

Spring 2016

Student Assessment System

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Student Assessment System

Document Type

Undergraduate Project

Department

Computer Science

First Supervisor

Nicholas Bucciarelli

Subject Categories

Computer Sciences

SENIOR PROJECT PRESENTATION 2016
MATHEMATICS/COMPUTER SCIENCE DEPARTMENT



STUDENT ASSESSMENT SYSTEM

Senior Project Team Members:

Derek M. Freitas,
Tyler A. Witter,
David Zehder,
Taylor M. Zona (*Team Lead*)

Internal College Customer:

Catherine S. Sweet, A&S Coordinator

PROJECT OVERVIEW

- **Project Objectives & Description**
- **System Technical Overview**
- **Engineering Process Methodology**
- **Engineering Test Methodology**
- **Engineering Key Work-Products**
- **Project Key Metrics**
- **Project Schedule/Key Milestones**
- **System Demonstration**
- **Academic Key Knowledge Acquired/Applied**
- **Strategic Value**
- **Questions**
- **Lessons Learned**
- **Strategic Improvements**
- **Additional Supporting Information**

PROJECT OBJECTIVES & DESCRIPTION

- **Architect, Develop, and Deploy an Assessment System that provides Students the capability to view their progress specific to their expected outcomes by course goals as measured against the goals set by their specific program and the goals for the college.**
- **Architect, Develop, and Deploy an Assessment System that provides Faculty the capability to view one or more Students specific to a program and the courses that they instruct.**
- **Architect, Develop, and Deploy an Assessment System that provides the A&S Assessment Coordinator the capability to administer and manage the system from a subject matter content perspective.**

Student Assessment System provides Students the capability to enter their courses and generate a report that aligns their academic work with the general education “core” goals and outcomes. For the first time, students are able to easily see how these fundamental skills are embedded into their coursework

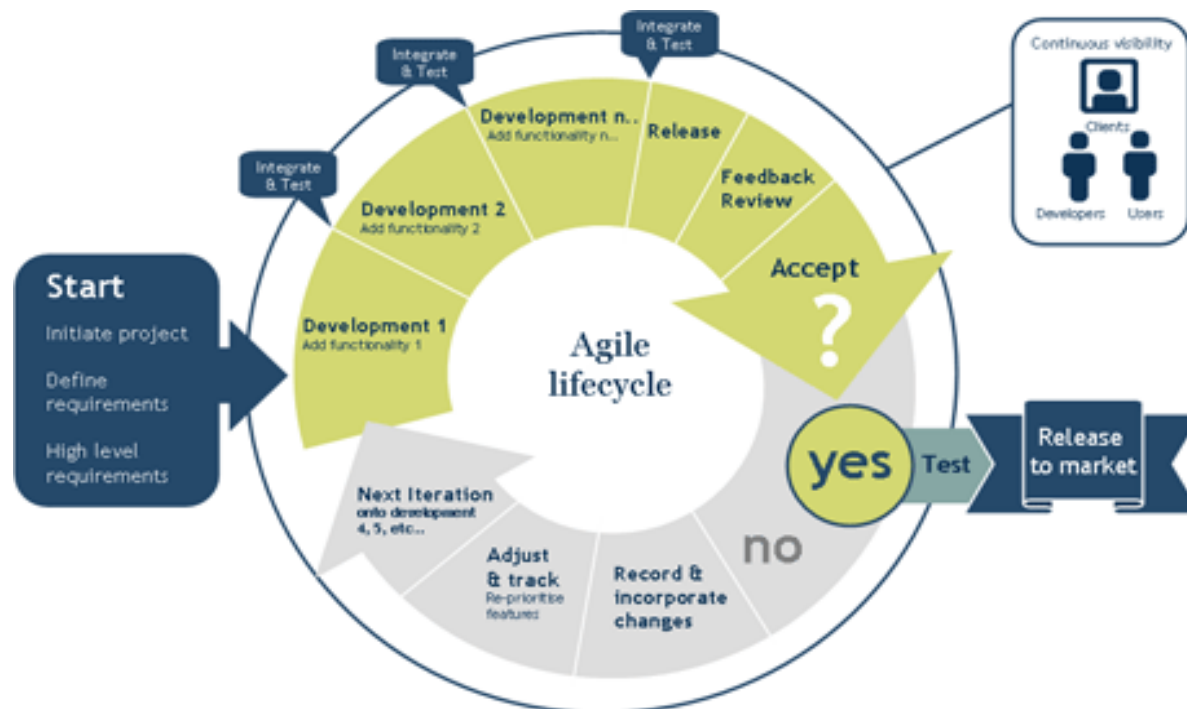
SYSTEM TECHNICAL OVERVIEW

- **Oracle Application Express (Oracle APEX), formerly called HTML DB, was utilized as a Rapid Web Application Development technology that has the underlying RDBMS based on Oracle 11g XE.**
- **Internal Information Technology Infrastructure of the college as supported by the Information Systems Department:**
 - **Deploy a VM image with the components:**
 - **Windows Server 2012R2**
 - **2 CPU's**
 - **8GB RAM**
 - **100GB Drive for OS / 100GB Drive for Application**

Note: Student Assessment System can be scaled upwards if needed in terms of technical capabilities such as Memory, Processors, etc...

ENGINEERING PROCESS METHODOLOGY

- **Agile Methodology** was used as an alternative to traditional project management specific to the design and development aspects of this system. The rationale for deploying Agile was to respond to unpredictability through incremental, iterative work cadences for this project.



ENGINEERING TEST METHODOLOGY

- **IEEE practices relative to Software Unit Testing, and Quality Engineering and Quality Assurance Testing Methods and Phases**

ENGINEERING KEY WORK-PRODUCTS

- **Requirements Document with Traceability Matrix**
- **Design Models based on UML that would support our final Systems Architecture Model**
- **Engineering Test Plans**
- **Release Notes for Transitioning this system to Information Systems organization**

PROJECT KEY METRICS

- **Project Assigned Tasks per our Project Plan**
 - **Re-work in terms of application code and database changes**
- **Project Meetings**

PROJECT SCHEDULE/KEY MILESTONES



























ID	Key Milestone	% Work Complet	% Complet	Task Mode	Task Name	Duration
1		0%	0%	★	Assessment Senior Project 2016	94 days
2		0%	0%	★	Phase_01 Data and Information	53 days
3		0%	0%	★	Requirements Analysis	17 days
4		0%	0%	★	Data Requirements	12 days
5		0%	0%	★	Information Requirements	5 days
6		0%	0%	★	Requirements Development	6 days
7		0%	0%	★	Data Requirements	2 days
8		0%	0%	★	Information Requirements	1 day
9		0%	0%	★	Requirements Review	4 days
10		0%	0%	★	Conduct Walk-through	0.5 days
11		0%	0%	★	Changes, if Needed	1 day
12	yes	0%	0%	★	Baseline Requirements	0.5 days
13		0%	0%	★	Relational Applications Database	5 days
14		0%	0%	★	Design ERD Model	1 day
15		0%	0%	★	Review ERD Model	0.5 days
16		0%	0%	★	Changes, if Needed	1 day
17	yes	0%	0%	★	Create Relational Applications Database	0.5 days
18		0%	0%	★	Engineering Test	8 days
19		0%	0%	★	Create Data Scripts (generate data and load tables)	2 days
20		0%	0%	★	Initiate DML SQLs to alter table constructs and relationships	1 day
21		0%	0%	★	Validate Database Construct Integrity	1 day
22		0%	0%	★	Initiate DML to alter data and append new data	1 day
23		0%	0%	★	Validate Data Elements Integrity	1 day
24		0%	0%	★	Data-Warehouse	24 days
25		0%	0%	★	Design Schemas / FACT tables / OLAP Cubes	3 days




















Project: Senior Project Schedule f Date: Mon 12/7/15	Task		Inactive Task		Start-only	
	Split		Inactive Milestone		Finish-only	
	Milestone		Inactive Summary		Deadline	
	Summary		Manual Task		Progress	
	Project Summary		Duration-only		Manual Progress	
	External Tasks		Manual Summary Rollup			
	External Milestone		Manual Summary			

5/25/2016



























Project Mentor: Nicholas C. Bucciarelli, Ph.D.




















PROJECT SCHEDULE/KEY MILESTONES

ID	 Key Milestone	% Work Complet	% Complet	Task Mode	Task Name	Duration
26		0%	0%		Review Schemas / FACT tables / OLAP Cubes	1 day
27		0%	0%		Changes, if Needed	1 day
28	yes	0%	0%		Create Schemas / FACT tables / OLAP Cubes	1 day
29		0%	0%		Engineering Test	6 days
30		0%	0%		Create Data Scripts (generate updated key indices and load FACT tables)	3 days
31		0%	0%		Initiate DML SQLs to alter schemas and relationships	1 day
32		0%	0%		Validate DW and OLAP Cubes Construct Integrity	1 day
33		0%	0%		Relational Applications Database and Data-Warehouse Review	5 days
34		0%	0%		Conduct Walk-through	0.5 days
35		0%	0%		Changes, if Needed	2 days
36	yes	0%	0%		Baseline Models, Relational Applications Database and Data-Warehouse	0.5 days
37	yes	0%	0%		Create Prototype Pre-Production Environemts	0.5 days
38		0%	0%		Phase_02 Application and User Interface	26 days
39		0%	0%		Requirements Analysis	8 days
40		0%	0%		Application Requirements	5 days
41		0%	0%		User Interface Requirements	3 days
42		0%	0%		Requirements Development	2 days
43		0%	0%		Application Requirements	1 day
44		0%	0%		User Interface Requirements	1 day
45		0%	0%		Requirements Review	2 days
46		0%	0%		Conduct Walk-through	0.5 days
47		0%	0%		Changes, if Needed	1 day
48	yes	0%	0%		Baseline Requirements	0.5 days
49		0%	0%		Applications and User Interfaces	5 days
50		0%	0%		Design Architecture Models based on UML	2 days

Project: Senior Project Schedule f Date: Mon 12/7/15	Task		Inactive Task		Start-only	
	Split		Inactive Milestone		Finish-only	
	Milestone		Inactive Summary		Deadline	
	Summary		Manual Task		Progress	
	Project Summary		Duration-only		Manual Progress	
	External Tasks		Manual Summary Rollup			
	External Milestone		Manual Summary			

PROJECT SCHEDULE/KEY MILESTONES















ID		Key Milestone	% Work Complet	% Complet	Task Mode	Task Name	Duration
51			0%	0%		Review Architecture Models	0.5 days
52			0%	0%		Changes, if Needed	1 day
53		yes	0%	0%		Create Applications and User Interfaces	1 day
54			0%	0%		SW Unit Testing	4 days
55			0%	0%		Develop/Conduct SW Unit Test Cases	2 days
56			0%	0%		Review Results, if changes are needed	0.5 days
57		yes	0%	0%		Regression Test and Approval	1 day
58			0%	0%		QE Integrations and System Testing	4 days
59			0%	0%		Develop/Conduct Integration and Systems Test Cases	2 days
60			0%	0%		Review Results, if changes are needed	0.5 days
61		yes	0%	0%		Regression Test and Approval	1 day
62			0%	0%		Applications and User Interfaces	3 days
63			0%	0%		Conduct Walk-through	0.5 days
64			0%	0%		Changes, if Needed	1 day
65		yes	0%	0%		Baseline UML Architecture Models, Applications and User Interfaces Source Code & Object	0.5 days
66			0%	0%		Phase_03 Analytical Reports/Dashboards	9 days
67			0%	0%		Analytical Reports	5 days
68			0%	0%		Design / Develop / Test Reports	2 days
69			0%	0%		Review with Assessment System Owner	0.5 days
70			0%	0%		Changes, if Needed	1 day
71		yes	0%	0%		Baseline Reports	0.5 days
72			0%	0%		Dashboards by Role	5 days
73			0%	0%		Design / Develop Dashboards	2 days
74			0%	0%		Review with Assessment System Owner	0.5 days
75			0%	0%		Changes, if Needed	1 day

Project: Senior Project Schedule f Date: Mon 12/7/15	Task		Inactive Task		Start-only	
	Split		Inactive Milestone		Finish-only	
	Milestone		Inactive Summary		Deadline	
	Summary		Manual Task		Progress	
	Project Summary		Duration-only		Manual Progress	
	External Tasks		Manual Summary Rollup			
	External Milestone		Manual Summary			




















5/25/2016

Project Mentor: Nicholas C. Bucciarelli, Ph.D.

PROJECT SCHEDULE/KEY MILESTONES

ID		Key Milestone	% Work Complet	% Complet	Task Mode	Task Name	Duration
76		yes	0%	0%		Baseline Dashboards	0.5 days
77			0%	0%		Phase_04 User Documentation	4 days
78			0%	0%		Develop User Guides by Role	2 days
79			0%	0%		Review with Assessment System Owner	0.5 days
80			0%	0%		Changes, if Needed	1 day
81		yes	0%	0%		Baseline Dashboards	0.5 days
82			0%	0%		Phase_05 Transition	3 days
83			0%	0%		Conduct Customer Acceptance Test	1 day
84			0%	0%		Changes, if Needed	0.5 days
85		yes	0%	0%		Baseline Assessment System and Release to Production	0.5 days
86			0%	0%		Phase_06 Academic Review	2 days
87		yes	0%	0%		Conduct Review Session with Department Chairman and Staff	0.5 days
88		yes	0%	0%		Publish with Lavery Library	1 day

Project: Senior Project Schedule f
Date: Mon 12/7/15

Task		Inactive Task		Start-only	
Split		Inactive Milestone		Finish-only	
Milestone		Inactive Summary		Deadline	
Summary		Manual Task		Progress	
Project Summary		Duration-only		Manual Progress	
External Tasks		Manual Summary Rollup			
External Milestone		Manual Summary			

SYSTEM DEMONSTRATION

***Walk-through of the System functionality based on
Student and Faculty actors***

Student	Goals Completed	Uncompleted Goals	Completed Program Goals	Completed Core Goals	Uncompleted Program Goals	Uncompleted Core Goals
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P3_SPEC_RQST

SELECT ID:

STUDENT INFO

STUDENT FIRST NAME	STUDENT LAST NAME	STUDENT MAJOR1
Oliver	Ross	PSYC

1 - 1

Student	Goals Completed	Uncompleted Goals	Completed Program Goals	Completed Core Goals	Uncompleted Program Goals	Uncompleted Core Goals
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STUDENT INFO

STUDENT_FIRST_NAME	STUDENT_LAST_NAME	STUDENT_MAJOR1
Oliver	Ross	PSYC

1 - 1

PROGRAM/CORE GOALS NOT COMPLETED PER STUDENT

PROGRAM CODE	GOAL NAME	GOAL DESCRIPTION
CORE	LC	Learning Community
CORE	RW	Researched-based Writing

1 - 2

Student	Goals Completed	Uncompleted Goals	Completed Program Goals	Completed Core Goals	Uncompleted Program Goals	Uncompleted Core Goals
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STUDENT INFO

STUDENT FIRST NAME	STUDENT LAST NAME	STUDENT MAJOR1
Oliver	Ross	PSYC

1 - 1

STUDENT COMPLETED PROGRAM GOALS

PROGRAM CODE	GOAL NAME	GOAL DESCRIPTION
HIST	Goal_1	Students will engage in historical inquiry, research, and analysis.
HIST	Goal_2	Students will have the skills and knowledge to craft historical narrative and argument.
HIST	Goal_3	Student will be well practiced in historical thinking.
PSYC	Goal_1	"Knowledge base of Psychology: Students will demonstrate familiarity with the major concepts, theoretical perspectives, empirical findings, and historical trends in psychology."
PSYC	Goal_2	"Research methods in psychology: Students will understand and apply basic research methods in psychology, including research design, data analysis, and interpretation."
PSYC	Goal_3	"Critical thinking skills in psychology: Students will understand and apply basic research methods in psychology, including research design, data analysis, and interpretation."
PSYC	Goal_4	"Application of psychology: Students will understand and then apply psychological principles to personal, social and organizational issues."
PSYC	Goal_5	"Values in psychology: Students will value empirical evidence, tolerate ambiguity, act ethically, and reflect other values that are underpinnings of psychology."

1 - 8

Student	Goals Completed	Uncompleted Goals	Completed Program Goals	Completed Core Goals	Uncompleted Program Goals	Uncompleted Core Goals
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STUDENT INFO

STUDENT FIRST NAME	STUDENT LAST NAME	STUDENT MAJOR1
Oliver	Ross	PSYC

1 - 1

STUDENT COMPLETED CORE GOALS

PROGRAM CODE	GOAL NAME	GOAL DESCRIPTION
CORE	P4	Explorations of the Natural and Technical World
CORE	SQ	Scientific and Quantitative Literacy
CORE	P1	Perspectives of the Arts
CORE	P5	Intercultural Perspectives and Languages
CORE	P3	Socio-cultural Perspectives
CORE	P2	Philosophical and Religious Perspectives
CORE	CC	Cultural Contrasts

1 - 7

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Student	Goals Completed	Uncompleted Goals	Completed Program Goals	Completed Core Goals	Uncompleted Program Goals	Uncompleted Core Goals
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STUDENT INFO

STUDENT FIRST NAME	STUDENT LAST NAME	STUDENT MAJOR1
Oliver	Ross	PSYC

1 - 1

STUDENT UNCOMPLETED PROGRAM GOALS

No data found.

Student	Goals Completed	Uncompleted Goals	Completed Program Goals	Completed Core Goals	Uncompleted Program Goals	Uncompleted Core Goals
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STUDENT INFO

STUDENT FIRST NAME	STUDENT LAST NAME	STUDENT MAJOR1
Oliver	Ross	PSYC

1 - 1

STUDENT UNCOMPLETED CORE GOALS

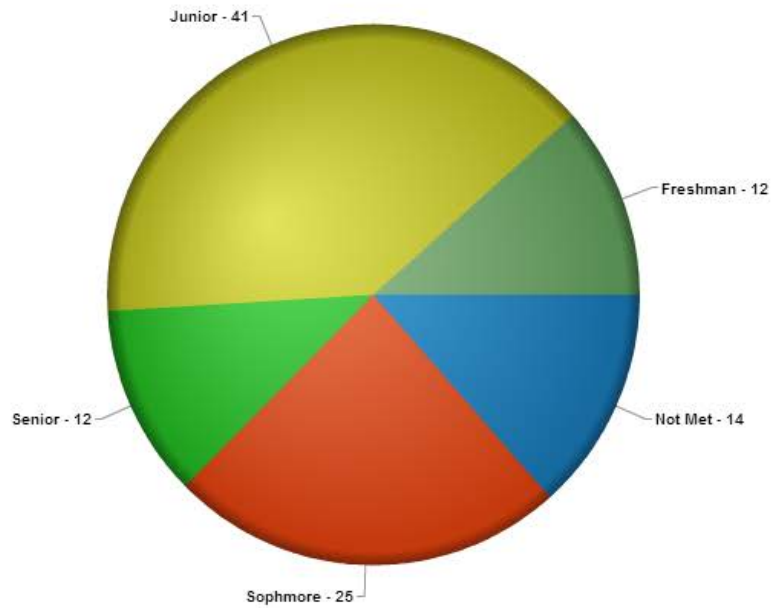
PROGRAM CODE	GOAL NAME	GOAL DESCRIPTION
CORE	LC	Learning Community
CORE	RW	Researched-based Writing

1 - 2

Class Status When Goal Met

Class Status P3 ▾

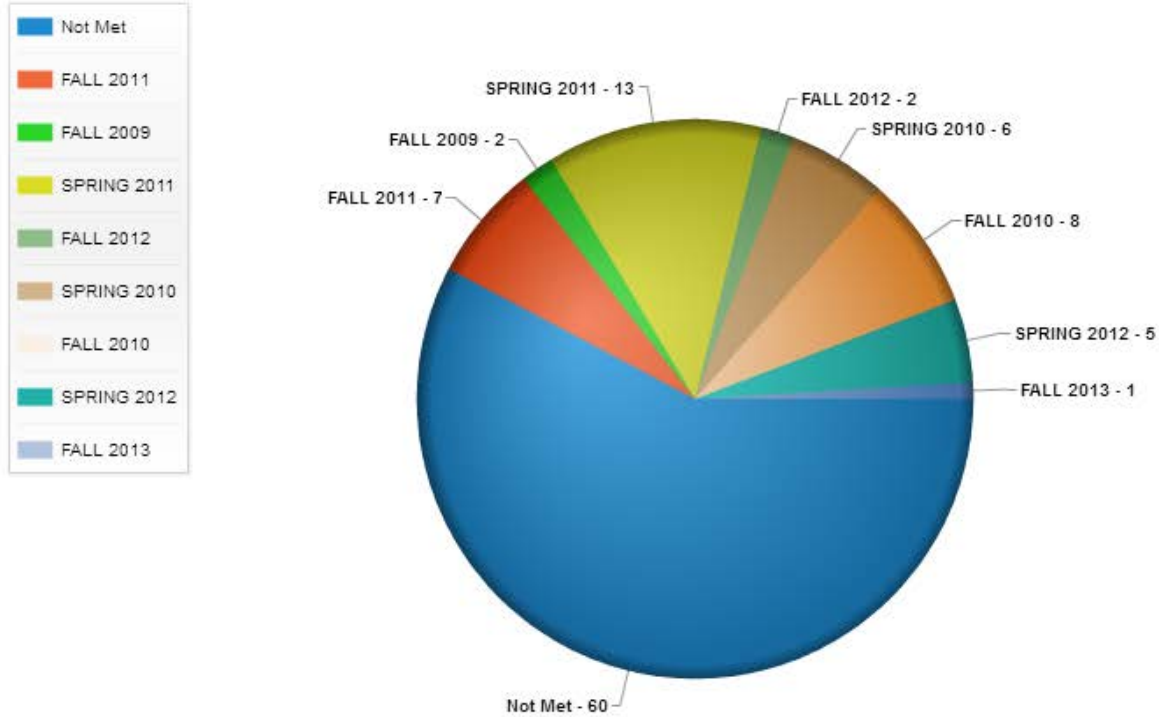
Class Status When Goal Met



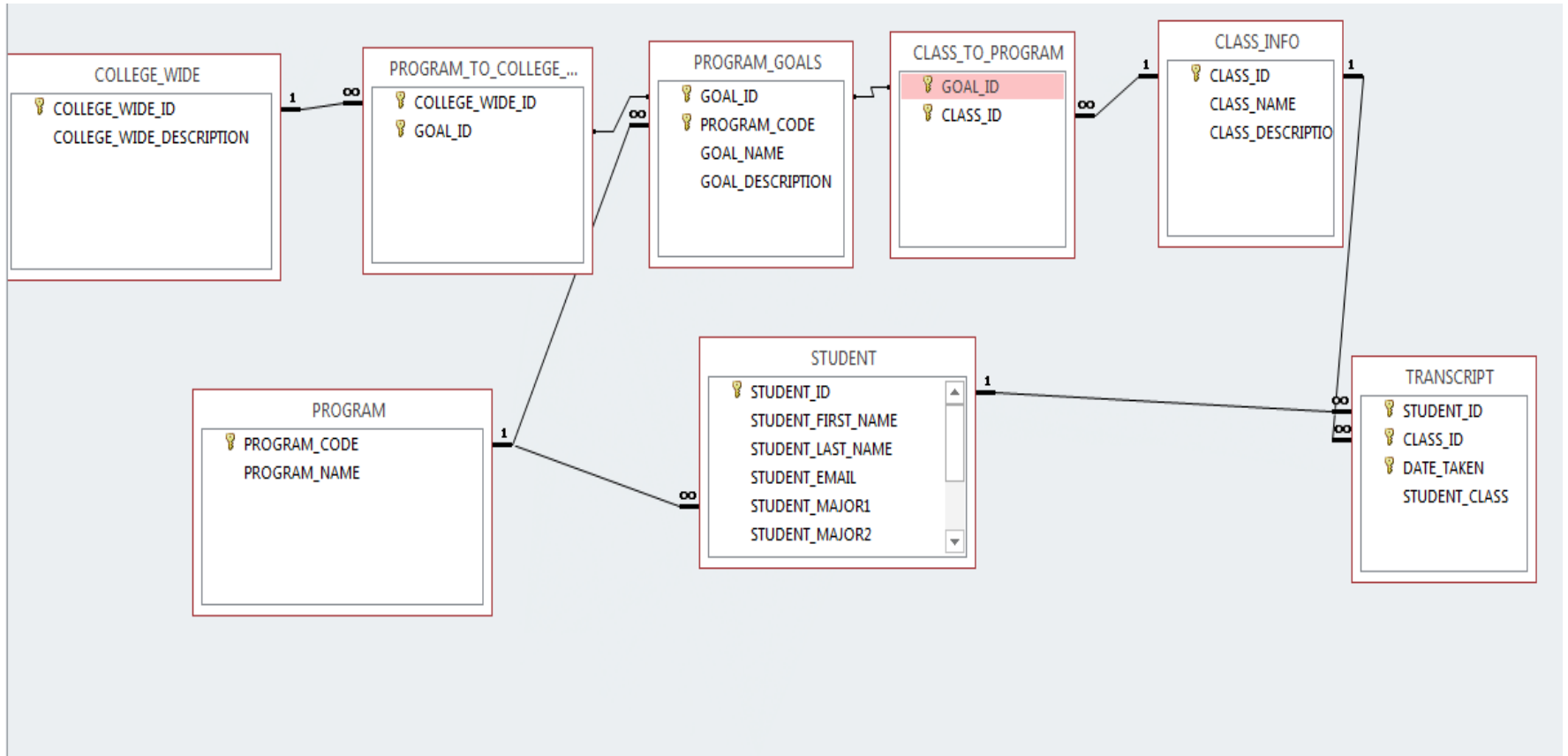
Term Goals Met

Goal P4 ▾

Term Goals Met



DATA MODEL



ACADEMIC KEY KNOWLEDGE ACQUIRED/APPLIED

- **Systems and Software Architecture Development and supporting frameworks**
- **Integrated Design and Development through Testing**
- **Oracle technology integrated platform for RDBMS and Application Development**

STRATEGIC VALUE

- **Provide the college with the capabilities:**
 - **In-depth Analytics**
 - **Integration to Banner and other SIS systems**
 - **Enterprise-wide based system sharing the resources of the college Information Technology framework, for example, LDAP, Security, Configuration Management, Systems Backup/Restore, Support, etc.....**

QUESTIONS



5/25/2016

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LESSONS LEARNED

- **There is a difference between a Programmer as opposed to a Systems/Software Engineer**
- **Rapid Development methods such as Agile**
- **Application of industry standard Architecture frameworks and best-practices**
- **Learning APEX, and the underlying Oracle technology stack which supports APEX**

STRATEGIC IMPROVEMENTS

- **Productionization of the Student Assessment System**
- **In-depth Analytics**
- **Integration to Banner and other SIS systems**

ADDITIONAL SUPPORTING INFORMATION

- **Materials provided by the professor**
 - **Lectures based on industry experience and similar projects**
 - **Work-product templates**
 - **Guidance with APEX**