

# Unit 10 - Week 9

## Course outline

How does an NPTEL online course work?

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Week 2

Week 3

Week 4

Week 5

Week 6

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Week 8

Week 9

Locking variations

Condition variables

Multiple producer, multiple consumer queue; semaphores; monitors

Transactions and lock-free primitives read/write locks

Quiz : Assignment 9

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Assignment Solution

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## Assignment 9

The due date for submitting this assignment has passed. **Due on 2020-04-01, 23:59 IST.**  
As per our records you have not submitted this assignment.

1) The atomic fetch-and-set x, y instruction unconditionally sets the memory location x to 1 and fetches the old value of x in y without allowing any intervening access to the memory location x. consider the following implementation of P and V functions on a binary semaphore. **1 point**

```

1 void P (binary_semaphore *s) {
2     unsigned y;
3     unsigned *x = &(s->value);
4     do {
5         fetch-and-set x, y;
6     } while (y);
7 }
8
9 void V (binary_semaphore *s) {
10    S->value = 0;
11 }
```

- The implementation may not work if context switching is disabled in P.
- Instead of using fetch-and-set, a pair of normal load/store can be used.
- The implementation of V is wrong.
- The code does not implement a binary semaphore.

No, the answer is incorrect.

Score: 0

Accepted Answers:

The implementation may not work if context switching is disabled in P.

2) The aim of this exercise is to help students understand the semantics of binary semaphore. Let S be a binary semaphore variable, therefore initially, S=0. What will be the value of S when following operations are performed in order:

2P, 4V, 5P, 2P, 8V, 3P, 2V

Where P and V stands for wait and signal respectively and numeral preceding specifies the number of processing executing it.

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0

3) What are Spinlocks?

- CPU cycles wasting locks over critical sections of programs.
- Locks that avoid time wastage in context switches.
- Locks that work better on multiprocessor systems.
- All of the mentioned.

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of the mentioned.

4) Which of the following is true about the critical section?

- For the requirement of single instruction critical section it is efficient to implement using atomics if possible.
- For the requirement of small size critical section it is efficient to use skinlocks
- For the requirement of large size critical section it is efficient to use blocking based locking implementation.
- On Uniprocessor it is always better to use spinning based locking implementation.

No, the answer is incorrect.

Score: 0

Accepted Answers:

For the requirement of single instruction critical section it is efficient to implement using atomics if possible.

For the requirement of small size critical section it is efficient to use skinlocks

For the requirement of large size critical section it is efficient to use blocking based locking implementation.

On Uniprocessor it is always better to use spinning based locking implementation.

5) Which of the following conditions is required for deadlock to be possible?

- a process may hold allocated resources while awaiting assignment of other resources.
- no resource can be forcibly removed from a process holding it.
- mutual exclusion.
- All of the above.

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of the above.

6) The monitor construct ensures that

- Only one process can be active at a time within the monitor.
- n number of processes can be active at a time within the monitor (n being greater than 1).
- The queue has only one process in it at a time.
- All of the above.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Only one process can be active at a time within the monitor.

7) To enable a process to wait within the monitor

- A condition variable must be declared as condition.
- Condition variables must be used as boolean objects.
- Semaphore must be used.
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

A condition variable must be declared as condition.

1 point

1 point

1 point

1 point

1 point

1 point