AFRICAN INSTITUTE FOR MATHEMATICAL SCIENCES

(AIMS RWANDA, KIGALI)

Name: Group 5 Assignment Number: 2

Course: Database and Data Management Date: March 5, 2023

1 Data Dictionary

Table 1: AIMS Rwanda Database Data Dictionary

Table Name	**Column Name**	**Data Type**	**Not Null**	**Unique**	**Description**
Block_Periods	block_id	integer	YES	YES	Unique identifier for each block
	block_start	date	YES	YES	Start date of the block
	block_end	date	YES	YES	End date of the block
Courses	course_id	integer	YES	YES	Unique identifier for each course
	course_name	varchar(50)	YES	YES	Name of the course
	course_code	varchar(20)	YES	YES	Course code for the course
	course_desc	text	YES	YES	Description of the course
	block_id	integer	YES	YES	Foreign key referencing Block table
Quizzes	quiz_id	integer	YES	YES	Unique identifier for each quiz
	course_id	integer	YES	YES	Foreign key referencing Course table
	dates	date	YES	YES	Date of the quiz
	mark	integer	YES	YES	Mark achieved by the student for the quiz
Assignment	assignment_id	integer	YES	YES	Unique identifier for each assignment
	course_id	integer	YES	YES	Foreign key referencing Course table
	date	date	YES	YES	Date of the assignment
	deadline	date	YES	YES	Deadline for the assignment
	mark	integer	YES	YES	Mark achieved by the student for the assignment

Table 2: AIMS Rwanda Database Data Dictionary

Table Name	**Column Name**	**Data Type**	**Not Null**	**Unique**	**Description**
Tutor	tutor_id	integer	YES	YES	Unique identifier for each tutor
	firstname	varchar(50)	YES	YES	first name of the tutor
	surname	varchar(50)	YES	YES	surname of the tutor
	email	varchar(50)	YES	YES	Email address of the tutor
	phone	varchar(20)	YES	YES	Phone number of the tutor
	course_id	integer	YES	YES	Foreign key referencing Course table
	country_id	integer	YES	YES	Foreign key referencing Country table
	background_id	integer	YES	YES	Foreign key referencing Background table
Students	student_id	integer	YES	YES	Unique identifier for each student
	firstname	varchar(50)	YES	YES	Name of the student
	surname	varchar(50)	YES	YES	surname of the student
	email	varchar(50)	YES	YES	Email address of the student
	Date_of_Birth	date	YES	YES	Date of birth of the student
	phone	varchar(20)	YES	YES	Phone number of the student
	course_id	integer	YES	YES	Foreign key referencing Course table
	country_id	integer	YES	YES	Foreign key referencing Country table
	background_id	integer	YES	YES	Foreign key referencing Background table
Lecturer	lecturer_id	integer	YES	YES	Unique identifier for each lecturer
	name	varchar(50)	YES	YES	Name of the lecturer
	email	varchar(50)	YES	YES	Email address of the lecturer
	phone	varchar(20)	YES	YES	Phone number of the lecturer
	course_id	integer	YES	YES	Foreign key referencing Course table
Country	Country_id	integer	YES	YES	Unique identifier for each Country
	country_name	varchar(50)	YES	YES	Name of the Country
Affliation	affiliation_id	integer	YES	YES	Unique identifier for each university a lecturer is affliation
	affliation_name	varchar(50)	YES	YES	Name of university a lecturer is affliated
Phase	phase_id	integer	YES	YES	Unique identifier for each Phase
	phase_name	varchar(50)	YES	YES	Name of the Phase
	start_date	date	YES	YES	Date of start of Phase
	end_date	date	YES	YES	Date of end of the Phase

Table 3: AIMS Rwanda Database Data Dictionary

Table Name	**Column Name**	**Data Type**	**Not Null**	**Unique**	**Description**
Background	background_id	integer	YES	NO	Unique identifier for each background
	background_name	varchar(50)	YES	NO	Name of the background
Tutorial	Tutorial_id	integer	YES	YES	Unique identifier for each tutorial
	Start_Time	time	YES	YES	Start time of the tutorial
	End_Time	time	YES	YES	End time of the tutorial
Students_Background	background_id	integer	YES	NO	Foreign key referencing Student table
	Student_id	integer	YES	YES	Foreign key referencing Student table
	Country_id	integer	YES	YES	Foreign key referencing Country table
Student_course	student_id	integer	YES	YES	Unique identifier for each tutorial
	Country_id	integer	YES	YES	Foreign key referencing Country table
	Course_id	integer	YES	YES	Foreign key referencing Course table
Gives_seminar	seminar_id	integer	YES	YES	Foreign key referencing Seminar table
	Country_id	integer	YES	YES	Foreign key referencing Country table
	Course_id	integer	YES	YES	Foreign key referencing Course table
	Teacher_id	integer	YES	YES	Foreign key referencing Teacher table
	background_id	integer	YES	NO	Foreign key referencing Student table
Courses_Tutorials	Course_id	integer	YES	YES	Foreign key referencing Course table
	Tutorial_id	integer	YES	YES	Foreign key referencing Tutorial table
Block_phase	Block_id	integer	YES	YES	Foreign key referencing Block table
	Phase_id	integer	YES	YES	Foreign key referencing Phase table
Seminar	seminar_id	integer	YES	YES	Unique identifier for each Seminar
	seminar_title	varchar(50)	YES	YES	Title of the seminar
stu_scores	assignment_id	integer	YES	YES	Foreign key referencing assignment table
	quiz_id	integer	YES	YES	Foreign key referencing Quiz table
	Student_id	integer	YES	YES	Foreign key referencing Student table

ER diagram for the problem

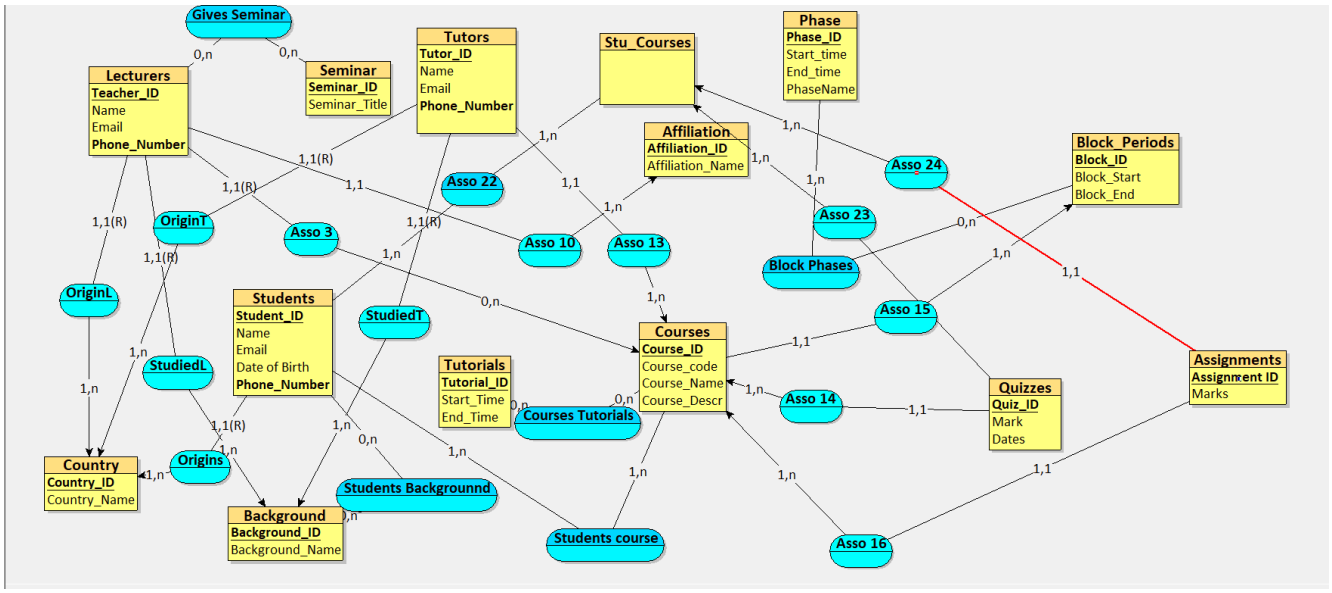

Figure 1: ER Diagram

Rules and constraints governing the system

- We have 3 phases.
- Each course has 3 tutorials ,3 quizzes, and 2 assignments.
- Each tutorial, quiz, and assignment belongs to only one course.
- Each block has 6 courses.
- Each student is enrolled in at least 2 courses.
- Each quiz and assignment has a mark.
- Each assignment has a deadline.
- Each teacher can teach multiple courses.
- Each tutor can assist multiple teachers.
- Tutorial assignment is compulsory.

List of Tables and the Link of Tables

1. Block- block_id(PK),Block_Start, Block_End.
2. CourseS - Course_ID (PK), Course_code, Course_Name , Course_Descr, Block_ID(FK) .
3. Tutorial -Tutorial_ID(PK), Start_Time ,End_Time
4. Quizzes - Quiz_ID (PK), Mark, Dates, Course_ID(FK)
5. Assignment - Assignment_ID (PK), Marks, Course_ID.
6. Students - Country_ID(FK), Student_ID (PK), Name, Email, Date_of_Birth , Phone_Number.
7. Tutor - (Country_ID(FK), Background_ID(FK), Tutor_ID(FK))(PK), Name, Email, Phone_Number, Course_ID.

8. Assignments - Assignment_ID (PK), Marks, Course_ID.
9. Lecturer - (Background_ID(FK), Country_ID(FK), Course_ID(FK), Teacher_ID(FK))(PK), Name, Email, Phone_Number, Affiliation.
10. Country - Country_ID(PK), Country_Name
11. Affiliation - Affiliation_ID(PK), Affiliation_Name
12. Phase - Phase_ID(PK), Start_time, End_time, PhaseName
13. Seminar- Seminar_ID(PK), Seminar_Title
14. Background- Background_ID (PK), Background_Name
15. Block phases - (Block_ID , Phase_ID)(PK)
16. students_course- Country_ID (FK), (Student_ID , Course_ID)(PK)
17. students_background- (Country_ID,Background_ID)(PK)
    Student_ID (FK),
18. gives seminar - (Background_ID , Country_ID , Course_ID,
    Teacher_ID)(PK), Seminar_ID (FK),
19. stu_scores- ((Student_ID(FK) , Quiz_ID(FK), Assignment_ID(FK))(PK) ,

The Link of Tables

There are several links between these tables based on foreign key relationships:

- Block_Periods table is referenced by Courses table using the foreign key Block_ID
- Courses table is referenced by Quizzes and Assignments tables using the foreign key Course_ID
- Lecturers table is referenced by Courses table using the foreign key Course_ID
- Tutors table is referenced by Courses table using the foreign key Course_ID
- Students table is referenced by Students_Background and Students_course tables using the foreign key Country_ID and Student_ID
- Background table is referenced by Lecturers and Students_Background tables using the foreign key Background_ID
- Country table is referenced by Students, Lecturers, Tutors and Students_Background tables using the foreign key Country_ID
- Affiliation table is referenced by Lecturers table using the foreign key Affiliation_ID
- Seminar table is referenced by Gives_Seminar table using the foreign key Seminar_ID
- Phase table is referenced by Block_Phases table using the foreign key Phase_ID

Additionally, there are some many-to-many relationships that are captured using the linking tables:

- Courses_Tutorials table links Courses table and Tutorials table in a many-to-many relationship
- Block_Phases table links Block_Periods table and Phase table in a many-to-many relationship.

Role of each chosen table in the system

1. Lecturers: ontains information about the lecturers at AIMS as their background, country of origin, and contact information together with their university of affiliation.
2. Tutors: table stores information about the tutors in the institution, such as their country of origin, background, and contact information..
3. Students: table to store information about the students at AIMS, such as their country of origin, name, date of birth, and contact information. .
4. Courses: table stores information about the courses that are taught at AIMS, such as the course code, course name, and course description.
5. Tutorials: To store information about tutorial sessions and their courses.
6. Quizzes: To store information about quizzes , their courses and marks.
7. The Students_course : table stores information about the courses that the students are enrolled in.
8. Assignments: To store information about assignments and their courses.
9. The stu_scores: table keeps track of the scores of the students in the quizzes and assignments.
10. The Block_Phases: table contains information about the relationship between the blocks and the phases of the academic year.
11. The Block_Periods table stores information about the academic periods.
12. Courses_Tutorials: table stores information about the tutorials that are associated with the courses.
13. Gives_Seminar :table contains information about the seminars given by the lecturers in the courses.
14. The Students_course: table stores information about the courses that the students are enrolled in.
15. The Phase table: contains information about the phases in the academic year, such as the start and end dates and the name of the phase.
16. The Country, Affiliation, and Background tables: are used to store information about the students, lecturers, and tutors in the institution
17. Seminar table: is used to store information about the seminars held in the institution.

Queries

- Query to retrieve all the courses a student is enrolled in:
- Query to retrieve all the lectures for a given course:
- Query to retrieve all the tutors for a given course
- Query to retrieve all the assignments for a given course:
- Query to retrieve all the quizzes for a given course:
- Query to retrieve all the seminars given by a specific lecturer for a given course:
- Query to retrieve all the tutorials for a given course:
- Query to retrieve all the blocks for a given period:
- Query to retrieve the phase information for a given block:
- Query to retrieve all the students enrolled in a given course:
- Count the number of quizzes for each course and order by most to least quizzes.

- Get a list of all countries in alphabetical order
- Get the names and emails of all lecturers teaching course C01.
- Count the total number of students
- Find the University with a particular affiliation id
- Get a list of all backgrounds in alphabetical order.
- Get the names, emails, and courses of all tutors
- Get the title of all seminars and the names of the lecturers who gave them.