

First name:

ENSIBS, Vannes, 2016-03-30

Last name:

☐CYBER ☐INFO

System 101 Evaluation

One handwritten A4 sheet double sided allowed but no communication **at all!**

Short and right answers are the best, no need to debate, nor philosophize, grammatically and orthographically correct in either French or English.

Final marking scheme may vary.

Good luck!

1 What is an OS? (6pts)

1. What are the two basic unrelated functions of an OS?
2. Who are the customers?
3. Name three types of hardware on which an OS run:

2 OS Concepts (8 pts)

1. What do UID and GID stands for? Are they unique?
2. Which metadata of a file does uniquely identify it?
3. Can several files share the same name?
4. Can several files sharing the same name be in the same directory?
5. In which data structure are organized files/directories and processes?
6. What is the use of pipe?

3 Processes and Thread (10 pts)

1. What are the two voluntary termination ways of a process?
2. What are the two involuntary termination ways of a process?
3. Draw the diagram of process state that links the process states [Running], [Ready], [Blocked] and the transitions (Scheduler pick another process), (Scheduler pick this process), (Input available), (Input required).
4. What is a race condition (definition or example with emphasis on the cause of the issue)?
5. Why interruption handlers are usually written in ASM?

4 System calls (4 pts)

1. What is the system call that reposition the pointer within a file?
2. What is the system call that send a signal to a process?
3. What is a trap instruction?

4. Why devices should be accessed through the same system calls used with files?

5 Memory (8 pts)

1. What does cause a segmentation fault? How does the OS handle it?
2. How does the free memory can be managed?
3. What is a page?
4. When does a page fault occur?
5. Name three page replacement algorithms and explain one.
6. What is the use of segmentation?

6 File System (16 pts)

1. What are the two types of file?
2. What are the two types of file access?
3. From the directory named *dir*, what would the command "cd ../dir" do?
4. What is an explicit path?

5. What is an implicit path?
6. What is an absolute path?
7. What is a relative path?
8. What does ".." represent?
9. What does "." represent?
10. Name two different means of implementation to keep track of which disk block match with which file.
11. Name one advantage and one drawback of contiguous allocation.
12. What does the "i" in i-nodes stand for?
13. What is named virtual file system?

7 Input/Output (4 pts)

1. What is a DMA?
2. What is called "cycle stealing"?
3. Why do disks need an intern buffer?

4. Why do errors should be handled as close as the hardware as possible?

8 Deadlock (5 pts)

1. What is a deadlock (example or former definition)?
2. According to:
 - (a) $p0$ owns B, I and requests C, E.
 - (b) $p1$ owns D and requests F, A.
 - (c) $p2$ owns G and requests H.
 - (d) $p3$ owns F, and requests B.
 - (e) $p4$ owns nothing and requests C.
 - (f) $p5$ owns H, C and requests D.

Is there a deadlock? If so, list the involved processes and resources?

3. Give two solutions to prevent a deadlock?

4. What does mean starvation?

9 Virtualization and Containerization (5 pts)

1. Give two differences between virtualization and containerization.
2. Name two tools for virtualization.
3. What is the difference between a Docker image and a Docker container?

10 True or False? (11 pts)

Statement	True	False
A process always has a working directory		
A process always has a UID		
A process always has a GID		
Can the user www-data access the file: -rw-r--r-- 1 auzias auzias 104K Mar 24 14:18 exam.pdf		
As for the rights, user is anyone who want to <i>use</i> the resource		
Group's rights exclude the user		
Other's rights exclude the group		
Other's rights exclude the user		
Threads are heavier than processes		
On every OS, file names are not case-sensitive		
You did not read this statement		

Table 1: False or True?

11 Bonus (0 pts)

Any comment on the lesson, slides, anything to say about the course? Advice or suggestion to give? Feel free!