

SET OPERATIONS, RECURSION, AND REGEX

MSiA 413 Discussion
Week 8

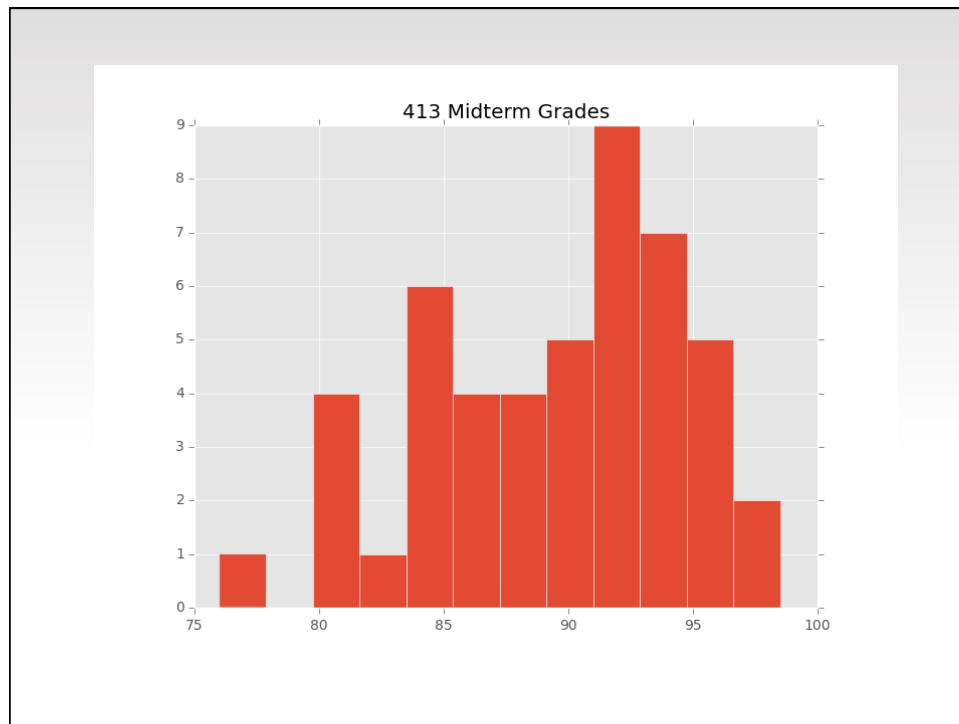
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Announcements

- Midterms have been graded!
 - My OH are tomorrow at 4 in Mudd
 - Mean: 89.25, Standard deviation = 4.98
 - Good job!
- HW4 grades should come out tonight.
- HW5 is released
 - Any questions?

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Set Operations

- What is the difference between a UNION and an INTERSECT?
- What is the difference between an INNER JOIN and an INTERSECT?
- What is the difference between a FULL OUTER JOIN and a UNION?
- What is the difference between UNION and OR?
- What is the difference between ANY and ALL?
- What will the result of the following queries be?
 - `SELECT name from Directors UNION SELECT name from Actors`
 - `SELECT name from Directors INTERSECT SELECT name from Actors`
 - `SELECT name from Directors UNION ALL SELECT name from Actors`
 - `SELECT name from Directors UNION SELECT birthYear from Actor`

Regular Expressions

- Regular expressions are a very powerful tool
- They are usually quite difficult to debug and interpret
- <https://regex101.com/>



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Regular Expressions

- Match all upper-level EECS courses
 - EECS 339
 - EECS 317
 - EECS 495
 - Answer: "EECS [34]\d{2}"
- Match Northwestern email addresses
 - vyasalwar2018@u.northwestern.edu
 - hardav@northwestern.edu
 - grad-students@eecs.northwestern.edu
 - Answer: `[A-Za-z0-9\._+]+@(\w+\.)?northwestern\.edu`
- Match US phone numbers in the formats
 - (847) 865-5309
 - 847-867-5309
 - 8478655309
 - 1(847) 865-5309
 - Answer: `1?(? \d{3} \d{3} | -) ? \d{3} - ? \d{4}`

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Recursion

- Given the following schema, find Alice's oldest ancestor in the database: Family(id, name, age, fatherId, motherId)

```
WITH RECURSIVE ancestors(id, name, age) AS (  
    SELECT id, name, age FROM Family WHERE name = 'Alice'  
    UNION ALL  
    SELECT id, name, age FROM Family  
    JOIN ancestors ON ancestors.id = Family.motherId  
    UNION ALL  
    SELECT id, name, age FROM Family  
    JOIN ancestors ON ancestors.id = Family.fatherId  
    SELECT name FROM ancestors HAVING age= MAX(age);
```
- Imagine that by mistake, Alice is listed as one of her ancestor's mother. What would happen to the recursive query?