## COMP SCI 3004/7064 Operating Systems

# Tutorial V

**1.** In a ring-protection system, level 0 has the greatest access to objects and level $n$ ($> 0$) has fewer access rights. The access rights of a program at s particular level in the ring structure are considered as a set of capabilities. What is the relationship between the capabilities of a domain at level $j$ and a domain at level $i$ to an objects (for $j > i$)?

**2.** Consider a system in which "computer games" can be played by students only between 10 p.m. and 6 a.m., by faculty members between 5 p.m. and 8 a.m. and by the center staff at all times. Suggest a scheme for implementing this policy efficiently.

**3.** Consider a computing environment where a unique number is associated with each process and each object in the system. Suppose that we allow a process with number $n$ to access an object with number $m$ only if $n > m$. What type of protection structure do we have?

**4.** The list of all passwords is kept within the operating system. Thus if a user manages to read this list, password protection is no longer provided. Suggest a scheme that will avoid this problem. (Hint: Use different internal and external representations.)

**5.** Discuss ways by which managers of systems connected to the Internet could have limited or eliminated the damage done by the worm. What are the drawbacks of making such changes to the way in which the system operates.

**6.** What are the advantages of encrypting data stored in the computer system?