**Assignment-1**

Q.1 Consider the following information about a university database:

Professors have an SSN, a name, an age, a rank, and a research specialty. Projects have a

project number, a sponsor name (e.g., NSF), a starting date, an ending date, and a budget.

Graduate students have an SSN, a name, an age, and a degree program (e.g., M.S. or Ph.D.).

Each project is managed by one professor (known as the project’s principal investigator).

Each project is worked on by one or more professors (known as the project’s co-

investigators). Professors can manage and/or work on multiple projects. Each project is

worked on by one or more graduate students (known as the project’s research assistants).

When graduate students work on a project, a professor must supervise their work on the

project. Graduate students can work on multiple projects, in which case they will have a

(potentially diﬀerent) supervisor for each one. Departments have a department number, a

department name, and a main oﬃce. Departments have a professor (known as the chairman)

who runs the department. Professors work in one or more departments, and for each

department that they work in, a time percentage is associated with their job. Graduate

students have one major department in which they are working on their degree. Each

graduate student has another, more senior graduate student (known as a student advisor) who

advises him or her on what courses to take.

Design and draw an ER diagram that captures the information about the university. Use only

the basic ER model here; that is, entities, relationships, and attributes. Be sure to indicate any

key and participation constraints.

Q.2 Consider the following schema:

Suppliers (sid: integer, sname: string, address: string)

Parts (pid: integer, pname: string, color: string)

Catalog (sid: integer, pid: integer, cost: real)

The key ﬁelds are underlined, and the domain of each ﬁeld is listed after the ﬁeld name.

Therefore, sid is the key for Suppliers, pid is the key for Parts, and sid and pid together form

the key for Catalog. The Catalog relation lists the prices charged for parts by Suppliers. Write

the following queries in relational algebra and SQL.

1. Find the names of suppliers who supply some red part.

2. Find the sids of suppliers who supply some red or green part.

3. Find the sids of suppliers who supply some red part or are at 221 Packer Street.

4. Find the sids of suppliers who supply some red part and some green part.

5. Find the sids of suppliers who supply every part.

6. Find the sids of suppliers who supply every red part.