Lab#2 CS4350 Database Systems

Given the following relational database schema:

Student = (SSN, Name, Major)

Course = (<u>CourseNumber</u>, PrerequisiteCourseNumber, Course Title, NumberUnits)

Section = (<u>CourseNumber, Quarter</u>, RoomNumber, DayTime), where DayTime is of the form MW 1:0-2:00PM.

Enrollment = (<u>SSN,CourseNumber, Quarter, Grade</u>)// Grade is either Null or a letter grade.

Express the following queries using appropriate SQL statements with a minimum number of operations:

Course Table

	CourseNumber	PrerequisiteCourseNumber	CourseTitle	NumberUnits
•	1	NULL	Formal Languages & Automata	3
	2	1	Database Systems	3
	3	NULL	Software Engineering	3
	4	2	Systems Programming	3
	5	HULL	Data Structures	3

Enrollment Table

	m omment rubic				
	SSN	CourseNumber	Quarter	Grade	
•	213784218	1	Fall2020	D	
	214612384	1	Fall2020	Α	
	472934828	1	Fall2020	Α	
	213784218	1	Spring2020	F	
	213784218	1	Summer2020	F	
	303231274	2	Fall 2020	Α	
	214612384	2	Fall2020	С	
	214612384	3	Spring 2021	NULL	
	303231274	3	Summer2021	D	
	NULL	NULL	NULL	NULL	

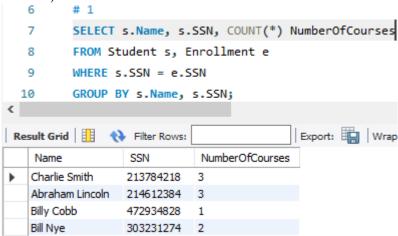
Section Table

	CourseNumber	Quarter	RoomNumber	DayTime
•	1	Fall 2020	704	MW12:00PM
	2	Fall2020	404	W4:50PM
	5	Spring 2021	615	T4:00PM
	4	Spring2021	603	M12:00PM
	NULL	NULL	NULL	NULL

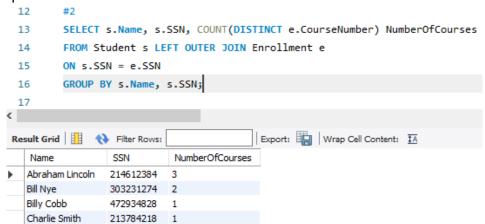
Student Table

	SSN	Name	Major
•	213784218	Charlie Smith	Art History
	214612384	Abraham Lincoln	Computer Science
	303231274	Bill Nye	Mechanical Engineering
	472934828	Billy Cobb	Computer Science
	NULL	NULL	NULL

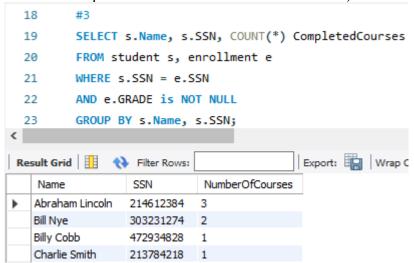
1. List the name, SSN and the number of courses the student has taken (courses with the same CourseNumber taken in different quarters are counted as different courses).



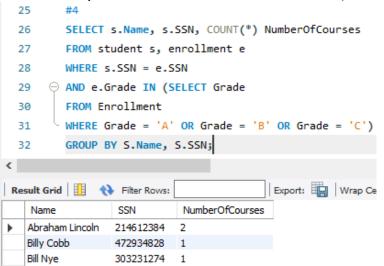
2. Answer #1 assuming courses with the same CourseNumber taken in different quarters are considered as one course.



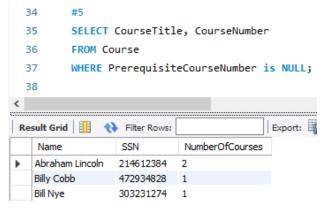
3. List the name, SSN and number of courses the student has taken and completed , i.e., received a letter grade (courses with the same CourseNumber taken in different quarters are counted as different courses)



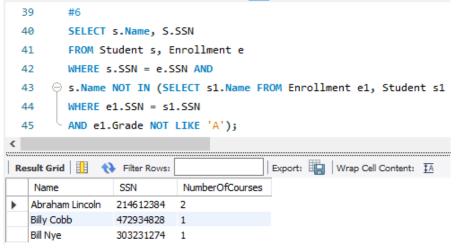
4. List the name, SSN and number of courses the student has taken and completed with a letter grade C or better (courses with the same CourseNumber taken in different quarters are counted as different courses).



5. List the Course Title and CourseNumber which does not have any prerequisite.



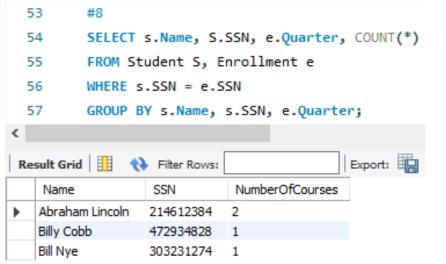
6. List the name of every student and SSN who earned an A in all courses he or she has completed, i.e., every grade is either Null or an A)



7. List the name of every student, SSN and the CourseNumber who has taken the course at least three times.

```
47
          #7
          SELECT s.Name, E.SSN, E.CourseNumber
          FROM Student s, Enrollment e
  49
          WHERE s.SSN = e.SSN
  50
  51
          GROUP BY s.Name, E.SSN, e.CourseNumber HAVING COUNT(*) > 2;
< □
Result Grid
                Filter Rows:
                                              Export: Wrap Cell Content: TA
                   SSN
                              NumberOfCourses
   Abraham Lincoln
                  214612384
   Billy Cobb
                  472934828
   Bill Nye
                  303231274
                              1
```

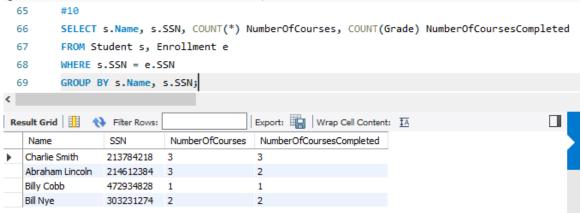
8. List the name of every student, SSN, every quarter, and the number of courses he or she has taken in the listed quarter.



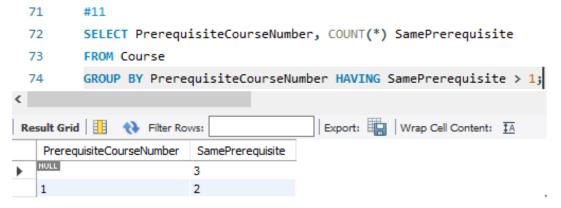
9. List the name of every student and SSN who has not taken any course more than once.

```
59
         #9
 60
         SELECT s.Name, s.SSN
         FROM Student s, Enrollment e
 61
         WHERE s.SSN = e.SSN
 62
         AND e.CourseNumber HAVING COUNT(*) > 1;
 63
                                              Export:
Result Grid
               Filter Rows:
   Name
                  SSN
                              NumberOfCourses
  Abraham Lincoln
                  214612384
                             2
  Billy Cobb
                  472934828
                             1
  Bill Nye
                             1
                  303231274
```

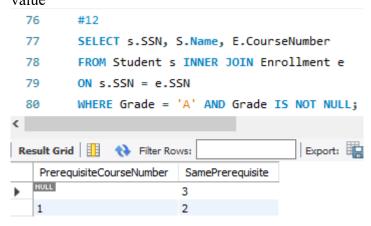
10. List the name, SSN, the number of courses the student has taken, and the number of courses completed (courses with the same CourseNumber taken in different quarters are counted as different courses)



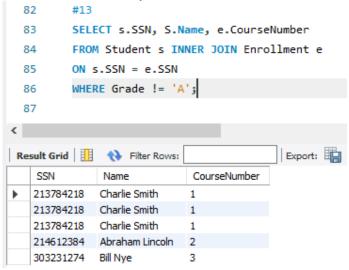
11. List every two CourseNumber and their titles which have the same prerequisites.



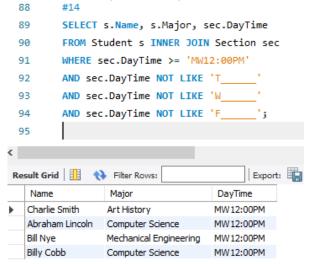
12. List the name of every student and SSN who has completed all the courses he/she has taken and earned an A in each course, i.e., every grade is an A and no NULL value



13. List the name of every student and SSN who earned no A in any course.



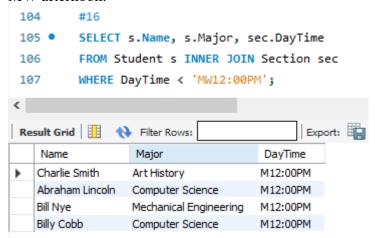
14. List the name and major of every student who has only taken courses that meet MW afternoon (12 or after).



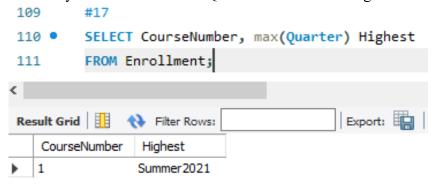
15. List the name and major of every student who has taken all the courses that meet MW afternoon.

```
96
         #15
         SELECT s.Name, s.Major, sec.DayTime
 97 •
         FROM Student s INNER JOIN Section sec
 98
 99
         WHERE sec.DayTime >= 'MW12:00PM'
         AND sec.DayTime NOT LIKE 'T
100
         AND sec.DayTime NOT LIKE 'W
101
         AND sec.DayTime NOT LIKE 'F
102
103
Result Grid
               Filter Rows:
                                              Export:
   Name
                  Major
                                       DayTime
  Charlie Smith
                  Art History
                                       MW12:00PM
   Abraham Lincoln
                  Computer Science
                                       MW 12:00PM
  Bill Nye
                  Mechanical Engineering
                                       MW12:00PM
  Billy Cobb
                  Computer Science
                                       MW 12:00PM
```

16. List the name and major of every student who has not taken any course that meets MW afternoon.



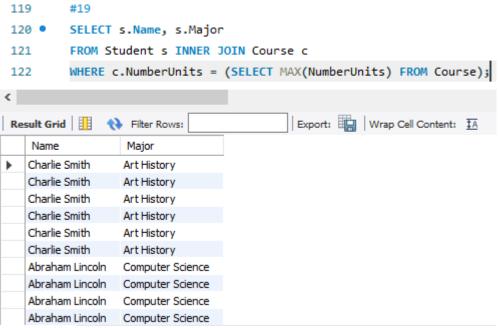
17. List every CourseNumber and Quarter which has the highest enrollment.



18. List every CourseNumber and CourseTitle which has the highest enrollment based on all quarters.

```
113
         #18
114 •
         SELECT e.CourseNumber, e.Quarter, c.CourseTitle
         FROM Enrollment e INNER JOIN Course c
115
116
         ON e.CourseNumber = c.CourseNumber
         WHERE e.Quarter = (SELECT MAX(NumberUnits) FROM Course);
117
Result Grid
                                           Export: Wrap Cell Content: TA
              Filter Rows:
   CourseNumber
                Quarter
                         CourseTitle
```

19. List the name and major of every student who has completed the highest number of units.



20. List every Course tile which is a prerequisite for the largest number of courses.

