Operating Systems: Practice: Lesson 2

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Threads

Thread contains the smallest sequence of the processor commands which can independently managed by the scheduler.

POSIX threads vs Linux threads

POSIX threads and other utilities are just interface for UNIX-based systems whereas Linux threads are kernel implementation of the thread concept.

Most of the POSIX implementations on linux distros implement POSIX threads as 1-1 to kthreads.

Threads As Kernel Objects

Threads are kernel objects and the operations with them cost time because of the obvious reasons.

POSIX Thread Creation

```
int pthread_create(
pthread_t thread,
const pthread_attr_t attr,
void *(*start_routine)(void*),
void* arg);
```

Linux Man:
https://man7.org/linux/man-pages/man3/pthread_create.3.html

Mutex

Mutex is a synchronization primitive which allows mutual exclusion for the resource it protects, i.e it limits the access to the only thread that currently holds the lock.

Other synchronization primitives??

POSIX Mutex

```
int pthread_mutex_init(
pthread_mutex_t mutex,
const pthread_mutexattr_t attr);
```

https://man7.org/linux/man-pages/man3/pthread_mutex_init.3p.html

Conditional Variable

Conditional variable is a concept of an operating system which is used to determine whether the specific condition is met or not.

We can:
init cv
wait on cv
wait on cv with timely manner
signal cv
broadcast
destroy

Homework 2: Blocking Queue Of Integers

Blocking queue is a FIFO queue which blocks the calling thread upon popping if it is empty or upon pushing when it is full.

You can find the declaration in the file called:
queue.h

Extra point:
What if the queue size is not limited??

Homework 2: Hints

You should use conditional variables and mutex / mutexes.

You have at least 2 conditions full and empty.

Multiple threads can access the queue at the same time.

Thank you!