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Scenario 1: All Right-Handed Philosophers

Parameters: 5 0 1 1 0

Output:

Philosopher 0 thinks for 1 units

Philosopher 4 thinks for 1 units

Philosopher 2 thinks for 1 units

Philosopher 1 thinks for 1 units

Philosopher 3 thinks for 1 units

Philosopher 3 wants left chopstick

Philosopher 4 wants left chopstick

Philosopher 4 has left chopstick

Philosopher 0 wants left chopstick

Philosopher 2 wants left chopstick

Philosopher 1 wants left chopstick

Philosopher 1 has left chopstick

Philosopher 3 has left chopstick

Philosopher 0 has left chopstick

Philosopher 2 has left chopstick

Observations:

- All philosophers began by thinking for 1 unit of time, consistent with the provided thinking time parameter.

- Each philosopher then attempted to pick up their left chopstick. Given their right-handed preference, this behavior was expected as part of the setup prone to deadlock.

- The provided output does not conclusively show a deadlock situation, but given the sequence of actions, a deadlock is a potential outcome if no philosopher can acquire both chopsticks to eat.

Scenario 2: Mixed Handedness to Avoid Deadlock

Parameters: 5 philosophers, 10 cycles, 1000 ms max thinking and eating times, mixed handedness (1)

Observations:

- The simulation demonstrates that introducing mixed handedness among philosophers effectively prevents deadlock. Each philosopher is observed to complete their cycles of thinking and eating without the program becoming stuck.
- Philosophers are seen successfully alternating between acquiring left and right chopsticks, eating, and then releasing the chopsticks, indicative of an efficient resource sharing mechanism that the mixed handedness strategy facilitates.
- Notably, the output shows continuous activity with no philosopher indefinitely waiting for a chopstick, contrasting sharply with scenarios where all philosophers have the same handedness and are prone to deadlock.

Insights:

- The mixed handedness approach disrupts the potential for a circular wait condition by ensuring that at least one philosopher can break the chain of holding and waiting for chopsticks, thus significantly reducing the likelihood of deadlock.
- This scenario underscores the importance of carefully considering resource allocation strategies and their impact on system behavior in concurrent programming environments.

Output:Philosopher 4 thinks for 206 units

Philosopher 4 wants left chopstick

Philosopher 4 has left chopstick

Philosopher 4 wants right chopstick

Philosopher 4 has right chopstick
Philosopher 4 eats for 58 units
Philosopher 4 releases right chopstick
Philosopher 4 releases left chopstick
Philosopher 3 thinks for 365 units
Philosopher 3 wants left chopstick
Philosopher 3 has left chopstick
Philosopher 3 wants right chopstick
Philosopher 3 has right chopstick
Philosopher 4 thinks for 464 units
Philosopher 2 thinks for 922 units
Philosopher 2 wants left chopstick
Philosopher 2 has left chopstick
Philosopher 1 thinks for 958 units
Philosopher 0 thinks for 995 units
Philosopher 0 wants left chopstick
Philosopher 0 has left chopstick
Philosopher 0 wants right chopstick
Philosopher 0 has right chopstick
Philosopher 3 eats for 802 units
Philosopher 3 releases right chopstick
Philosopher 3 releases left chopstick
Philosopher 4 wants left chopstick
Philosopher 2 wants right chopstick
Philosopher 4 has left chopstick
Philosopher 2 has right chopstick

Philosopher 3 thinks for 400 units
Philosopher 0 eats for 769 units
Philosopher 0 releases right chopstick
Philosopher 0 releases left chopstick
Philosopher 4 wants right chopstick
Philosopher 4 has right chopstick
Philosopher 0 thinks for 351 units
Philosopher 2 eats for 981 units
Philosopher 2 releases right chopstick
Philosopher 2 releases left chopstick
Philosopher 1 wants left chopstick
Philosopher 1 has left chopstick
Philosopher 1 wants right chopstick
Philosopher 1 has right chopstick
Philosopher 1 eats for 235 units
Philosopher 1 releases right chopstick
Philosopher 1 releases left chopstick
Philosopher 1 thinks for 164 units.....

Scenario 3: Large Thinking and Eating Times

Parameters: 5 0 1 1 0

Output:

Philosopher 4 thinks for 333 units
Philosopher 4 wants left chopstick

Philosopher 4 has left chopstick
Philosopher 4 wants right chopstick
Philosopher 4 has right chopstick
Philosopher 3 thinks for 768 units
Philosopher 4 eats for 431 units
Philosopher 4 releases right chopstick
Philosopher 4 releases left chopstick
Philosopher 3 wants left chopstick
Philosopher 3 has left chopstick.....

Observations:

- This scenario involves philosophers with large thinking and eating times.
- Each philosopher goes through a thinking phase before attempting to eat.
- The output demonstrates the process of philosophers attempting to acquire chopsticks, eating, and then releasing the chopsticks.
- Despite the long thinking and eating times, the system manages the philosophers' interactions effectively, allowing them to take turns eating without deadlock.