**UNIVERSITY OF NEW YORK TIRANA**
**Komuna e Parisit,Tirana, Albania**
**Tel.: 00355-(0)4-273056-8 – Fax: 00355-(0)4-273059**
***Web Site Address*: http://www.unyt.edu.al**

**Operating Systems**
**Fall 2009**

---

## Example Test: Lesson 6

1. What do you understand with race condition? (2 points).
2. Describe the critical section problem. (4 points)
3. What is the difference between a preemptive and nonpreemtive kernel? (4 points)
4. Describe the three criteria for the solution of the critical section problem. (4 points)

5. Which of the following is correct? Synchronization hardware: ___ (2 points)
   a. can disable interrupts
   b. do not allow for processes to communicate
   c. cannot disable interrupts
   d. cannot allow for atomic instructions
   e. none of these
6. Correct the error in the semaphore below: (4 points)

```
wait (S) {
while S <= 0
; // no-op
S++;
}
signal (S) {
S--;
}
```

7. What is spinlock? (4 points)
8. Correct the error in the following definition of semaphore with no busy waiting. (6 points)

**Implementation of wait:**

```
wait (S){
value++;
if (value < 0) {
add this process to waiting queue
block(); }
```

}

 **Implementation of signal:**

```
Signal (S){
value--;
if (value <= 0) {
remove a process P from the waiting queue
wakeup(P); }
}
```

9. What is violated if the following is verified? (4 points)

```
signal(mutex);
        critical section
wait(mutex);
```

10. What is an atomic transaction? (2 points)
11. Correct the following operations of log-based recovery: (4 points)

If log contains <Ti starts> without <Ti commits>, redo(Ti)
If log contains <Ti starts> and <Ti commits>, undo(Ti)

12. What is purpose of a checkpoint and how does it work? (4 points)