Assessment Plan for the Computer Information Systems Department
College of Business Administration
California State Polytechnic University, Pomona

2012-2013

May 31, 2013
Computer Information Systems
Assessment Plan

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I. Program

Mission Statement

Our mission is to provide quality education opportunities to a diverse and multicultural student body in computer information systems at the undergraduate and graduate levels, with particular emphasis on undergraduate preparation, and to provide support courses for other departments of the College to enhance their understanding of the increasingly critical role of information systems and information technology in organizations.

Vision Statement

We provide our students with the education to become Information Technology leaders. Our cutting-edge, career-focused programs and learn-by-doing teaching will give our graduates national recognition for their outstanding Information Technology expertise, innovative problem-solving ability, and effective interpersonal and communication skills.

Program Overview

The Computer Information Systems Curriculum is evaluated every four years and updated every year. The last curriculum evaluation was in 2008. The Department’s Industry Advisory Board (IAB) participated in both the evaluation and update of the curriculum. In the past the IAB found that the program could be improved by adding Risk and Project Management. The IAB asked us to study the feasibility of adopting SAP in the curriculum, to consider offering online courses, and to introduce one course on Fundamentals of CIS.

In Fall 2010, the Department worked on the Department’s 2011 – 2016 Strategic Plan. The main result, regarding the curriculum, was the reintroduction of tracks (set of upper elective courses) for two sub disciplines within the curriculum: Information Assurance and Systems Development.

We successfully started offering CIS 231 Fundamentals of Computer Information Systems, we became members of the University Alliance with SAP, and we are offering more online (CIS 100, CIS 120, and CIS 310) and hybrid courses(CIS 421, CIS 433, and CIS 481).

Faculty and Students

<table>
<thead>
<tr>
<th>Action</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attracting more majors</td>
<td>We started a promotion program that included PR documents and a Web site for future students, and change-major presentations to undeclared, computer engineering, and computer science majors. The number of majors for the last four years are the following: 09/10 467 majors 10/11 514 majors 11/12 495 majors</td>
</tr>
</tbody>
</table>
II. Assessment Overview

**Department Assessment Committee**

Dr. Carlos J. Navarrete (Chair)
Dr. Zhongming Ma (Curriculum Committee)

**Assessment Background**

The assessment plan expanded the learning goals to include leadership. Because of these new learning goals and the fact that we can no longer collect assessment data in the CIS 328 (course cancelled), the Assessment Committee proposed a pilot assessment program. Table 1 presents the main characteristics of this pilot program. We proposed having one test per core course. These tests will be applied in courses requiring the assessed course as a prerequisite. For example, CIS 307 Business Telecommunications course will be assessed in CIS 347, which has CIS 307 as prerequisite. Track courses will be assessed in CIS 466 Senior Project, our cap stone course.

**Table 1. Pilot Assessment Program**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>The pilot’s focus will be on the assessment process. We would like to put more emphasis in the assessment process instead of producing the Assessment Plan or the Assessment Report.</td>
</tr>
<tr>
<td>Participative process</td>
<td>All faculty members will participate in the process. Faculty teaching a core course, for example, will be in charge of designing the assessment test or grading the test. Links to the proposed rubrics for 2012-2013: <a href="http://cba.csupomona.edu/cis/cis_assessment.aspx">http://cba.csupomona.edu/cis/cis_assessment.aspx</a></td>
</tr>
<tr>
<td>Program learning goal</td>
<td>Program learning goals will be expanded to include the main characteristics envisioned in our new vision statement. These characteristics include leadership and teamwork skills, and information technology competencies.</td>
</tr>
<tr>
<td>Reliability</td>
<td>The main weakness of our approach to assessment is the</td>
</tr>
</tbody>
</table>
reliability of our assessment test. We are using one question to assess one, or even two, courses. This yields contradictory results. For example, the test showed a low performance for database knowledge. However, most senior projects involved the use of a database to support the business solutions, and none of the teams working on these projects had problems designing or implementing a required database.

The proposed pilot program will require having a test with a set of questions to evaluate one course learning goal. We expect this approach will improve the reliability of data collection per course.

<table>
<thead>
<tr>
<th>Time table</th>
<th>The pilot program requires:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubrics selection or design</td>
<td>Rubrics selection or design</td>
</tr>
<tr>
<td>Core courses assessment test</td>
<td>Core courses assessment test</td>
</tr>
<tr>
<td>Data collection schedule</td>
<td>Data collection schedule</td>
</tr>
<tr>
<td>Data analysis and report to faculty.</td>
<td>Data analysis and report to faculty.</td>
</tr>
<tr>
<td>Closing the loop activities</td>
<td>Closing the loop activities</td>
</tr>
<tr>
<td>Assessment reports to College and University</td>
<td>Assessment reports to College and University</td>
</tr>
</tbody>
</table>

| Faculty approval                  | CIS faculty will need to approve the pilot program before it can be adopted. |

**Assessment Objective**

To measure and analyze our learning goals for the purpose of curriculum improvement or student support.

**Program Learning Goals**

1. Develop professional written and oral communication skills (CIS 231 assignments)
2. Develop broad technical knowledge in core CIS areas (Pilot program, Table 1)
3. Develop analytical abilities in problem solving (CIS 304)
4. Demonstrate IT leader capabilities (CIS 200)
5. Be able to apply knowledge of information systems (CIS 466)

**Curriculum Map**

Table 2 presents the mapping of CIS core courses and the Department learning goals. The CIS core courses are:

- CIS 231 Fundamentals of Computer Information Systems
- CIS 234 Introduction to Java Programming
- CIS 304 Intermediate Java
- CIS 305 Database Design and Development
- CIS 307 Business Telecommunications
Table 2. Mapping of CIS Core Courses to Departmental Learning Goals (2012-2013)

<table>
<thead>
<tr>
<th>CIS Core</th>
<th>Departmental Learning Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>communication skills</td>
</tr>
<tr>
<td>CIS 231</td>
<td>25%</td>
</tr>
<tr>
<td>CIS 234</td>
<td>40%</td>
</tr>
<tr>
<td>CIS 304</td>
<td>40%</td>
</tr>
<tr>
<td>CIS 305</td>
<td>35%</td>
</tr>
<tr>
<td>CIS 307</td>
<td>15%</td>
</tr>
<tr>
<td>CIS 311</td>
<td>10%</td>
</tr>
<tr>
<td>CIS 315</td>
<td>5%</td>
</tr>
</tbody>
</table>

Table 3 presents the Curriculum Matrix. The first column includes the CIS core courses and columns 2 to 5 present the intended student learning outcomes. The key for the matrix states when each learning outcome is introduced (I), reinforced (R), emphasized (E), and assessed (A). Also it is worth mentioning that for the technical knowledge, the table presents what courses are assessed. According to the pilot program, the data collection for the assessment of each course was performed in a course that has the assessed course as a prerequisite. For example, CIS 304 was assessed in CIS 311.

Table 3. Curriculum Matrix

<table>
<thead>
<tr>
<th>CIS Core Courses</th>
<th>Communication Skills</th>
<th>Technical Knowledge</th>
<th>Analytical abilities</th>
<th>Leadership Skills</th>
<th>Teamwork</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key: I= Introduce</td>
<td>R= Reinforce</td>
<td>E= Emphasize</td>
<td>A= Evidence collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS 231</td>
<td>I</td>
<td>A</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>CIS 234</td>
<td>I</td>
<td>A</td>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS 304</td>
<td>R</td>
<td>A</td>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS 305</td>
<td>I</td>
<td>A</td>
<td>R</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
III. Assessment Annual Report 2012-13

Table 4 presents the Assessment Annual Report 2012-13. The table also includes the links to the assessment documents that support the assessment process.

<table>
<thead>
<tr>
<th>Table 4. Assessment Annual Report</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. College</strong></td>
</tr>
<tr>
<td><strong>Department Report</strong></td>
</tr>
<tr>
<td><strong>2. Department</strong></td>
</tr>
<tr>
<td><strong>Department Report</strong></td>
</tr>
<tr>
<td><strong>3. State the type of degree (BA, BS, et.) and program name in full with acronyms in parentheses as appropriate.</strong></td>
</tr>
<tr>
<td><strong>Department Report</strong></td>
</tr>
<tr>
<td><strong>Committee Comments</strong></td>
</tr>
<tr>
<td><strong>4. Cite all locations where SLOs are published (URL, ECO’s, Syllabi, etc.) URL link should take the user directly to the outcomes, either to a separate page or to the location on a more general page.</strong></td>
</tr>
<tr>
<td>Department Report</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

| Committee Comments | Meets expectations. |

5. Cite all locations where curriculum matrices are published. URL link should take the user directly to the outcomes, either to a separate page or to the location on a more general page.

<table>
<thead>
<tr>
<th>Department Report</th>
<th>Curriculum Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Road Map</td>
</tr>
</tbody>
</table>

| Committee Comments | Meets expectations. |

6. List all tools, strategies, and methods to collect DIRECT data/evidence used to determine students’ progress to meet learning outcomes.

| Department Report | Please see page 10. |

| Committee Comments | Meets expectations. |

7. List all tools, strategies, and methods to collect INDIRECT data/evidence used to determine students’ progress to meet learning outcomes.

<p>| Department Report | Please see page 11. |</p>
<table>
<thead>
<tr>
<th>Committee Comments</th>
<th>Non-Responsive: Please include example of indirect assessment tools such as student survey, alumni survey, etc.</th>
</tr>
</thead>
</table>

8. Provide at least one example from the last two years of a learning outcome that has been evaluated, the evaluation method used, and the data/evidence collected. Give a short description of the process used to collect and interpret the evidence.

<table>
<thead>
<tr>
<th>Department Report</th>
<th>Please see pages 12 and 13.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Committee Comments</th>
<th>Meets expectations.</th>
</tr>
</thead>
</table>

9. Provide at least one example from the last two years of a finding that resulted from evaluation of an outcome and how the finding was used to revise the program and/or assessment plan. Give a short description of the analysis and the revision.

<table>
<thead>
<tr>
<th>Department Report</th>
<th>Please see pages 14 and 15.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Committee Comments</th>
<th>Meets expectations.</th>
</tr>
</thead>
</table>

10. Description of program assessment activities to be undertaken in the next year. Be reasonable, but be active!

<table>
<thead>
<tr>
<th>Department Report</th>
<th>Please see pages 16 and 17.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Committee Comments</th>
<th>Non-Responsive: Please include example of future assessment plans.</th>
</tr>
</thead>
</table>
6. List all tools, strategies, and methods to collect DIRECT data/evidence used to determine students’ progress to meet learning outcomes.

The University requires each student to take the Graduate Writing Test (GWT) and pass it with a minimum score of seven. This examination tests the student’s ability to communicate in written form on a randomly selected subject that may or may not be of a business nature.

In the CIS 231 course students presented their cover letters and resumes. These documents were evaluated using the corresponding rubric. The evaluation took place before the instructor gave feedback to each student. Table 5 presents the rubric used to measure communications skills in CIS 231.

Table 5 CIS 231 – Resume and Cover Letter Rubric (Written Communication Skills)

<table>
<thead>
<tr>
<th></th>
<th>Great</th>
<th>Good</th>
<th>Average</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grammar and Format</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear Objective</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student has technical Skills that are clearly articulated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cover Letter is professional and to the point</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the Pilot Program (Table 1) a set of tests were developed to assess technical skills for CIS 231, CIS 234, CIS 304, CIS 305, CIS 307, and CIS 311. Appendix A includes the test for each one of these courses.

In the CIS 466 Senior Project Course, our students worked on CIS related projects for actual clients, providing a real world example of a small CIS Support project. The projects require students to work in a team environment, preparing proposals, budgets, meeting with clients, developing requirements, designing prototype systems, testing, and implementing programs to solve business needs. Each team’s final report is a documented solution to the problem or project posed by the client. This solution is presented to the client during finals week. The clients provide two evaluations of the teams: one after the project proposal is presented and the second one at the end of the course. The evaluations reflect the teams’ performance and whether the team project met the needs of the client. The final presentation is taped for assessment purposes. Table 6 presents the rubric for “Final presentation to the client” used to assess senior projects. Table 7 includes the URLs for the written communication rubrics.
| Table 6. Final Presentation to Client Rubric (Written and Oral Communication Skills) |
|--------------------------------------------------|----------------|----------------|----------------|----------------|
| Students have clear agenda and stick to it.      | Great          | Good           | Average        | Unacceptable   |
| Student handouts are professional and clear.     |                |                |                |                |
| Presentation is clear, relevant and interesting. |                |                |                |                |
| Each team member shares in the presentation of business solution. | | | | |
| Team communicates technical topics in a way that a client can understand. | | | | |
| Students communicate with technology. (shared document group, email, IM, Blackberry…etc.) | | | | |

| Table 7. Assessment Instruments and Rubrics |
|---------------------------------------------|--------------------------------------------------|----------------|----------------|----------------|
| **Rubric**                                  | **Planned Activity**                             | **URL**        |                |                |
| Technical Knowledge Test                    | Tests for CIS 231, CIS 234, CIS 304, CIS 305, CIS 307, CIS 311 | Not published in Web Site (Included in Appendix A) |
7. **List all tools, strategies, and methods to collect INDIRECT data/evidence used to determine students’ progress to meet learning outcomes.**

**Internships**

Under CIS 441 and CIS 442 courses, the students can receive academic credit for internship experience limited to a total of 16 units. The CIS Department requires the student to write an internship proposal and the project supervisor submits an evaluation of the project and the student performance. Specifically the evaluation covers communications skills, teamwork skills, interpersonal skills, and analytical abilities. This metric has been used since 1990. Data were collected during the year.

**Cyber Defense Competition**

Cal Poly Pomona's Collegiate Cyber Defense Competition (CCDC) team had another great year in 2013. The team captured is fifth consecutive western regional competition in March of this year defeating twelve opponents including teams from UC Berkeley, USC, three sister CSU campuses, and seven other schools. With the victory, the team advanced to the national competition and we are awaiting placement results from that event. The CCDC competition is the single best measure of students' ability to defend systems in the real world as it pits a team of the best hackers in the nation against student teams that must defend their infrastructures while also carrying out tasks that resemble typical daily work in the industry. The fact that Cal Poly's teams are consistently placing among the top teams in the nation is a testament to the quality of the interdisciplinary hands-on programs at Cal Poly Pomona.

**Southern California Conference on Undergraduate Research.**

Greg Richardson and Justin Davis did a research project investigating the death of passwords. Using a few password cracking techniques and publically available test databases, they looked at common processors and how long it took to break individual passwords. They also examined how bit coin mining, a scheme for making money by transferring funds though several online organizations to convert it to actual dollars, works. Jeff Fredrick and Kevin Ferris did a poster session on Digital Rights Management. They looked at several different media and researched the history of DRM thoroughly. They became experts in the legal history of DRM and they also developed economic models to help with thinking about DRM strategies and how they impact the market.

**IT Leaders in Telecommunications Program**

The IT Leaders in Telecommunications Program, a successful industry-academia partnership project, aims to educate Information Systems professional with the technical and professional skill required by industry positions in the area of Computer Network Administration. Since the CIS Department cannot offer the courses required to prepare IT professionals for Network Administration positions, the IT Leaders in Telecommunications is a nice alternative to allow students to seek a career as network administrators. The program is an alliance between the CIS Department and Business Data Link (BDL) a company located in our Campus Innovation Village. BDL provides network administration and technology management services to customers in Southern California. 32 students have participated in the program and ten were invited as BDL’s interns. All students that graduated from the program got hired this year.
8. Provide at least one example from the last two years of a learning outcome that has been evaluated, the evaluation method used, and the data/evidence collected. Give a short description of the process used to collect and interpret the evidence.

Example 1. Written and Oral Communication

Data Collection

We have used the rubrics presented in tables 5 and 6 (above) for several years. Table 5 is used to assess cover letters and curricula submitted by students in the CIS 328 in the past and CIS 231 – the course that replaced CIS 328. Only one grader reviewed each cover letter and resume. Table 8 presents the results for the year 2011-2012 assessment with a sample of 74 cover letters and resumes while Table 9 presents the results for this year assessment with a sample size of 35 cover letters and resumes.

| Table 8. CIS 328 – Resume and Cover Letter – Apply this Rubric to Measure Written Communication Skills |
|-----------------------------------|-----|-----|-----|-----|
|                                    | Great | Good | Average | Unacceptable |
| Grammar and Format                 |   10  |   42  |    16    |       6       |
| Clear Objective                    |   13  |   11  |  36 (generic and weak) | 14 (no objective written on resume) |
| Student has technical Skills that are clearly articulated |   52  |   10  |  8 (minimal or poorly displayed) | 4 (students didn’t identify any skills from their classes) |
| Cover Letter is professional and to the point |   31  |   20  |  15 (canned) |       8       |
| Extracurricular or Work Experience |   40  |   17  |  10 (unrelated work experience) |       7       |
| Certifications                     |    9  |    6  |        4    |      55       |
| Security is Emphasized             |    8  |    9  |        4    |      53       |
| Project Management / Client Focus is Shown |   15  |   14  |    16    |       29       |
| Good use of Keywords for electronic Searches |   13  |   21  |    12    |       28       |
### Table 9. CIS 231 – Resume and Cover Letter – Apply this Rubric to Measure Written Communication Skills

<table>
<thead>
<tr>
<th></th>
<th>Great</th>
<th>Good</th>
<th>Average</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grammar and Format</td>
<td>5</td>
<td>14</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Clear Objective</td>
<td>5</td>
<td>9</td>
<td>10 (generic and weak)</td>
<td>11 (no objective written on resume)</td>
</tr>
<tr>
<td>Student has technical Skills that are clearly articulated</td>
<td>7</td>
<td>6</td>
<td>12 (minimal or poorly displayed)</td>
<td>10 (students didn’t identify any skills from their classes)</td>
</tr>
<tr>
<td>Cover Letter is professional and to the point</td>
<td>10</td>
<td>6</td>
<td>12 (canned)</td>
<td>7</td>
</tr>
<tr>
<td>Extracurricular or Work Experience</td>
<td>8</td>
<td>6</td>
<td>11 (unrelated work experience)</td>
<td>10</td>
</tr>
<tr>
<td>Certifications</td>
<td>14</td>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Security is Emphasized</td>
<td>13</td>
<td>7</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Project Management /Client Focus is Shown</td>
<td>6</td>
<td>10</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Good use of Keywords for electronic Searches</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

### Results

Last year (Table 8) grammar and format assessment presented different averages for the cover letter and the resumes. Students did very well with formatting and writing the resumes. However, the sample shows that there were more grammar problems when students had to compose a paragraph about their professional development plans. Students need to be aware of the value that future employers give to technical certifications and that the screening of candidates is more frequently done by a computer system. It is critical to master the use of key words for information technology related positions. Without mastering these key words, the likelihood of receiving a job offer is slim.

The results for this year (Table 9) show some inconsistencies. Instead of having a normal distribution for the categories of “extracurricular or work experience”, “certifications”, and “security is emphasized”, there are two distinct groups one group doing “great”, and a second group ranking “average” or “unacceptable”. This is likely because the new CIS 231 has two groups of students: Seniors that took CIS 231 because CIS 328 is no longer offered, and freshman and sophomore students who are taking CIS 231 as their first CIS course.
The results for grammar and format are consistent with the results of the Graduate Writing Test (Table 10). On average, twenty eight percent of the students taking the test in the last three years have failed the test. However, the students’ performance in oral communications has been consistently good. Last year report showed that four senior project teams were “Great” in “client interaction” (Table 11). This year’s assessment results show all four senior project teams ranked as “Great” in “Client Interaction”. Furthermore, in the IT Leaders in Telecommunications Program reports students reaching the highest evaluation for communication skills (Table 14) by the end of the three quarters program.

Table 10. GWT Results for CIS Students

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fail</td>
<td>10</td>
<td>6</td>
<td>22</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Pass</td>
<td>20</td>
<td>26</td>
<td>47</td>
<td>27</td>
<td>44</td>
</tr>
<tr>
<td>Failure Rate</td>
<td>33%</td>
<td>18%</td>
<td>31%</td>
<td>30%</td>
<td>26%</td>
</tr>
</tbody>
</table>

Source CPP Datwarehouse

Table 11 Senior Project Evaluations 2011-2012 (four projects)

<table>
<thead>
<tr>
<th></th>
<th>Great</th>
<th>Good</th>
<th>Average</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionalism</td>
<td>4</td>
<td>1</td>
<td>2, 3</td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td>1, 4</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Clarity</td>
<td>1, 4</td>
<td>4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Shared Workload</td>
<td>1, 4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear Process Defined and Followed</td>
<td>1, 4</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Ability to Deal with Problems</td>
<td>2, 4</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Client Interaction</td>
<td>1, 2, 3, 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 12 Senior Project Evaluations 2012-2013 (four projects)

<table>
<thead>
<tr>
<th></th>
<th>Great</th>
<th>Good</th>
<th>Average</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionalism</td>
<td>1, 2, 3, 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td>1, 2, 4</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clarity</td>
<td>1, 2, 4</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared Workload</td>
<td>1, 2, 3, 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear Process Defined and Followed</td>
<td>1, 2, 4</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to Deal with Problems</td>
<td>1, 2, 3, 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client Interaction</td>
<td>1, 2, 3, 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Example 2. Technical Knowledge in core CIS areas (Telecommunications)

Data collection

In the previous two year assessment periods in the CIS 328 course students took a knowledge test. The test reflected technical knowledge from core computer information systems areas. One question on this test corresponded to the CIS 307 course. Then, a professor teaching the course graded the question using a range of zero to ten points. On the other hand, this year, students took a test (Appendix A) in CIS 347 a course that uses CIS 307 as a prerequisite. The test maps a set of questions for each one of the course learning goals. A CIS 307 professor graded the test.

Results

Table 13 (raw 1) shows the average results for the three periods. The results show that students taking CIS 307 are ready to take courses of the Track in Information Security and for the IT Leaders in Telecommunications Program.

<table>
<thead>
<tr>
<th>Question (scale of 0 to 10)</th>
<th>Average 10/11</th>
<th>Average 11/12</th>
<th>Average 12/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 What is the OSI Model? What is it used for?</td>
<td>4.43</td>
<td>3.8</td>
<td>5.4</td>
</tr>
<tr>
<td>2 Write a small program that types ‘hello world’ to the screen 7 times.</td>
<td>6.7</td>
<td>6.6</td>
<td>Not available</td>
</tr>
<tr>
<td>3 Draw a class diagram for an ATM machine.</td>
<td>4.07</td>
<td>3.9</td>
<td>Not available</td>
</tr>
<tr>
<td>4 List two things that can make a Web site more accessible to a disabled person.</td>
<td>8.2</td>
<td>3.3</td>
<td>Not available</td>
</tr>
<tr>
<td>5 List two things you can do to make a network more secure.</td>
<td>7.73</td>
<td>6.6</td>
<td>Not available</td>
</tr>
<tr>
<td>6 What is the SDLC for?</td>
<td>3.57</td>
<td>4.0</td>
<td>Not tested</td>
</tr>
<tr>
<td>7 Why is database normalization important?</td>
<td>4.87</td>
<td>3.0</td>
<td>9.0</td>
</tr>
</tbody>
</table>
Example 3. Technical knowledge in core CIS areas (Databases)

Data collection

The data collection process for this example matches the data collection of example 2. A question in the CIS 328 was used to assess CIS 305 Database course in the last two years, and this year, a test (Appendix A) was designed to evaluate the course. A professor that teaches the course graded the test.

Results

Table 13 (row 7) shows the results for the three evaluated periods. Our explanation for the low score last year (11/12) was lack of reliability of the test. In that period we used only one question to assess the course (CIS 305). For this period (12/13), having a more comprehensive test demonstrated the weakness of our previous test and the true database skills of our students. The results of the test for the present period (12/13) are aligned with the database expertise demonstrated by our students in all senior projects that require a database design and implementation. 60 to 70% of our senior projects require the design and implementation of a database. For the reported period, three of the four project used for assessment included the implementation of a database.
9. Provide at least one example from the last two years of a finding that resulted from evaluation of an outcome and how the finding was used to revise the program and/or assessment plan. Give a short description of the analysis and the revision.

Example 1. Gap between general knowledge of core CIS areas (learning goal 2) and industry requirements for targeted positions for CIS graduates.

Last year recommended action

Restate tracks that include sets of upper electives. Two tracks will be offered: Information Assurance and Systems Development.

Results

We have two tracks: 1) Systems Development Track with the following courses: CIS 338, CIS 421, CIS 424, CIS 451, and CIS 491; and 2) Information Security Track with CIS 347, CIS 433, CIS 467, CIS 471 and CIS 481. By focusing on these ten courses, we dramatically reduced the number of upper electives in the program; we managed a course offer that reduces the student graduation time; we increased the seat average per section per quarter, the highest in the College with 44 students per section in the spring quarter 2013; and most importantly, we are matching industry requirements for information security and systems development positions. Winning the West Coast Cyber Defense Competition and finishing in fourth place at the National Competition shows the academic and professional excellence that our program has reached in this area.

Example 2. Poor database performance

Last year recommendations

Make learning to use a database management system (Access) a requirement in CIS 101.
Introduce projects to complement testing process in CIS 101: passing from “clicking to thinking.” Students will solve four projects in this course.
Require a more complex database project in CIS 310.

Results

Students are learning Access in CIS 101 and they are required to complete a project with Access in order to credit this course. In CIS 310 students have to do a more complex database project. This basic training is complemented with the CIS 305 Database course. Lastly, students demonstrate their database expertise in CIS 466 Senior Project course. Over sixty percent of our senior projects require to design and adopt a database system. Students excel at this requirement of systems development. The database assessment results for the reported period (12/13) are very positive and they reflect the effectiveness of previous assessment actions.
Example 3. Written Communication Skills (Learning goal 1)

Last year recommendations
Enforce the College’s policy regarding writing assignments. According to this policy there should be one writing assignment in every course of the program. Introduce a new rubric for more complex writing assignments (i.e. persuasive essays, research papers.)

Results
We have a “flat” performance for this learning goal. We have not improved but our performance has not decreased either, our conclusion is that the College policy regarding writing assignments is securing a given level of performance, but it is not enough to improve our students’ performance. In order to “close-the-loop” regarding this learning goal, we will propose to have faculty to increase the number of writing assignments, to promote students using the Writing Center, and to have faculty vote to require students to pass the GWT before they can enroll in upper elective courses.

Example 4. New Vision Statement

Last year recommendation
Expand the program learning outcomes to include leadership, information technologies competencies, and teamwork.

Result
Information Technologies Competencies was not accepted by the Department, and Teamwork was not included in the assessment program of the College. We piloted leadership assessment in the IT Leaders in Telecommunications Program. This program requires students to take a two-unit course on Networking Technologies. The best students in the course were invited to the internship program of BDL, a company located at Cal Poly’s Innovation Village. Table 13 presents BDL’s rubric for professional skills, including leadership, which match the CIS rubric for leadership. In the program, professional skills were assessed four times: 1) a self-assessment at the beginning of the course, 2) an instructor’s assessment at the end of the course, 3) BDL’s assessment at the end of the first internship period (one quarter), and 4) BDL’s assessment at the end of the second internship period. In total 32 student have taken the course and 22 have been invited to BDL’s internship program. Table 14 presents the assessment results of the program for professional skills that include the leadership assessment.
<table>
<thead>
<tr>
<th>Professional Skills</th>
<th>No Rating</th>
<th>Low Rating</th>
<th>Medium Rating</th>
<th>High Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem Solving</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Work with Google to find solutions</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2. Work with Technology forums to find solutions</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3. Work with Colleagues to find solutions</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4. Work with past trouble tickets to find solutions</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5. Time management</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6. Empathy with users</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td><strong>Teamwork Skills</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Collaboration</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2. Participation</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>3. Quality of Work</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>4. Availability</td>
<td>O</td>
<td>O</td>
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<tr>
<td>5. Timeliness</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td><strong>Leadership Skills</strong></td>
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<td></td>
<td></td>
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<tr>
<td>1. Organized</td>
<td>O</td>
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<td>O</td>
</tr>
<tr>
<td>2. Responsible</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3. An Effective Communicator</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4. Aware</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5. Open-Minded / Respectful</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>6. Reflective</td>
<td>O</td>
<td>O</td>
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<td>O</td>
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<tr>
<td><strong>Communication Skills</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>1. Body Language</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>2. Eye Contact</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>3. Vocal Presentation and Tone</td>
<td>O</td>
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<tr>
<td>4. Word Choice</td>
<td>O</td>
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<tr>
<td>5. Use of Visual Aids</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6. Organization of communication</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>7. Support / Evidence</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td><strong>Professional Skills</strong></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
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<tr>
<td><strong>Problem Solving</strong></td>
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<tr>
<td>1. Work with Google to find solutions</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2. Work with Technology forums to find solutions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3. Work with Colleagues to find solutions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3. Work with past trouble tickets to find solutions</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>5. Time management</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>6. Empathy with users</td>
<td>0</td>
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<td>3</td>
<td>3</td>
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<tr>
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<td>2</td>
<td>3</td>
<td>3</td>
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<td>3</td>
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<td>5. Timeliness</td>
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<td>3</td>
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<td>3</td>
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<td>3</td>
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<tr>
<td>3. Aware</td>
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<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5. Open-Minded / Respectful</td>
<td>3</td>
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</tr>
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<td>1</td>
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<td>2</td>
<td>2</td>
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<td>3</td>
</tr>
<tr>
<td>7. Support / Evidence</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
10. Description of program assessment activities to be undertaken in the next year. Be reasonable, but be active!

1) Define the scope of the assessment program for 2013-2014

The pilot program to assess technical knowledge in core CIS areas is not feasible. We need to reduce our assessment program to make it feasible. Next year, the Department’s assessment program should include the College’s assessment program (AACSB) and the University’s assessment program. By taking into account all the assessment requirements, the Department can define a feasible program that satisfies all assessment expectations.

2) Written communication skills

Set a performance target for the GWT, and then, increase the number of writing assignments in the program.
Promote the use of the Writing Center among students.
Have the Department vote on requiring a passing grade on the GWT before taking upper elective courses.

3) Technical knowledge in core CIS areas

Select four or five learning goals to be used as a base for the assessment test. Then update the test to focus on these main learning goals.
Explore other alternatives for assessment. For example, the test for CIS 234 turned out to be too complex to be fair to the students. Perhaps a rubric for the final project in this class can be used for assessment purposes. This alternative would generate enough evidence to feed the assessment process for programming skills in the program. Also, by using this rubric, we can reduce the time and effort spent on assessment because the rubric will be used as part of the course grading process.
Promote action to “close-the-loop” in CIS core courses. The main weakness of the pilot program was that we did not “close-the-loop” for several courses. If having too many tests limited the feasibility of the assessment program, we should reduce the number of courses tested, so we can secure that the assessment process is completed.

4) Leadership assessment

Expand the leadership assessment by collecting data in CIS 231, CIS 315, and CIS 466. If we replicate the assessment process of the IT Leaders in Telecommunications Program, we will secure the fulfillment of our mission and vision.

5) Ethics and ethical behavior
Expand the program to include ethics and ethical behavior. This action can be seen as contradictory with respect to some previous recommendations. On one side, we are reporting that our assessment pilot was not feasible because of the time required to assess so many learning outcomes. And on the other side, we are proposing to expand these learning outcomes by including a new one. The rationale for this action is that ethics and ethical behavior should be a mandatory learning outcome for us because we are educating information security experts, and the techniques and technologies that these experts master can be used to harm people, organizations, industries, and even countries. We must work with our students on resolving ethical dilemmas so they can have professional careers free of legal and moral complications.
Appendix A

Assessment Pilot Program

Assessment Tests for CIS Core Courses

CIS 231
CIS 304
CIS 305
CIS 307
CIS 310
CIS 311
Computer Information Systems Department
Assessment Program
CIS 231
2011-2012

Name_____________________________________________________

True/False

1. One of the principles of networks is that each computer must have a network operating system
2. Twitter is an example of a Web 2.0 application
3. Deleted data cannot be recovered from most operating and file systems, even if you use a tool such as EnCase
4. A computer forensics investigator can recover data from the contents of computer memory
5. It is possible to recover a file from a computer even if it was entered, printed and not saved on any digital media.
6. The principles of the universal design movement are to provide products and environments that can be used by all people, without adaptation or specialized design.
7. It is OK to rip a song from a commercial CD that you bought, and play 30 seconds of it on your website, because you bought the CD and fair use says you can use up to 30 seconds content of copyrighted material.

8. If you download files from a file sharing site such as FLICKR, you always have permission to use them on your website, because giving you permission is part of the agreement when the copyright owner uploads a file.

9. The term “royalty-free” means that the copyright owner of an audio file gives you permission to use it on your website.

Multiple choice. Chose the one best answer

One disadvantage of using a Cable TV line and cable modem to connect to the Internet is:

   a. It needs a special dish
   b. You have to be close to the central office or it doesn’t work well
   c. The speed degrades when the numbers of people using it increase
   d. You cannot use the telephone to talk to people while you are online
   e. None of the above

10. A device that allows computers to access a network using radio waves:
   a. network interface card
   b. Wireless network access point
   c. firewall
   d. switch
   e. network hub

11. A device that connects multiple computers into a network in which multiple communication links can be simultaneously in action:
   a. Network interface card
   b. Wireless network access point
   c. Firewall
   d. Switch
   e. Network hub

12. RSS is a ____ technology which lets you send out new blog entries to your friends
   a. Pull technology
   b. Push technology
   c. peer-to-peer file sharing
   d. mash-up
   e. none of these

13. The source code tags that start and finish a web page are
   a. <html></html>
   b. <head></head>
c. `<body>`<body>
d. `<header>`</header>
e. `<title>`</title>

14. When you test your website, the best practice is to:
   a. Test as you build, and fix any errors
   b. Wait until you are finished building the site, to make the testing phase most efficient
   c. Don't bother to test. Let the customer do it and report the problems to you so you can fix them later.
   d. Don't bother to test. Let the users report the problems. Then you only fix problems that people actually find.

15. The type of network that covers a metropolitan area is called a:
   a. Client/Server
   b. WLAN
   c. LAN
   d. WAN
   e. MAN

Fill in the blanks:

16. When you deploy your website, you have to make sure that it appears in
   ______________________________________________ (2 words) because that will help people find it.

17. The most widely used video hosting site on the Internet today is
   ______________________________________________

18. The SDLC in which you follow steps in building a technology solution is sometimes called the ______________________________________________

19. The big difference between Web 2.0 and the earlier version of the web is that the
   ______________________________________________ create the content for Web 2.0

20. Deleted data can be recovered from most operating and file systems, because computers do not erase ___________ ___ file data, even when it is deleted by the user

21. A __________________________________ connects computers into a network, separating it from any other network to allow multiple simultaneous communications links, which also acts as a firewall
22. Wireless fidelity or IEEE 802.11a, b or g is a standard for transmitting information in the form of ___________________________ (2 words) over distances up to about 300 feet

Short Answer

23. What does section 508 of the United States Rehabilitation Act prohibit?

24. Define the term “computer network”
25. What are the steps in the SDLC (Systems Development Lifecycle)? Name them.

26. What is one advantage of using the SDLC rather than just jumping in and starting to program?
27. There are 4 reasons to separate content from presentation in web development. What are 2 of them?
28. Jakob Nielsen defines Web usability as:

   Definition: Usability is “a quality attribute that assesses how easy user interfaces are to use”

   There are 5 quality components of web usability? Briefly describe what at least 2 of them mean:
Multiple Choices (10 points)

1. Assume that all three classes in this inheritance hierarchy contain an \textit{accelerate} method. When the second statement in the following code is executed, which class, which defines the method, is called?

   \begin{verbatim}
   MotorVehicle car = new Automobile();
   car.accelerate();
   \end{verbatim}

   a. Automobile  
   b. MotorVehicle  
   c. Vehicle  
   d. Object

2. Which of the following is \textit{not} a difference between arrays and collections?
   a. Collections can grow in size, but arrays can’t.
   b. Arrays can store unwrapped primitive types, but collections can’t.
   c. Arrays can store user-defined objects, but collections can’t.
   d. Collections are created from classes, but arrays aren’t.

3. Which of the following statements creates an array list that can store double values?
   a. ``ArrayList\langle double\rangle sales = new ArrayList\langle double\rangle();``
   b. ``ArrayList sales = new ArrayList\langle Double\rangle();``
   c. ``ArrayList\langle Double\rangle sales = new ArrayList();``
   d. ``ArrayList\langle Double\rangle sales = new ArrayList\langle Double\rangle();``

4. AWT components are considered
   a. lightweight components because they rely on the underlying system
   b. lightweight components because they are written entirely in Java
   c. heavyweight components because they are written entirely in Java
   d. heavyweight components because they rely on the underlying system

5. What term does Java use to refer to the following component?

   a. window  
   b. frame  
   c. panel  
   d. dialog box

6. What type of component is represented here?

   a. a combo box  
   b. a radio button  
   c. a check box  
   d. a text field
7. What layout manager lays out components in one of five specific regions?
   a. Flow layout  
   b. Grid Bag layout  
   c. Grid layout  
   d. Border layout

8. What must a program do to respond to an event?
   a. Register an event source with an event listener  
   b. Register an event source with an event  
   c. Register an event listener with an event source  
   d. Register an event with an event listener

9. What is the object that handles events generated by GUI components?
   a. a registered event  
   b. an event listener  
   c. an event monitor  
   d. an event source

10. An applet can
    a. run programs on the client computer  
    b. access a database on the client computer  
    c. access files on the client computer  
    d. connect to the applet’s host server

Problems (20 points)
1. Write Java code to create a combo box that contains “USC”, “Oregon State”, and “Harvard” as shown below (4 points) Note: do not need to use JPanel or write a complete program GUI application for this question, just write the statement to create the combo box with the three entries.

![Combo Box Example](image)

API Specifications are given at follows.

**Constructors of JComboBox class**

<table>
<thead>
<tr>
<th>Constructor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JComboBox()</td>
<td>Creates a JComboBox with a default data model.</td>
</tr>
<tr>
<td>JComboBox(ComboBoxModel aModel)</td>
<td>Creates a JComboBox that takes its items from an existing ComboBoxModel.</td>
</tr>
<tr>
<td>JComboBox(Object[ ] items)</td>
<td>Creates a JComboBox that contains the elements in the specified array.</td>
</tr>
</tbody>
</table>

**Some Methods of JComboBox class**

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>getSelectedItem()</td>
<td>Returns an Object type for the selected item.</td>
</tr>
<tr>
<td>addItem(Object)</td>
<td>Adds an item to the combo box.</td>
</tr>
</tbody>
</table>
removeltemAt(int) | Removes the item at the specified index from the combo box.

2. With the given UML diagram for Course and Section, assume that the Course class has been defined and available for you to use (Thus you don’t need to define it here. The constructor of this class does not have any parameter and assigns "" to string type attributes and 0 to integer type attribute. The toString() method of the Course class returns values for code, title, and unit.)

Now define the Section class, including all methods shown in the Section class in the diagram. The toString() method of the Section returns values for all attributes it has. Also define one constructor without any parameter for Section class which assigns "" to string type attribute and 0 to integer type attributes. (11 points)

// define the Section class at below. Remember assume the Course class has already been defined.
3. Based on the above question 2 and its solution, complete the following MyApp class according to requirements. (5 points)

   // Complete the following MyApp class
   public class MyApp
   {
      public static void main(String args[])
      {
         MyApp ca = new MyApp();
         ca.test();
      }
      public void test()
      {
         // instantiate the Section class by creating an instance, named s

         // set attribute values for the instance s, such that
         // code is CIS 311
         // title is Interactive Web Development
         // unit is 4
         // number is 1
         // classSize is 28
         // locationCode is 98C4-027

         // By now, since the instance s has been instantiated and been assigned values, now use
         // System.out.println() command to print out the values for all attributes of instance s.
} // end of test
} // end of MyApp
Suppose that you are given the following data attributes: Customer ID, Customer Name, Customer Street, Customer City, Customer State, Customer Zip Code, Customer Credit Limit, Order ID, Order Date, Due Date, Ship Date, Product ID, Quantity Ordered, Product Description, Product Unit Price. Arrange these attributes into third normal form and illustrate the result by producing either an Entity Relationship Diagram or a schema of the relations that include all of these attributes.
Multiple choice answers (2 points/ question)

1. Before information can be transmitted, it must be transformed into _______. (LO3)
   a) periodic signals
   b) electromagnetic signals
   c) aperiodic signals
   d) low-frequency sine waves

2. What is the bandwidth of a signal that ranges from 40 KHz to 4 MHz? (LO4)
   a) 36 MHz
   b) 360 KHz
   c) 3.96 MHz
   d) 396 KHz

3. 108 GHz is equivalent to _______ KHz? (LO5)
   a) 108 x 10^6
   b) 108 x 10^9
   c) 108 x 10^4
   d) 108 x 10^-6

4. _________ is a type of transmission impairment in which the signal loses strength due to the resistance of the transmission medium. (LO4)
   a. Distortion
   b. Noise
   c. Decibel
   d. Impedance
   e. Attenuation

5. Which one is not a factor of network reliability (LO10)
   a. Frequency of failure
   b. Time required to recover
   c. Network robustness in a catastrophe
   d. Unauthorized access
6. On a network that uses NAT, the _____ has a translation table (LO7).
   a) Switch
   b) Router
   c) Server
   d) None of the above

7. A subnet mask in a class C can have _________ 1s with the remaining bits 0s. (LO7)
   a) 10
   b) 25
   c) 12
   d) 7
   e) None of the above

8. Repeaters function in the _________ layer(s) (LO)
   a) Physical (MAC)
   b) Data Link
   c) Network
   d) a) and b)
   e) None of the above

9. A repeater takes a weakened or corrupted signal and ___________ it. (LO4)
   a) amplifies
   b) Regenerates
   c) Resamples
   d) Reroutes
   e) None of the above

10. VLAN technology divides a LAN into _________ groups. (LO6)
    a) physical
    b) logical
    c) multiplexed
    d) framed
    e) None of the above

11. In a VLAN, stations are separated into groups by _________ (LO6)
    a) physical methods
    b) software methods
    c) location
    d) switches
    e) None of the above

12. The access method for wireless LANs as defined by IEEE 802.11 is based on _________ (LO6)
    a) CSMA
    b) CSMA/CD
c) CSMA/CA  
d) Token passing  
e) None of the above

13. Which error detection method involves polynomials? (LO6)
   a. simple parity check  
   b. two-dimension parity check  
   c. CRC  
   d. Checksum

II Short answer questions

14. Name the two major categories of transmission media (LO4)

15. What is the significance of the twisted in twisted-pair cable? (LO4)
16. What does the Nyquist theorem have to do with communication? (LO4)

17. What does the Shannon capacity have to do with communications? (LO4)

18. List three components of the telecommunications industry system not including regulation, political/legislative/judicial, or standards. (LO2)
19. Identify two global standards-setting organizations and one standard. (LO3)

20. What are two disadvantages of a telecommunications standard? (LO3)
21. List the seven layers of the OSI Model in order from the user to the transmission medium? (LO3)

22. On which layer are the physical addresses of the sender and receiver specified? (LO3)
23. What is multiplexing? Why can it be beneficial? (LO4)

24. Lists five functions of network management (LO1)
Survey:

Did you take the following courses before this quarter? Please mark (X) your answer.

<table>
<thead>
<tr>
<th>Course</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 347 Local Area Networks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS 427 Mobile Communication and Wireless Networks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS 467 Network Security</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Computer Information Systems Department
CIS 310 Management Information Systems
Name

1. Two ways to reduce buyer power is through switching costs and loyalty programs.
   a) True  b) False

2. Value chain analysis views a firm as a series of business processes that each adds value to the product or service.
   a) True  b) False

3. Business intelligence is information collected from multiple sources. Which of the following provides an example of a source that would be included in business intelligence?
   A. Suppliers.
   B. Customers.
   C. Competitors.
   D. All of the above.

4. Today's workers are referred to as ____________ and they use BI along with personal experience to make decisions based on both information and intuition, a valuable resource for any company.
   A. Knowledge workers
   B. Knowledge thinkers
   C. Knowledge resources
   D. All of the above
5. Which four elements are included in systems thinking?
A. Output, Process, Feedback, and Accounting.
B. Process, Output, Operations, and Accounting.
C. Input, Process, Output, and Feedback.
D. Input, Output, Sales, and Feedback.

6. Which of the following represents a reason why competitive advantages are typically temporary?
A. The competitor will hire away your key employees.
B. The competitor quickly seeks ways to duplicate your business operations.
C. The competitor will purchase new technology.
D. All of the above.

7. Which of the below represents the three different levels of a company pyramid from the top to the bottom?
A. Managerial-Strategic-Operational
B. Strategic-Managerial-Operational
C. Operational-Managerial-Strategic
D. Strategic-Operational-Managerial

8. Which of the below is an example of a critical success factor?
A. Increase customer satisfaction
B. Number of new customers
C. Number of new products
D. Percentage of employee turnover

9. Key performance indicators are the metrics a company uses to evaluate progress toward critical success factors. Which of the below represents a key performance indicator?
A. Create high-quality products
B. Reduce product costs
C. Percentage of help desk calls answered in the first minute
D. Hire the best business professionals
10. What is the ebusiness model which applies to customers offering goods and services to each other over the Internet?
A. C2C  
B. C2B  
C. B2B  
D. B2C

11. What occurs when a system updates information at the same rate it receives the information?
A. Collective intelligence system  
B. Collaboration system  
C. Real-time communication  
D. Knowledge management system

12. Which of the following best describes Web 3.0?
A. User-generated online business  
B. Based on the ‘intelligent’ Web where applications use natural language processing  
C. Collaboration and social media  
D. All of the above.

13. Which of the following means the right to be left alone when you want to be, to have control over your personal possessions, and not to be observed without your consent?
A. Safety  
B. Ethical standard  
C. Privacy  
D. Proper
14. What is forging of someone's identity for the purpose of fraud?
A. Identity crisis
B. Identity theft
C. Ediscovery
D. All of the above

15. A smart card is a device, the size of a credit card that contains embedded technology that stores information and small amounts of software, and can act as _________________.
A. Identification instruments
B. A form of digital cash
C. A data storage device
D. All of the above

16. Charles Mott works for a company called VeriSign that acts a trusted third party to verify information. One of Charles' largest clients is CheckMd, which holds and authenticates customer reviews of doctors and dentists online and having a third party validating the reviews is critical to CheckMd's success. What type of authentication technique is VeriSign providing for CheckMD?
A. Firewall
B. Certificate authority
C. Online certificate
D. Digital content certificate

17. What are the first two lines of defense a company should take when addressing security risks?
A. Technology first, customers second
B. Technology first, people second
C. Innovation first, technology second
D. People first, technology second

18. The power of MIS comes from its ability to ____________ information.
A. Carry
B. House
19. Which of the following is a benefit of a solid MIS infrastructure?
A. Reduces costs
B. Improves productivity
C. Optimizes business operations
D. All of the above

20. Which of the following describes the difference between a backup plan and a recovery plan?
A. Recovery is an exact copy of a system's information, where backup is the ability to get a system up and running in the event of a system crash or failure
B. Backup is mandatory, where recovery is optional
C. Backup is an exact copy of a system's information, where recovery is the ability to get a system up and running in the event of a system crash or failure
D. Recovery is mandatory, where backup is optional

21. What enables computers to run multiple operating systems and multiple software applications at the same time and creates multiple 'virtual' machines all on a single computing device?
A. Virtualization
B. Innovation
C. Availability
D. Viral computing

22. Which of the following encompasses all of the information contained within a single business process or unit of work, and its primary purpose is to support daily operational tasks?
A. Targeted information
B. Analytical information
C. Productive information
D. Transactional information

23. Which of the following are examples of analytical information?
A. Airline ticket, sales receipts, and packing slips
B. Hotel reservation, sales receipts, and packing slips
C. Future growth analysis, sales projections, and product statistics
D. Packing slips, grocery receipt, and competitor information

24. What is the overall management of the availability, usability, integrity, and security of company data?
A. Data Intelligence
B. Data governance
C. Data forbearance
D. Data forecasting

25. Why do relational databases use primary keys and foreign keys?
A. To create an entity
B. To create physical relationships
C. To create logical relationships
D. To create an attribute

26. Which of the following illustrates the primary concepts of the relational database model?
A. Ethics, applications, keys, and relationships
B. Entities, attributes, keys, and relationships
C. Endeavor, aspire, control, and regulate
D. Early, after, before, and future

27. What is the primary difference between an entity and an attribute?
A. An attribute is a table, an entity is a column from the attribute table
B. An entity is specific, where as an attribute is not data at all but brainstorming ideas that take place before the entity is created
C. An attribute refers to applications, and an entity refers to executives
D. An entity is a table that stores information about people, places, or events, whereas an attribute is a column or specific field of the data elements associated with an entity.

28. What is the largest and most important network that has evolved into a global information superhighway?
A. Internet  
B. Intranet  
C. Extranet  
D. LAN

29. What measures network performance by the maximum amount of data that can pass from one point to another in a unit of time?
A. Bandwidth  
B. Frequency  
C. Access  
D. Protocol

30. Which of the following allows high-speed digital data transmission over standard telephone lines?
A. Digital subscriber line (DSL)  
B. Data subscription service (DSS)  
C. Dominance service line (DSL)  
D. Data converter input (DCI)
31. What is a benefit of network convergence?
A. The weaving together of voice, data, and video
B. Multiple services offered from a single vendor
C. Multiple devices supported by one provider
D. All of the above

32. What is the digital divide?
A. A worldwide gap giving advantage to those with access to technology
B. A data interruption in the Internet connection
C. A deficiency in school-aged children with computer knowledge
D. A divide between the economies of third world countries

33. What is a wireless PAN technology that transmits signals over short distances among cell phones, computers, and other devices?
A. Laptop
B. PDA
C. Bluetooth
D. Camera

34. Which business application uses location information to provide a service and is designed to give mobile users instant access to personalized local content?
A. Radio-frequency identification
B. Global positioning systems
C. Geographic information systems
D. Location-based services

35. Walmart and Procter & Gamble (P&G) implemented a tremendously successful SCM system. The system linked Wal-Mart's _____________ centers directly to P&G's _____________ centers.
A. manufacturing, distribution
B. distribution, manufacturing
C. stores, distribution
D. distribution, stores

36. Today, SCM systems focus on extending beyond an organization's four walls to influence:
A. Suppliers
B. Suppliers' supplier
C. Customers' customer
D. All of the above

37. What is enterprise resource planning?
A. The analysis and redesign of workflow within and between enterprises
B. A standardized set of activities that accomplish as specific task, such as processing a customer's order
C. Integrates all departments and functions throughout an organization into a single IT system so that employees can make decisions by viewing enterprisewide information on all business operations
D. Involves managing all aspects of a customer's relationship with an organization to increase customer loyalty and retention and an organization's profitability

38. What is the systems development life cycle?
A. Involves establishing a high-level plan of the intended project and determining project goals
B. Involves analyzing end-user business requirements and refining project goals into defined functions and operations of the intended system
C. Involves describing the desired features and operations of the system
D. The overall process for developing information systems from planning and analysis through implementation and maintenance

39. What is a business requirement?
A. The nonspecific business requests the system must meet to be successful
B. The specific business requests the system must meet to be successful
C. The nonspecific methodology the system must meet to be successful
D. The specific methodology the system must meet to be successful

40. What emphasizes extensive user involvement in the rapid and evolutionary construction of working prototypes of a system to accelerate the systems development process?
A. RAD methodology
B. Agile methodology
C. Waterfall methodology
D. Extreme programming

Questions

1. Why would an organization use Porter’s five forces?

2. What is a business model?
3. What does information ethics mean? Referring back to the clash between Google and China, do you think it was ethical business decision for Google to offer uncensored site in Honk Kong? Why or why not?
Name_________________________________________________________________________

1. XML tags are case sensitive, while HTML is not.
   (a) True   (b) False

2. What is the most current HTML standard?
   (a) HTML 3  (b) HTML 4
   (c) HTML 5  (d) HTML 6

3. XHTML is a combination of:
   (a) XHTML & HTML  (b) XML & HTML
   (c) XTD & HTML  (d) XML & HTTP

4. The most commonly used CSS is?
   (a) Embedded/internal style  (b) Inline style
   (c) Linked/external style  (d) None of the above

5. Which of the following is the current trend of layout design?
   (a) Frame-based  (b) Table-based
6. For web developers in general, web standards refers to the following elements:
   (a) structure, content, behavior       (b) structure, content, presentation
   (c) content, layout, presentation     (d) structure, presentation, behavior

7. Web accessibility not only focuses on support for people with disabilities but in broader sense also used to focus on support for all user agents.
   (a) True             (b) False

8. Web accessibility suggests that information and user interface components be presentable to users in ways they can perceive through:
   (a) providing text alternatives for non-text content
   (b) providing captions and alternatives for audio and video content
   (c) using sufficient contrast to make things easy to see and hear
   (d) all of the above

9. Web development is consisted of client-side and server-side technologies.
   (a) True             (b) False

10. JavaScript is a client-side technology.
    (a) True             (b) False

11. ASP.net is a server-side technology.
    (a) True             (b) False
12. AJAX is the combination of the following two technologies:
   (a) HTML & Java  (b) HTML & JavaScript
   (c) XML & HTM   (d) XML & JavaScript

13. What is the back-end server that processes HTTP requests and responses?
   (a) Database server  (b) RPC server
   (c) Web server       (d) FTP server

14. Which of the following is NOT a server-side scripting environment?
   (a) ASP.net  (b) PHP
   (c) JSP      (d) none of the above

15. ASP.net is a computer language used to development web applications.
   (a) True  (b) False

16. Which of the following is a function of server-side scripting environment?
   (a) Configure Web application  (b) Manage site design
   (c) Generate dynamic web pages  (d) All of the above

17. If a web application uses stateful interaction, it has to implement a state management,
    which allows clients and servers to exchange information within a context of state called
    "___session____".

    List out three widely used methods for maintaining sessions in web environment:

18. _______query string________
19. ______ cookie _______

20. ______ session or application or hidden form field _______

21. Within a document we can define a destination anchor.

<A href="#privacy">Privacy policy </A>

Then in the destination we put:

(a) Privacy policy <br/> Detailed privacy policy follows...
(b) <privacy>Privacy policy</privacy> Detailed privacy policy follows...
(c) <A name="privacy">Privacy policy</A> Detailed privacy policy follows...
(d) <A id="privacy">Privacy policy</A> Detailed privacy policy follows...
22. How do you display a link in red the moment it is clicked?

(a) a:link {color:#FF0000;}
(b) a:visited {color:#FF0000;}
(c) a:hover {color:#FF0000;}
(d) a:active {color:#FF0000;}

23. What is the correct syntax for referring to an external script called "global.js"?

(a) <script type="text/javascript" src="global.js">
(b) <script type="text/javascript" name="global.js">
(c) <script type="text/javascript" href="global.js">
(d) <script type="text/javascript" = "global.js">

24. What does the following Javascript output?

<script type="text/javascript">
    var str="Bronco rules!";
    document.write(str.substring(4,9));
</script>

(a) Bron
(b) Bronco
(c) co rules!
(d) co ru
(e) nco rules

25. What does the following Javascript output?

var str = "I love Cal Poly Pomona!";

document.write(str.indexOf("Pomona"));

(a) Pomona
(b) -1
(c) 5
(d) 16
(e) 17

26. Which of the following is a correct declaration of an integer variable named intLength with an initial value of 13?
(a) Dim intLength As Integer initialize to 13
(b) Dim intLength = 13 As Integer
(c) Dim intLength As Integer = 13
(d) Dim intLength As Integer 13
27. What value will be assigned to `strWear` when `intTemperature` equals 75?

```vbnet
If intTemperature > 50 Then
    strWear = "Wear a jacket!"
ElseIf intTemperature > 60 Then
    strWear = "Wear a sweater!"
ElseIf intTemperature > 70 Then
    strWear = "Wear a long sleeve!"
ElseIf intTemperature > 80 Then
    strWear = "Wear a T-shirt!"
End If
```

(a) Wear a jacket!
(b) Wear a sweater!
(c) Wear a long sleeve!
(d) Wear a T-shirt!

28. What value is assigned to `lblSum.Text` by the following code?

```vbnet
Dim intTotal As Integer = 0
For intLoop = 1 To 4
    intTotal += intLoop * intLoop
Next
lblSum.Text = intTotal.ToString()
```

(a) 0
(b) 4
(c) 14
29. A(n) ____ displays information in a row and column format, similar to a spreadsheet, and is often used to align the information on a Web page.

(a) Web server  
(b) Web client  
(c) GridView control  
(d) DetailsView control

30. What is the base class from which all Web forms inherit?

(a) Master Page  
(b) Page Class  
(c) Session Class  
(d) All of the Above  
(e) None of the Above