Tutorial Activity 5

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Concept Questions:

1. **Pthread_create:** creates a new thread, stores id of created thread in location referenced by thread.
   Pthread_join: suspends execution of calling a thread until the argument thread terminates. Once it returns successfully it means the target thread has been terminated.
   Pthread_exit: The thread that calls this function terminates. The cleanup handlers are executed after the thread has been terminated.
2. The memory of threads are all shared. Yes, a thread can access the memory of another thread because it is shared, all dedicated memory is constantly accessible by all other threads. Processes however have separate memory from one another but are contained within the same code block.
3. **Multithreading** is accessing multiple threads on one process.
   Advantages -
   1 - Minimizes idle CPU cycles
   2 - Better use of cache resources
   Disadvantages -
   1 - Increase potential for deadlocking
   2 - Since shared memory, unpredictable results

   Multiprocessing is the use of two or more CPUs within a computer.
   Advantages -
   1 - Independence in memory
   2 - Increase speeds (as if using two computers rather than 1)
   Disadvantages -
   1 - Large main memory required
   2 - Not all problems can be divided
4. **Critical section** is a piece of code that should not be run by multiple threads at the same time because of the shared resources used by the code. **Mutual exclusion (mutex)** is a data structure used to protect critical sections. Mutex can be shared between processes.
5. **Pthread_mutex_init** takes a pthread_mutex_t as a first arg and attributes can be defined in the secon arg. NULL in the second arg uses default values.
   Pthread_mutex_(lock/trylock/unlock) these functions can be used to perform mutex locking and unlocking