Assignment 1

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Chapter 1 Problems

1. How many records does this file contain?

**Answer:** The file has 7 records in it and each record has 5 fields those are PROJECT\_CODE, PROJECT\_MANAGER, MANAGER\_PHONE, MANAGER\_ADDRESS and PROJECT\_BID\_PRICE

1. What problem would you encounter if you wanted to produce a listing by city? How would you solve this problem by altering the file structure?

**Answer:** There can be multiple problems when we try to produce a listing by city. Firstly, by looking at this table it is not possible to list the data by city as it is combined along with other details in the MANAGER\_ADDRESS field. We will get the expected output, but the data will be repeated as in we face data redundancy. For example, for a single user Holly B. Parker we will get same city three times which is not the ideal output. The best way to solve this problem is by use of Database system which ideally **normalize this table**. Firstly, we can divide the address table separately into City, State, Zip, and address. Then we can divide the table(normalize) with PROJECT\_CODE as key between the tables as it has **unique values**. The we can easily produce a listing by city.

1. If you wanted to produce a listing of the file contents by last name, area code, city, state, or zip code, how would you alter the file structure?

**Answer:** We could create new file structure by designing it with relatable tables. The MANAGER\_ADDRESS field has all the details we need such as area code, city, state, and zip code. We must design a new table with these as our new fields with a key which matches with other table which has other details. The table can be again designed nicely be splitting the PROJECT\_MANGER field into **first\_name and last\_name**. Then we can write a query to join these two tables to get our required details.

**Note: This can be done in a single table which will have all employee address details asked in questions along with the first\_name and last\_name but designing table with related data gives us much better results and can be avoided from problems.**

1. What data redundancies do you detect? How could those redundancies lead anomalies?

Answer: Data Redundancy basically refers to the duplication of data. In this table two of the managers are handling more than one project as a result we can see multiple copies of phone **number and address**. Project managers Holly B. Parker and George F. Dort’s details are causing data redundancy in this. This can lead to anomalies such as data inconsistency. Imagine a situation if Holly B. Parker changes her address then we need to make changes to all the remaining projects as well or else it will be an anomaly. If the same user quit the organization then we need to delete that users details which indirectly affect the details about the project which is not valid.

1. Identify and discuss the serious data redundancy problems exhibited by the file structure shown in figure P1.5.

**Answer:** There are a couple of data redundancy in P1.5. Firstly, there is a **data entry error** in this table for user John D. Newson whose phone number is different for PROJ\_NUM 1 and 2. Most of the fields have repeated values such as JOB\_CODE, EMP\_NAME etc. Change of phone number for john would be reflected both in Hurricane and Coast project. Something similar situation for Anne as well. Change in data would affect the change in **application program** as we have multiple repeated data.

1. Looking at the EMP\_NAME and EMP\_PHONE contents in figure P1.5, what change(s) would you recommend?

**Answer:** Looking at this table I would recommend designing a new related table which will have only **employee details** such as employee first\_name, last\_name and phone number with a key field as EMP\_NUM. This will resolve the data redundancy from the main table. We can perform better analysis and get faster result with this approach.

1. Identify the various data sources in the file you examined in problem 5.

**Answer:** The data sources available in P1.5 are employee details like their full name, their id, and their phone number. It also has data sources/ details such as project employee work under which project, project id and how many hours do they work. The other type of data source available is job details which has fields such as job code and for how long they have worked in that project.

1. Given your answer to problem 7, what new files should you create to help eliminate the data redundancies found in the file shown in figure P1.5?

**Answer:** I would newly design a file which will have only employee details and separate it from Project details. The new employee file would have details about employee last\_name, first\_name, phone\_num and EMP\_NUM as key. I would design another table with Project details with EMP\_NUM as key again which will have project name, project number and project hours. And then a final table with employee job details.

1. Identify and discuss the serious data redundancy problems exhibited by the file structure shown in figure P1.9?

**Answer:** Major data redundancy in this table is poorly designed data. One of the teacher’s initial is missing. DBMS enters empty fields as null to avoid problems. Lot’s of dependencies here. Imagine a situation where a particular teacher who takes more than one subject decide to change their teaching hours then whole table needs to be updated. Another redundancy is that we cannot retrieve the data as we want in this. The DAYS\_TIME field has both days and timings of the lectures. Building codes have a lot of repeated data. The room code also has repeated data. All these repeated data results in data redundancy.

1. Given the file structure shown in figure P1.9, what problems might you encounter if building KOM were deleted?

**Answer:** If building KOM were deleted from the P1.9, there will be anomalies with the data. There will be **deletion anomalies** which will affect the loss of data for teachers who are assigned for that building. 50% of data from our file system will be lost as a result if it as there are 5 records related to KOM building.