Part 1

1. Create a database named websyslab8.

   CREATE DATABASE `websyslab8`;

2. Create a table named courses. It should contain
   crn (int 11, primary key)
   prefix (varchar 4, not null)
   number (smallint 4, not null)
   title (varchar 255, not null)
   collate should be utf8_unicode_ci

   ```
   CREATE TABLE `courses` (
      `crn` int(11) NOT NULL AUTO_INCREMENT PRIMARY KEY,
      `prefix` varchar(4) NOT NULL,
      `number` SMALLINT(4) NOT NULL,
      `title` varchar(255) NOT NULL
   ) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci;
   ```

3. Create a table named students. It should contain
   rin (int 9, primary key)
   rcsID (char 7)
   first name (varchar 100, not null)
   last name (varchar 100, not null)
   alias (varchar 100, not null)
   phone (int 10)
   collate should be utf8_unicode_ci

   ```
   CREATE TABLE `students` (
      `rin` int(9) NOT NULL PRIMARY KEY,
      `rcsID` char(7) NOT NULL,
      `first_name` varchar(100) NOT NULL,
      `last_name` varchar(100) NOT NULL,
      `alias` varchar(100) NOT NULL,
      `phone` int(10)
   ) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci;
   ```

Part 2

1. Add address fields (street, city, state, zip) to the students table

   ```
   ALTER TABLE students
   ADD COLUMN street VARCHAR(255),
   ADD COLUMN city VARCHAR(100),
   ADD COLUMN state CHAR(2),
   ADD COLUMN zip CHAR(10);
   ```

2. Add section and year fields to the courses table

   ALTER TABLE courses
   ADD COLUMN section VARCHAR(10),
   ADD COLUMN year YEAR;

3. CREATE a grades table containing
   - id (int primary key, auto increment)
   - crn (foreign key)
   - rin (foreign key)
   - grade (int 3 not null)

   CREATE TABLE grades (
   `id` INT PRIMARY KEY AUTO_INCREMENT,
   `crn` INT NOT NULL,
   `rin` INT NOT NULL,
   `grade` INT(3) NOT NULL,
   FOREIGN KEY (crn) REFERENCES courses(crn),
   FOREIGN KEY (rin) REFERENCES students(rin)
   );

4. INSERT at least 4 courses into the courses table

   INSERT INTO `courses` (`crn`, `prefix`, `number`, `title`, `section`, `year`) VALUES
   (35797, 'PHYS', 1100, 'Physics I', 1, 2025),
   (37514, 'CSCI', 1100, 'Introduction to Computer Science', 2, 2025),
   (37730, 'MATH', 2010, 'Multivar Calculus & Matrix Algebra', 1, 2025),
   (73048, 'ITWS', 2110, 'Web Systems Development', 1, 2025);

5. INSERT at least 4 students into the students table

   INSERT INTO `students` (`RIN`, `RCSID`, `first_name`, `last_name`, `alias`, `phone`, `street`, `city`, `state`, `zip`) VALUES
   (662057096, 'siongd', 'Dana', 'Siong Sin', 'dana', 1231231234, '4 College Ave', 'Troy', 'NY', '12180'),
   (662057097, 'spauln', 'Nicole', 'Spaulding', 'nicole', 1231231233, '3 College Ave', 'Troy', 'NY', '12180'),
   (662057098, 'sitc', 'Courteney', 'Sit', 'courteney', 1231231232, '2 College Ave', 'Troy', 'NY', '12180'),
   (662057099, 'wongp4', 'Priscilla', 'Wong', 'priscilla', 1231231231, '1 College Ave', 'Troy', 'NY', '12180');

6. ADD 10 grades into the grades table
   INSERT INTO `grades` (`crn`, `RIN`, `grade`) VALUES
   (35797, 662057096, 85),
   (35797, 662057097, 89),
   (35797, 662057098, 79),
   (37514, 662057096, 89),
   (37514, 662057099, 94),
   (37730, 662057098, 88),

(37730, 662057099, 82),
(73048, 662057097, 91),
(73048, 662057098, 92),
(73048, 662057099, 87);

7. list all students in the following sequences; in alphabetical order by rin, last name, RCSid, and firstname

SELECT * FROM students ORDER BY rin;

rin rcsID first_name last_name alias phone street city state zip
662057096 siongd Dana Siong Sin dana 1231231234 4 College AveTroy NY 12180
662057097 spauln Nicole Spaulding nicole 1231231233 3 College AveTroy NY 12180
662057098 sitc Courteney Sit courteney 1231231232 2 College AveTroy NY 12180
662057099 wongp4 Priscilla Wong priscilla 1231231231 1 College Ave Troy NY 12180

SELECT * FROM students ORDER BY last_name;

rin rcsID first_name last_name alias phone street city state zip
662057096 siongd Dana Siong Sin dana 1231231234 4 College AveTroy NY 12180
662057098 sitc Courteney Sit courteney 1231231232 2 College Ave Troy NY 12180
662057097 spauln Nicole Spaulding nicole 1231231233 3 College Ave Troy NY 12180
662057099 wongp4 Priscilla Wong priscilla 1231231231 1 College Ave Troy NY 12180

SELECT * FROM students ORDER BY rcsID;

rin rcsID first_name last_name alias phone street city state zip
662057096 siongd Dana Siong Sin dana 1231231234 4 College Ave Troy NY 12180
662057098 sitc Courteney Sit courteney 1231231232 2 College Ave Troy NY 12180
662057097 spauln Nicole Spaulding nicole 1231231233 3 College AveTroy NY 12180
662057099 wongp4 Priscilla Wong priscilla 1231231231 1 College AveTroy NY 12180

SELECT * FROM students ORDER BY first_name;

rin rcsID first_name last_name alias phone street city state zip
662057098 sitc Courteney Sit courteney 1231231232 2 College AveTroy NY 12180
662057096 siongd Dana Siong Sin dana 1231231234 4 College AveTroy NY 12180

662057097 spauln Nicole Spaulding nicole 1231231233 3 College AveTroy NY 12180
662057099 wongp4 Priscilla Wong priscilla 1231231231 1 College AveTroy NY 12180

8. list all students rin, name and address if their grade in any course was higher than a 90

```
SELECT DISTINCT s.RIN, s.first_name, s.last_name, s.street, s.city, s.state, s.zip
FROM students s
JOIN grades g ON s.RIN = g.RIN
WHERE g.grade > 90;
```

RIN	first_name	last_name	street	city	state	zip
662057097	Nicole	Spaulding	3 College Ave	Troy	NY	12180
662057098	Courteney	Sit	2 College Ave	Troy	NY	12180
662057099	Priscilla	Wong	1 College Ave	Troy	NY	12180

9. list out the average grade in each course

```
SELECT c.title, AVG(g.grade) AS average_grade
FROM grades g
JOIN courses c ON g.crn = c.crn
GROUP BY c.crn;
```

title	average_grade
Physics I	84.3333
Introduction to Computer Science	91.5000
Multivar Calculus & Matrix Algebra	85.0000
Web Systems Development	90.0000

10. list out the number of students in each course

```
SELECT c.title, COUNT(DISTINCT g.RIN) AS num_students
FROM grades g
JOIN courses c ON g.crn = c.crn
GROUP BY c.crn;
```

title	num_students
Physics I	3
Introduction to Computer Science	2
Multivar Calculus & Matrix Algebra	2
Web Systems Development	3