THE AUSTRALIAN NATIONAL UNIVERSITY

Mid-semester Quiz, Second Semester 2000

COMP2310
(Concurrent and Distributed Systems)

Writing Period: 1 hour duration

Study Period: 5 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)

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. The Connection Machine CM-2 is a MIMD computer.

TRUE ❑ FALSE ❑

1

2. The design of a shared-memory multiprocessor (where each CPU has its own cache) must address the problem of *cache coherence*.

TRUE ❑ FALSE ❑

2

3. Within a Unix process, operations are carried out strictly one at a time.

TRUE ❑ FALSE ❑

3

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

TRUE ❑ FALSE ❑

4

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

TRUE ❑ FALSE ❑

5

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

6. The situation where all processes are stuck in the pre-protocol of a critical region because of continual 'bad luck' with interleaving is called *starvation*.

TRUE ❑ FALSE ❑

6

7. Dekker's Algorithm is a solution to the mutual exclusion problem that uses shared variables.

TRUE ❑ FALSE ❑

7

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

TRUE ❑ FALSE ❑

8

9. The semaphore `signal` method *never* suspends the calling process.

TRUE ❑ FALSE ❑

9

10. In the Readers & Writers problem, readers have priority over writers.

TRUE ❑ FALSE ❑

10

11. The file descriptor table is preserved across a call to `exec()`.

TRUE ❑ FALSE ❑

11

12. Standard output can be redirected to one end of a pipe using `close()` and `copy()`.

TRUE ❑ FALSE ❑

12

13. To share a pipe between two processes a program must call `pipe()` before calling `fork()`.

TRUE ❑ FALSE ❑

13

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

TRUE ❑ FALSE ❑

14

15. Monitors are a lower-level structuring concept than semaphores.

TRUE ❑ FALSE ❑

15

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

TRUE ❑ FALSE ❑

16

17. A monitor can be simulated in Java using `synchronized` methods.

TRUE ❑ FALSE ❑

17

18. Java threads run in separate Unix processes.

TRUE ❑ FALSE ❑

18

19. In a monolithic kernel, the device drivers are executed in the CPU's privileged mode.

TRUE ❑ FALSE ❑

19

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

TRUE ❑ FALSE ❑

20

21. The upper half of a device driver is interrupt-driven.

TRUE ❑ FALSE ❑

21

22. In the case of repeated collisions on an Ethernet cable, backoff times increase linearly.

TRUE ❑ FALSE ❑

22

23. The page table is maintained by the memory manager.

TRUE ❑ FALSE ❑

23

24. Synchronous message-passing systems use some form of communication channel.

TRUE ❑ FALSE ❑

24

25. The telephone system is a metaphor for buffered asynchronous communication.

TRUE ❑ FALSE ❑

25

26. Dynamic process creation works best in real-time systems, where predictability is important.

TRUE ❑ FALSE ❑

26

27. According to RFC1983, a multicast packet is a packet intended for all nodes on the network.

TRUE ❑ FALSE ❑

27

28. Communication in Ada is synchronous and unbuffered.

TRUE ❑ FALSE ❑

28

29. The Ada rendezvous is an ideal mechanism with which to program servers.

TRUE ❑ FALSE ❑

29

30. An occam channel can be used to connect any number of processes.

TRUE ❑ FALSE ❑

30

31. The Linda tuple space is used to store untyped tuples of objects.

TRUE ❑ FALSE ❑

31

32. Futures are a programming construct which can be used to implement eager evaluation in shared-variable programming.

TRUE ❑ FALSE ❑

32

33. UDP is a connection-oriented protocol.

TRUE ❑ FALSE ❑

33

34. Connection-oriented protocols are most often used with concurrent servers.

TRUE ❑ FALSE ❑

34

35. The `inetd` super-server uses the `select` system call to listen for requests.

TRUE ❑ FALSE ❑

35

36. If a crash is fail-stop, changes to persistent state are assumed to be correct and complete.

TRUE ❑ FALSE ❑

36

37. The operation 'delete a file' (e.g. using `rm -f`) is idempotent.

TRUE ❑ FALSE ❑

37

38. An idempotent operation is not necessarily atomic.

TRUE ❑ FALSE ❑

38

39. Using a write-ahead log is a way of implementing idempotent operations.

TRUE ❑ FALSE ❑

39

40. To write data to non-volatile RAM, a program must follow a special protocol.

TRUE ❑ FALSE ❑

40