**Mutex and Channel basics**

**What is an atomic operation?**

*Atomic operations are operations which are indivisible and can’t be interrupted. It’s an operation which a processor can simultaneously read a location and write it in the same bus operation, the operation HAS to be completed.*

<https://www.webopedia.com/TERM/A/atomic_operation.html>

**What is a semaphore?**

*A good metaphor for semaphore is a bouncer at a night club where the semaphore limits the number of threads(processes) using a resource. It appears as a single integer. The semaphore signals the threads telling them if they can use a resource or not.*

<https://docs.oracle.com/cd/E19683-01/806-6867/sync-27385/index.html>

<https://stackoverflow.com/questions/34519/what-is-a-semaphore>

**What is a mutex?**

*Mutually exclusive so in a way a mutex is also a way to limit accessibility to threads. The thread who has the mutex is the only thread which can operate on that said resource at a time.*

<https://stackoverflow.com/questions/34524/what-is-a-mutex>

**What is the difference between a mutex and a binary semaphore?**

*A mutex is a locking mechanism while a semaphore is a signalling mechanism.*

<https://www.geeksforgeeks.org/mutex-vs-semaphore/>

**What is a critical section?**

*A critical section is a section ensuring that multiple threads doesn’t use the same resources at the same time. The section is protected from unexpected behaviour.*

**What is the difference between race conditions and data races?**

*A race condition is when the timing or the order of events affects a programs correctness. While a data race happens when there are two memory accesses in a program which targets the same location, are performed by two concurrent threads and the operation isn’t a reading one, and they are asynchronous.*

<https://blog.regehr.org/archives/490>

**List some advantages of using message passing over lock-based synchronization primitives.**

*The advantages of message passing over lock-bases sync are that it is easier to build massively parallel hardware, and are more tolerant to message passing programming models.*

**List some advantages of using lock-based synchronization primitives over message passing.**

*These can be better in single servers because it could be easier to attain higher performance*

<https://stackoverflow.com/questions/26389408/advantages-of-message-passing>

<https://stackoverflow.com/questions/7140544/message-passing-vs-locking>