

THE AUSTRALIAN NATIONAL UNIVERSITY

Mid-semester Exam

Semester 1 - 2005

COMP1200**(Perspectives on Computing)**

Writing Period: 1 hour duration

Study Period: 0 minutes duration

Permitted Materials: None

Maximum Marks: 40

Answer ALL questions

Family Name :

Given Names :

Student Number :

Answer all questions in the space provided in either black or blue pen. This exam is worth 20% of the exam mark and will be marked out of 40. Marks for individual questions are given in square brackets. Students are allowed 60 minutes to complete the exam. Students are permitted to have pens, pencil, ruler, etc. However, no other materials are permitted. If there is insufficient space for you to answer a question, then use the blank pages at the end of this exam paper. Clearly indicate this in the space provided for the answer.

No copy of this paper is to be removed from the examination room by candidates nor may any portion of the paper be copied. All copies must be returned to the examiner.

The following are for use by the examiners

Q1	Q2	Q3	Q4	Q5	Q6	Q7	
Q8	Q9	Q10	Q11	Q12	Q13		Total Mark

Computer Architecture

1. [4] In the CPU of a simple computer

- [1] what does ALU mean? _____
- [1] what is stored in the Program Counter?

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- [2] Write down what is the relationship between the *current* value of the Instruction register, and the *previous* value of the Program Counter, while an instruction is being executed?

2. [3] Fill in the blanks:

- [1] The bit pattern 11010011 in 8-bit twos complement represents the value _____ in decimal.
- [1] The value +24 in decimal is represented as _____ in 8-bit twos complement (*show all of the 8 bits*)
- [1] The number of Mb (megabits) in 128 KB (kilobytes) of memory is _____ Mb.

3. [2] A farmer has a herd of cows. She marks each cow with a plastic tag. Each tag carries a unique binary code number.

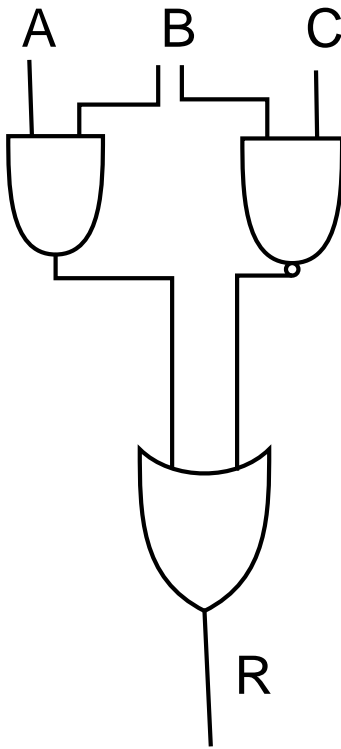
The binary code is marked on the tags by cutting a series of slots in the plastic: a long slot means '1', a short cut means '0'.

What is the maximum size of the herd of cows if she allows a maximum of only 6 slots in every tag?

(*this is the same answer as to the question:*

how many states in a finite state machine can be represented with 6 bits?)

4. [4] Complete the truth table for the logic diagram below.



A	B	C	R
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

————— *Operating Systems and Networks* —————

5. [1] Is this statement true or false?

In an operating system, there can be more than one process that is executing the same program.

Write *True* or *False*: _____

6. [2] In computer networking, TCP and IP are kinds of _____.

In the usual layered stack, one of these (TCP or IP) is shown above the other. The one which is *above* is _____.

7. [2] In an operating system with virtual memory management, consider just one of the processes. The total memory used by this one process

must be smaller than the size of physical memory

can be larger than the size of physical memory

must be exactly the same size as physical memory

none of these answers

Mark the *one* best answer with a cross **X**

8. [4] Explain why a computer will generally complete all of its work more quickly if it uses time-multiplexing. Illustrate your explanation with a simple example.

9. [4] *File system management*

[1] What is the name for the basic allocation unit used for managing disk storage space? _____

[3] Describe one way to store a file that is larger than the size of one of these basic units, on a disk. Explain how can all of the data be read sequentially from a file that is stored in this way.

Computation

10. [5] Fill the blanks in the following sentences.

- A greyscale image containing 512×512 pixels requires _____ KBs of memory to store the frame.
- The _____ approach to representing images allows easy rescaling of images to any arbitrary size, without loss of image quality.
- Given the compressed string 101011 (5, 2, 0) created using the LZ77 compression technique, the uncompressed string is _____.
- An assembler translates code from _____ language into _____ language.
- An algorithm that has a running time of $O(n^{1000} \log n)$ is said to be (tractable/intractable) _____.

11. [4] Briefly describe the declarative programming paradigm. Give an example of a declarative programming language.

12. [2] State two ways of representing algorithms.

13. [3] The compilation process consists of three main stages. State and briefly describe what occurs in the second stage.

This page is for rough work.