

CS2506

Review II

Sample of exam questions

Learn all the content of the course – all lecture notes. The exam paper may include questions as listed below, variations of them or compositions of several.

Give comprehensive answers that address the respective question.

Lectures 17 and 18 are **not** required for the exam.

1. Explain the structure of the OS and the role of each layer.
2. Analyse the structure and functions provided by the kernel of an OS.
3. How can a user program enter the kernel ? Explain the trap mechanism.
4. Give a classification of OS.
5. Give a definition of the process and analyse it.
6. What are the main components of the process context ?
7. Analyse the set of operations used for process management, considering their outcome.
8. Use an example to discuss what a child process is and how it is created.
9. Explain the concept of thread and its benefits. How is a thread managed ?
10. Explain the purpose of process scheduling.
11. Use a numeric example to analyse the shortest process first scheduling strategy.
12. What is priority scheduling ? In this context, explain the concept of dynamic priorities.
13. Use a diagram to analyse the multilevel feedbacks queue scheduling strategy.
14. Explain the rationale behind two-level scheduling.
15. In the context of real-time scheduling, explain the earliest deadline first scheduling technique.
16. What is the main challenge of the scheduler in a multi-core system ?
17. Analyse the idea of process group scheduling.
18. Explain how the scheduling domain works. Present examples of policies.
19. What is active balancing ?
20. Explain a couple of UNIX process system calls.
21. Explain how UNIX is using the process table.
22. What elements define UNIX scheduling ?
23. What scheduling strategies are used by Win NT ?
24. Explain the component structure of TinyOS.
25. Analyse Android application's lifecycle using a diagram.
26. Compare two different OS in terms of process management.

27. Show and comment Linux process state diagram.
28. How is the process ID allocated in Linux ?
29. Characterise Linux scheduling by its key features.
30. How is Linux computing priorities ?
31. Comment on the difference between virtual addresses and physical addresses.
32. Present methods used to translate virtual addresses into physical addresses.
33. Explain the mechanism of memory pages and the general content of the page table entry.
34. What mechanisms can be used and how for the effective management of page tables ?
35. How does the OS manage free memory space ? Explain the free bitmap solution.
36. How does the OS manage free memory space ? Explain the linked list solution. Discuss how this solution can be made more efficient.
37. What is memory fragmentation and how can it be minimized ?
38. Compare the first fit, next fit, best fit and worst fit memory allocation strategies by using an example.
39. Analyse the buddy memory allocation algorithm.
40. Analyse the swapping technique of memory management. What is demand paging ?
41. Compare two memory replacement strategies, first in first out and second chance.
42. Compare two memory replacement strategies, second chance and the clock algorithm.
43. Compare two memory replacement strategies, not recently used and least recently used.
44. Compare two memory replacement strategies, least recently used and not frequently used.
45. Analyse the working set strategy for memory replacement. What criterion is used to set the values of the two thresholds ? Discuss how Win NT implements this strategy.
46. Explain Linux slab allocator system.
47. How does a device driver work ?
48. Explain the structure of a device driver. What are water marks ?
49. How are I/O devices represented in UNIX ?
50. Compare two I/O schedulers.
51. How does the OS provide exclusive access to a file ?
52. Explain the concept of file metadata. What is included ?
53. Explain the concept of file system metadata. What is included ?
54. How does the OS manage free storage space ?
55. Explain the purpose of Linux Virtual File System.
56. What are a superblock and an i-node ?
57. Explain how RAID improves reliability.

58. Explain how resources are protected in a computer system, using the access matrix strategy as an example.
59. What are the attributes of access rights revocation ?
60. Does Java provide any protection mechanism ?
61. Explain methods used by OS for user authentication.
62. Discuss the MIDP security model.
63. Present the public key infrastructure, discussing the hierarchy of certification authorities.