* Database
  + Spreadsheets- visualize data might be easier
    - Excel can corrupt data🡪 changes fields to dates, etc.
    - Formula could be in any cell🡪 hard to figure out how data is calculated🡪 SQL has clear command to get data
  + SQL: Structured Query Language
    - Fast, lots of data, complex relationships, reliability and computability
    - Ex command: SELECT data FROM someTable(s) WHERE a condition is met
    - Pipelined data
      * Select, filter, sort, aggregate, appending (create new column of data)
    - Commands in this version are not case sensitive, but helps with readability
      * Keyword DISTINCT provides only unique values
      * Adding parenthesis helps clarify order of operations
      * ORDERBY command
      * JOIN command to join tables and output from both
        + Select unifying feature of tables to combine

SELECT \* FROM Experiment JOIN Project ON Experiment.projectID = project.projectID

* + - * + GROUP BY variable
      * Important! When grouping and sorting, must make sure to sum values or will only display last record
      * Null values
        + WHERE variable IS NULL will display any lines with null values
        + Replace with value like 0

SELECT IFNULL (experimentdate, ‘nothing’) FROM experiment

* + - * Nested Queries
        + Put entire query to do first in parenthesis as FROM command for second query

SELECT \* FROM(nested query) WHERE

* + - * Joins
        + Left join will show all left data table plus joined region
      * Varchar data type= more efficient, handles almost any text (up to 65,000 characters)
    - Best use of SQL is to rapidly extract data of interest from very large data set
      * Command line tools available to do same queries on several data sets in a series
      * Save result of query as new CSV file
      * Use other programs to do plotting
    - www.w3schools.com/sql
    - Sample problems
      * Display name of project and number involved
        + SELECT projectname,COUNT(DISTINCT(Login)) as 'NumInvolved' FROM involved
        + JOIN project ON involved.projectId = project.projectId
        + GROUP BY projectName
      * Display first name of persons who worked on projects before 1900
* Shell tips
  + If command not working, try ./command to
  + Cat can take multiple inputs
  + Print everything in file🡪use cat + path + wildcard to describe which files to print (\* to list everything)
  + \*4\*
  + find looks for name of file
  + grep looks for string within file
    - –H will print out name of file that contains grep file
  + look for phrase within man page using /wordsearch

Git

* + steps
  + make project
  + make files
  + add files to be committed
  + commit files
  + if git added something and want it out of add docket
    - git reset HEAD filename (removes file from staging area)
    - or git reset –-soft HEAD^ (undoes last commit, puts it back in staging area)
    - git checkout --filename1 filename2
  + making changes to committed file
    - can edit file in text editor🡪 git status will show file has been modified
      * use git checkout -- filename to discard changes
  + Branches
    - Master branch is most recent commit
    - Head is which branch you’re on
    - Create branch: git branch name
    - Move to branch: git checkout name
    - Note: if you get into vi editor :q! (to get out of editor)
    - If you need to go back to a prior point in time, create a new branch
      * Git checkout -b branchname
  + Merging branches
    - Git merge development (merges specified branch to branch you’re on)
      * undo merge
        + git reset --hard HEAD (tried to merge and had lots of problems)
  + Working on server
    - Making