Southern New Hampshire University

IT 600 Final Project Guidelines and Rubric

Overview

IT professionals are often called upon to make decisions, provide recommendations, and perform analyses that require an in-depth understanding of the inner workings of an operating system. This summative assessment will provide students with the knowledge and skills required to achieve and maintain this level of understanding throughout their careers. For the summative assessment, students will perform a technical evaluation of an operating system. Students will be offered a choice of operating systems to analyze. Students will use real-time and log-based tools, empirical observation, and scholarly research to analyze the core subsystems of the operating system. For each subsystem, students will research and describe the technology used in that subsystem and compare it to other available technologies. For the final report, students will assess the results of their analyses and perform an overall evaluation of the operating system, with recommendations for how it might be improved.

For the summative assessment you will perform an in-depth technical evaluation of an operating system. The evaluation will be made in terms of the ability of the system and its supporting hardware to meet a set of organizational needs and technical requirements. The organization is a global enterprise that provides premium technical support to other enterprise businesses.

Management will use your evaluation as one element among several in their assessment of options for future technology adoption. You will define the technical requirements, based on tasks performed by the organization, the applications used, system loads, security, system management, maintenance, and performance. The scope of the evaluation will include analyses and assessments of the hardware-software interface, the techniques used to implement processes and threads, the file systems supported by the operating system, the input/output subsystem, and the operating system security features. You will use these analyses and assessments to produce a comprehensive evaluation, which will be written in the form of a detailed technology review.

SNHU will provide tools to support analysis of some commonly used operating systems, but you may select another operating system if you have the resources to do so. There will also be several milestones throughout the course that will allow you to develop the evaluation incrementally.

The project is divided into three milestones, which will be submitted at various points throughout the course to scaffold learning and ensure quality final submissions. These milestones will be submitted in **Modules Two, Three, and Seven**. Your final report will be submitted in **Module Nine**.

Prompt

Your technical evaluation of an operating system should include analyses and assessments of the hardware-software interface, the techniques used to implement processes and threads, the file systems supported by the operating system, the I/O subsystem, and the operating system security features. You will use these analyses and assessments to produce a comprehensive evaluation, which will be written in the form of a detailed technology review.

Specifically, the following **critical elements** must be addressed:

I.   Organizational Needs and Requirements
    A. Develop an **organizational profile** that analyzes the tasks performed by the organization, the computer applications in use or expected to be in use, and the estimated system loads anticipated for the operating system.
    B. What are the organizational, security, and performance and reliability requirements related to operating system **function, management, and maintenance**?

II. Computer Architecture
    A. What **hardware** is required to host the operating system? This should include an identification of the minimal hardware required and an assessment of what would be needed to support organizational needs and requirements.
    B. Analyze the architecture in terms of **support and functionality** of process management, memory management, I/O, and mass storage.
    C. Analyze the architectural support for multiprocessor systems and assess the organization, connection, and control aspects. What are some **architectural issues** that might arise regarding technologies used in multiprocessor systems and how would you recommend utilizing multiprocessor systems in light of these issues?

III. Process Management
    A. Assess the operating system process management in terms of its **responsiveness to organizational requirements**. Use process monitoring tools to gather data for your assessment.
    B. Assess **software tools** for thread analysis and deadlock detection that are available for the operating system. What strategies does the operating system provide for handling deadlocks?
    C. What **support** does the operating system provide for multiprocessing? Assess the applicability and ability of the operating system to allocate tasks between multiple processors.

IV. Memory Management
    A. Describe how the types of memory supported by the operating system are used. What **memory abstraction** does the system use? Use an analysis tool to investigate the mapping to physical memory.
    B. Describe the system support for virtual memory, memory paging, and segmentation. Use a monitoring tool to **assess** their **activity** under heavily loaded conditions.
    C. Assess the **techniques** used for memory management policy and mechanism separation and their utility in managing complexity.

V.   I/O and Mass Storage

     A. Describe the **hardware-software interface** for I/O management used by the operating system. Various techniques are used for enabling the operating system to communicate with devices. What techniques are supported and what are their advantages and disadvantages?

     B. Analyze the **file systems** supported by the operating system. Use file system performance tests to assess the available file systems.

     C. What is the relationship between scheduled process **context switching and I/O interrupt handling**? Analyze the use of device interrupts in the operating system and compare them to other possible approaches to input/output.

VI.   Security

     A. What formal **security model** does the system support? Analyze the system to determine what support it provides for implementing security models and assess the relevant tools and services made available to administrators.

     B. **Recommend techniques** and best practices to further support security of the operating system.

VII.   **Overall Evaluation**: Using the defined requirements, analyses, and assessments, develop a comprehensive detailed technology recommendation. Include an integrated assessment of the operating system's capability to support organizational needs and technical requirements.

Milestones

Milestone One: *Situation Analysis*

In **Module Two**, you will conduct a situational analysis. You will write a short paper that describes the business-related challenges faced by the organization. **This milestone will be graded with the Milestone One Rubric.**

Milestone Two: *Analytical Organizational Profile*

In **Module Three**, you will conduct an analytical organizational profile. Your work will be completed in the Milestone Two Template document. **This milestone will be graded with the Milestone Two Rubric.**

Milestone Three: *Full Organizational Profile*

In **Module Seven**, you will complete a full organizational profile. Your work will be completed in the Milestone Three Template document. **This milestone will be graded with the Milestone Three Rubric.**

Final Submission: *Technical Evaluation of an Operating System*

In **Module Nine**, you will consider the questions below and make revisions to the document you submitted for Milestone Three. With your Milestone Three document in front of you, consider the following and make revisions as necessary:
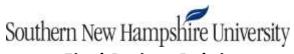
a) Have you incorporated all of the feedback and suggestions you received from your instructor?
b) Does your submission address all of the critical elements outlined above?
c) Does the operating system you selected match the specific requirements your organization identified?
d) Do you have title and references pages?
e) Is your submission at least 15 pages of content not including title and reference pages?
f) Have you supported each of your positions with a credible source?
g) Have you properly cited your sources and made proper attribution for any copyrighted graphics or photos?
h) Does your submission make a clearly stated recommendation for an operating system?

Your final submission should be a polished artifact containing all of the critical elements of the final project. It should reflect the incorporation of feedback gained throughout the course. **This submission will be graded using the Final Project Rubric (below).**

Deliverables

Milestone	Deliverable	Module Due	Grading
One	Situation Analysis	Two	Graded separately; Milestone One Rubric
Two	Analytical Organizational Profile	Three	Graded separately; Milestone Two Rubric
Three	Full Organizational Profile	Seven	Graded separately; Milestone Three Rubric
	Final Submission: Technical Evaluation of an Operating System	Nine	Graded separately; Final Project Rubric

Final Project Rubric

Guidelines for Submission: Your report should be 15 pages double-spaced paper or the completed template provided in Milestone Three, professionally written, with necessary citations in APA format and any accompanying visuals or additional artifacts submitted as part of an appendix section.

Critical Elements	Exemplary (100%)	Proficient (90%)	Needs Improvement (70%)	Not Evident (0%)	Value
Organizational Profile [IT-600-06]	Meets "Proficient" criteria and organizational profile shows keen insight into organizational needs and requirements	Develops an accurate and detailed organizational profile that analyzes the tasks performed by the organization, the computer applications in use or expected to be in use, and the estimated system loads	Develops an organizational profile that analyzes the tasks performed by the organization, the computer applications in use or expected to be in use, and the estimated system loads, but with gaps in accuracy or details	Does not develop an organizational profile that analyzes the tasks performed by the organization, the computer applications in use or expected to be in use, and the estimated system loads	5.75
Function, Management, and Maintenance [IT-600-06]	Meets "Proficient" criteria and draws insightful conclusions or inferences about the implications of the requirements for the operating system	Fully describes the organizational, security, performance, and reliability requirements as they relate to operating system function, management, and maintenance	Describes the organizational, security, performance, and reliability requirements as they relate to operating system function, management, and maintenance, but with gaps in details	Does not describe the organizational, security, performance, and reliability requirements as they relate to operating system function, management, and maintenance	5.75
Hardware [IT-600-01]	Meets "Proficient" criteria and draws insightful conclusions or inferences about the implications of the requirements for the hardware	Accurately explains the hardware required to support the operating system, and assesses the hardware needed to support organizational needs and requirements	Explains the hardware required to support the operating system, and assesses the hardware needed to support organizational needs and requirements, but with gaps in accuracy or details	Does not explain the hardware required to support the operating system	5.75
Support and Functionality [IT-600-01]	Meets "Proficient" criteria and analysis shows keen insight into the significance of the architecture for process management, memory management, I/O, and mass storage	Accurately analyzes the architecture in terms of support and functionality of process management, memory management, I/O, and mass storage	Analyzes the architecture in terms of support and functionality of process management, memory management, I/O, and mass storage, but analysis is inaccurate or lacking detail	Does not analyze the architecture in terms of support and functionality of process management, memory management, I/O, and mass storage	5.75
Architectural Issues [IT-600-05]	Meets "Proficient" criteria and analysis shows keen insight into the significance of the architecture multiprocessor systems	Accurately analyzes the architectural support for multiprocessor systems and assesses the organization, connection, and control aspects of the system	Analyzes the architectural support for multiprocessor systems and assesses aspects of the system, but with gaps in accuracy or details	Does not analyze the architectural support for multiprocessor systems	5.75

Responsiveness to Organizational Requirements [IT-600-02]	Meets "Proficient" criteria and draws insightful conclusions or inferences about the value of process management in terms of its responsiveness to organizational requirements	Assesses operating system process management in terms of its responsiveness to organizational requirements, using process monitoring tools to gather data	Assesses operating system process management but the assessment lacks detail or the use of process monitoring tools is not evident	Does not assess operating system process management	5.75
Software Tools [IT-600-02]	Meets "Proficient" criteria and shows keen insight into the significance of deadlocks and related problems and the tools and techniques used in detection, recovery, avoidance, and prevention	Assesses software tools for thread analysis and deadlock detection available for the operating system and explains associated strategies	Assesses software tools for thread analysis and deadlock detection available for the operating system and explains associated strategies, but with gaps in detail or accuracy	Does not assess software tools for thread analysis and deadlock detection available for the operating system and explain associated strategies	5.75
Support [IT-600-05]	Meets "Proficient" criteria and evidences keen insight into the technology of multiprocessing and its applicability in organizational needs and requirements	Accurately assesses the applicability and ability of the operating system to allocate tasks between multiple processors	Assesses the applicability and ability of the operating system to allocate tasks between multiple processors, but with gaps in accuracy, analysis, or detail	Does not assess the applicability and ability of the operating system to allocate tasks between multiple processors	5.75
Memory Abstraction [IT-600-03]	Meets "Proficient" criteria and shows keen insight into the significance of the memory abstraction for system utility	Accurately describes how the types of memory supported by the operating systems function based on analysis	Describes how the types of memory supported by the operating systems function but with gaps in detail or accuracy	Does not describe how the types of memory supported by the operating systems function	5.75
Assess Activity [IT-600-03]	Meets "Proficient" criteria and shows keen insight into the advantages and disadvantages of memory management technologies	Assesses the system support for virtual memory, memory paging, and segmentation	Assesses the system support for virtual memory, memory paging, and segmentation, but the assessment lacks accuracy or detail	Does not assess the system support for virtual memory, memory paging, and segmentation	5.75
Techniques [IT-600-03]	Meets "Proficient" criteria and shows keen insight into how separation of policy from mechanism can serve as a general principle for reducing complexity	Assesses the techniques used for memory management policy and mechanism separation for their utility in managing complexity	Assesses the techniques used for memory management policy and mechanism for their utility in managing complexity, but some techniques are omitted or the assessment lacks accuracy	Does not assess the techniques used for memory management policy and mechanism separation for their utility in managing complexity	5.75
Hardware-Software Interface [IT-600-04]	Meets "Proficient" criteria and draws insightful conclusions or inferences about I/O techniques across the full range of devices and I/O subsystems	Fully describes the hardware-software interface for I/O management used by the operating system	Describes the hardware-software interface for I/O management, but lacks detail or accuracy of explanation around the role of the operating system in controlling the computer's I/O	Does not describe the hardware-software interface for I/O management	5.75

File Systems [IT-600-04]	Meets "Proficient" criteria and draws insightful conclusions or inferences about the performance of the file systems supported by the operating system	Analyzes the file systems supported by the operating system, including an assessment of file system performance	Analyzes the file systems supported by the operating system, but the analysis is incomplete or inaccurate	Does not analyze the file systems supported by the operating system	5.75
Context Switching and I/O Interrupt Handling [IT-600-04]	Meets "Proficient" criteria and demonstrates clearly the applicability of context switching and I/O interrupt handling technologies	Accurately and comprehensively analyzes the relationship between scheduled process context switching and I/O interrupt handling and compares to other approaches	Analyzes the relationship between scheduled process context switching and I/O interrupt handling and compares to other approaches, but the analysis is incomplete or inaccurate	Does not analyze the relationship between scheduled process context switching and I/O interrupt handling or compare to other approaches	5.75
Security Model [IT-600-06]	Meets "Proficient" criteria and evidences keen insight into the value of formal security models	Concisely analyzes the system to determine the formal security model the system supports	Analyzes the system to determine the formal security model the system supports, but with gaps in detail or accuracy	Does not analyze the system to determine the formal security model the system supports	5.75
Recommended Techniques [IT-600-06]	Meets "Proficient" criteria and evidences keen insight into the effect recommended techniques and best practices would have on further supporting security of the operating system	Recommends techniques and best practices to further support security of the operating system	Recommends techniques and best practices, but the recommendations are not applicable to the operating system or would not logically support security	Does not recommend techniques and best practices for supporting the operating system	5.75
Overall Evaluation [IT-600-06]	Meets "Proficient" criteria and evidences keen insight into the value of the recommendations and their feasibility	Develops a comprehensive, integrated technology recommendation for the case based on the analyses, assessments, and defined requirements	Develops a technology recommendation for the case, but is not comprehensive or not based on the analyses, assessments, and defined requirements	Does not develop a technology recommendation for the case	5.75
Articulation of Response	Submission is free of errors related to citations, grammar, spelling, syntax, and organization and is presented in a professional and easy-to-read format	Submission has no major errors related to citations, grammar, spelling, syntax, or organization	Submission has major errors related to citations, grammar, spelling, syntax, or organization that negatively impact readability and articulation of main ideas	Submission has critical errors related to citations, grammar, spelling, syntax, or organization that prevent understanding of ideas	2.25
				Earned Total	**100%**