

Theory assignment: Overview

Daniel Bosk*

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1 Aim

The aim of the assignment is, first, to aid your understanding of the treated content by providing questions and problems which inspire reflection. Second, it is to examine the following:

- That you can explain the role of the operating system in a computer system.
- That you understand the requirements for an operating system to work properly and to be able to provide secure execution of user processes.
- That you can analyze the overlaying structure of different operating systems.

2 Prerequisites

This assignment covers part one of the book [2; 3], i.e. “Overview”. This part contains the chapters “Introduction” and “System Structures”. Thus, before beginning with this assignment you should have read these chapters at least once. See the study guide for a complete list of reading instructions.

*This work is licensed under the Creative Commons Attribution-ShareAlike 3.0 Unported license. To view a copy of this license, visit <http://creativecommons.org/licenses/by-sa/3.0/>. Some of the questions are derived from the work of Silberschatz, Galvin, and Gagne.

3 Tasks

1. Define the following operating system types:
 - (a) batch,
 - (b) interactive,
 - (c) time-sharing,
 - (d) realtime, and
 - (e) distributed.
2. Describe the advantages of multiprogramming.
3. Describe why or why not the following instructions should be either privileged or not privileged:
 - (a) setting a timer,
 - (b) reading the time from the system clock,
 - (c) freeing (or erasing) memory,
 - (d) turning off interrupt handling,
 - (e) switching between user and kernel mode.
4. Define the terms
 - (a) trap, and
 - (b) interrupt.(What is the difference between them?)
5. Define the terms
 - (a) kernel, and
 - (b) shell.
6. Describe the relationship of the kernel and shell in
 - (a) a UNIX-like operating system (not including MacOS), and
 - (b) the Microsoft Windows operating system.
7. Describe the role of an operating system in a computer system, including its relationship to the other parts of the system.

4 Examination

Your answers should be handed in using the course platform in a PDF-format. All questions and subquestions must be fully answered. The answers should be well written using correct references including page or section numbers. Use the IEEE Citation Reference¹ and the IEEE format for your references.

¹The IEEE Citation Reference is available at: <http://apachepersonal.miun.se/~jimahl/DT141G/ieeecitationref.pdf>

References

- [1] Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne. *Operating System Concepts*. John Wiley & Sons Inc, Hoboken, N.J., 8 edition, 2009. International Student Version.
- [2] Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne. *Operating System Concepts*. John Wiley & Sons Inc, Hoboken, N.J., 9 edition, 2013. International Student Version.
- [3] Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne. *Operating System Concepts*. John Wiley & Sons Inc, Hoboken, N.J., 9 edition, 2013.