SAINT LOUIS UNIVERSITY

Program-Level Assessment: Annual Report

bold

2. Assessment Methods: Artifacts of Student Learning

3.

PLO 3 - Application of Theory, Systems, and Software Development Fundamentals

Outcomes

Graduates of the program will have an ability to...

BA-CS, BS-CS, MS-CS

Application of Computer Systems Fundamentals

Criterion	4: Exemplary	3: Accomplished	2: Developing	1: Beginning
Program Execution	Student can **critically evaluate** execution management strategies in real contexts and **adapt or create** new strategies to accomplish or optimize system goals.	Student can **implement or describe a concrete implementation** of different code execution strategies to achieve desired system-level outcomes.	Student can **reason about** how and when a system executes code to accomplish its goals. Students can **compare and contrast** different systems and explain why they manage code execution differently.	Student can **describe** how programs, processes, threads, tasklets, or other runnable code is executed on hardware in an abstract, idealized manner. Student can **describe** mechanisms and algorithms that manage computing time as a resource.
Memory and Data Mangement	Student can **critically evaluate** data management strategies in real contexts and **adapt or create** new strategies to accomplish or optimize system goals.	Student can **implement or describe a concrete implementation** of different data management strategies to achieve desired system-level outcomes.	Student can **reason about** how a system manages data storage and movement to accomplish its goals. Students can **compare and contrast** different systems and explain why they manage data differently.	Student can **describe** how data management systems (memory, cache, databases, etc.) function in an abstract, idealized manner. Student can **describe** how computer data is managed as a resource.
Networking	Student can **critically evaluate** networking strategies in real contexts and **adapt or create** new strategies to accomplish or optimize system goals.	Student can **implement or describe a concrete implementation** of different networked communication strategies to achieve desired system-level outcomes.	Student can **reason about** how distributed systems use communication to accomplish their goals. Student can **compare and contrast** different systems and explain why they manage communication differently.	Student can **describe** how network hardware and software operates in an abstract, idealized manner. Student can **describe** protocols and algorithms that manage the transfer of information between systems.
Security				

Notes on the above rubric

- This learning outcome evaluates the students' process of applying learned knowledge and skills to a specific problem, not necessarily the specific skills and learned knowledge itself.
- PLO3 is a broad learning outcome that applies to many courses. This rubric attempts to be general enough so that elements may be applicable to any course covered under PLO3. It is not intended to be specific to the Computer Systems courses. For example, the Algorithms course could incorporate elements of "Program Execution" by analyzing an algorithm's Big-O running time under two models: one where a single instruction occurs per time step (sequential execution) versus another where all possible instructions occur per time step (infinitely parallel execution). Or, the Algorithms course could incorporate elements of "Memory and Data Management" by discussing working-set-size and in-cache versus out-of-cache algorithms or in-core and out-of-core algorithms.
- This rubric attempts to hit Computer Systems concerns at a high and low level. For "Memory and Data Management" a programming course may talk about how the Java garbage collector manages memory, an architecture course may talk about how the CPU cache interacts with memory, an OS course may talk about virtual memory and paging, a database course may talk about database organization, and a security course may talk about where data is encrypted and decrypted.
- In many courses these four dimensions of computer systems will interrelate to one another, even if there are apparently one or two primary dimensions. For example, a networking or distributed systems course might talk about efficiently distributing computation and data storage across client and server, subject to the security concerns of who is trusted to do what kinds of operations.

Application of Software Development Fundamentals

Criterion	4: Exemplary	3: Accomplished	2: Developing	1: Beginning
Team and Work Organization	Student can critically evaluate software development strategies in real contexts and adapt or create new strate-			