The following narrative is the information you should use to develop the deliverables from your take home final exam in MIS 571.

Narrative:

The Really Good Engineers Company is a civil engineering firm that provides a full range of services to its clients. After years of operating a manual system, RGE management has decided to automate their project tracking activity. RGE certified professional engineers have responsibility to oversee a project for a client. Each project has one professional engineer assigned; however, a given professional engineer will typically be responsible for several projects, although some work in an administrative capacity and are not involved directly with client projects. All certified professional engineers are partners at RGE and RGE keeps the following professional engineering license data elements: professional engineer 12-character license number, issuing state, most recent professional certification date, continuing education hours achieved since last certification, date partner status awarded. Each certified professional engineer is assigned a company truck; the database should hold each truck's vehicle identification number, year, make, vehicle description, odometer reading, date of odometer reading, purchase date, purchase price of each truck, and whether it is assigned to a partner.

Each project can include more than one client and many clients contract across numerous projects. The total cost of each project is apportioned to clients according to their percentage share of the project cost. Some projects are done for internal reasons and are not associated with clients. RGE management only wants to store data on clients who have contracted for projects. Projects can occur at multiple site locations (i.e., site), so RGE tracks the progress of each project at each site. RGE also has an inventory of construction equipment (e.g., bulldozer, loader, grader, excavator, telescopic handler, backhoe, tractor scraper, skid-steer loader, dump truck, trencher, paver, skidder, compactor, and roller) that are assigned and located on multiple sites, used across projects, and redistributed across sites as necessary. RGE tracks the hours of usage per project for construction equipment and targets construction equipment with more than 10,000 hours of total usage for replacement. Additionally, RGE tracks construction equipment by category and records vehicle identification number, manufacturer, year, model, purchase date, purchase price, hours used, date of last usage, decommission date, and selling price. Each site requires tracking of associated projects' completions as well as the site identification, plat map identification, address, city, county, state, zip, acreage, GIS coordinates, server URL of current infrastructure blueprints, and type of site (i.e., government, industrial, commercial, or residential).

Each project requires multiple forms of labor for completion. Certified professional engineers at RGE are partners in the group and receive compensation based the percentage completion of a project. Contractors are considered as third-party partners who are paid according to contract agreements based on project completion. Salaried employees perform project work, but their labor is not charged directly to any given project. Salaried employee

labor is considered a fixed cost. Hourly employee labor is charged directly to projects and is considered a variable cost. Employee types are distinguished by indicators of P for professional engineer, S for staff, H for hourly, and C for contractors. Each professional engineer earns five percent of project cost as the project is completed. Each contractor has a unique contract amount that is paid monthly. Salaried employees are paid monthly based on individual monthly salaries. Hourly employees are paid based on hours worked and their unique hourly wage. Each project tracks the total month-to-date labor charged against the project. A stored procedure is run monthly, outside of this database, that calculates the associated labor charge from labor costs inside this database and then updates the relevant projects' column amounts respectively. RGE also tracks all employees by identification number, social security number or employee identification number, date of birth, gender, ethnicity, address, city, state, zip, cellular phone, preferred email, emergency contact, emergency contact cellular phone, and hire date.

The data on projects includes a project number, name, project description, start date, end date, contracted cost, labor expended, and contract number. Awarded contracts are specific to construction projects and the associated clients. Client data consists of the client's identification number, name, address, city, state, zip, contact, contact phone, contact email, and letter of credit amount. A primary source of new clients is referrals from existing clients; the other source of business comes from RGE advertisements.

RGE has several standing reports and forms that management would like to automate once the new database is completed. RGE tracks which clients refer other new clients. Each day, employees submit forms for hours worked on each project and hours for all construction equipment used. RGE tracks the inventory value of construction equipment by site location, the number of hours of construction equipment usage by individual equipment in each equipment category, as well as the number of hours of construction equipment by category used per project. RGE tracks truck mileage accrued, which trucks are assigned to partners, as well as collecting ending monthly odometer readings from trucks. RGE tracks how many projects are concurrently active on sites, as well as individual project total cost and the percentage of labor cost expended to the total project cost. Finally, RGE also monitors total projects' costs and compares the combined projects' costs across sites for an individual client as a percentage of the letter of credit granted to the client.

Deliverables:

The deliverables should include:

1) The narrative with entities, relationships, attributes, and reports/forms highlighted and identified (5%).

2) An ERD reflecting the entities, attributes, and relationships identified in the narrative (30%). Please note that conceptual models do not reflect foreign keys.

3) A logical model in 3rd normal form from the conceptual model that identifies relations, primary keys, foreign keys, and attributes(25%).

4) A DDL SQL script, capable of building the required physical database in SQLite, to reflect the information represented in the narrative and resulting conceptual and logical models. Using different kind of constraints beyond PK and FK is encouraged, as well as an application of at least one View and one Trigger is recommended. (30%).

5) A listing of reports/forms, identified in the narrative, with the associated related table.column content to populate the required queries or views (10%).

The take-home exam deliverables are due by 6PM on Tuesday, May 5th.

All deliverables should be labeled and combined into one Microsoft Word document to be submitted via the appropriate Canvas assignment.

Points will be taken off for missing this deadline, no matter what the reason.