CS 6210 Prelab

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Questions

1 The main function contains calls to exit() (line 66) and pthread_exit() (line 80). How will the effect of these two calls differ when they are executed?

Line 80 is a *pthread_exit()* which fails when the thread is unable to join. It is an exit function for the specific thread, while Line 66 calls a ubiquitous exit, since a producer thread could not be created. Unlike the exit subroutine, the *pthread_exit()* subroutine does not close files and it calls only he calling thread. Thus any file opened and used only by the calling thread must be closed before calling this subroutine. Simply put, *pthread_exit()* terminates only the calling thread while *exit()* terminates the entire process.

2 The main function calls pthread_join() (line 77) with the parameter thread_return. Where does the value stored in thread_return come from when the consumer_thread is joined?

Thread_return() value is obtained as a return from the consumer routine which returns the count value. If the thread does not return, the parameter is obtained from the cancelled or exiting function of the respective thread.

3 Where does the value stored in thread_return come from if the joined thread terminated by calling pthread_exit instead of finishing normally?

Pthread_exit function is passed the argument and it gives the parameter for thread_return if the thread terminates instead of finishing normally.

4 On the same call to pthread_join() (line 77), what will it do if the thread being joined (consumer_thread, in this case) finishes before the main thread reaches the that line of code (line 77)?

Pthread_join() returns when the joining thread returns. If the joining thread has already finished, pthread_join() return IMMEDIATELY and the program execution continues.

5 In this program, the main thread calls pthread_join() on the threads it created. Could a different thread call pthread_join() on those threads instead? Could a thread call pthread_join() on the main thread (assuming it knew the main thread's thread ID - i.e. pthread_t)?

Any thread can call pthread_join() in order to join it as long as it knows the thread ID. But when the main thread returns, it calls an explicit exit() that terminates all threads and thus making the join infeasible.

6 The consumer_routine function calls sched_yield() (line 180) when there are no items in the queue. Why does it call sched_yield() instead of just continuing to check the queue for an item until one arrives?

Schedul_yield() is a means of the routine to return use of the CPU to any other thread in need of it. If it continues to check the queue, it wastes scheduled cycles to simply wait on an item to arrive. Thus *schedule_yield()* allows other threads to access resources.