

Course

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This course has already ended.  
The latest instance of the course can be found at: [Concurrent Programming: 2023](#)

Assignment description

My submissions (5/5)

Concurrency basics -- Computational model and critical section.

1. *What is the maximum achievable (theoretical) limit of speed-up when we have a problem where 99% of it is parallelizable?*

1 / 1

Type the answer using an integer number.

100

Correct!

2. *Considering two programs  $x$  and  $y$  which have 2 ( $x1, x2$ ) and 3 ( $y1, y2, y3$ ) actions, what is the total possible number of interleavings when they run concurrently?*

1 / 1

Type the answer using an integer number.

10

Correct!

3. *Which ones are true about Limited Critical Reference?* 0 / 1

- ☒ A statement has a Critical Reference if it either writes to a shared variable that may be read by another thread or it reads from a shared variable that may be written to by another thread.
- ☒ Limited Critical Reference is satisfied if every statement has at least one Critical Reference.
- ☐  $x = x + y$  has 2 critical references if x and y can be read and written to by other threads.
- ☐ LCR is a convenient way that lets us use larger statements instead of listing individual LOAD and STORE machine instructions in order to reason about concurrent programs.
- ☐ A statement that satisfies LCR can be compiled to a sequence of standard (atomic) LOAD or STORE machine instructions of which at most one accesses a shared variable.

More than one is correct.

Incorrect

4. *Which ones are the requirements or assumptions for a correct critical section?* 1 / 1

- ☒ It is required to ensure at most one process is in its critical section.
- ☒ It is required to be deadlock-free in case multiple processes try to enter the critical section.
- ☒ The process scheduler is required to ensure no process is starved of execution time.
- ☐ There is a need to assume a process does not stay indefinitely in both its critical and non-critical sections.

Correct!

5. *Which requirement is not satisfied for the following concurrent program? You can assume that you have a weakly fair scheduler, threads entering their critical section will eventually exit and individual statements are atomic.*

1 / 1

```
//shared variable
boolean signal[] = {false, false};
```

```
// thread 1
while (true) {
    // Non-critical section
    await (!signal[1]);
    signal[0] = true;
    // Critical Section
    signal[0] = false;
}
```

```
// thread 2
while (true) {
    // Non-critical section
    await (!signal[0]);
    signal[1] = true;
    // Critical Section
    signal[1] = false;
}
```

- ☐ Deadlock.
- ☐ Starvation.
- ☒ Mutual exclusion.

Correct!

Submit

Earned points

8 / 10



Exercise info

**Assignment category**  
Multiple choice questionnaires

**Your submissions**  
5 / 5

**Deadline**  
Tuesday, 16 November 2021, 14:00

**Late submission deadline**  
Tuesday, 23 November 2021, 14:00  
(-30%)

**Total number of submitters**  
52

Submission info

**Submitted on**  
Saturday, 13 November 2021, 14:27:14

**Status**  
Ready

**Grade**  
8 / 10

**Submitters**  
Binh Nguyen