# CS345 - Final - Fall 2017 - 11/26/2017

1. Do not open the exam until you are directed to do so. Read all of the instructions first.
2. Please print your name on every page of the exam (in the upper right corner). Additionally, sign your name on the front page.
3. The exam contains 8 pages (including this one). Verify that you do indeed have 8 pages.
4. Please turn cell phones **off**.
5. The exam is closed book and closed notes. Please place books, bags, notes and personal items **under** your desk.
6. The exam is closed neighbor. Refrain from talking to your neighbors during the exam.
7. Computers, headsets, hats or sunglasses are **not** permitted.
8. You may bring a calculator.
9. Write your solutions in the space provided. If you need extra space or scratch space, you may use pp. 8. If you need additional pages, raise your hand and additional paper will be provided. Any additional paper you use must be turned in with your exam and have your name printed on the upper right corner.
10. Do not spend too much time on one problem. Read them all and attack them in the order that allows you to make the most progress.
11. Show your work. Partial credit will be given. You are graded not only on correctness of outcome but in **correctness** and **clarity** of approach.
12. Questions during the exam should only be of an administrative nature (I’m missing page 2, I can’t read this, etc.)
13. Good luck!

Name (printed) Name (signed)

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## Comparisons and Boolean operators

1. Return the trainee ID and full name for all trainees who are older than 20.
2. Return the ids and names of trainees whose last name starts with the letter ‘D’.
3. Assume that you have a view available, that returns all data, called ‘all\_data’. See the attachment.

Return the ids and names of trainees, along with the course ID and short name of courses they take, whose first name starts with the letter ‘M’ OR whose last name starts with the letter ‘R’. Of that group of trainees we only want to return those who are between 20 and 30 years old (exclusively).

1. Assume that you have a view available, that returns all data, called ‘all\_data’, see the attachment.  
   Who are the trainees who received an A in CS345? Return the full name and ID.
2. Assume that you have a view available, that returns all data, called ‘all\_data’, see the attachment.  
     
   See the last question: who failed that course? Trainees fail a class if they receive either an ‘F’ or a ‘D’.
3. Assume that you have a view available, that returns all data, called ‘all\_data’, see the attachment.  
     
   Which courses are popular among older trainees (course ID and full name)? Return the courses that are taken by trainees who are older than 40. Return each course only once.

## Joins and order by

For all join problems, you are not allowed to use view ‘all\_data’.

1. Write a query that returns the instructor IDs, their full name and the course short names that they teach. Use as small a number of tables as possible. Order the result by instructor last name, first name.
2. Return all the IDs and full names of trainees who have an A in any class. Make sure to return any name only once. Also, use only tables that are necessary.
3. Write a query that returns the complete data set over all tables, ordered by: trainee last name, first name, grade. Hint: to join in instructor, the intermediate table structure needs to already contain table class. That said, you might as well join instructor as the very last table.
4. Write a query that returns all trainee IDs and full names of trainees who have not taken any class.
5. Write a query that returns the course ID as well as short and long name of courses that have not been offered at all.

## Group by

1. Return each course (not class), i.e. its ID and short name, along with the age of the oldest trainee that takes the course (in some class).
2. Return the number of classes each trainee took. Return the trainee ID and full name.
3. Return the trainee ID, along with first/last name and the best grade that trainee achieved in any class.

## Subqueries

1. Return the course (not class!) ID and short/long names of all courses, along with the oldest trainee in the course, plus the trainee’s ID and full name. Write a correlated subquery in order to achieve this.
2. See the last question: write the same query, but use an INNER JOIN, instead of a correlated subquery.

