CSC 345 Operating Systems
Class 16 March 6, 2014
Assignment on POSIX Threads
Complete by: Thursday, March 27, 2014

Objectives: Gain experience in designing concurrent applications
Gain experience using POSIX threads
Gain experience in using synchronization techniques

Please work individually on this assignment.

1) **Turn in a written report (printed and bound appropriately)**, including a current bug report (not a listing of issues you found and solved, but a listing of the sections of the project not implemented or not generating correct results, etc.). This report is to be handed in at the beginning of class on March 27. *No late work will be accepted.* The report must contain a description of your specifications of the system you create (minimum specs provided below), a descriptive summarization of your implementation, and discussion of testing, with each component of testing summarized and output generated used as illustration. Do not use cell phone pictures to capture your output. Actual screen shots are acceptable. You must include a section of discussion on the support of concurrency and the control of data consistency through synchronization in your project implementation.
2) **Upload** a copy of your report to Canvas, as well as your (fully commented) code and any data files. A readme file is needed, describing compilation (e.g., use of a makefile or other compilation strategy) and execution steps.
3) **In-person peer/instructor review** (TBA)

Priority Based Room Reservation System
Basic Specifications

Faculty, staff, and students would like to reserve study rooms in the TCNJ Library. Assume there are three priorities of users requesting use of a study room: students (high), the group consisting of faculty and staff (low), and an administrator (controlling hours of availability and room availability (for example, a room might go offline to be painted or a room might be specially reserved, over-riding the reservation system). You are to design a room reservation system. You may implement a proof of concept system that focuses on a one-month time frame. Recognize that this is a priority-based system. You need to consider how to incorporate fairness while asserting priority levels in the system. Each developer must determine whether s/he is implementing a reservation system vs. a reservation simulator.

A user can request availability for a room of specific size {small, standard, or very large} for a particular day and time slot. A response to the request is returned in real-time, assuming a true system is implemented. A simulator approach will make the response appear real-time.

The requester must provide information: User ID (a 6 digit number, such as your PAWS ID), a valid email address, specific room requested, hours requested (3 hour limit; you may assume full hour segments), and willingness to substitute (have a similar or larger sized room assigned as an alternative). In near real-time, the requester will receive a confirmation (with pertinent information) or a decline.

A user will be notified if an over-ride occurs, via an email.
A user may cancel a reservation.
You should use the system date and time in synchronizing reservations.

You may assume that study rooms may be reserved during the hours as shown:
Monday-Thursday, 8:00 a.m. – 12:00 a.m.
Friday, 8:00 a.m. – 6:00 p.m.
Saturday, 10:00 a.m. – 7 p.m.
Sunday, 11:00 a.m. – 11:00 p.m.

The Library rooms and sizes are listed on the following page.

The room reservation system is to be multi-threaded. Requests may be concurrent.

Overbooking of rooms is not permitted.

Any updates to these basic specifications listed above will be posted on Canvas.

A rubric will be posted during the week of March 17th, after we have had an opportunity to discuss your questions on the project.

TCNJ Library Study Rooms

Floor	Room number	Special purpose	Designation of size	Sq. footage	Seating	Floor total
LL						0
1						3
	109		small	122	4	
	110		standard	145	6	
	111		small	125	4	
2					14	7
	202		standard	165	6	
	205	Some Curr mat'l storage	standard	165	6	
	220		very large	310	12	
	224		large	190	6	
	225		standard	154	6	
	226		standard	155	6	
	228		standard	168	6	
3					48	9
	301		standard	159	6	
	308		standard	150	6	
	309		standard	150	6	
	310		standard	146	6	
	311		standard	146	6	
	315		standard	150	6	
	316		standard	150	6	
	317		standard	149	6	
	319		standard	161	6	
4					54	7
	404	Group listening	small	130	4	
	406	Group Viewing	standard	150	8	
	411		standard	144	6	
	412		standard	144	6	
	413	Graduate Students	very large	281	12	
	414		standard	184	6	
	415		standard	184	6	
					48	
Building Total					164	26