

Concurrent Programming

Concurrent Programming

1. Implement a stack as a linked list in which the push, pop, and isEmpty methods can be safely accessed from multiple threads
2. Implement a Queue class whose add and remove methods are synchronized. Supply one thread, called the producer, which keeps inserting strings into the queue as long as there are fewer than ten elements in it. When the queue gets too full, the thread waits. As sample strings, simply use time stamps new Date().toString(). Supply a second thread, called the consumer, that keeps removing and printing strings from the queue as long as the queue is not empty. When the queue is empty, the thread waits. Both the consumer and producer threads should run for 100 iterations.
3. N philosophers sit at a table with a plate of spaghetti in front of them and a fork on their right and one on their left. To eat spaghetti, a philosopher needs both forks close together. Each philosopher is continuously engaged in a sequence of 3 activities: meditating, trying to acquire forks and eating. Write a program that activates N philosopher threads that execute the described loop 100 times. Meditation and the phase where the philosopher eats must be implemented with a variable delay (use for example the sleep call and the rand() function)
4. Reader-Writer Problem: This is a classic problem that demonstrates the use of synchronization in Java. The goal is to have multiple readers reading a shared resource simultaneously, while a writer is able to modify the resource. The challenge is to ensure that readers do not interfere with each other and that the writer has exclusive access to the resource when making modifications.
5. Sleeping Barber Problem: This problem is used to demonstrate the use of synchronization and inter-thread communication in Java. The goal is to model the behavior of a barber shop where customers arrive to get haircuts and the barber is responsible for cutting their hair. The challenge is to ensure that customers are served in the order in which they arrive, and that the barber does not start cutting hair until a customer is available.
6. Write a python program to Print alternate numbers using 2 Threads. Implement using wait and notify construct.
7. Write a python program to implement banking account with necessary function. Ensure both winthdrawl and deposit can be carried out safely by employing concurrenct control.