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# Question Paper Code : 40905

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Fourth/Fifth/Sixth Semester
Computer Science and Engineering
CS 6401 – OPERATING SYSTEMS
(Common to : Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Medical Electronics/Information Technology)
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What is the difference between trap and interrupt ?
2. Mention the purpose of system calls.
3. What are the benefits of synchronous and asynchronous communication ?
4. Give an programming example in which multithreading does not provide better performance than a single-threaded solutions.
5. Define external fragmentation.
6. What are the counting based page replacement algorithm ?
7. State the typical bad-sector transactions.
8. What is the advantage of bit vector approach in free space management ?
9. List the advantages and disadvantage of writing an operating system in high-level language such as C.
10. What is handle ? How does a process obtain a handle ?

PART – B (5×13=65 Marks)

11. a) State the operating system structure. Describe the operating-system operations in detail. Justify the reason why the lack of a hardware-supported dual mode can cause serious shortcoming in an operating system ?

(OR)

b) i) Give reason why caches are useful. What problems do they solve ? What problems do they cause ? If a cache can be made as large as the device for which it is caching why not make it that large and eliminate the device ? (8)

ii) Describe the major activities of operating system with regards to file management. (5)

12. a) Describe the difference among short-term, medium-term and long-term scheduling with suitable example.

(OR)

b) Explain the differences in the degree to which the following scheduling algorithms discriminate in favor of short processes :

i) RR

ii) Multilevel feedback queues.

13. a) Explain why sharing a reentrant module is easier when segmentation is used than when pure paging is used with example.

(OR)

b) Discuss situation under which the most frequently used page replacement algorithm generates fewer page faults than the least recently used page-replacement algorithm. Also discuss under which circumstances the opposite holds.

14. a) What are the various disk space allocation methods. Explain any two in detail.

(OR)

b) State and explain the FCFS, SSTF and SCAN disk scheduling with examples.

15. a) i) Under what circumstance would an user process request an operation that results in the allocation of a demand-zero memory region. (8)

ii) Describe an useful application of the no-access page facility provided in Window XP. (5)

(OR)

b) i) What optimization were used to minimize the discrepancy between CPU and I/O speeds on early computer systems. (8)

ii) What manages cache in Windows XP ? How is cache managed ? (5)



PART – C (1×15=15 Marks)

16. a) Consider a system consisting of 'm' resources of the same type being shared by 'n' processes. Resource can be requested and released by processes only one at a time. Show that the system is deadlock free if the following two conditions hold :

i) The maximum need of each process is between 1 and m resources.

ii) The sum of all maximum needs is less than m + n.

(OR)

b) Consider the following set of processes, with the length of the CPU burst given in milliseconds :

| Process | Burst Time | Priority |
|---|---|---|
| $P_1$ | 10 | 3 |
| $P_2$ | 1 | 1 |
| $P_3$ | 2 | 3 |
| $P_4$ | 1 | 4 |
| $P_5$ | 5 | 2 |

The process are assumed to have arrived in the order $P_1$, $P_2$, $P_3$, $P_4$, $P_5$ all at time 0.

i) Draw Gantt charts that illustrate the execution of these processes using the scheduling algorithms FCFS (smaller priority number implies higher priority) and RR (quantum = 1). (10)

ii) What is the waiting time of each process for each of the scheduling algorithms ? (5)