

Query Languages for Data

- Declarative query language
 - Specify the pattern of the data you want, not how to achieve the goal
 - Query optimizer chooses indexes, join methods for execution
 - Decouple the user queries from the details of execution
 - SQL, XPath
- Imperative code
 - Tell the computer to perform certain operations in a certain order
 - Map-Reduce programming model

Graph-like Data Models

A better solution to many-to-many relationships

- Graph : vertices + edges
 - schema-less, Eg. social graphs, the web graph, road/rail networks etc.
- Property graph model
 - two relational tables: one for vertices and one for edges
 - good for evolvability
 - query language
 - Cypher query language - declarative, created for Neo4J
 - SQL:1999 - recursive common table expressions (the WITH RECURSIVE syntax); very clumsy
- Trip-store model
 - a record is in the form: (subject, predicate, object)
 - semantic web, RDF (Resource Description Framework)
 - the SPARQL query language
- Catalog: the foundation of query languages