

Homework 3 report

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1 assignment 1 Hungry Birds

1.1 Solution

Two semaphores were used for this solution one for tracking if the dish is empty i.e wake up parent bird to produce. Another semaphore is track if the dish contains items to consume as well as give mutual exclusion to the dish. If the dish is empty the bird that consumes the last item will release the empty permit and wake up the parent bird. The parent bird will acquire the empty permit and fill the dish with worms in this case 1's. The parent bird will the release the full permit so the next bird can acquire the permit.

2 assignment 2 Bear and Honeybees

2.1 Solution

Solved similar to the assignment 1 the only major difference is that there are several producers instead of consumers. Two semaphores full and empty several bees try to acquire the empty permit and when they do produce one item in the honeypot and the bees will continue to produce until the buffer is full. The last be will then release the permit for full and the bear will wake up and and eat all the honey. After the bear has consumed the honey the bear releases the empty permit.

3 Fair analysis

Because in this solution the semaphore was not set to ensure fairness it is technically not fair. This because if first one thread waits for a permit and then another thread later also waits for the same permit. There is no ensures that the first thread will get said permit. However because of the threads sleeping in between consuming/producing the program will be fair as long as all last thread is can get the permit before the first thread wakes up. Which is generally true as long as the sleep time is long enough or the threads are few enough.