CSPB 3753 - Fall 2024 - Knox - Operating Systems

Started on	Monday, 28 October 2024, 9:28 PM
State	Finished
Completed on	Monday, 28 October 2024, 9:33 PM
Time taken	5 mins 29 secs
Grade	**9** out of 10 (**90**%)

Question **1**

Correct

Mark 1 out of 1

Match the word with the definition!

Race Condition	When two or more threads try to change the shared data at the same time. ✔
Concurrency	Interleaving of execution to simulate parallelism ✔
Synchronization	Mechanisms for ensuring order of execution ✔
Critical Section	Area in code where processes access shared resources. ✔
Mutual Exclusion	The idea of which we want to prevent one process from accessing a resource while the current process is modifying said shared resour ✔

Your answer is correct.

The correct answer is: Race Condition → When two or more threads try to change the shared data at the same time., Concurrency → Interleaving of execution to simulate parallelism, Synchronization → Mechanisms for ensuring order of execution, Critical Section → Area in code where processes access shared resources., Mutual Exclusion → The idea of which we want to prevent one process from accessing a resource while the current process is modifying said shared resource.

Question **2**

Correct

Mark 1 out of 1

Which of the following is NOT true for the Test and Set function?

Select one:

- a. is an atomic operation
- b. Blocks the process or thread until value is correct ✔
- c. provides a mutex mechanism
- d. Sets the variable to the new value and returns the old value

Your answer is correct.

The correct answer is: Blocks the process or thread until value is correct

Question **3**

Correct

Mark 1 out of 1

Which of the following are true about Condition Variables?

Select one or more:

- [ ] a. blocks threads based on a value
- [x] b. keeps a list of threads waiting for a signal ✔
- [ ] c. provides exclusive use a variable
- [ ] d. provides mutual exclusion based on a variable value
- [x] e. provides an ordering for thread access ✔

Your answer is correct.

The correct answers are: keeps a list of threads waiting for a signal, provides an ordering for thread access

Question **4**

Correct

Mark 1 out of 1

Which of the following are true about a Monitor?

Select one or more:

- [x] a. functions can only access monitor variables, local variables, and parameters ✔
- [ ] b. any accessed global variable now has implicit mutual exclusion
- [ ] c. monitors have a built-in sleep function
- [x] d. implicitly provides mutual exclusion ✔

Your answer is correct.

The correct answers are: implicitly provides mutual exclusion, functions can only access monitor variables, local variables, and parameters

Question **5**

Correct

Mark 1 out of 1

Which of the following is true when comparing a Mutex with a Binary Semaphore

Select one:

- ( ) a. They represent two states of a process synchronization
- (•) b. They are equivalent ✔
- ( ) c. Semaphores handle more threads than a mutex
- ( ) d. Mutex handle more threads than a semaphore

Your answer is correct.

The correct answer is: They are equivalent

Question **6**

Correct

Mark 1 out of 1

Which of the following is true when comparing a Mutex with a Semaphore

Select one:

- a. They are equivalent
- b. Mutex is built into the kernel, semaphore is not
- c. The semaphore has counting and the mutex does not ✔
- d. Semaphores handle more threads than a mutex

Your answer is correct.

The correct answer is: The semaphore has counting and the mutex does not

Question **7**

Correct

Mark 1 out of 1

A semaphores are accessed through two atomic operations P() and V(). This correspond to what two other names for the functions?

Select one:

- a. signal() and wait()
- b. lock() and unlock()
- c. unlock() and lock()
- d. wait() and signal() ✔

Your answer is correct.

The correct answer is: wait() and signal()

Question **8**

Correct

Mark 1 out of 1

What problem can arise when implementing synchronization with Semaphores?

Select one:

- a. Memory leaks
- b. Race conditions
- c. Deadlock ✔
- d. Mutual Exclusion

Your answer is correct.

The correct answer is: Deadlock

Question **9**

Correct

Mark 1 out of 1

A counting semaphore is initialized to 15.
8 wait operations and 7 signal operations were completed on this semaphore. What is the resulting value of semaphore?

Select one:

- a. 0
- b. 14 ✔
- c. 15
- d. 16

Your answer is correct.

The correct answer is: 14

Question **10**

Incorrect

Mark 0 out of 1

Given the following code with critical section of task 1 and 2 (C1 and C2):

```
/* variables shared between 2 threads */
Lock mutex;
Condition CV;
int state=0;
```

Thread T1:

```
C1;  // code C1
lock(mutex);
state=1;
unlock(mutex);

signal(CV);
```

Thread T2:

```
lock(mutex)
while(!state) {
  unlock(mutex);
  wait(CV);
  lock(mutex);
}
unlock(mutex);
C2;   // code C2
```

Select one:

- C1 always execute followed by C2 executing ✖
- C2 always executes followed by C1 executing
- C2 never executes
- C2 might not execute

Your answer is incorrect.

Remember that a signal may occur when no process is waiting. If T2 does not reach the wait() before T1 signals, T2 will be stuck waiting for a signal that never occurs.

The correct answer is: C2 might not execute