M.E. First Semester (Computer Science & Engg.) (F.T.) (P.T.) (CGS)

13143 : Operating System Design : 1 RMEF 3 / 1 RME 3 / 1 KMEF 3

P. Pages : 2 AU - 3224

Time : Three Hours *0611* Max. Marks : 80

Notes : 1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Illustrate your answer necessary with the help of neat sketches.

1. a) Difference between. 6
i) Operating system kernel and shell ii) Process and thread
iii) Kernel space and users pace

b) With the help of neat diagram, describe the kernel structure in Linux indicating various components like processor management, memory management etc. 7

OR

2. a) With neat diagram, describe kernel source tree in Linux 6

b) With reference to process management of Linux, Explain purpose of process descriptor and task structure. 7

3. a) Difference between interrupt & interrupt handler. Explain why is it necessary to register interrupt handler under Linux? Give typical structure of code for registry & system call. 6

b) With the help of neat diagram, Explain implementation of interrupt handling under Linux. 7

OR

4. a) With reference to process scheduling under Linux, explain each one of the following: 6
i) Priority ii) Real-time
iii) Context switching.

b) Explain typical structure of system call handler and its implementation under Linux. 7

5. a) Difference between. 6
i) Reader lock & writer locks. ii) Binary & general semaphores.
iii) Semaphores & completion variable.

b) What is meant by big kernel locks? 3

c) What is meant by preemption disabling? Give & explain kernel preemption related function. 5

OR

6. Define each of the following term giving its significance. 14
1) Critical section. 2) Race condition.
3) Contention. 4) Scalability.
5) Semaphores. 6) Deadlocks.
7) Spinlocks.

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7. a) Explain kernel notion of time. Give meaning of tick rate with its benefits & drawbacks. 7

   b) Difference between. 4
   i) RTC & system timer. ii) Jiffies & tick rate.

   c) Briefly explain the structure of timer interrupt handler. 3

OR

8. a) Difference between. 9
   i) Paging & demand paging. ii) Pages & zones.
   iii) Page fragment & page fault.

   b) Explain struct page structure giving the meaning of each field. 5

9. a) Describe common file system interface under Linux. Indicate how an application program can have access to file system. 6

   b) What are various file systems supported by Linux. Explain a need for different file systems. 7

OR

10. a) What is file abstraction layer in Linux? Why is it needed? Explain its interface with kernel had hardware. 7

    b) With the help of neat diagram describe dentry object of VFS in Linux. 6

11. a) Enumerate various kernel modules under Linux and describe the purpose of each module. 7

    b) What is mean by portability of an Operating system? Describe the features of Linux to support portability. 6

OR

12. a) Describe main memory organization as seen by Linux bringing out the meaning of various memory areas. 7

    b) Differentiate between. 6
    i) Virtual address and physical address.
    ii) Virtual memory and cache memory.
    iii) Page cache and Buffer cache.

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