

THE AUSTRALIAN NATIONAL UNIVERSITY

Mid-semester Quiz, Second Semester 2001

**COMP2310
(Concurrent and Distributed Systems)**

Writing Period: 65 minutes duration

Study Period: 0 minutes duration

Permitted Materials: None

All your answers must be written in the spaces provided in this booklet. Only answers written in this booklet will be marked. Do not remove this booklet from the examination room.

Name (family name first):

Student Number:

Official use only:

#4	#1	#-1	#0	Total (160)
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Consider each statement carefully. If you believe that it is correct, write a tick (✓) in the TRUE box, and write nothing in the large box. If you believe that it is incorrect, write a tick (✓) in the FALSE box and write a corrected version of the statement in the large box. It is not sufficient merely to negate a false statement; your answer must show that you understand why it is false.

A correct response earns four marks. An incorrect response earns a penalty of one mark. If you correctly tick the FALSE box but do not rewrite the statement correctly, you earn one mark. If you tick neither box, you earn zero.

1. APL is a programming language that supports virtual MIMD programming.

TRUE FALSE

1

2. In a network of n machines, each of which has a direct connection to all others (but not itself), there are a total of $n(n + 1)/2$ connections.

TRUE FALSE

2

3. *Virtual shared memory* is the simulation of a single address space on a machine with a distributed memory.

TRUE FALSE

3

4. The Unix `fork()` system call returns 0 to the child process.

TRUE FALSE

4

5. The C/Unix statement `sleep(5)`; may return in *more* than 5 seconds.

TRUE FALSE

5

(Have you read the instructions at the top of page 2?)

6. The situation where two processes wish to enter a critical region is called *contention*.

TRUE FALSE

6

7. The first complete solution to the mutual exclusion problem that uses shared variables is known as Dijkstra's algorithm.

TRUE FALSE

7

8. Using a spin lock requires more CPU time than waiting on a semaphore.

TRUE FALSE

8

9. The monitor `wait` method *always* suspends the calling process.

TRUE FALSE

9

10. The Readers & Writers problem is about controlling access to a bounded buffer.

TRUE FALSE

10

11. The file descriptor table is manipulated only via system calls.

TRUE FALSE

11

12. The file descriptor table of a process newly created by `fork()` refers only to standard input, standard output, and standard error.

TRUE FALSE

12

13. Standard output can be redirected to a socket using `close()` and `dup()`.

TRUE FALSE

13

14. Multiple threads within the same process share global variables and the heap.

TRUE FALSE

14

15. The semaphore `signal` method *may* suspend the calling process.

TRUE FALSE

15

16. The monitor wait method *always* suspends the calling process.

TRUE FALSE

16

17. Each method of a monitor is a critical region.

TRUE FALSE

17

18. A program that uses multiple POSIX threads may appear as *one* Unix process.

TRUE FALSE

18

19. In a microkernel operating system, the device drivers are executed in the CPU's privileged mode.

TRUE FALSE

19

20. In a monolithic kernel operating system, the memory manager is executed in the CPU's user mode.

TRUE FALSE

20

21. The lower half of a device driver runs synchronously.

TRUE FALSE

21

22. On an token ring, packet collisions are impossible.

TRUE FALSE

22

23. A process's status changes according to the rules of a state transition diagram.

TRUE FALSE

23

24. Indentation is used to group statements in occam.

TRUE FALSE

24

25. The Ada Linda Output call blocks until another process calls Input with matching parameters.

TRUE FALSE

25

26. The Linda tuple space has a password-protection mechanism.

TRUE FALSE

26

27. Connectionless network protocols are like file I/O systems.

TRUE FALSE

27

28. The `inetd` super-server handles all requests iteratively.

TRUE FALSE

28

29. Sockets are symmetrical: two processes can swap server/client role at will.

TRUE FALSE

29

30. Before streams, the link between a process and most device drivers was the UNIX character I/O system.

TRUE FALSE

30

31. In the fail-stop model, changes to persistent state are not assumed to be correct.

TRUE FALSE

31

32. Crash resilience is the extent to which an application has support to recover from system crashes.

TRUE FALSE

32

33. The operation 'add \$100 to your bank balance' is idempotent.

TRUE FALSE

33

34. An atomic operation is not necessarily idempotent.

TRUE FALSE

34

35. When using a write-ahead log, it is important to write to the log only after it is certain that the operation has been performed.

TRUE FALSE

35

36. Lamport's Algorithm creates a logical time for all transmitted events on a distributed system.

TRUE FALSE

36

37. Unlike a normal procedure call, a remote procedure call is non-blocking.

TRUE FALSE

37

38. A safety property is one which must eventually be true.

TRUE FALSE

38

39. Linear waiting is the strongest form of fairness.

TRUE FALSE

39

40. A set of processes is deadlocked when each process in the set is waiting for an event which can only be caused by another process not in that set.

TRUE FALSE

40