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University of Asia Pacific

Department of Computer Science & Engineering

Project Report – Database Systems Lab (CSE - 212)

❖ Project Name: University Student Mental Health Tracking System

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1.Topic

Our topic is “University Student Mental Health Tracking System,” which is a database management system designed to monitor and support the mental health of university students. The reason for choosing this topic is that student mental health is a growing concern due to academic stress, social challenges, and personal struggles. By creating this system, we aim to help universities track mental health trends and provide timely support, ensuring students can perform better both academically and personally.

2.Description of Topic

A Database Management System is a database for Student Mental Health Tracking and Support designed to monitor, evaluate, and improve the mental health of students.

This system will:

1. Collect and store various information about students' mental health to track their mental health status over time.
2. Monitor mental health progress and outcomes through regular surveys, past history, assessments, and observations.
3. Support students through individual therapy, medication, treatment, and assessments conducted by therapists.
4. Provide therapy sessions to diagnose issues, offering detailed insights into students' mental health conditions.
5. Offer group therapy through specialized mental health problem-wise groups.
6. Regularly evaluate students' mental health through sessions, observations, and monitoring, providing an overall status of their well-being.
7. Facilitate collaboration between students, therapists, and the support system to enhance students' mental health and academic success.

This database has many tables with complex relationships to ensure efficient data management. It eliminates data inconsistency by centralizing information and maintaining data integrity. A DBMS allows universities to:

1. Monitor mental health trends and support early interventions.
2. Track therapy sessions, diagnoses, and treatment outcomes.
3. Ensure secure access to sensitive mental health data.
4. Automate data processes for efficient operation and decision-making.

The system offers significant benefits, such as improved data security, accessibility, and personalized support. It enables universities to promote mental well-being proactively, ensuring a positive impact on students' academic and personal growth.

3.Database Name

The name of the database will be "University_Mental_Health_DB". It will contain 13 tables to manage and monitor student mental health effectively. This system will centralize data, including surveys, therapy sessions, diagnoses, treatments, and group activities. It will help track mental health trends, enable early intervention, and support informed decision-making to improve student well-being and academic success.

4.Users

- **Admin/Database Designer**: Responsible for creating and maintaining the database schema.
- **Therapists**: Manage therapy sessions and patient outcomes.
- **Students**: Subjects of the mental health surveys, therapy, and medical interventions.
- **Medical Staff**: Use diagnosis and treatment data to manage student health.

5.Tables

There are 13 tables in this database -

1. Student
2. Student Mental Health survey
3. Therapist
4. Student Therapy Session
5. Diagnosis
6. Student Medical History
7. Treatment
8. Medication
9. Student_Assesment
10. Student_Observation
11. MentalHealth_ProblemwiseGroups
12. Student_Attendance
13. Emergency Intervention

6.Table Columns/Attributes

- **student_id** *(Primary Key)*
- name
- date_of_birth
- gender
- age
- email
- phone

`Student_mental_health_survey`

- **survey_id** *(Primary Key)*

- student_id *(Foreign Key)*
- survey_date
- survey_type
- student_mood
- comment

Therapist

- **therapist_id** *(Primary Key)*
- first_name
- last_name
- email
- salary

Student_therapy_session

- **session_id** *(Primary Key)*
- student_id *(Foreign Key)*
- therapist_id *(Foreign Key)*
- session_date
- duration
- session_reports

Diagnosis

- **diagnosis_report** *(Primary Key)*
- **diagnosis_id** *(Primary Key)*
- student_id *(Foreign Key)*
- diagnosis_date
- diagnosis_code

Student_medical_history

- student_id *(Foreign Key)*
- **medical_report** *(Primary Key)*
- medical_record_type
- record_date

Treatment

- **treatment_id** *(Primary Key)*
- diagnosis_id *(Foreign Key)*
- diagnosis_report *(Foreign Key)*
- medical_report *(Foreign Key)*
- treatment_plan
- start_date
- end_date

Medication

- **medication_id** *(Primary Key)*
- student_id *(Foreign Key)*
- medication_name
- dosage
- start_date
- end_date
- medication_side_effect

Student_assessment

- **assessment_id** *(Primary Key)*
- student_id *(Foreign Key)*
- assessment_start_date
- assessment_end_date
- assessment_type

Student_observation

- **observation_id** *(Primary Key)*
- student_id *(Foreign Key)*
- observation_date
- observation_type
- observation_report

Mental_Health_problemwise_group

- **group_name** *(Primary Key)*
- student_id *(primary and Foreign Key)*
- group_times
- performance

Student_attendance

- attendance_id *(Primary Key)*
- student_id *(Foreign Key)*
- group_name *(Foreign Key)*
- attendance_date
- group_effects

Emergency_intervention

- emergency_id *(Primary Key)*
- student_id *(Foreign Key)*
- intervention_date
- intervention_type
- intervention_outcome
- comments

7.Primary key, Foreign key / Relation & Description

Primary Key, Foreign Key / Relation & Description

Table	Primary Key	Foreign Key	Relationship Description
Student	Student_ID	None	Each student is uniquely identified by Student_ID.
Student Mental Health survey	Survey_ID	Student_ID	Links mental health records to specific students.
Therapist	Therapist_ID	None	Each therapist is uniquely identified by Therapist_ID.
Student Therapy Session	Session_ID	Student_ID, Therapist_ID	Tracks therapy sessions for students with specific therapists.
Diagnosis	Diagnosis_ID	Student_ID	Links diagnosis records to students.
Student Medical History	History_ID	Student_ID	Tracks the medical history of students.
Treatment	Treatment_ID	Diagnosis_ID, Therapist_ID	Tracks treatments associated with a diagnosis and therapist.
Medication	Medication_ID	Treatment_ID	Tracks medications prescribed as part of treatments.
Student Assessment	Assessment_ID	Student_ID, Therapist_ID	Tracks mental health assessments conducted by therapists for students.
Student Observation	Observation_ID	Student_ID	Tracks observations made by external observers about students.
Mental Health Problem wise Groups	Group_ID	Therapist_ID	Groups students by mental health problems and assigned therapists.
Student Attendance	Attendance_ID	Student_ID, Session_ID	Tracks attendance for therapy sessions.
Emergency Intervention	Emergency_id	Student_id	Response to any emergency of a student through Student id

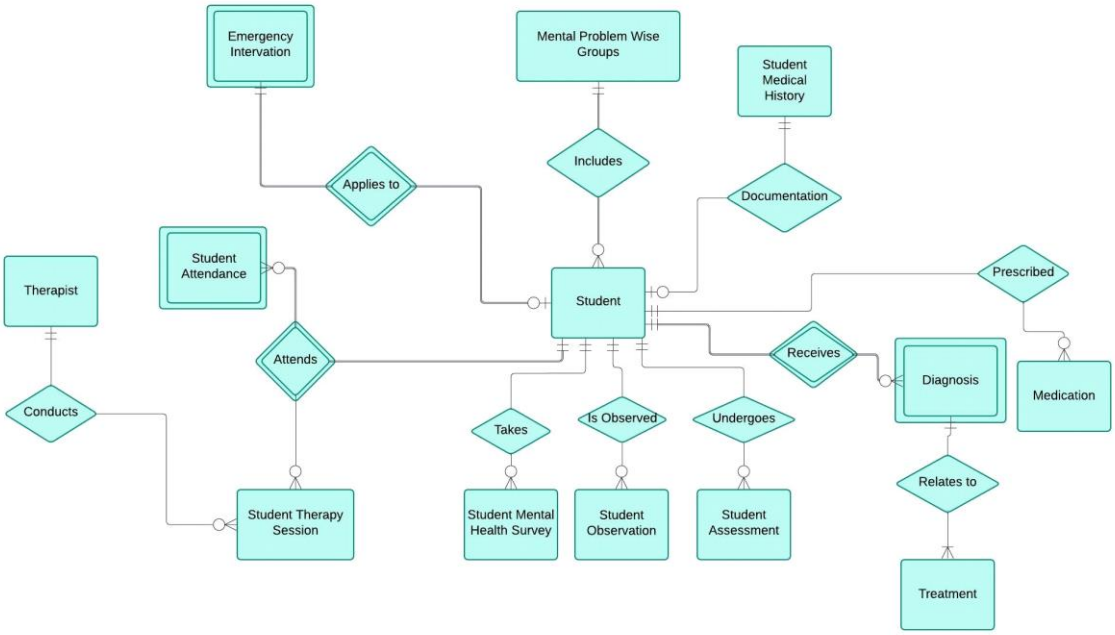
8.Entity Relationship

The relationships in this database are designed to model real-world interactions.

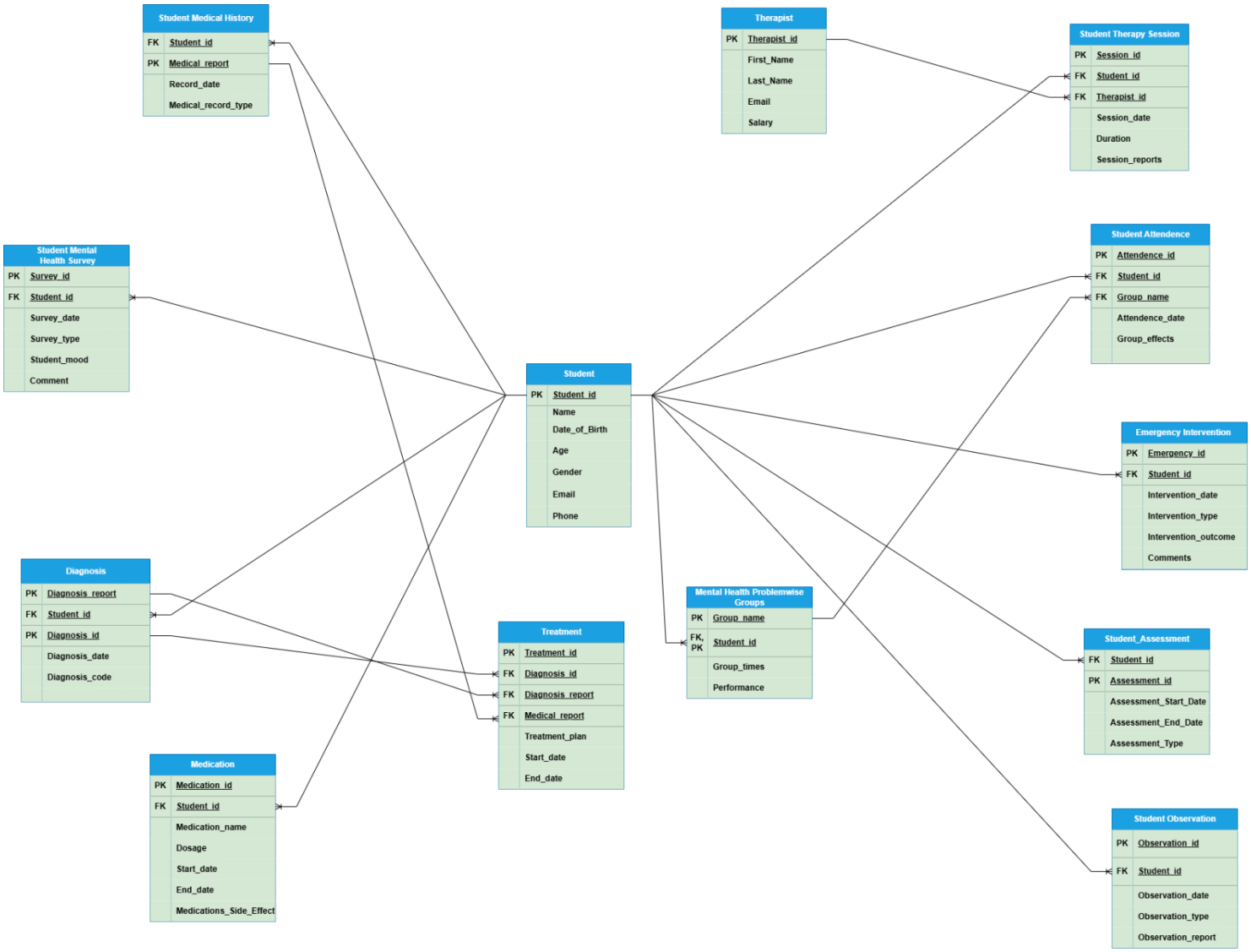
- **Student–Mental Health**: One-to-One
    - A student has one mental health record.
- **Student–Therapy Session**: One-to-Many
    - A student can have multiple therapy sessions.
- **Therapist–Therapy Session**: One-to-Many
    - A therapist can handle multiple therapy sessions.
- **Diagnosis–Treatment**: One-to-Many
    - A diagnosis can lead to multiple treatments.
- **Treatment–Medication**: One-to-Many
    - A treatment can have multiple prescribed medications.
- **Student–Assessment/Observation**: One-to-Many
    - A student can have multiple assessments and observations.
- **Student--Mental Health ProblemWise Groups:** Many-to-Many
    - A group of many students can have multiple mental health problems.
- **Student--Medication:** One-to-Many
    - A student can be prescribed multiple medications.

These relationships ensure that all tables are logically connected and data can flow between them to support comprehensive mental health management within the university system.

9.ER Diagram


Emergency Intervation
Mental Problem Wise Groups
Student Medical History
Applies to
Includes
Documentation
Student Attendance
Therapist
Student
Prescribed
Attends
Receives
Diagnosis
Medication
Conducts
Takes
Is Observed
Undergoes
Relates to
Student Therapy Session
Student Mental Health Survey
Student Observation
Student Assessment
Treatment

10.Schema Diagram



11.Queries

1 Arithmetic Operation

```
                        ---arithmetic---------

--Calculate the annual salary of each therapist.

select therapist_id,first_name, last_name,salary*12 as annual_salary from Therapist


--Calculate the new salary for each therapist after a 10% raise

select therapist_id,first_name, last_name,salary*1.10 as new_salary from Therapist

--query to print each therapist's ID, name, and salary after 6 years, while accounting for a monthly tax deduction of 1000.

select therapist_id, first_name as name,salary, (salary * 12 * 6) - (1000 * 12 * 6) AS salary_after_6_years
from Therapist
```

100 %

Results | Messages

	therapist_id	first_name	last_name	annual_salary
1	Th001	Dr. Rina	Sarkar	600000
2	Th002	Dr. Kabir	Rahman	660000
3	Th003	Dr. Liza	Ahmed	720000
4	Th004	Dr. Nazma	Begum	540000
5	Th005	Dr. Shahid	Alam	624000

	therapist_id	first_name	last_name	new_salary
1	Th001	Dr. Rina	Sarkar	55000.00
2	Th002	Dr. Kabir	Rahman	60500.00
3	Th003	Dr. Liza	Ahmed	66000.00
4	Th004	Dr. Nazma	Begum	49500.00
5	Th005	Dr. Shahid	Alam	57200.00

	therapist_id	name	salary	salary_after_6_years
1	Th001	Dr. Rina	50000	3528000
2	Th002	Dr. Kabir	55000	3888000
3	Th003	Dr. Liza	60000	4248000
4	Th004	Dr. Na...	45000	3168000
5	Th005	Dr. Sh...	52000	3672000

Query executed successfully. DESKTOP-O4OIP6C\SQLEXPRESS DESKTO

2

```
                        ---where, between, in based:------------

---Find all students who are male and were born after January 1, 2000.
select student_id, name, date_of_birth, gender
from Student
where gender = 'Male' and date_of_birth > '2000-01-01'


---Find all details of medications from the Medication table where the start_date falls between February 1, 2024, and August 1, 2024."
select *
from Medication
where  start_date between '2024-04-02' and '2024-08-01';
```

100 %

Results | Messages

	student_id	name	date_of_birth	gender
1	22201190	Jisan	2000-03-30	Male
2	22201196	Shahriar	2000-02-18	Male
3	22201200	Masud	2000-11-02	Male
4	22201203	Shihab	2000-06-25	Male
5	22201206	Tahsin	2000-07-10	Male

	medication_id	student_id	medication_name	dosage	start_date	end_date	medication_side_effect
1	M007	22201202	Clomipramine	25mg	2024-06-08	2025-06-08	Headache
2	M010	22201204	Paroxetine	10mg	2024-04-10	2025-04-10	Sleep Disturbance
3	M018	22201214	Mirtazapine	30mg	2024-06-20	2025-06-20	Weight Gain
4	M019	22201206	Quetiapine	25mg	2024-06-11	2025-06-11	Dry Mouth
5	M021	22201205	Lamotrigine	50mg	2024-05-26	2025-05-26	Rash

```sql
            --string based:--------

---Find diagnosis report, diagnosis ID, student ID, and diagnosis code
--from the Diagnosis table where the diagnosis report starts with the letter 'A'

select diagnosis_report, diagnosis_id, student_id, diagnosis_code
from  Diagnosis
where diagnosis_report like 'A%'


----query to find the mental health problem-wise groups that start with the letters 'a', 'b', 'd', or 'o'

select group_name from Mental_Health_problemwise_group where group_name like '[abdo]%'


-- find the mental health problem-wise groups that do not start with the letters 'a', 'b', 'd', or 'o'

select * from Mental_Health_problemwise_group where group_name like '[^abdo]%'
```

100 %

Results | Messages

	diagnosis_report	diagnosis_id	student_id	diagnosis_code
1	Anxiety	D001	22201207	A001
2	Anxiety	D011	22201203	A001
3	Anxiety	D013	22201196	A001

	group_name
1	Anxiety Recovery Group
2	Anxiety Support Group
3	Anxiety Support Group
4	Anxiety Support Group
5	Bipolar Disorder Group
6	Bipolar Disorder Group
7	Depression Recovery Group
8	Depression Support Group

	group_name	student_id	group_times	group_performance
1	PTSD Recovery Group	22201209	Wed, Sat	5
2	Stress Management Group	22201200	Mon, Thu	7
3	Stress Relief Group	22201204	Mon, Thu	6
4	Stress Relief Group	22201208	Mon, Fri	6

Query executed successfully

4

```
            -----ordering----------

---find all details  from the Treatment table and display them in ascending order based on the start_date.
select *
from Treatment
order by start_date asc;


---Find all records from the Mental_Health_problemwise_group table where the group_performance \
--is less than 10, and display them in descending order based on group_performance.
select *
from Mental_Health_problemwise_group
where group_performance<10
order by group_performance desc
```

100 %

Results | Messages

	treatment_id	diagnosis_id	diagnosis_report	medical_report	treatment_plan	start_date	end_date
1	T001	D001	Anxiety	MR001	Cognitive Behavioral Therapy	2024-01-10	2024-03-10
2	T013	D013	Anxiety	MR013	CBT and Relaxation Exercises	2024-01-20	2024-03-20
3	T002	D002	Depression	MR002	Medication and Counseling	2024-02-15	2024-04-15
4	T014	D014	OCD	MR014	CBT and Exposure Therapy	2024-02-28	2024-04-28
5	T015	D015	Depression	MR015	Cognitive Therapy and Medication	2024-03-15	2024-05-15
6	T003	D003	Stress	MR003	Relaxation Techniques and Therapy	2024-03-20	2024-05-20
7	T004	D004	PTSD	MR004	Exposure Therapy and Support Groups	2024-04-25	2024-06-25
8	T005	D005	Bipolar Disorder	MR005	Medication and Therapy	2024-05-30	2024-07-30

	group_name	student_id	group_times	group_performance
1	Anxiety Support Group	22201197	Tue, Fri	9
2	Anxiety Support Group	22201203	Wed, Sat	9
3	Depression Recovery Group	22201205	Tue, Sat	8
4	Depression Support Group	22201206	Tue, Thu	8
5	OCD Support Group	22201190	Mon, Fri	8
6	Bipolar Disorder Group	22201216	Mon, Thu	7
7	Bipolar Disorder Group	22201220	Tue, Fri	7
8	Stress Management Group	22201200	Mon, Thu	7

Query executed successfully. DESKTOP-O4OJ

5

```sql
-----set operation-------

---Find  diagnosis report, diagnosis ID, student ID, and diagnosis code from
--the Diagnosis table where the diagnosis_report gives  the word 'Depression' or the diagnosis code is 'B001'
select diagnosis_report, diagnosis_id, student_id, diagnosis_code
from  Diagnosis
where diagnosis_report like '%Depression%'
union
select  diagnosis_report, diagnosis_id, student_id, diagnosis_code
from  Diagnosis
where  diagnosis_code = 'B001';
---Find diagnosis report, diagnosis ID, student ID, and diagnosis code
--from the Diagnosis table where the diagnosis report starts with the letter 'A' or the diagnosis code is 'D001'."
select diagnosis_report, diagnosis_id, student_id, diagnosis_code
from  Diagnosis
where diagnosis_report like 'A%'
union
select  diagnosis_report, diagnosis_id, student_id, diagnosis_code
from  Diagnosis
```

100 %

Results | Messages

	diagnosis_report	diagnosis_id	student_id	diagnosis_code
1	Bipolar Disorder	D005	22201216	B001
2	Bipolar Disorder	D012	22201220	B001
3	Depression	D002	22201206	D001
4	Depression	D009	22201205	D001
5	Depression	D015	22201214	D001

	diagnosis_report	diagnosis_id	student_id	diagnosis_code
1	Anxiety	D001	22201207	A001
2	Anxiety	D011	22201203	A001
3	Anxiety	D013	22201196	A001
4	Depression	D002	22201206	D001
5	Depression	D009	22201205	D001
6	Depression	D015	22201214	D001

6

```sql
---Find all records from the Mental_Health_problemwise_group table where the group_performance is less than 10, and display them in descending order based on group_performanc
select *
from Mental_Health_problemwise_group
where group_performance<10
order by group_performance desc
```

97 %

Results | Messages

	group_name	student_id	group_times	group_performance
1	Anxiety Support Group	22201197	Tue, Fri	9
2	Anxiety Support Group	22201203	Wed, Sat	9
3	Depression Recovery Group	22201205	Tue, Sat	8
4	Depression Support Group	22201206	Tue, Thu	8
5	OCD Support Group	22201190	Mon, Fri	8
6	Bipolar Disorder Group	22201216	Mon, Thu	7
7	Bipolar Disorder Group	22201220	Tue, Fri	7
8	Stress Management Group	22201200	Mon, Thu	7
9	Stress Relief Group	22201204	Mon, Thu	6
10	Stress Relief Group	22201208	Mon, Fri	6
11	Anxiety Recovery Group	22201196	Mon, Thu	6
12	PTSD Recovery Group	22201209	Wed, Sat	5
13	Depression Support Group	22201214	Tue, Thu	5

7

```sql
---Find the number of therapy sessions attended by each student, grouped by student ID.
select student_id, count(session_id) as session_count
from Student_therapy_session
group by student_id;
```

97 %

Results | Messages

	student_id	session_count
1	22201190	1
2	22201196	1
3	22201197	2
4	22201200	1
5	22201202	2
6	22201203	1
7	22201204	3
8	22201205	2
9	22201206	4
10	22201207	3
11	22201208	1
12	22201209	1
13	22201214	1
14	22201216	1
15	22201220	1

8

```sql
---Find the maximum and minimum duration of therapy sessions.

select max(duration) as max_duration, min(duration) as min_duration
from Student_therapy_session;

--Find the average duration of therapy sessions for each therapist, but
```

97 %

Results | Messages

	max_duration	min_duration
1	75	45

9

```sql
---Find the Names of Therapists with a Salary Higher than the Average Salary
select first_name, last_name, salary
from Therapist
where salary > (select avg(salary) from Therapist)
```

97 %

Results | Messages

	first_name	last_name	salary
1	Dr. Kabir	Rahman	55000
2	Dr. Liza	Ahmed	60000

10

```sql
--Find the Therapists Who Have Conducted the Highest Number of Therapy Sessions

select therapist_id,first_name, last_name
from Therapist
where therapist_id in (select therapist_id from Student_therapy_session
group by therapist_id
having count(session_id) = (select max(session_count)
from (select therapist_id, count(session_id) as session_count
from Student_therapy_session
group by therapist_id) as Temp))
```

97 %

Results | Messages

	therapist_id	first_name	last_name
1	Th003	Dr. Liza	Ahmed

11

```sql
---Find the students who had therapy sessions in the month of January 2024:
select student_id,name from student
where student_id in(select student_id from Student_therapy_session where session_date between '2024-01-01' and '2024-01-31')
```

97 %

Results | Messages

	student_id	name
1	22201200	Masud
2	22201205	Roudro

```sql
----join

---Get students with their survey details
select Student.name,Student_mental_health_survey.survey_date, Student_mental_health_survey.survey_type
from Student
inner join   Student_mental_health_survey
on   Student.student_id = Student_mental_health_survey.student_id


--- Get student diagnosis and treatment details

select d.student_id,d.diagnosis_report,t.treatment_plan
from diagnosis as d

inner join treatment as t
on d.diagnosis_id = t.diagnosis_id
```

100 %

Results | Messages

	name	survey_date	survey_type
1	Muhib	2024-11-01	Mood Survey
2	Arnob	2024-04-10	Satisfaction Survey
3	Shihab	2024-03-11	Stress Survey
4	Alif	2024-02-12	Behavioral Survey
5	Shahriar	2024-09-13	Mood Survey
6	Jisan	2024-10-14	Stress Survey
7	Urmi	2024-11-15	Satisfaction Survey
8	Muhib	2024-12-16	Stress Survey

	student_id	diagnosis_report	treatment_plan
1	22201207	Anxiety	Cognitive Behavioral Therapy
2	22201206	Depression	Medication and Counseling
3	22201208	Stress	Relaxation Techniques and Therapy
4	22201209	PTSD	Exposure Therapy and Support Groups
5	22201216	Bipolar Disorder	Medication and Therapy
6	22201197	General Anxiety	CBT and Medication
7	22201202	OCD	Exposure and Response Prevention ...
8	22201200	Stress	Mindfulness and Counseling

12.CEP Mapping

Our project is a solution to a complex engineering problem because it can't be resolved without in depth engineering knowledge. There is no obvious solution to and requires some amount of abstract thinking depending on the Database model. It also involves a diverse group of stakeholders with widely varying needs.

CEP Mapping

Criteria	Mapping to the Project
K3: Engineering Fundamentals	Our project incorporates engineering fundamentals such as designing a structured database schema, implementing programming logic, and solving technical challenges related to mental health data.
K5: Engineering Design	We designed an Entity-Relationship (ER) Diagram and Schema Diagram to represent the relationships among users, mental health professionals, and mental health resources in the system.
K6: Engineering Practice	Using MSSQL, we implemented the database schema, created tables, and performed queries using Data Definition Language (DDL) and Data Manipulation Language (DML). We used MSSQL for visualization and management.
P1: Depth of Knowledge Required	The project involves a deep understanding of database fundamentals, including designing and implementing the mental health database system. It requires creating ER diagrams (K5) and schema designs, as well as implementation using MSSQL (K6).
P3: Depth of Analysis Required	The design and implementation require a detailed analysis of the unique requirements of the university's mental health services, including privacy, data categorization, and user access levels. Abstract thinking is crucial for modeling mental health support processes and analyzing database queries effectively.
P7: Interdependence	The database includes several interdependent modules. For instance, tables for mental health appointments link to counselors' schedules, feedback tables connect to service reports, and user accounts manage authentication and permissions across the system.
A1: Range of Resources	The project required diverse resources, such as: • Developers (our team) • Database management tools (MSSQL) • Hardware (laptops, desktops) • Research materials on mental health policies, privacy laws, and university-specific requirements.
A5: Familiarity	To successfully execute the project, we needed to familiarize ourselves with mental health care workflows, data privacy regulations and best practices in designing user-friendly database systems.