* Cover slides
* Describe mongod and mongo
  + Mongod is the database engine
    - Used to run interactively
    - **MongoS** would run as a service in a prod environment
  + Mongo is the MongoDB shell
    - Interactive JS shell
    - Supports multi-line operations and autocomplete
    - Ways to interact with the mongo shell:
      * Directly in the shell with JS and mongo command
      * Using the load method on a JS file within the shell – can be used like library files as variables and methods are accessible in the shell after the file loads – DEMO RecipeLibrary.JS
      * Evaluate a JS file from the command line with the mongo command
      * Shell methods are not valid in JS files, but most have equivalent methods that can be executed in script.
* Mongorc.js – resides in the user’s HOME directory. Used to store commonly used functions and/or customize the mongo shell.
* Robomongo – graphical shell, open source software – also can use mongorc.js.
* Collections – documents stored in the BSON format. Can contain nested documents, i.e. joins on tables.
* CRUD – write operations – MongoDB write operations are atomic for only a single document (but include embedded documents), operations can interleave if updating multiple documents. You are able to perform two phase commits by rolling your own code.
  + DEMO BasicWriteOperation.JS
  + Describe \_id field and BSON ObjectID – 12 byte BSON type used to guarantee uniqueness
  + Insert – adds a document
  + Save – updates a document if \_id is specified, otherwise create a document
  + Update – updates multiple documents (w/multi:true) via a query document, upsert inserts documents if no match found
    - $set operator will update specific fields within the document – can update multiple documents this way
    - Without $set, the document is replaced and only one document can be updated
  + Query – find vs findOne vs find w/limit
  + Execute the insert method for 100k rows in RecipeLibrary.JS.
  + Query – AND and OR conditions
  + Query – match exact subdocument
  + Query – match certain fields in subdocument
  + Query – project fields returned – include fields with fieldname: 1 or exclude all but with fieldname: 0. Cannot combine include/exclude except for excluding the \_id field.
  + Query – explain() method to show a query plan
* Indexes - \_id is unique and created by default: single, compound key indexes just like relational DB’s. Multikey indexes for array fields adds an index entry for every value in the array.
* Aggregation – aggregation is achieved through a multi-stage pipeline to aggregate results into a single output.
* .NET/GridFS Demo
  + Mongofiles used in the Mongo shell
  + Show MongoDB Nuget package.
  + GridFS used for storing documents over 16MB in size.
  + Two tables, fs.chunks (255k chunk) and fs.files (stores metadata)
  + Chunks can be pulled out of the db in such a way to create video or audio snippets.