Alternate Project 4: Non-traditional Operating Systems

The purpose of the project is to introduce you to operating systems that are very much out of the mainstream of ordinary computing but that are important in specialized situations.

In this project, you will research and study three different, operating systems that are not the traditional Linux, Unix, Windows, or Macintosh for desktops, laptops, or server systems. You will present your findings in a 10-page report that compares and contrasts the three operating systems, their purposes or reasons for being, their approaches to or implementations of the principal abstractions of an operating system, and what makes them special.

Of your three operating systems

- at least one must be a smartphone operating system,
- at least one must be an embedded operating system (i.e., an operating system for a computer that is embedded in a larger system), and
- at least one must be a real-time operating system.

It is okay if one operating system falls into more than one of these categories, but you still need to report on three operating systems in all.

Part 1: Choosing your Operating Systems

We are all familiar with the personal computer systems such as MacOS and Windows and with Unix and Linux systems used in university computing centers and many commercial situations. Most of us are less familiar with operating systems used to support games, cell phones and other personal devices, real-time applications, process control systems, embedded applications, fault-tolerant transaction processing systems, etc.

For the first part of this project, you must research and identify five operating systems that meet these qualifications. The operating systems must be currently available and in use for practical purposes. Systems that are not acceptable include (but are not restricted to)

- obsolete operating systems of an earlier generation that are no longer maintained,
- academic systems that exist purely for the teaching of operating systems topics,
- experimental or new systems that are not readily available or released,
- Linux or Unix lookalikes and variants, such as GNU Linux, FreeBSD, and Solaris.

For each identified system, please write one paragraph that describes its reason for being, its target market or application space, the principal requirements that it must address, and its goals and objectives. Paragraphs should be written in your own words, not copied from published material. Also include at least one reference indicating where in-depth information may be found.
List the operating systems in order of your preference. The Professor will review your submissions and tell you which three to study for your final report.

The reason for requiring five operating systems in this part of the project is to ensure, to the extent possible, that students report on as wide a variety of operating systems as possible and that not everyone reports on the same three systems.

You must submit this part of the project to the web-based Turnin system by 11:59 PM on Thursday, September 29. Please submit it to the project AltProject4.

Part 2: Your Written Report

For the second part of this project, you must conduct in-depth research using the web and other sources about the three operating systems selected from your list by the Professor. You are responsible for studying the principal characteristics of the selected operating systems, including how they handle concurrency and scheduling, memory management, files and persistent storage, input, output, and graphics (if any), networking (if any), security and authentication, and anything else that is relevant.

Compare and contrast the three operating systems. Tables, charts, and figures are welcome. Explain what is similar about them and what is different. Relate the differences to the target markets or application spaces that the respective operating systems are intended for. Also explain why one of the traditional desktop/laptop/server operating systems based on Windows, Linux, Unix, or MacOS cannot be used.

Present your findings in a written report of about ten pages in either Microsoft Word or PDF format. This should be 11-point font and 1.5-line spacing. Not included in your page count is the cover page, table of contents (if any), list of figures (if any), list of references, and other material that adds to the page count but does not add to the body of the report.

Written reports are due at 11:59 PM on Sunday, October 9, 2011. Please submit them to the project AltProject4.

Written reports must be in your own words! Occasional quoting from published manuals or other sources is acceptable, provided that appropriate citations are included. However, constructing a written report by broadly quoting or copying published material is not acceptable, even if the material is properly cited. You may include figures and charts that you find in the reference materials, so long as you provide appropriate citations.

Wikipedia

Wikipedia is not a valid source for citations in research. However, it is a very practical tool for helping you to find valid sources. Once you have found some valid sources — i.e., research papers, product brochures or manuals, vendors’ white papers, etc. — cite those, not Wikipedia. If you find some interesting information in Wikipedia, track it down to the primary sources and verify its accuracy and validity.

Grading

This project will be worth 40 project points in CS-3013. The grade will be apportioned as follows—
• 10 points for Part 1, the list of five operating systems with one paragraph of explanation each (i.e., 2 points per operating system)

• 30 points for the written report, based on the clarity and thoroughness of the explanations and comparisons.

Late delivery without prior permission from the Professor will result in a loss of 10% of the points for that deliverable per day late.¹

¹ “Prior permission” means at least one full day before the assignment is due.