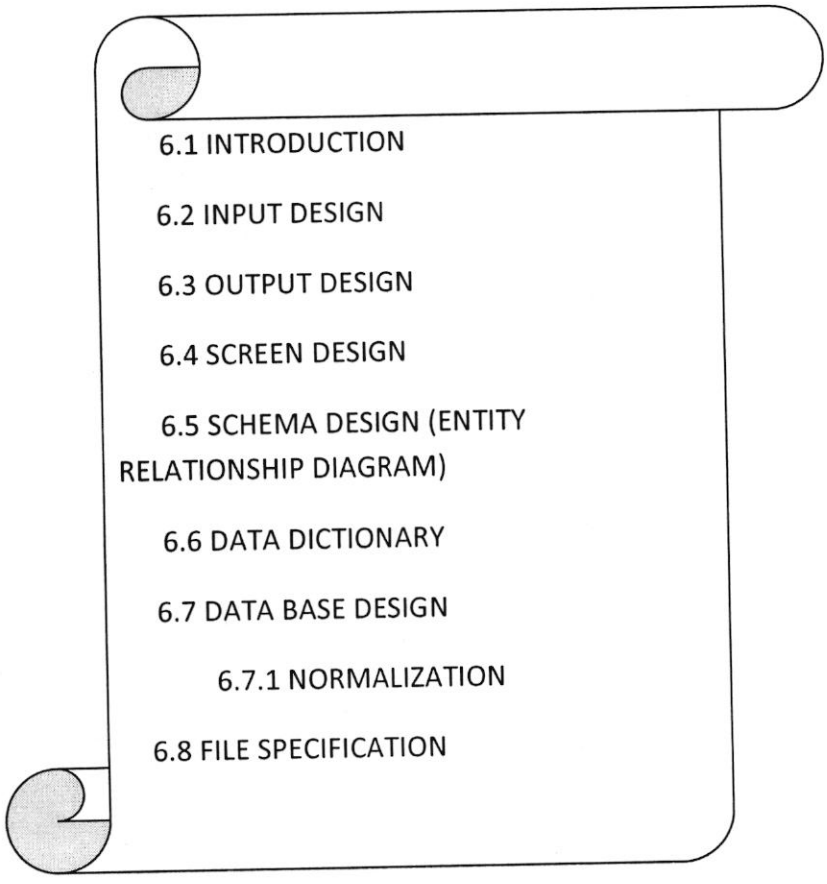
CHAPTER 6: SYSTEM DESIGN



CHAPTER 6: SYSTEM DESIGN

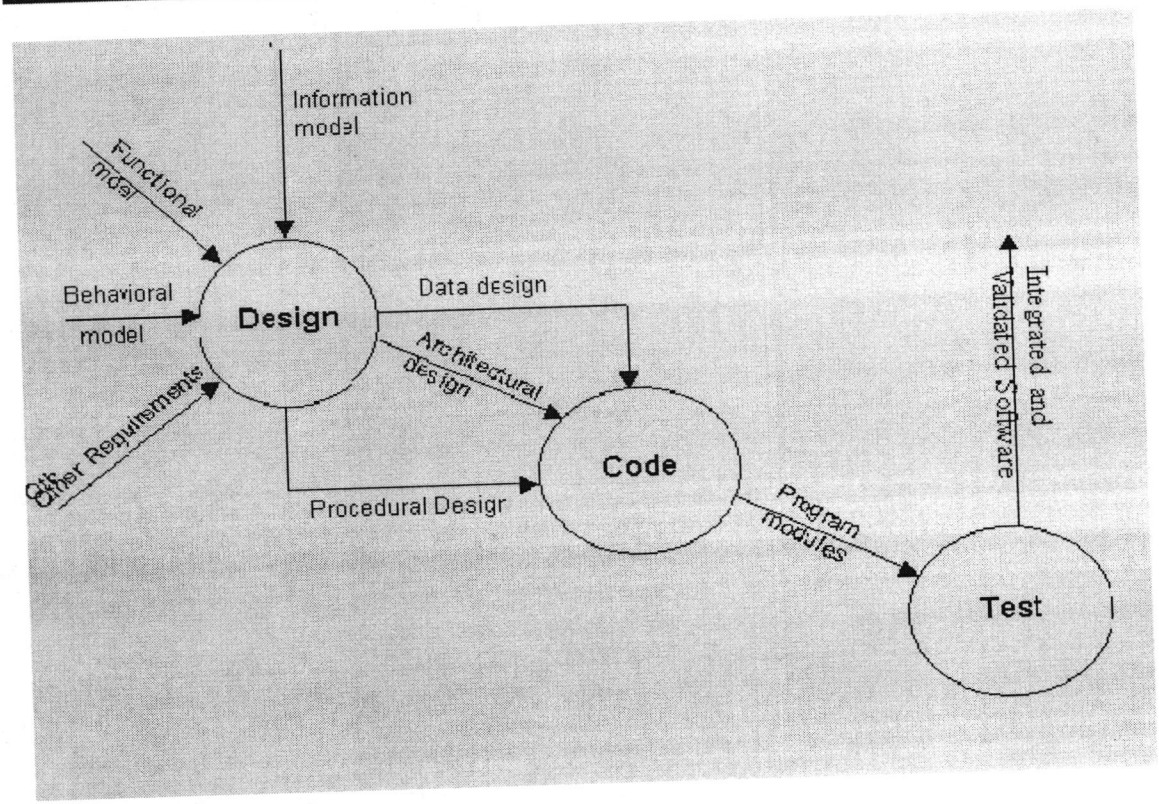
6.1 INTRODUCTION

Software design is a process through which requirements are translated into a representation of Software. It may be defined as *"the process of applying various techniques for the purpose of defining a device, a process or a system in sufficient detail to permit its physical realization"*[1]. It facilities the understanding and provide the procedural details necessary for implementation of the system recommended in the feasibility study. Emphasis is given on translating the performance requirements into design specifications. Design goes through logical and physical stages of development. Logical design reviews the present physical system; prepares input and output specifications; make edit; security and control specifications; details the implementation plan, and prepare logical design walk through. The physical design maps out the details of the physical system, plans the system implementation plan and specifies any hardware and software. System design translates the system requirements into a ways of the system recommended in the feasibility study. So system design is a translation from a user–oriented document to a document oriented to a programmers or database personnel. System design is a highly creative process which can be greatly facilitate by the following –

- ✓ Strong Problem Definition
- ✓ Pictorial description of the Existing System
- ✓ Set of Requirements of the new system.

The database design phase covers E-R diagram, database design and integrity constraint diagram. Similarly architectural design covers menu hierarchy design, form design, report format design, application flow diagram and security measures. In the procedural design phase we have considered the pseudo codes of designed module.

[1] Software Engineering by Rogor S. Pressman



6.2 INPUT DESIGN

It is the first step in design within predefined guideline. Here, user–oriented inputs are converted to a computer based format. Input design is a crucial part of any system design. Inaccurate input data are the most common causes of errors in data processing. Error entered can be controlled by input design. The goal of displaying input data is to make data as easy as possible, logical and free from errors. Keeping the user requirements in view, the input screen have been designed and developed for easy and error free data entry. We design the source documents that capture the data and enter them into a computer. Several input forms have been designed. These input screens are of the fill–in blank type and are provided with system prompt and message to guide the data entry operator step by step.

6.3 OUTPUT DESIGN

In output design, the emphasis is on providing a hard copy of the information requested or displaying the output on a CRT screen in a predefined format. Computer output is the most

important and direct source of information to the user. Efficient, intelligent output design should be prepared to improve the systems relationship with its user and help in decision making. A major form of output is a hardcopy from the printer. In the system under consideration, printouts are designed around the requirement of the user.

6.4 SCREEN DESIGN

With data there is no system, but some data must be provided in the right screen for input and the information produced must be in a format acceptable to the user. The screen carries some data, which come from people, and information output of the system goes to the people. Screen is a physical carrier of data or information.

6.5 SCHEMA DESIGN (ENTITY RELATIONSHIP DIAGRAM)

The most important consideration in database design is how the information will be stored. The various applications and procedures that will be use the database introduce requirements upon the structure of data.

In a relational database, representation of the data and data relationship as collection of tables. Each table has one or more columns.

The first step in creating a database is designing it. First plan, what tables we require and that they will contain. It also determines how the tables are related. This is an important step and deserves careful consideration.

It should be determined what things we want to store information about (entities) and how these are related (relationship). A useful technique in designing the database is to draw a picture of tables. The graphical display of a database is called Entity–Relationship Diagram. Usually, each box in an E–R Diagram corresponds to a table in a relational database and each line from the diagram corresponds to a foreign key.

Entity-Relationship model is a popular high-level conceptual data model. This model and its variation are frequently used for conceptual design of database application, and many database design tools employ this concept.

The following diagram illustrates the notations, the system used to create in the E–R Diagram.

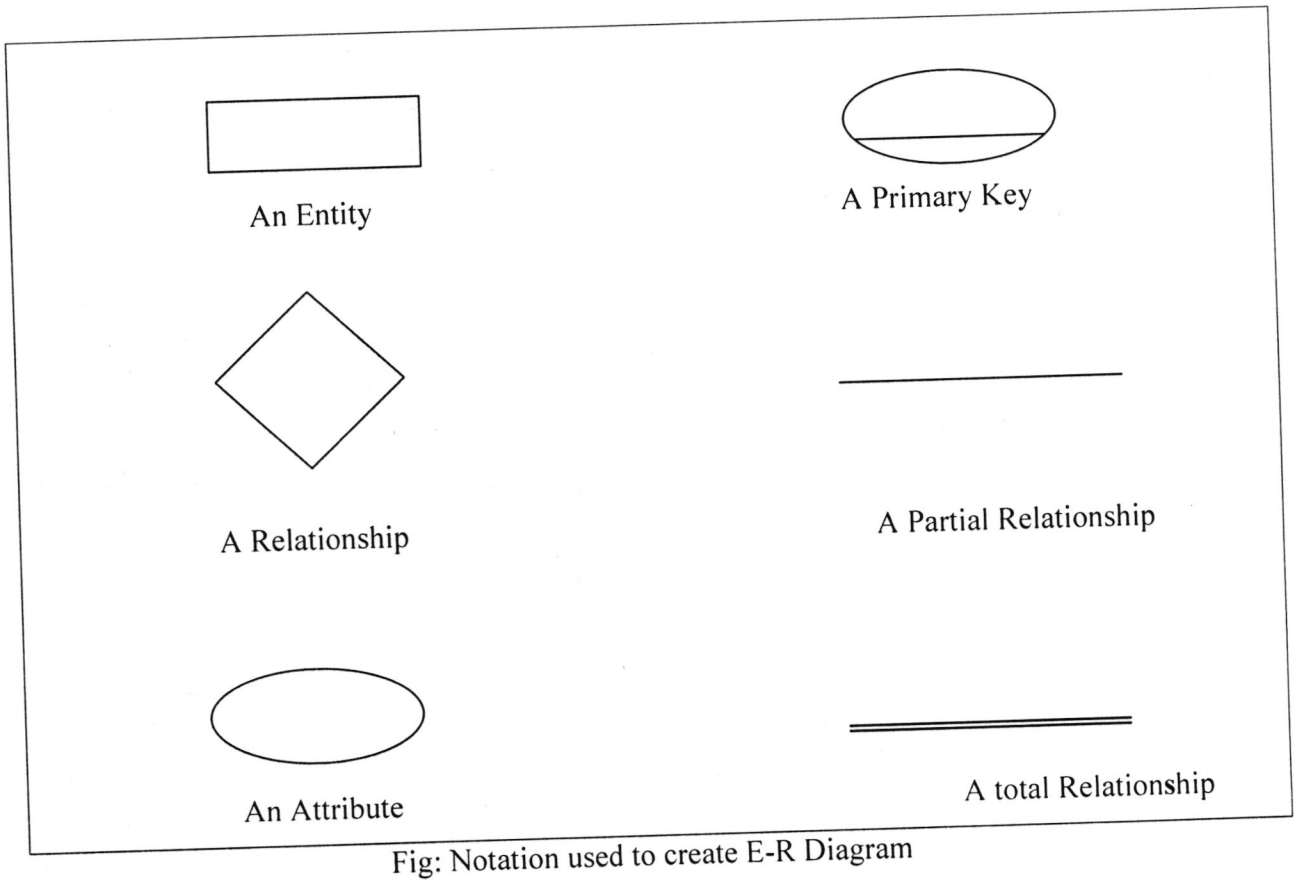
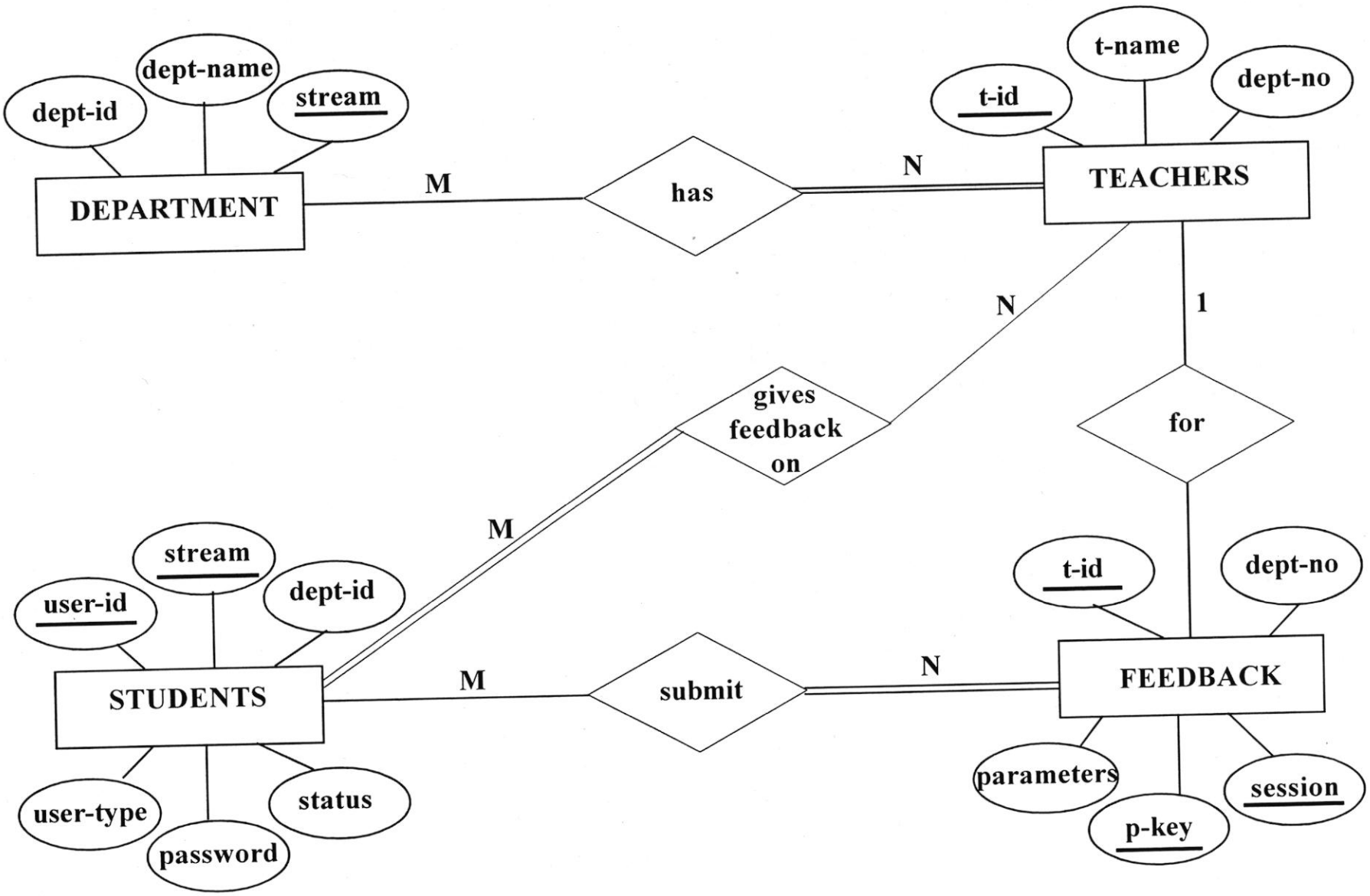


Fig: Notation used to create E-R Diagram

E-R Diagram for student Feedback form Analysis



6.6 DATA DICTIONARY

A data dictionary is a structured repository of data about data. It is a set of rigorous definition if all DFD data elements and structures.

A data dictionary has many advantages. The most obvious is documentation; it is a valuable reference in any organization. Another advantage is improving analyst\user communication by establishing consistent definitions of various elements, terms and procedures. Also a data dictionary is an important step in building a database.

The data dictionary of the proposed Students Feedback Analysis System is mentioned below:

SL No	FIELD NAME	FIELD TYPE	WIDTH	CONSTRAINTS	DESCRIPTION
1	dept_id	varchar	5	Primary key	Identity number of Department
2	dept_name	varchar	30		Name of Department
3	stream	varchar	7		Stream of Course
4	p_key	int	5	Primary key	Number of feedback questions
5	parameters	varchar	100		Feedback questions
6	session	varchar	11		Current session
7	t_id	varchar	5	Primary key	Identity number of teacher
8	dept_no	varchar	5		Number of Department
9	session	varchar	10		Current session
10	p1	varchar	5		Feedback question 1
11	p2	varchar	5		Feedback question 2
12	p3	varchar	5		Feedback question 3
13	p4	varchar	5		Feedback question 4

14	p5	varchar	5		Feedback question 5
15	p6	varchar	5		Feedback question 6
16	p7	varchar	5		Feedback question 7
17	p8	varchar	5		Feedback question 8
18	p9	varchar	5		Feedback question 9
19	p10	varchar	5		Feedback question 10
20	t_id	varchar	6		Identity number of Teacher
21	t_name	varchar	30		Name of Teacher
22	dept_no	varchar	5		Number of Department
23	user_id	varchar	15	Primary key	Identity number of User
24	stream	varchar	8	Primary key	Stream of Course
25	dept_id	varchar	5	Foreign key	Identity number of Department
26	status	int	1		
27	password	varchar	15		Password of User
28	user_type	varchar	10		Type of User
29	sub1	Varchar	30		Subjects studied by a student
30	sub2	Varchar	30		Subjects studied by a student
31	sub3	Varchar	30		Subjects studied by a student
32	sub4	Varchar	30		Subjects studied by a student
33	sub5	Varchar	30		Subjects studied by a student

6.7 DATABASE DESIGN

The collection of data is usually referred to as the database. The objective of the database is accuracy and integrity, successful recovery from failure, privacy and security of data, and good overall performance. The database contains information about the particular enterprise. Database systems are designed to store and manage large volume of information. The management of data involves both the definition of structures of the storage of information and provides mechanism for the manipulation of information. In addition, the database system must be responsible for safety of information stored in the database, despite system crashes or unauthorized access.

As regards the system under consideration, as it is to be developed and installed on a relational DBMS. The database has been designed in the form of some normalized relational tables. For the purpose, the system has been analyzed to determine the entities and their attributes. After that, considering the relationship between different entities as depicted while studying the existing system and talking in to account the requirements of the proposed system.

6.7.1 NORMALIZATION

In logical database we have discussed E-R diagram. Normalization is also a logical database design where step-by-step decomposition of complex records into simple record is being done. Precisely we can define normalization as the process during which unsatisfactory relation schemes are decomposed by breaking up their attributes into smaller relation schemes in desirable properties. The main objective of normalization is to reduce redundancy-using principle of no loss decomposition. No loss decomposition implies reduction of table into smaller without loss of information.

One objective of the normalization process is to ensure that the update anomalies do not occur.

Normal form provides us the following facilities:

- A formal framework for analyzing relations schema based on their keys and on functional dependencies among their attributes.
- A series of tests that can be carried out on individual relation schemas so that relational database can be normalized to any degree. When a test fails the relation violating that test must be decomposed into relations that individually meet the normalization tests.

The tables have been normalized up to BCNF.

Validating 1NF All the tables are in 1NF since

(i) Their attributes are atomic i.e. simple and individual

(ii) There is no repetition of data.

Validating 2 NF All the tables in 2NF since

(i) Tables are identified with more than one key.

(ii) Data that depends on only one part of the key are removed.

(iii) One or more tables and relationships are created with the data that has been removed.

Validating 3NF All the tables in 3NF since

(i) Data that depends on other data in the table and not on the key are removed.

(ii) One or more tables and relationship are created with the data has been removed.

Validating BCNF All the tables are BCNF since

(i) Data that depends on other keys in the table and not on the super key are removed.

(ii) One or more tables and relationships are created with the data has been removed.

6.8 FILE SPECIFICATION

After the system analysis we now can think for the design of the system i.e. the database design based on which actual database will be created. In our system the database files that we have used to develop the system is given below:

1. TABLE NAME : **department_master**

Description

It contains all the required information about the classification of departments. To get any information regarding the department and also if any modification is required, the user can search for the particular information relating to the teacher and edit it.

SL No	FIELD NAME	DATA TYPE	WIDTH	DATA DESCRIPTION
1	dept_id	varchar	5	Identity number of Department
2	dept_name	varchar	30	Name of Department
3	stream	varchar	7	Stream of Course

2. TABLE NAME : **feedback_master**

Description

It contains all the required information about the classification of feedback questions. To get any information regarding the feedback questions and also if any modification is required, the user can search for the particular information relating to the feedback and edit it.

SL NO	FIELD NAME	DATA TYPE	WIDTH	DATA DESCRIPTION
1	p_key	int	5	Number of feedback questions
2	parameters	varchar	100	Feedback questions
3	session	varchar	11	Current session

3. TABLE NAME : **f_dtls20122013**

Description

It contains all the required information about the classification of feedback details. To get any information regarding the feedback details and also if any modification is required, the user can search for the particular information relating to the feedback and edit it.

SL NO	FIELD NAME	DATA TYPE	WIDTH	DATA DESCRIPTION
1	t_id	varchar	10	Identity number of teacher
2	dept_no	varchar	5	Number of Department
3	session	varchar	10	Current session
4	p1	varchar	5	Feedback question 1
5	p2	varchar	5	Feedback question 2
6	p3	varchar	5	Feedback question 3
7	p4	varchar	5	Feedback question 4
8	p5	varchar	5	Feedback question 5
9	p6	varchar	5	Feedback question 6
10	p7	varchar	5	Feedback question 7
11	p8	varchar	5	Feedback question 8
12	p9	varchar	5	Feedback question 9
13	p10	varchar	5	Feedback question 10

4. TABLE NAME : **teacher_master**

Description

It contains all the required information about the classification of teachers. To get any information regarding the teachers and also if any modification is required, the user can search for the particular information relating to the teachers and edit it.

SL No	FIELD NAME	DATA TYPE	WIDTH	DATA DESCRIPTION
1	t_id	varchar	6	Identity number of Teacher
2	t_name	varchar	30	Name of Teacher
3	dept_no	varchar	5	Number of Department

5. TABLE NAME : **user**

Description

It contains all the required information about the classification of users. To get any information regarding the users and also if any modification is required, the user can search for the particular information relating to the users and edit it.

SR. No	FIELD NAME	DATA TYPE	WIDTH	DATA DESCRIPTION
1	user_id	varchar	15	Identity number of User
2	stream	varchar	8	Stream of Course
3	dept_id	varchar	5	Identity number of Department
4	status	int	1	To check the status of the teacher

				0- Present Teacher 1- Ex-Teacher
5	password	varchar	15	Password of User
6	user_type	varchar	10	Type of User

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