3. Übung IBN

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Aufgabe 1

Aufgabe 2

a) `wait()` unblocks a process, if `S` is larger than 0.
`signal()` increases S by 1
If those two instructions were to be exchanged, the critical section would be executed not regarding if there is a queue, since the instruction to wait has not been given yet.

b) If $S \geq 2$, Two processes would be allowed to be executed at the same time, or, if $S < 2$, just one process would be started, never giving another process the signal to start.

c) If `wait()` is missing, the critical section will just be executed without checking if there is a queue.
If `signal()` is missing, only S processes can be executed, as there is no way to increase S after a process has finished.

Aufgabe 3

Aufgabe 4

The pseudocode can be found in `pseudo_4.cpp`

Aufgabe 5

Aufgabe 6

a) A Mutex has seperate lock and condition variables. Therefore, condition variables have no history. The condition has to be tested seperately, instead of relying on a signal. Semaphores will remember the Signals given through the Semaphore counter `S`. If a Thread broadcasts a signal, the next time another Thread calls `wait()`, it will start running immediately, regardless of when the signal was given.

b) The Mutex has to hold the lock, in order for processes not to get stuck waiting. This can happen, when a wait function is called first, then a signal runs between the time, where the wait checked for a signal, and the condition. The Thread will not see that a signal has been called, and wait forever.

Aufgabe 7

Memory Task	Long term memory Stores fundamental concepts	Working memory Stores currently needed things
Comparison	Random Access Memory (RAM)	Cache
Speed	Slow	Fast
Volatility	Long storage duration	short storage duration
Unit	Junks / Items	Junks / Items
Size	$10^9 Bytes$	$10^2 Bytes$

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- Memory can be moved from the working memory into the long term memory by repeating the information several times. This works especially well for memorizing vocabulary. Studying everything on one day is generally less efficient then repeating the vocabulary several times during the week.