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FIGURE P 1.1

PROBLEM 1:

RECORDS:

The file contains 7 records.

FIELDS:

Each record contains 5 fields.

PROBLEM 2:

PROBLEM:

If we want to produce listing  
by city then the main problem would be  
MANAGER\_ADDRESS field as it is a  
single entity.

## SOLUTION :

We can split MANAGER\_ADDRESS into separate fields:

- Street address
- City
- State
- Zip code.

## PROBLEM 3 :

- In the PROJECT\_MANAGER into First name & last name fields.
- Split MANAGER\_ADDRESS into city, state, zip code fields
- Split MANAGER\_PHONE into area code, phone numbers fields.

## PROBLEM 4 :

### DATA REDUNDANCIES :

In fields of  
PROJECT\_MANAGER, MANAGER\_PHONE &  
MANAGER\_ADDRESS data has repeated for  
multiple times.

## ANOMALIES :

### • UPDATE ANOMALY :

If the manager's phone number or address changes, it must be updated in various records.

### • INSERTION ANOMALY :

A new manager cannot be added without associating them with a project.

### • DELETION ANOMALY :

If a project is deleted, it might delete other details too.

## FIGURE P 1.5

### PROBLEM 5:

The EMP\_NAME & EMP\_PHONE fields are repeated multiple times which can become a serious data redundancy.

- The job\_code & job\_chg\_hour fields are also repeated.

Due to these secondary storage requirements can be increased & can lead to other issues too.

## PROBLEM 6:

To reduce the data

secondary EMP\_NAME & EMP\_PHONE & make a separate field of EMP\_ID which consists of other 2.

## PROBLEM 7:

- PROJ\_NUM, PROJ\_NAME
- EMP\_NAME, EMP\_PHONE
- JOB\_CODE, JOB\_CHG\_HOUR
- PROJ\_HOURS.

## PROBLEM 8:

Employee table : EMP\_ID, EMP\_NAME, EMP\_PHONE

Project table : PROJ\_NUM, PROJ\_NAME

Job table : JOB\_CODE, JOB\_DESCRIPTION, JOB\_CHG\_HOUR  
Assignment table (joins employees, projects, & jobs) : EMP\_ID, PROJ\_NUM, JOB\_CODE, PROJ\_HOURS