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Project title: - Student biography data management system

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Abstract

This data management system is part of reforms to the existing system of data storage manually. Data that are manually recorded and managed are not that accurate as well as secured. Someday they may get lost. That's the main reason why we are motivated to develop the student biography management system. This management system involves the teachers, the students and the staff. The main purpose of this system is to facilitate the school management to store student background information and disseminating information for the staff that are in the given organization about the students status later on the disseminated data helps in decision making. This system is the fastest way to send and distribute information directly and accurately and also holds the full background information of an individual who enrolled in the given education institution. With this system, the possibility of error or offense, or storage of data registration is low. The existing system holds the data of a student's biography in a manual way. From the beginning-registration of the student up to recording its each course result and GPA recorded manually. This system has its own numerous problems. So the development of a system which manages and keeps the background data of a student is not only important but also necessary. To develop this system the first thing we did was gather requirements. We tried to interview students to understand the proposed system and obtain and document the data and functional requirements. The data requirements document is used to confirm the understanding of the requirements with users and after the collection of data requirements and analysis was conducted to obtain a detailed description of the data that will suit user requirements so that both high and low level properties of data and their use are dealt with. Also we identify problems and effective ways to overcome existing problems. Overall, the system is achieving the objectives but still need some reforms to make the system better.

1. Introduction

The scenario that in most schools and universities today, most of the work done manually filling out the form and saving the regular place of storage provided, gives an idea to develop the Student biography data Management System. This system focuses on student personal and academic management. When students enroll in the given institution many scenarios happen. These scenarios have to be collected and stored as data somewhere and when the data is required it should be retrieved as it holds the previous data. In the old times, data that were recorded manually doesn't have a guarantee that we would get them again or we may not get them as they were before. So this and such problems should be resolved by another system of recording data.

This chapter will describe the Student biography data management overview at Project Overview, problem statement which reported about the issue caused by the manual system. This student biography data management system is a system that was developed for school to ensure all the past whether academic or residential status of a student process or management is in order and organized. This system is developed to facilitate the administrative management and arrange of laying out all the administration and management students. The system is created to solve the problem and give a standard academic process for the students of that school. Many problems are occurring because there is no system to manage the students' biography later on that helps in different decision making. The computerized data management system can solve this problem because this system is systematic and effective to prevent any data loss and some kind of problem. As a conclusion this system is developed for a school and it can manage the student management of academics.

1.1. Background of the system

The very basic need for conducting the student biography data management is because there are many problems on the existing traditional data management system. Students datas are very dynamic; they should be managed and manipulated persistently to store accurate information but to do that the existing system is no longer dynamic and efficient. For expeditious retrieval and dissemination of information and better service for the clientele, application of modern techniques has become absolutely indispensable (Neelakandan et al., 2010).

Student biography data management is a sub-discipline of school management that focuses on specific issues and scenarios faced by the students and school staff management professionals.

The student biography data management system is an application which refers to the background data of the student that will be retrieved later when needed. It is used by the staff members of the institution to manage the data of an individual student using a computerized system where they can record the biography of the student.

The main aim of this project is to develop an efficient system which can manage and retrieve accurate and reliable data of a student. The system only manages and retrieve the background academic and personal data of an individual student.

1.2.Problems of current system

In most schools today, most of the work is done manually filling out the form and saving the regular place of storage provided. In management of student data, they have to store all data manually by writing it on paper and storing it in the regular place of storage provided. This problem in the standard schools and universities in Ethiopia did not have systematic data arrangement in the student management. When the staff of the administrator wants to record the data of the student, they need to fill out by using the manual system. In this case data might be lost when several problems occur. Other problems that can happen it is hard to search and update the student information and class arrangement. Teachers also have some problem to as same as administrator that using manual system including to develop the student performance example student grade, biography, attendance and so on that have no any systematic record. The systematic requirement is required so that

all data is stored into the database for future reference and enhancement. there are the specific problem statement that occurs in many universities via using manual system:

1. Lack of data arrangement that is record by using manual system and using a lot of paper to record the student information, student result and performance.
2. The manual system is hard to search and update about the student information, result and performance
3. The manual system is not providing the security of the academic information that might be lost
4. Some information released by the school is not known by the parents or teachers

1.3 Objectives

1.3.1 General objectives

In this project we aim to create a seamless interface that offers the advantages of a modern database management system while keeping the practicality of the original schema and maximizing the interoperability of the design as a whole. When we take a look at the role of a data management system from a simplistic perspective it can be divided into two:-

- Collecting multifaceted data about a given enterprise and
- Making the collected data accessible to the authorized persons

To state more precisely the purpose of this system extends to handle the issue of providing a complete database management system focusing on usage at a secondary educational institution. More importantly it promises to fulfill the demands of both the student and the administration by linking the services as one. We are targeting the accumulation of the student's personal data from their

background as well as from the time spent at the specific institution they belong to. And in continuation relate that amassed information with the university's store and give access to specific services necessary to run the day to day activities involved.

1.3.2 Specific objectives

In order to achieve the general objectives set above we have set forward a more convergent list of points to address the task at hand

- Retrieve student information on where they are studying
- Divide the university into campuses and show student's placement
- Display the corresponding department a student belongs to
- Enroll students in courses based on their field
- List out the courses given in a specific academic year
- Display the cumulative grade report for a student in a full academic year

1.4 Scope

In the implementation of our proposed system we have strived to include the extent to realize the whole demands of both participants at a university level. The range consists of but is not limited to administration, learning, placement and networking of entities within a functional environment that forms and maintains several relationships among each other. Using the DBMS is the main non-functional requirement to manage all the data in the system. The system will capture information about student's personal details, fields and courses and also allows storing, updating and retrieving in an efficient and accurate way. The extent to which the problem can be treated by volume is vast but our proposed system will automate the partial service of the organization.

1.5. Limitations

Our database Limited on one university but if it works for all universities, it will be very useful because the biography data may be stored at a national level therefore easy to access.

Despite the fact that it is a mini project, there are a lot of entities, attributes and relationships that are out to be considered.

1.6. Significance of the System

A biography, or simply bio, is a detailed description of a person's life. so the database that we make about the student biography at university allow the university to store data and provide facilities (tools) to search for specific records in a given set of data, easy retrieval of Information about students at a certain university.

1.7. METHODOLOGY

The main methodology involves feasibility study, data collection, system analysis and design, developing and implementing student biography data management systems. The data considered necessary to build the system were collected and analyzed. The methodology is very important to ensure that the new system would give benefits to the proposed learning institution.

Data Collection

The required data including department details, course details, student personal details, semester details, exam details etc. were collected. The data collected would help identify attributes, relationships, classes, entities/objects that describe, relate and interact with the system. The data collection tools and techniques that were used are as follows:

1.7.1 Observation

We went and observed them daily as regards to their current system and they were recording the student's biography records in registrars, and offices. A follow up was made to determine the time it took to carry out the student biography data management system.

1.7.2 Interviewing

Interview is a powerful tool for data gathering since it allows the interviewer to probe and clarify a number of issues. Face to face interview was used to interact with the registrar of the proposed system to obtain the data required for the Student biography data management system.

1.7.3 Document Analysis

The document of this project includes the following: interview, world wide web, references to published and unpublished collection. The data collected for this research can be broadly classified into two types, namely: the primary and secondary data.

Primary data

Primary data can be defined as data collected directly from respondents relevant to the subject under investigation. The primary data used in this case is the interview method .Primary source data collection is source from firsthand information that can be obtained. The tools for gathering the primary source of data collection include; interview, observation and questionnaire etc.

Secondary source

These are sources of data collection in which an already made data is obtained i.e. those information that is already in printed form. Sources of secondary data include textbooks, magazines, journals etc . In the case of this project, most of the data are published, documents and references.

Chapter two

Database design

2.1. Conceptual database design

The main thing we did in the conceptual database is analyzing the data requirements. During analysis we try to identify entities, attributes, relationships among the entities and constraints. This helped us to overview the system conceptually what it is gonna look like. The aim of analysis is to obtain a detailed description of the data that will suit student requirements so that both high and low level properties of data and their use are dealt with. We try to focus on the data in a database, irrespective of the eventual use of that data in user processes or implementation of the data in specific computer environments. We tried to analyze by asking questions like “What is required?” not “How is it achieved?”

Entities are real-world things or real-world objects which are distinguishable from other objects in the real world. So in our case we try to distinguish real-world objects that have a definite relation with a student from the data requirements we collected at the beginning. And attributes are descriptions of the entity. Constraints are also rules that govern the whole system

2.1.1 identification of entity and attribute

Entities

❖ University

- This entity indicates the specific university name that the student studied

❖ **Campus**

- this entity indicates the campus in which the individual student assigned for the given university she/he studied

❖ **student**

- This entity holds the background academic and personal status datas of the student

❖ **Department**

- Indicates the department and related data that the student placed at

❖ **Course**

- This entity holds data of the students enrolled in the given department

❖ **Grade_report**

- This entity holds data of the student's consecutive grade reports

❖ **Academic_year**

- This entity shows the data of the individual status in each academic year the student attended.

Attributes

university(entity) has an attributes of:

- ❖ university_code
- ❖ Uni_name
- ❖ Region
- ❖ Phone

Campus has attributes of:

- ❖ C_ID
- ❖ Campus_name
- ❖ Address

Student has an attribute of:

- ❖ student_ID
- ❖ Name
- ❖ F_name
- ❖ L_name
- ❖ sex
- ❖ DOB
- ❖ stream

- ❖ Region
- ❖ Matrik_result
- ❖ Grade_8_result

Department has an attribute of:

- ❖ D_ID
- ❖ Department_name
- ❖ D_location-
- ❖ Department_dean

Course has the following attributes:

- ❖ course_ID
- ❖ course_name
- ❖ Credit_hour

Grade_report has the following attributes:

- ❖ G_code
- ❖ semester
- ❖ GPA
- ❖ CGPA

Academic_year has the following attributes:

- ❖ year
- ❖ Enroll_year

2.1.3. Role of attribute in relationship

university(entity) has an attributes of:

- ❖ university_code - indicates the unique identifiable code of the given university
- ❖ Uni_name- indicates the name of the university
- ❖ region - indicates the region where the given university located
- ❖ Phone- store the phone number of the university

Campus has attributes of:

- ❖ C_ID- the attribute that uniquely identify the campus
- ❖ Campus_name- stores the names of the campuses

- ❖ Address - store the location of that campus

Student has an attribute of:

- ❖ student_ID - store the unique id that identify the student
- ❖ Name - store the name of the student
- ❖ F_name- the students father name
- ❖ L_name- store the students last name
- ❖ sex - store the gender of the student
- ❖ DOB- store the date of birth of the student
- ❖ stream- store whether the student is natural science or social science
- ❖ region- store the specific region where the student came from
- ❖ Matrik_result- store the grade 12 matrik result of the student
- ❖ Grade_8_result - store the academic result of the student

Department has an attribute of:

- ❖ D_ID - that unique identifier code of the department
- ❖ Department_name- name of the department
- ❖ D_location- store the location of the department given
- ❖ Department_dean- store the head of the department

Course has the following attributes:

- ❖ course_ID- that unique identifier of the course
- ❖ course_name - the name of the course
- ❖ Credit_hour- the time it last in the class

Grade report has the following attributes:

- ❖ G_code- the unique identifier for the garde report
- ❖ semester -the two half academic years
- ❖ GPA- the grand percentile average of the student in a specified semester
- ❖ CGPA- the cumulative GPA of the student

Academic_year has the following attributes:

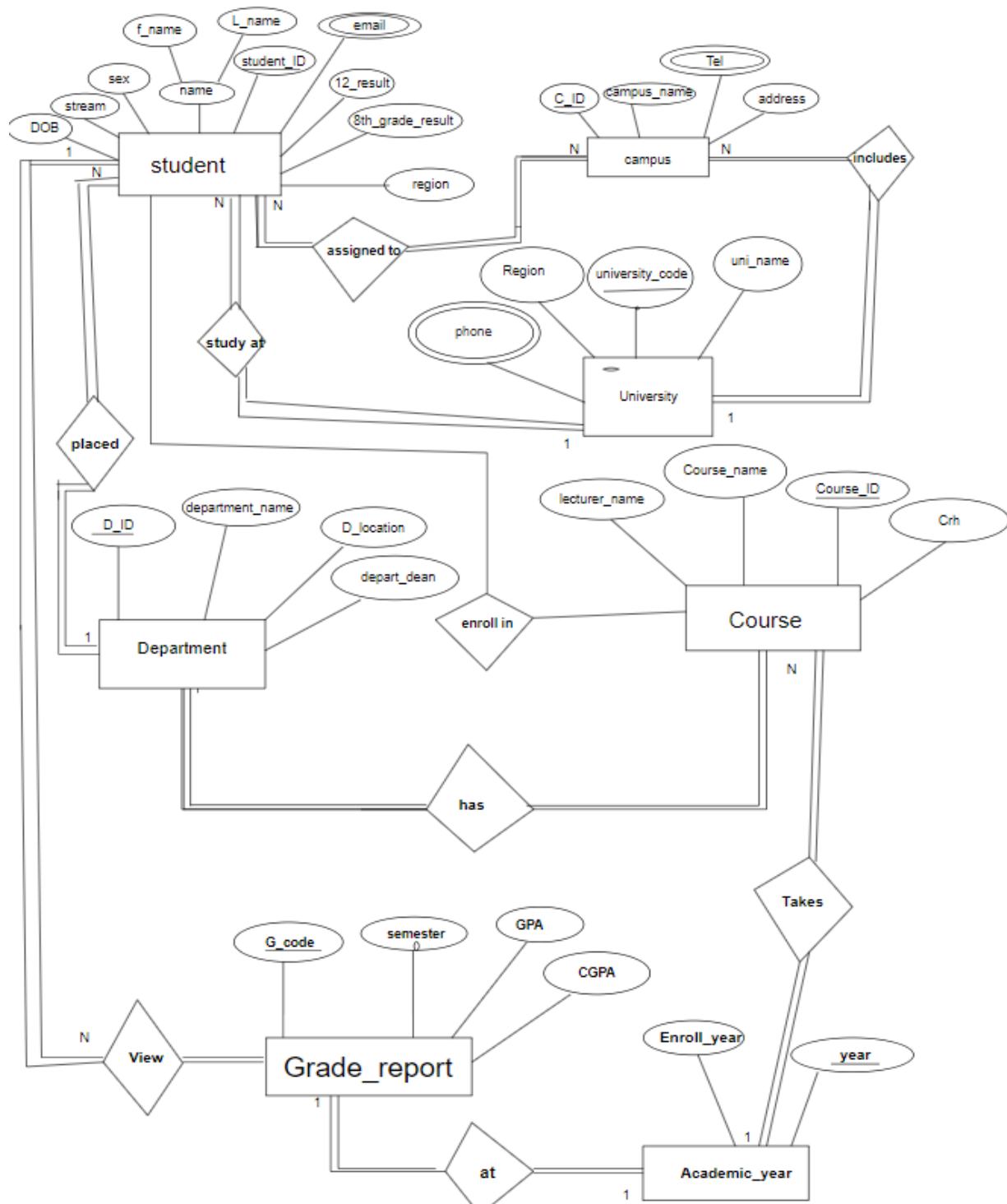
- ❖ year- the time being year of the students academic year
- ❖ Enroll_year- the level in which the student is at the time

2.1.4. Entity, relationship, cardinality participation

Generally, we summarize the relationship and cardinality as below

<u>Relationship</u>	<u>Cardinality</u>
● Student study at university -----	(N-1)
● University includes campus-----	(1-N)
● Student placed at department-----	(N-1)
● Student enroll in course-----	(1-N)
● Student view grade report-----	(1-N)
● Department has course-----	(N,N)
● Academic_year given course-----	(1,N)
● Grade_report at academic_year-----	(1,N)
● Student assigned to campus-----	(N,1)

2.1.6. ER_digram



2.2. Logical database design

2.2.1. Converting ER-diagram into Relation

University table

<u>University_code</u>	uni_name	region	phone
------------------------	----------	--------	-------

Campus table

<u>C_ID</u>	campus_name	address	Tell_number	university
-------------	-------------	---------	-------------	------------

Student table

student_ID	F_name	L_name	sex	DOB	stream	region	matrik_result	grade_8_result	department	campus	university	phone_number
------------	--------	--------	-----	-----	--------	--------	---------------	----------------	------------	--------	------------	--------------

Department table

<u>D_ID</u>	Department_name	D_location	department_dean
-------------	-----------------	------------	-----------------

Course table

<u>Course_ID</u>	course_name	credit_hour	lecturer_name	academic_year
------------------	-------------	-------------	---------------	---------------

Grade_report table

G_code	semester	GPA	CGPA	student_ID	academic_year
--------	----------	-----	------	------------	---------------

Academic_year table

<u>year</u>	enroll_year
-------------	-------------

2.2.2 Normalization

2.2.2.1 First Normal Form (1NF)

Since table university has a multivalued attribute which is phone. So we should change it into 1st normal form

University table

<u>University_code</u>	uni_name	region
------------------------	----------	--------

Uniphone table

university_code	phone
-----------------	-------

❖ It is 1st Normal Form

Campus table has also a multivalued attribute

Campus table

<u>C_ID</u>	campus_name	address	university
-------------	-------------	---------	------------

Tell_number table

C_ID	Tell_number
------	-------------

❖ It is 1st Normal Form

Student table has also two attributes that have a multivalued attributes

Student table

student_ID	F_name	L_name	sex	DOB	stream	region	matrik_result	grade_8_result	department	campus	university
------------	--------	--------	-----	-----	--------	--------	---------------	----------------	------------	--------	------------

Studentphone number table

student_ID	phone_number
------------	--------------

Student_email table

student_ID	email
------------	-------

- ❖ It is 1st Normal Form

2.2.2.2. Second Normal Form (2NF)

Since all the tables have one candidate primary key and there are no partial dependencies between the attributes of each table we can conclude that all the tables are in 2nd normal form.

2.2.2.3. Third normal form(3NF)

Course table

<u>Course_ID</u>	course_name	credit_hour	lecturer_name	academic_year
------------------	-------------	-------------	---------------	---------------

- ❖ This Table is in 2NF
- ❖ But it is still having transitive dependencies

course_ID→**course_name**,

course_ID→**credit_hour**,

course_ID→**lecturer_name**,

Course_name→**academic_year**- so from, this we can conclude that **course_ID** is transitive dependency with **academic_year**.

Course table

course_ID	course_name	credit_hour	lecturer_name
-----------	-------------	-------------	---------------

Courses of the year table

course_ID	academic_year
-----------	---------------

- ❖ Now transitive dependency are removed

Grade report table

G_code	semester	GPA	CGPA	student_ID	academic_year
--------	----------	-----	------	------------	---------------

- ❖ This Table is in 2NF
- ❖ But it is still having transitive dependencies

$G_code \rightarrow semester,$

$G_code \rightarrow GPA,$

$G_code \rightarrow CGPA,$

$G_code \rightarrow student_ID,$

$Semester \rightarrow academic_year$

From this we can understand that G_code and $academic_year$ has a transitive dependency between them

Grade report table

G_code	semester	GPA	CGPA	student_ID
--------	----------	-----	------	------------

Assesment_of_the_year table

G_code	academic_year
--------	---------------

- ❖ Now transitive dependency are removed

2.3. Physical database design

2.3.1. Physical implementation on SQL server

Process of producing a description of the implementation of the database on secondary storage; it describes the base relations, file organizations, and indexes used to achieve efficient access to the data, and any associated integrity constraints and security measures. We will describe the plan for how to build the tables, including appropriate data types, field sizes and attribute domains as below.

University

- ❖ `university_code char(50)` primary key,

- ❖ uni_name **char(50)**,
- ❖ Region **char(50)**,
- ❖ Uniphone **int**

Campus

- ❖ C_ID **char(50)** primary key,
- ❖ campus_name **char(50)**,
- ❖ Address **char(50)**,
- ❖ Tell_number **int**,
- ❖ University **char(50)** foreign key

Student

- ❖ student_ID **char(50)** primary key,
- ❖ Name **char(50)**,
- ❖ F_name **char(50)**,
- ❖ L_name **char(50)**,
- ❖ Sex **char(40)**,
- ❖ DOB **int**,
- ❖ stream **char(50)**,
- ❖ Region **char(50)**,
- ❖ matrik_result **int**,
- ❖ Grade_8_result **int**,
- ❖ department **char(50)** foreign key
- ❖ campus **char(50)** foreign key
- ❖ University **char(50)** foreign key
- ❖ Phone_number **int**
- ❖ Email **char(50)**

Department

- ❖ D_ID **char(50)** primary key,
- ❖ Department_name **char(50)**,
- ❖ D_location **char(50)**,
- ❖ Department_dean **char(50)**

Course

- ❖ course_ID **char(50)** primary key,
- ❖ course_name **char(50)**,
- ❖ credit_hour **int**,

- ❖ Lecturer_name **char(50)**,
- ❖ Academic_year **int foreign key**

Academic year

- ❖ year **int primary key**,
- ❖ Enroll_year **char(50)**

Grade_report

- ❖ G_code **char(50) primary key**,
- ❖ semester **int**,
- ❖ GPA **float**,
- ❖ CGPA **float**,
- ❖ student_ID **char(50) foreign key**
- ❖ Academic_year **int foreign key**

```

----create the database-----
create database student_biography
----create table university----
create table university(
university_code char(50) primary key,
uni_name char(50),
Region char(50)
)
create table uniphone(
phone int,
University_code char(50) foreign key references university(university_code)
)
---create campus table---
create table campus(
C_ID char(50) primary key,
campus_name char(50),
Address char(50),
University char(50) foreign key references university(university_code)
)
create table Tell_number(
Tell int,
C_ID char(50) foreign key references campus(C_ID)
)
create table student(
student_ID char(50) primary key,
Name char(50),
F_name char(50),
L_name char(50),
Sex char(40),
DOB int,
stream char(50),
Region char(50),
matrik_result int,
Grade_8_result int,
department char(50) foreign key references Department(D_ID),
campus char(50) foreign key references campus(C_ID),
University char(50) foreign key references university(university code)

```

```

)
create table phone_number(
phone int,
student_ID char(50) foreign key references student(student_ID)
)
create table email(
Email char(50),
student_ID char(50) foreign key references student(student_ID)
)
create table Department(
D_ID char(50) primary key,
Department_name char(50),
D_location char(50),
Department_dean char(50)
)
create table course(
course_ID char(50) primary key,
course_name char(50),
credit_hour int,
Lecturer_name char(50),
Academic_year int foreign key references academic_year(year)
)
create table studentcourseT(
student_ID char(50) foreign key references student(student_ID),
course_ID char(50) foreign key references course(course_ID)
)
create table DepartmentcourseT(
course_ID char(50) foreign key references course(course_ID),
D_ID char(50) foreign key references Department(D_ID)
)
create table Grade_report(
G_code char(50) primary key,
semester int,
GPA float,
CGPA float,

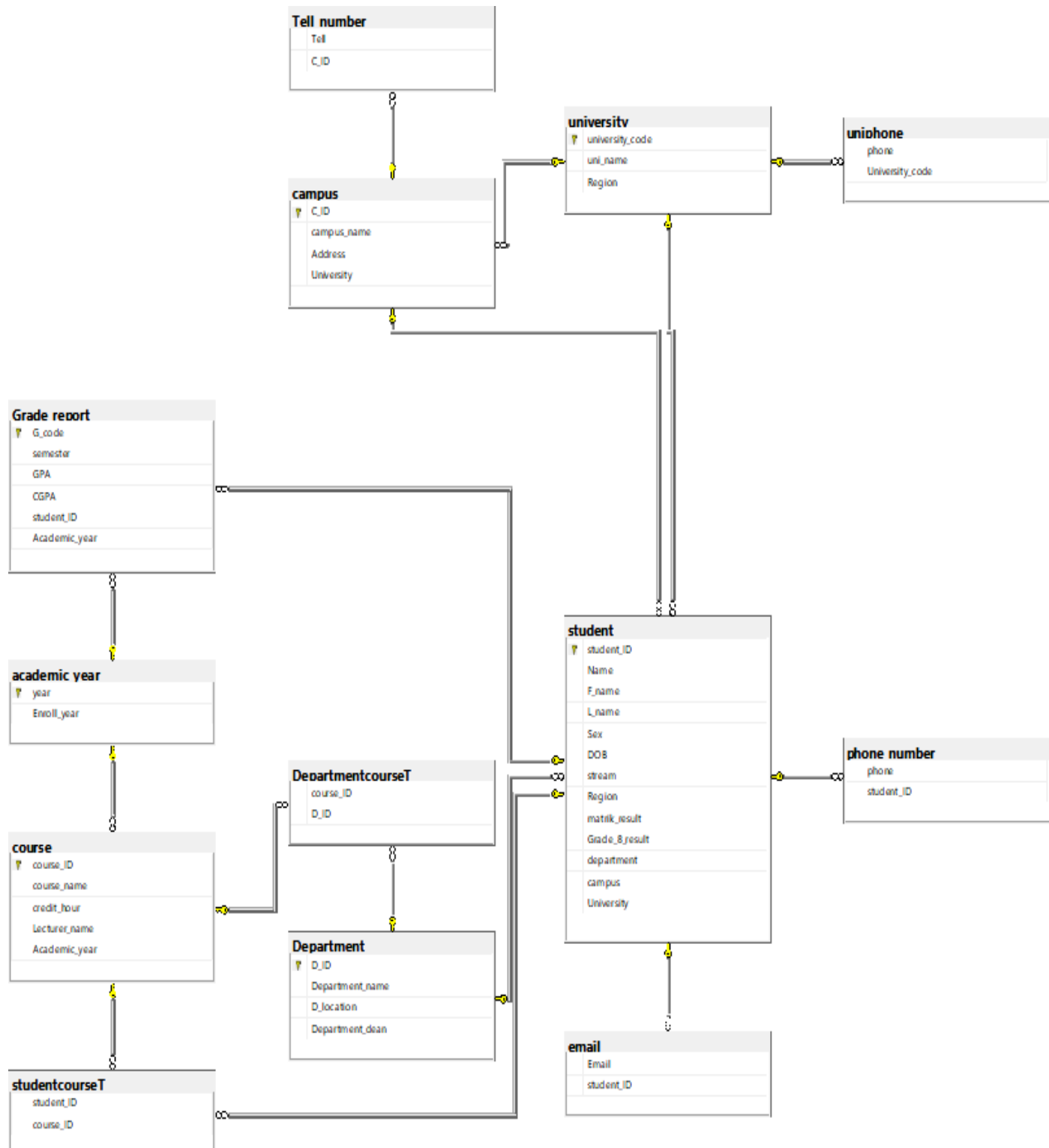
```

```

student_ID char(50) foreign key references student(student_ID),
Academic_year int foreign key references academic_year(year)
)
create table academic_year(
year int primary key,
Enroll_year char(50)
)

```


2..2.Database diagrams of student biography management system



Chapter Three

3.1 Conclusion

Taking into account our proposed schema for upholding the objectives and the resulting implementations of our project we can infer that the overall outcome has kept to the guidelines set previously and the nature of the system has been molded to adhere to the requirements of the users more or less. When we break down the achievements into the aims stated at the beginning of the document, the goal of collecting necessary information from the sources was realized through the techniques of survey and interview as mentioned in the section of methodology above. We collected and analyzed several samples of student data pertaining to our specific outline and then proceeded to structure the data in a form that was suitable for use in further operations following it. The interview was conducted in a versatile manner referring to online resources for support and clarification of facts. After the application of that step next was the building of the database system we had envisioned to carry the demands and execute the services owed to the users and publishers alike. In the approach of the design we kept to a simplistic schema as much as possible and routed the relations towards the practicality of a modern scheme while employing the tools of research and organization to the best of our abilities. That said, we did face a few challenges and some inconveniences we were not able to overcome in the current version of our work, one of them being the task of integrating a nation-wide university management scope to the system. Owing to the fact that this is a minimized project there was a shortage of means but a lot of attributes to be put into consideration. We can decisively conclude that the result of this operation has in an academic range satisfied the requirements of a typical data collection and retrieval project in the normative scope we established before the execution of the plan at hand.

Appendix

Sample inserted data

Student table

student_ID	name	f_name	l_name	sex	DOB	stream	region	matrik_result	grade_8_result	department	campus	university
BDU1302139	makbel	Tessema	Tarekegn	M	1993	natural	Addis ababa	594	85	CS12	po101	BDR
BDU1307134	Meklit	yeshiwas	alem	F	1993	Natural	Addis ababa	602	84	MED14	seba101	BDR

Phone number table

student_ID	phone
BDU1307139	0964062587
BDU1307139	0960904976

Grade_report table

G_code	semester	GPA	CGPA	student_ID	academic_year
GR10	1	4	4	BDU1307139	2014
GR11	2	4	4	BDU1307139	2014