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CISC 3320

Homework 2

Design Document

Semaphores.cpp

Main:

- Description: Creates 3 semaphores and forks 100 processes. Each process randomly selects a semaphore to use and requests said resource.

class Semaphore

- Semaphore(char *, int, mutex&):
    - Description: The constructor that creates the Semaphore, and sets the size while allocating the required data structures.
    - Parameters: name - C style string, size - an integer representing the number of available resources. And mu - a reference to a mutex lock.
    - Function: to create the Semaphore object
- Bool RequestResource(int):
    - Description: Locks the resource, or waits until the resource is unlocked. Then check if there are any available resources if there are insert processes into the active processes set and decrement available resources. Else store pid in the queue for later.
    - Parameters: pid - int represents the process id that is requesting the resource.
    - Function: to regulate access to limited number of resources.

- Void ReleaseResource(int):
    - Description: Locks the resource or waits until the resource is unlock. Then verifies that the process has actually requested a resource, if so checks if the queue has any processes waiting for access. If there are any waiting processes the first one is dequeued, inserted into the active processes, and told to continue. Otherwise, if there are no active processes increment available resources.
    - Parameters: pid - int represents the process id that is requesting the resource.
    - Function: To release a requested resource and allow other processes to continue with their request.