

## **Project report for Mulcahy Dental Practice**

### **Introduction**

Design and construction of a database was required to meet the information needs of Mulcahy Dental. A number of points needed to be considered to do this:

- Patients ask for appointments and one is arranged unless the patient owes over a certain amount or owes money for too long
- Patients rearrange and cancel appointments
- Late cancellations are charged a late cancellation fee
- Every Tuesday the following week's patients are sent a reminder of their appointment
- Patients are sent itemised bills for unpaid treatments. Patients have the option to pay in full or make several smaller payments
- Specialist cases are referred to Cork city

These were considered to begin designing a database to suit the business needs of Mulcahy Dental.

### **Discussion**

The ANSI/SPARC model was taken into consideration when designing and creating the database. The project narrative considered in the introduction above helped fulfill the requirements gathering stage.

Next the concepts and semantic objects were considered to represent the real world system by means of semantic objects. The Entity Relationship(ER) model was used to do this. Entities were decided on and the characteristics of the entities and their relationships with other entities were considered.

An ER model is not directly implementable as the concepts of ER modelling are not directly supported by a database management system and it had to be translated into an implementable model. In this case we used the Relational Model. Strong entities were mapped to a base relation and weak entities were mapped to a base relation by also using a foreign key to the entity it depended on.

The relational model should not be directly implemented post conceptual modelling as the relations contain redundant data and these cause problems with insert and update operations. Links or constraints between attributes may cause this. The relations were checked for updating anomalies.

The normalisation process was used to avoid this. If a relation is in a normal form, it is well structured. The higher the normal form, the better the structure. The relations were taken through the normalisation process to the third normal form.

Data Definition Language (SQL) was then used to create database objects, define access rights, add constraints, insert data. An index was created on patientID in the patients relation as patient information will be frequently searched for by patientID.

Data Manipulation Language (SQL) was used to query the database i.e. Insert, Update, Delete and Retrieve data.

Codd's 12 rules were considered and SQL code was written to demonstrate and test the rules where possible.

## **Conclusion**

Database design and creation is a complex process with many stages and considerations. The design must ensure data integrity, data redundancy elimination, query execution efficiency, and high performance. It must reflect the real world system involved and iterative analysis is of the utmost importance through all phases.