

GEOG 413/613

LECTURE 5

1

Editing and Data Maintenance

- A general-purpose geographic database will require tools for
 - geometry and attribute editing
 - database maintenance
 - creating and updating indexes and topology,
 - importing and exporting data
 - georeferencing objects

2

2

Editing and Data Maintenance

- Access to the database must be carefully managed to ensure continued security and quality.
- Edits must be stored persistently in the database
- The mechanism for managing edits to a database is called a transaction
- Editing for multiple users will require
 - concurrent read, write and query access
 - avoid database corruption from multiple concurrent edits

3

3

Transactions

- A transaction is a group of changes that are made to a database as a coherent group. All the changes that form part of a transaction are either committed, or the database is rolled back to its initial state.
- Many databases are multiuser and transactional
 - they have multiple users performing update operations at the same time

4

4

Transactions

- Many databases have short transactions (less than 0.01 seconds) e.g. editing bank records
 - Multiuser editing is handled by locking (preventing access to) affected database records during the course of the transaction
- Geospatial databases have long transaction times
 - locking a database for a long transaction is impractical
 - If system failure occurs during a long transaction, work may be lost unless there is a procedure for storing updates in the database

5

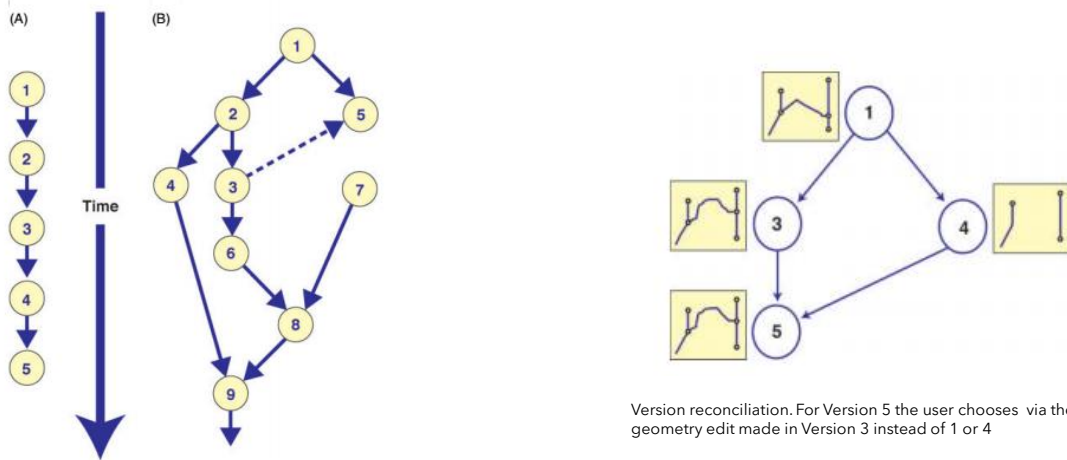
5

Versioning

- Versioning allows multiple users to update a database at the same time
 - Assumes that conflicts from concurrent edits are very unlikely to occur and can be used to resolve them

6

6



Database transactions: (A) linear short transactions; (B) branching version tree.

Source: Longley, Goodchild, et al Geographic Information Science and Systems. Wiley

7

7

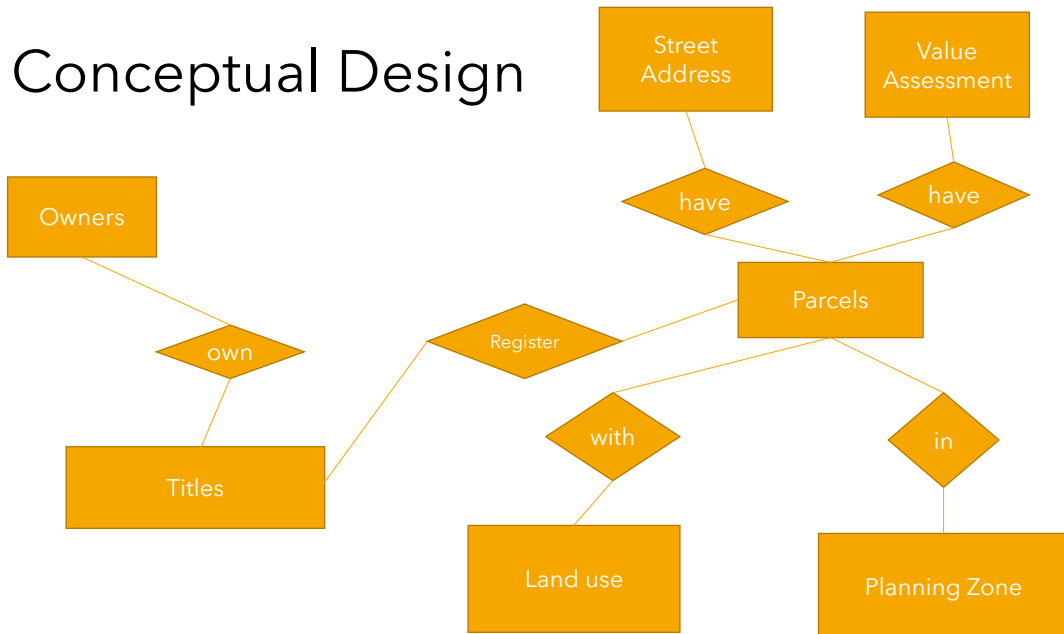
In Class Exercise

- Database Design Exercise
- Consider a contrived case of a database cadastral parcel information
 - Needed by city planners
 - Needed by taxation authorities
 - Needed by public for records search

8

8

Conceptual Design



9

9

Conceptual Design

10

10

Logical Design

11

11

Implementation

12

12