

- 1a* Please list 4 methods of dealing with deadlocks. Which method does MINIX 3 use? *5pt*
- 1b* Give a solution to the producer-consumer problem using (regular) semaphores. *5pt*
- 1c* Give a solution to the producer-consumer problem using binary semaphores. *10pt*
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- 2a* Explain the tradeoffs of tracking memory allocation with bitmaps vs. linked lists. *5pt*
- 2b* Describe five algorithms that determine appropriate holes for memory allocation. Which algorithm does MINIX 3 use? *10pt*
- 2c* Explain the utility and structure of Inverted Page Tables. *5pt*
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- 3a* Describe the usage of synchronous vs. asynchronous message passing in MINIX 3. *5pt*
- 3b* Explain how a pipeline is implemented between a parent and child process. *10pt*
- 3c* What is a Magic Number? Please name three parts of MINIX 3 in which they are used. *5pt*
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- 4a* Explain the significance of a special file's major and minor device number. **Be precise.** *5pt*
- 4b* What are lost clockticks? How are they handled by the Clock interrupt handler? *5pt*
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- 5a* Explain how the *fsck* utility works. *5pt*
- 5b* Explain the purpose and usage of the *filp* table. *5pt*
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- 6a* What is the difference between ACL and capability-based security?. *5pt*
- 6b* Provide a few brief examples of subverting security using covert channels. *5pt*

Grading: The final grade is calculated by adding the scores per question (maximum: 90 points), and adding 10 bonus points. The maximum total is therefore 100 points.