INSTITUTE OF TECHNOLOGY, TRALEE
B.Sc. (Hons & Ord) in Computing with Games Development
B.Sc. (Hons & Ord) in Computing with Multimedia
B.Sc. (Hons & Ord) in Computing with Software Development
Stage 1

SEMESTER 2 EXAMINATION 2008/2009

Operating Systems

External Examiner: Ms. J. Hughes
Internal Examiner: Ms. C. Casey

Duration: 2 Hours

Instructions to Candidates: Answer **any THREE** questions. All questions carry equal marks (33 marks).

Question 1 Process Management

Note: assume here that there is a single CPU.

(a) What is the difference between a program and a process? **(4 marks)**

(b) Describe the 3 states of a process. **(9 marks)**

(c) Give a diagram to illustrate process state transitions. Describe each possible transition that can occur. **(13 marks)**

(d) Describe what is meant by a context switch and how the process control block (PCB) is used in this process. **(7 marks)**

Question 2 CPU Scheduling

Note: assume here that there is a single CPU.

(a) Explain the difference between preemptive and nonpreemptive scheduling. **(6 marks)**

(b) The following table shows the arrival and burst times of 4 processes:

Process	Arrival Time	Burst Time
P1	0	3
P2	1	6
P3	4	4
P4	6	3

Draw Gantt charts for each of the following scheduling algorithms:

(i) FCFS (First-Come, First-Served)
(ii) Nonpreemptive SJF (Shortest-Job-First)
(iii) Preemptive SJF (also called Shortest-Remaining-Time-First (SRTF))
(iv) RR (Round Robin) quantum = 2

For each algorithm give the waiting time of each process. **(21 marks)**

(c) State whether FCFS and RR are preemptive or nonpreemptive. Explain your answer in each case. **(6 marks)**

Question 3 Memory Management

(a) Contiguous Allocation is one method that can be used to allocate memory. Describe this method by explaining what happens when a new process arrives to be executed.
Use diagrams to illustrate to your answer.
Assume First-fit is the method used to allocate memory i.e. allocate the first unused block of memory that is big enough. **(10 marks)**

(b) Paging is another method that can be used to allocate memory. Describe this method by giving an example of a new process and how it is allocated memory. Explain how the free-frame list is used and how a page-table is created for the new process.
Use diagrams to illustrate to your answer. **(23 marks)**

Question 4 Linux

(a) Linux is a multiuser, multitasking operating system. Explain what the terms multiuser and multitasking mean. **(4 marks)**

(b) What will the following commands do in Linux? Assume testfile and testfile1 are files and mydocuments and directory1 are directories.

(i) date
(ii) man pwd
(iii) pwd
(iv) cd mydocuments
(v) cp testfile testfile1
(vi) mkdir directory1
(vii) rm –i testfile1
(viii) cat testfile **(19 marks)**

(c) The following is one of the lines of output from the ls –l command:

-rwxr--r--   1   t00012345   students 4096 2009-02-22 14:10   testfile

(i) Explain the meaning of rwxr--r-- in this output. Give the command to change the value to rwxr--rw- (use chmod command). **(6 marks)**

(ii) Explain the meaning of any 2 other items of information in this output. **(4 marks)**