

CS1356 Introduction to Information Engineering

Quiz 6, 2010/11/08

Your name _____ Student ID _____

1. For protecting non-shareable resources, there are some related terms. Please explain what is **critical region** ? What is the **mutual exclusion** requirement?

Ans **Critical Region:** A group of instructions that should be executed by only one process at a time.

Mutual exclusion: Requirement for proper implementation of a critical region.

2. Following problem 1, how can we make sure the mutual exclusion of critical region ? Please write out **at least one** solution and use a section of code to explain how to use it.

Ans 1. Use `disable_interrupt()` to prevent context switch during the flag test and set process.

2. A machine instruction called "test-and-set" which cannot be interrupted

3. What are the **four** necessary conditions of causing a deadlock?

Ans 1. Competition for non-sharable resources

2. Resources requested on a partial basis

3. Allocated resources cannot be forcibly retrieved

4. Circular wait

4. What is **virtual memory**? In what case will we use virtual memory? Please list out **two cases**.

Ans **Virtual memory:** employs the physical memory and disk space to create the *illusion* of a larger memory space

1. Memory space is not enough for the program.

2. More than one programs have to use the same space in memory.

5. Suppose a computer contained 512KB of main memory, each page size is 4KB. and there are two programs: A and B.

Both programs need be placed in memory 0x0000-0x08000

Program A and B are executed concurrently (in the multiprogramming sense)

How many **pages** would be required?

Ans:

There are two programs want to use the same space in memory, so them have to use virtual memory artchitecture.

Program A and B need size of ~~32Kbits~~(4KByte = 4KB). 32K bytes

That is both program A and B have a ~~1-page page table~~. 8 pages

So, the answer is ~~1x2 = 2 pages~~. 16 pages