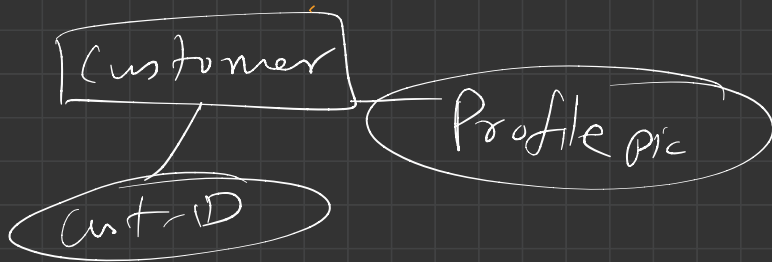# Lec-4
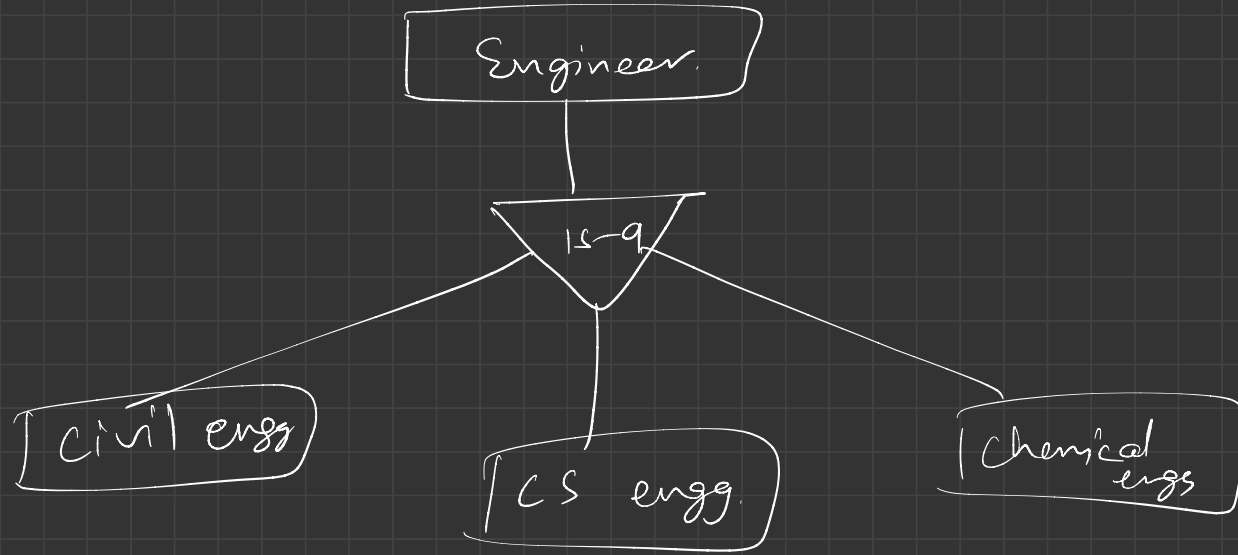
Extended ER Features

① Specialization

Person
- name
- address
- Contact

Customer
- Cust-ID
- Profile pic

Employee
- Role
- Salary

Top-Down

- address — Person — name
- is-a
  - customer — Cust-ID, Profile Pic, memBership Period
  - employee — Role, Sdary
    - is-a
      - HR manager — working hours
      - Developers — tech stack
      - Housekeeper — Building No.

```
               ┌─────────────────┐
               │    Engineer     │
               └─────────────────┘
                        │
                       ╲ is-a ╱
                        ╲────╱
              ╱          │          ╲
   ┌──────────────┐ ┌──────────┐ ┌──────────────┐
   │  civil engg  │ │ CS engg  │ │   chemical   │
   └──────────────┘ └──────────┘ │     engs     │
                                  └──────────────┘
```

```
              ┌─────────────┐
              │   Vehicle   │
              └──────┬──────┘
                     │
                  ╲  ▼  ╱
                   ╲Isa╱
                    ╲ ╱
          ╱          │          ╲
  ┌────────┐    ┌────────┐    ┌────────┐
  │  Car   │    │  SUV   │    │  Bus   │
  └────────┘    └────────┘    └────────┘
```

②   Generalizations

*   Aggregation

Job

emp.

works on

branch.

works on

manager

manager.

eg.

Student —— attends? —— Semester

has —— Subject