Scenario 1

1. buf wait queue blocked queue

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  | C1 |  |  |  |  |  |  |  |  |  |  |  |  |

1. buf wait queue blocked queue

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| c |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C2 |  |  |  |  |

1. buf wait queue blocked queue

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C1 |  |  |  |  |

Is there a character in buf for C1 to get?

No

What will happen in the program as written?

C2 will trigger notify() and C1 will be released from the blocked queue. C1 will attempt to remove from an empty buffer and there will be an error.

What would have happened if the while loop was not in the get() method?

C1 and C2 would not have been held until a character was in the buffer and would have tried to remove characters from an empty buffer.

1. buf wait queue blocked queue

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| c |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | C2 | C1 |  |  |  |

Scenario 2

1. buf wait queue blocked queue

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| c |  |  |  |  |  |  |  | P2 | P3 |  |  |  |  |  |  |  |  |  |  |

1. buf wait queue blocked queue

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  | P2 | P3 |  |  |  |  |  | C2 | C3 |  |  |  |

1. buf wait queue blocked queue

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  | P3 | C2 | C3 |  |  |  |  | P2 |  |  |  |  |

1. buf wait queue blocked queue

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| d |  |  |  |  |  |  |  | P3 | C2 | C3 |  |  |  |  |  |  |  |  |  |

1. buf wait queue blocked queue

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| d |  |  |  |  |  |  |  | C2 | C3 | P3 |  |  |  |  |  |  |  |  |  |

Is it possible for any thread to be woken up by another notify?

No

What would have happened if in 6b a notifyAll() was called?

P3 would have gone to the blocked queue instead of back to the wait queue. It would have acquired the lock and continued.