

## Rubric (Spring 2013)

### 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 Senior Project Website

Semester & Year Spring 2013

Moderator (Faculty / Industry Sponsor): Masoud Sadjadi and Juan Caraballo

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**

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 design utilizes finite state machines to model system behavior

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)

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

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

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

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 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**

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 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)

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 implements a customized DBMS or customized DBMS components

X Project implementation utilizes conceptual and/or relational schema

X Project utilizes an appropriate database query language such as SQL

X Project documents consideration of information security issues

X Project documents consideration of information privacy issues

X 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)**

**1**

**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.*

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 demonstrates understanding of the Software Development Life Cycle

  X   Project deliverables include Project Specification

  X   Project deliverables include Feasibility Study and/or Project Plan

  X   Project deliverables include Requirements Documentation

  X   Project deliverables include Design Documentation

  X   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.*

**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 is implemented using an appropriate high level language

X Project implementation is reasonably efficient rather than “brute force”

X Project implementation is modular and well structured

X Project implementation uses a modern API or Tool-Kit

    Project implementation utilizes recursion

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

X 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**

**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.**

  X   Project documents sources and references

       Project identifies and addresses any relevant social issues

       Project identifies and addresses any relevant ethical issues

  X   Project identifies and addresses relevant legal issues

  X   Project identifies and addresses any relevant privacy issues

  X   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***

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.**

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  $\geq 4.0$  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>	5
2: <i>Team members maximized the use of their individual skill sets</i>	5

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>	5
4: <i>Team members completed assignments in a timely fashion</i>	5

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>	5
6: <i>Team members were able to negotiate and compromise</i>	5

Project completion evidences equitable participation by team members

<u>Criterion</u>	<u>Mean Score</u>
7: <i>Team members contributed ideas and viewpoints</i>	5
8: <i>Team members did their fair share of the work</i>	5

Team members shared responsibility for success and failure

<u>Criterion</u>	<u>Mean Score</u>
9: <i>Team members actively sought &amp; shared information from each other</i>	5
10: <i>Team members were adaptable to changing requirements</i>	4.3

**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

2 Completeness            Project reports document all essential project features

2 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  $\geq 3.0$**

X Domain Knowledge:

Presenter 1	Presenter 2	Presenter 3	Presenter 4	Presenter 5	Mean
4	4	4			4

X Organization:

Presenter 1	Presenter 2	Presenter 3	Presenter 4	Presenter 5	Mean
4	4	4			4

X Presentation Aids:

Presenter 1	Presenter 2	Presenter 3	Presenter 4	Presenter 5	Mean
4	4	4			4

X Elocution:

Presenter 1	Presenter 2	Presenter 3	Presenter 4	Presenter 5	Mean
3	3	3			3

X Audience Contact:

Presenter 1	Presenter 2	Presenter 3	Presenter 4	Presenter 5	Mean
3	3	3			3

**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.***

Presentations use contemporary presentation and demonstration tools

Project artifacts are developed using modern document preparation tools

Project management and/or version control software are employed

Design phase utilizes modeling software

Implementation utilizes a contemporary database management system

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

Implementation is validated using contemporary validation/testing software

Notes: