrent = Two Queues One Coffee Machine



Parallel = Two Queues Two Coffee Machines



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- 2) Basically, mutexes and semaphores provide synchronization. Mutexes work with keys and locks. One thread can have the key and continue to run. As long as the buffer is filled by that mutex, other mutex has to wait.
By using semaphores, we can achieve to run these threads at the same time by splitting buffer size to equal parts.
While semaphores signal, mutexes lock the system.
- 3) Both error and exception are part of Throwable class. Errors are more like: java gives us insufficient memory error or stack overflow error etc. But exceptions are unexpected situations while compiling and running the program. Compile time errors are checked exceptions and run time errors are unchecked exceptions.
- 4) It is useful because we do not need to use codes for threads. If we want to use `@Scheduled` annotation, firstly we have to add awaitility dependency to our pom.xml and `@EnableScheduled` to main class to configure it. And then, we can put `@Scheduled(fixedRate = ?)` upon to a void and non-parameter taken method. With this way, we are able to execute that method periodically.
- 5) When we put `@Async` annotation upon to a public method, this annotation makes sure that method will be executed in a separate thread from main thread. But if we call that method in the same class, then that method does not work asynchronously. To use it, we have to put `@EnableAsync` to our main configuration class. It basically helps us to execute that method independently from system.
- 6) High availability is the ability of a system to operate continuously without failing for a designated period of time.

