Lecture Monday 30th September  
  
Overview of Database Technology  
  
Databases – established technology used for managing large amounts of data; an organised collection of data.  
  
Database Management System (DBMS) – software to enable user to create and maintain databases.  
  
Relational Database (RDBMS) – organises data into tables.  
  
Simple Text-based databases: names of columns, and the data is text.  
Structured text-based databases: names of columns, types, and lengths and data as text of the same type.  
  
Advantages:  
- Simple to read  
  
Disadvantages:  
- Hard to search  
  
File system databases:  
- one file – one record

- Filepaths are the dependant records  
  
Pros:  
Data is structured  
simple to implement  
  
Cons:

Hard to get data  
no checks of consistency  
too many files  
  
Hierarchical Databases:  
proposed and implemented by IBM in 1966  
representation:  
 the tree of relations

Relational Databases:   
Structure:  
 Data is in multiple tables  
 Checks for consistency and relations  
 Relations are set through queries  
  
  
Pros:  
Allows all relations  
mathematical model  
  
Cons:  
complex implementation  
hard to represent hierarchical data

Hard to make efficient queries  
  
examples:  
oracle database  
mySQL

NoSQL Databases:  
Proposed around 1998  
Types:  
Document Database (Json, XML)  
Key-value storage  
Graph database  
 graph of objects  
 data in nodes and on edges

Wide column store  
 format can change depending on a row  
  
Pros:  
Big choice depending on the problem  
flexible  
fast  
  
Cons:  
Most things are in code  
No optimiser  
  
Client/server architecture  
  
Client Tier:  
Handles user interface display and submits requests to the processing tier.  
  
Processing Tier:

Handles interaction between the client and the data storage tier.  
  
  
Data Storage Tier:  
Stores data in a database and returns requests presented by the processing tier.  
  
The processing tier and data storage tier can be the same computer.  
  
Inside RDBMS:  
Program -> Driver -> Network Driver -> Query Parser -> Query Planning -> Query Runner -> Storage  
  
Why are RDBMS widely used?  
- Organisation  
- Extensible  
- Security