

## Conceptual modelling of real estates for the purposes of mass appraisal

Ewa Dębińska, Piotr Cichociński  
AGH University of Science and Technology  
Department of Land Information  
Kraków, Poland

## Mass appraisal in Poland

- legislative works are taking place on elaboration of detailed regulations concerning mass appraisal
- necessity of valuation of several million properties
- comparative approach
- need for the information about real estates similar to appraised

## Characteristic attributes that influence the cadastral value (1)

- location
- intended purpose specified in the local spatial development plan or, in the case of lack of this plan, the manner of using
- level of outfitting with technical infrastructure equipment
- state of development
- the soil-based land classification, if specified in the land and buildings cadastre

## Characteristic attributes that influence the cadastral value (2)

- area
- location (the zone)
- geometrical conditions (the shape, the form of the ground)
- surroundings (neighbourhood)
- communication accessibility
- popularity of given location

## Main information sources

- land and buildings cadastre
- land and mortgage registers
- local spatial development plans
- basic maps
- spatial registration of utility infrastructure
- registers of building permits
- builder's records
- resources of the Central Statistical Office

## The problem – data availability

- data sources – distracted and managed by different institutions
  - land and buildings cadastre – districts
  - local spatial development plans – communes
  - topographical database – provinces
- data ≠ attributes
  - real estate spatial attributes
  - relationships to other objects

## The solution – geodatabase

- all attributes of objects (including position and shape) are recorded in a table of relational or object-relational database
- allows the application of relational databases design methods also for geographic information

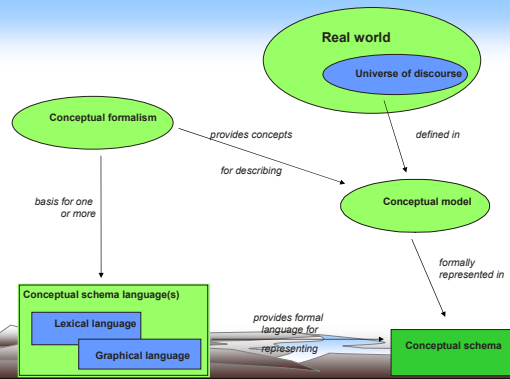
## Three stages of database design

- construction of conceptual data model (acquisition of information about objects, relationships and attributes)
- creation of logical model of a database (transformation of a conceptual data model into logical database structure)
- physical implementation of a logical data model

## Conceptual modelling

- definition of objects of interest (e.g. streets, parcels, buildings, owners)
- identification of relationships among objects (e.g. “located on”, “owned by”, “is a part of”)
- may exist only in the minds of people and be communicated verbally and often imprecisely
- may also be written down using conceptual schema language and stored for wider dissemination

## From real world to conceptual schema



## Unified Modelling Language (UML)

- language for specifying, visualizing, constructing, and documenting the elements of software systems, as well as for business modelling and other non-software systems
- set of readable symbols and signatures, which can be understood even by persons with the minimum knowledge of computer science
- approved as the standard language for object-oriented methods

## Basic definitions

- Object – concrete entity which can be univocally identified and compared to the real or material entity.
- Class – the group of objects which have identical set of attributes, operations and methods.
- Inheritance, generalization – the relationship between object classes describing the transfer of characteristics (attribute definitions, methods) from the superclass to its subclasses.
- Association – the kind of relationship between classes projecting the existing relationship between appropriate entities in analyzed objective domain.
- Aggregation – the relationship between object classes modelling proportion of the whole to its part.

