

Rubric (Fall 2012)

Senior Project

Assessment of Student Outcomes of the BS in Computer Science of the School of Computing and Information Sciences Florida International University

The School of Computing and Information Sciences evaluates the Senior Projects of its graduating seniors for the purpose of assessing the level of attainment of the Student Outcomes of the BS in Computer Science program.

Your responses to this survey will be used solely for the purpose of assessing the Student Outcomes of the BS in Computer Science program of the School of Computing and Information Sciences at FIU. This survey is expressly NOT for assessment of student performance in the SCIS Senior Project course for assignment of letter grade, nor for assessment of the instructor(s).

Rating Instructions

For each program outcome standard, you are provided with a check-list of 7 or more criteria that evidence attainment of that standard. Please check all criteria that are represented in this project. You may include additional criteria that are not explicitly listed; if so, please record the additional criteria in the appropriate sections. Unless noted otherwise, the number of checked criteria in each section, up to a maximum of 5, will be recorded as your rating of attainment of that outcome standard evidenced in the project.

Project Title Energy-Efficient Scheduling of Delay-Sensitive Applications over Heterogeneous Servers

Semester & Year Fall 2012

Moderator (Faculty / Industry Sponsor): Shaolei Ren

Evaluators: Masoud Sadjadi

Student Outcome (a): Demonstrate proficiency in the foundation areas of Computer Science including discrete structures, logic and the theory of algorithms

Mathematical Foundations

5

Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

X Project design utilizes finite state machines to model system behavior

X Project uses graphs or trees to model some system feature(s)
(Unified Modeling Language, PERT Charts, etc)

 Project uses the syntax of Symbolic Logic to specify design features
(Object Constraint Language, etc)

 Project utilizes terminology and operations of sets, relations or functions
(Equivalence Class Partitioning for generating test cases, etc)

X Project incorporates elements of mathematical reasoning or proof
(Lemma, Theorem, Induction, etc)

X Project utilizes some statistical procedure(s) to represent or summarize data
(Mean, Standard Deviation, Histogram, Percentile-Graph, etc)

X Project utilizes some statistical measure(s) of system behavior or performance
(Probability Distributions, Confidence Intervals, Hypothesis Testing, etc)

Student Outcome (b): *Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.*

Data Structures & Algorithms

3

Enter **n/a** if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

Project utilizes a non-trivial data structure
(Search Tree, Hash Table, Priority Queue, etc)

Project utilizes some graph algorithm
(Shortest Path, Minimum Spanning Tree, etc)

Project implements a customized algorithm

Data structure(s)/algorithm(s) selected are appropriate for the project

Project documents runtime and/or space analysis of selected algorithm(s)

Project documents empirical measurement of algorithm performance

Project documents tradeoffs in selection of data structure(s)/algorithm(s)

Student Outcome (b): *Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.*
Concepts of Programming Languages

3

Enter **n/a** if this Knowledge Area is not significantly represented in this project.
Otherwise, please record the number of checked criteria, up to a maximum of 5.

- Project utilizes knowledge of programming language syntax
(Context-Free Grammars, Parse Trees, Ambiguity, Recursive Descent)

- Project utilizes knowledge of programming language semantics
(Natural Semantics, Interpreters, Expressions, L- and R- Value, Environments)

- Project demonstrates familiarity with language design data-typing issues
(Scoping rules, Dynamic Type-Checking, Static Type-Checking)

- Project utilizes appropriate encapsulation mechanisms for data abstraction

- Project utilizes appropriate code hierarchies (subclasses) for code reuse

- Project implementation utilizes advanced programming language feature(s)
(Recursion, polymorphism, generics)

- Project documents analysis of tradeoffs in selection of the programming language(s)
used in the project implementation

Student Outcome (b): *Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.*

Computer Systems (Database)

3

Enter **n/a** if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

Project implements a customized DBMS or customized DBMS components

Project implementation utilizes conceptual and/or relational schema

Project utilizes an appropriate database query language such as SQL

Project documents consideration of information security issues

Project documents consideration of information privacy issues

Project utilizes an appropriate database management system

Project documents analysis of tradeoffs in selection of a DBMS

Student Outcome (b): Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.

Computer Systems (Operating Systems & Networking)

2

Enter **n/a** if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

Project implementation utilizes knowledge of memory management

Project implementation utilizes knowledge of synchronization

Project documents layered structure of a networked architecture

Project documents analysis of resource allocation or congestion issues

Project documents analysis of performance or reliability issues

Project documents analysis of system security issues

Project documents analysis of tradeoffs in selection of system characteristics

Student Outcome (c): *Demonstrate proficiency in problem solving and application of software engineering techniques.*

4

Enter **n/a** if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

Project demonstrates understanding of the Software Development Life Cycle

Project deliverables include Project Specification

Project deliverables include Feasibility Study and/or Project Plan

Project deliverables include Requirements Documentation

Project deliverables include Design Documentation

Project documents testing and/or evaluation of the implementation

Project incorporates system walkthroughs

Student Outcome (d): *Demonstrate mastery of at least one modern programming language and proficiency in at least one other.*

3

Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

Project is implemented using an appropriate high level language

Project implementation is reasonably efficient rather than “brute force”

Project implementation is modular and well structured

Project implementation uses a modern API or Tool-Kit

Project implementation utilizes recursion

Project implementation utilizes some advanced language features, e.g. polymorphism

A project sub-system or module utilizes an appropriate programming language other than the primary implementation language, e.g. SQL, ML, assembly language

Student Outcome (e): Demonstrate understanding of the social and ethical concerns of the practicing computer scientist

2

Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

Project documents sources and references

Project identifies and addresses any relevant social issues

Project identifies and addresses any relevant ethical issues

Project identifies and addresses relevant legal issues

Project identifies and addresses any relevant privacy issues

Project documents anticipated impact on users/clients

Project documents and addresses any anticipated technology impact issues

Student Outcome (f): *Demonstrate the ability to work cooperatively in teams*

4

Enter **n/a** if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

To be completed by an evaluator

Project presentation(s) included all team members equally

Project team activity is appropriately and adequately documented

To be completed from the data obtained from team members' peer evaluations

Each team member rates each of the other members of their team individually on each criterion listed below on a scale of 1 to 5. The mean of all ratings for each criterion is recorded.

The rubric item is checked only if the project (mean) score ≥ 4.0 for each of the 2 criteria.

Team members' roles were clearly defined and executed

| <u>Criterion</u> | <u>Mean Score</u> |
|---|-------------------|
| 1: <i>Team members had clear understanding of expectations</i> | 3 |
| 2: <i>Team members maximized the use of their individual skill sets</i> | 3 |

Project team set out and followed a schedule for timely completion

| <u>Criterion</u> | <u>Mean Score</u> |
|---|-------------------|
| 3: <i>Team members complied with mechanisms to track progress</i> | 3 |
| 4: <i>Team members completed assignments in a timely fashion</i> | 3 |

Project team negotiated consensus when needed

| <u>Criterion</u> | <u>Mean Score</u> |
|---|-------------------|
| 5: <i>Team members showed respect for other team members opinions</i> | 4 |
| 6: <i>Team members were able to negotiate and compromise</i> | 4 |

Project completion evidences equitable participation by team members

| <u>Criterion</u> | <u>Mean Score</u> |
|---|-------------------|
| 7: <i>Team members contributed ideas and viewpoints</i> | 4 |
| 8: <i>Team members did their fair share of the work</i> | 4 |

Team members shared responsibility for success and failure

| <u>Criterion</u> | <u>Mean Score</u> |
|---|-------------------|
| 9: <i>Team members actively sought & shared information from each other</i> | 3 |
| 10: <i>Team members were adaptable to changing requirements</i> | 3.5 |

Program Outcome (g): *Demonstrate effective communication skills*

5

Enter **n/a** if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

Written presentation

X Completeness Project reports document all essential project features

X Organization Project reports are organized and written in standard formats

Oral Presentation

- 1) Rate each presenter individually using the oral presentation rubric provided
- 2) Record the presenters' ratings of each presenter in each rubric item
- 3) Calculate the mean presenter rating for each rubric item
- 4) **For each rubric item, check only if the mean score ≥ 3.0**

X Domain Knowledge:

| Presenter 1 | Presenter 2 | Presenter 3 | Presenter 4 | Presenter 5 | Mean |
|-------------|-------------|-------------|-------------|-------------|------|
| 4 | 4 | | | | 4 |

X Organization:

| Presenter 1 | Presenter 2 | Presenter 3 | Presenter 4 | Presenter 5 | Mean |
|-------------|-------------|-------------|-------------|-------------|------|
| 4 | 4 | | | | 4 |

X Presentation Aids:

| Presenter 1 | Presenter 2 | Presenter 3 | Presenter 4 | Presenter 5 | Mean |
|-------------|-------------|-------------|-------------|-------------|------|
| 3 | 3 | | | | 3 |

X Elocution:

| Presenter 1 | Presenter 2 | Presenter 3 | Presenter 4 | Presenter 5 | Mean |
|-------------|-------------|-------------|-------------|-------------|------|
| 3 | 3 | | | | 3 |

X Audience Contact:

| Presenter 1 | Presenter 2 | Presenter 3 | Presenter 4 | Presenter 5 | Mean |
|-------------|-------------|-------------|-------------|-------------|------|
| 3 | 3 | | | | 3 |

Note: Scores were taken from Juan Caraballo's grade sheet.

Program Outcome (h): Have experience with contemporary environments and tools necessary for the practice of computing

5

Enter n/a if this Knowledge Area is not significantly represented in this project. Otherwise, please record the number of checked criteria, up to a maximum of 5.

Self-ratings of competency are provided by the student project-team on the following scale:

5: Expert, 4: Advanced, 3: Competent, 2: Intermediate, 1: Novice

Check-mark is earned if the team's competency rating is 2 or higher.

 X Presentations use contemporary presentation and demonstration tools

 X Project artifacts are developed using modern document preparation tools

 Project management and/or version control software are employed

 X Design phase utilizes modeling software

 X Implementation utilizes a contemporary database management system

 X Implementation includes web-based programming (server, web-page)

 Implementation is validated using contemporary validation/testing software

Notes: