**Assignment 2 – Advanced ER Diagrams**

Total points: 50

**You may work in up to groups of 2 on this assignment. Include each student’s name on your assignment submission. Only one student should submit the completed assignment. Please note, once an assignment is submitted I will not allow you to add or change student names on the submission, be sure to include the appropriate names on the assignment.**

**Review the scenario and business rules provided and draw a Crow’s foot ERD.**

Instructions for the ERDs:

1. List the entities ***AND*** attributes.
2. Show the relationships, connectivity, ***AND*** cardinality. Be sure to label all relationships
3. Convert all M:N relationships using composite entities.
4. Identify the primary key(s) in each entity. (underline with solid line or notate with PK indicator).
5. Place foreign keys as necessary and notate the foreign key (underline with dotted line or notate with FK indicator).
6. Include all other extended ER modeling notations as necessary.
7. All attributes should be single valued attributes.
8. Use proper naming conventions for entities and attributes.
9. Copy and paste your ERD into a Word or PDF document. Save the document and upload using the assignment link provided in eLearning.

**Global Computer Solutions (GCS) is an information technology consulting company with many offices located throughout the United States. The company’s success is based on its ability to maximize its resources—that is, its ability to match highly skilled employees with projects according to region. To better manage its projects, GCS has contacted you to design a database so that GCS managers can keep track of their customers, employees, projects, and assignments.**

**Create a complete Crow’s Foot ERD for these requirements:**

* The *employees* working for GCS have an employee ID, an employee last name, a first name, a region, and a date of hire.
* Each employee has one or more skills, and many employees have the same skill. GSC only keeps track of skills that employees have.
* Each *skill* has a description and rate of pay. Valid skills are as follows: data entry I, data entry II, systems analyst I, systems analyst II, database designer I, database designer II, Cobol I, Cobol II, C++ I, C++ II, VB I, VB II, ColdFusion I, ColdFusion II, ASP I, ASP II, Oracle DBA, MS SQL Server DBA, network engineer I, network engineer II, web administrator, technical writer, and project manager. Table 1 shows an example of the Skills Inventory.
* GCS has many *customers*. Each customer has a customer ID, customer name, phone number, and region. Every region has at least one customer.
* GCS works by *projects*. A project is based on a contract between the customer and GCS to design, develop, and implement a computerized solution. Each project has specific characteristics such as the project ID, the customer to which the project belongs, a brief description, a project date (that is, the date on which the project’s contract was signed), a project start date (an estimate), a project end date (also an estimate), a project budget (total estimated cost of project), an actual start date, an actual end date, an actual cost, and one employee assigned as manager of the project. A customer can own many projects, but a project is owned by one customer. All projects must have a single project manager assigned (An employee is assigned to a project).
* Different projects have different characteristics. GCS currently works on government projects, healthcare projects, projects for non-profit organizations as well as for profit organizations. Government projects have two unique characteristics – government office and government resource number. Healthcare projects have two unique characteristics – healthcare type and doctor sponsor name. Non-profit projects have a tax-id number. A project will only be one type.
* All projects are broken down into many tasks after the project start date. GCS pools all of its employees by region, and from this pool, employees are assigned to one or more tasks. Each task has a description a begin date and an end date. Each task also requires one or more skills. For example, for project ABC for the period 3/1/10 to 3/6/10, a Systems Analyst II, a Database Designer I, and a Project Manager are needed. Using that information, GCS searches the employees who are located in the same region as the customer, matching the skills required and assigning them to the project task.
* Each project task can have many employees assigned to it and an employee can work on up to 4 project tasks at a time. Each employee records the duration of time spent on each task. Not every employee is assigned to a task.

Your assignment is to create a database that will fulfill the operations described in this problem. The minimum required entities are employee, skill, customer, project, task. (There are additional required entities that are not listed.) Create all of the required tables and all of the required relationships.

You will be graded on appropriate naming conventions for entities, attributes, and relationships and an appropriate representation of the business rules.

**Table 1. Skills Inventory**

|  |  |
| --- | --- |
| **Skill** | **Employee** |
| Data Entry I | Seaton Amy; Williams Josh; Underwood Trish |
| Data Entry II | Williams Josh; Seaton Amy |
| Systems Analyst I | Craig Brett; Sewell Beth; Robbins Erin; Bush Emily; Zebras Steve |
| Systems Analyst II | Chandler Joseph; Burklow Shane; Robbins Erin |
| DB Designer I | Yarbrough Peter; Smith Mary |
| DB Designer II | Yarbrough Peter; Pascoe Jonathan |
| Cobol I | Kattan Chris; Epahnor Victor; Summers Anna; Ellis Maria |
| Cobol II | Kattan Chris; Epahnor Victor, Batts Melissa |
| C++ I | Smith Jose; Rogers Adam; Cope Leslie |
| C++ II | Rogers Adam; Bible Hanah |
| VB I | Zebras Steve; Ellis Maria |
| VB II | Zebras Steve; Newton Christopher |
| ColdFusion I | Duarte Miriam; Bush Emily |
| ColdFusion II | Bush Emily; Newton Christopher |
| ASP I | Duarte Miriam; Bush Emily |
| ASP II | Duarte Miriam; Newton Christopher |
| Oracle DBA | Smith Jose; Pascoe Jonathan |
| SQL Server DBA | Yarbrough Peter; Smith Jose |
| Network Engineer I | Bush Emily; Smith Mary |
| Network Engineer II | Bush Emily; Smith Mary |
| Web Administrator | Bush Emily; Smith Mary; Newton Christopher |
| Technical Writer | Kilby Surgena; Bender Larry |
| Project Manager | Paine Brad; Mudd Roger; Kenyon Tiffany; Connor Sean |

**Table 2**  **Project Assignment Form**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Project ID:** 1 **Description:** Sales Management System  **Company:** See Rocks **Contract Date:** 2/12/2010 **As of:** 03/29/10 | | | | | |
| **SCHEDULED** | | | | **ACTUAL ASSIGNMENTS** | |
| **Project**  **Task** | **Start**  **Date** | **End Date** | **Skill** | Employee |
| Initial Interview | 3/1/10 | 3/6/10 | Project Mgr.  Sys. Analyst II  DB Designer I | 101—Connor S.  102—Burklow S.  103—Smith M. |
| Database Design | 3/11/10 | 3/15/10 | DB Designer I | 104—Smith M. |
| System Design | 3/11/10 | 4/12/10 | Sys. Analyst II  Sys. Analyst I  Sys. Analyst I | 105—Burklow S.  106—Bush E.  107—Zebras S. |
| Database Implementation | 3/18/10 | 3/22/10 | Oracle DBA | 108—Smith J. |
| System Coding & Testing | 3/25/10 | 5/20/10 | Cobol I  Cobol I  Cobol II  Oracle DBA | 109—Summers A.  110—Ellis M.  111—Ephanor V.  112—Smith J. |
| System Documentation | 3/25/10 | 6/7/10 | Tech. Writer | 113—Kilby S. |
| Final Evaluation | 6/10/10 | 6/14/10 | Project Mgr.  Sys. Analyst II  DB Designer I  Cobol II |  |
| On-Site System Online and Data Loading | 6/17/10 | 6/21/10 | Project Mgr.  Sys. Analyst II  DB Designer I  Cobol II |  |
| Sign-Off | 7/1/10 | 7/1/10 | Project Mgr. |  |