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The cadastral geodatabase modelling in Poland, applying Computer Aided Software Engineering tools

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Systems for real estates data collection in Poland:

There are two systems for real estates data collecting in Poland. They are:

- The Land Register (Księgi Wieczyste)
- The Ground (and Building) Cadastre (Ewidencja gruntów i budynków - kataster)

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The prices' and values' register for real estates (RCiWN)

- The prices' and values' register for real estates (RCiWN) is the part of ground and building cadastre managed by local (county) authorities.
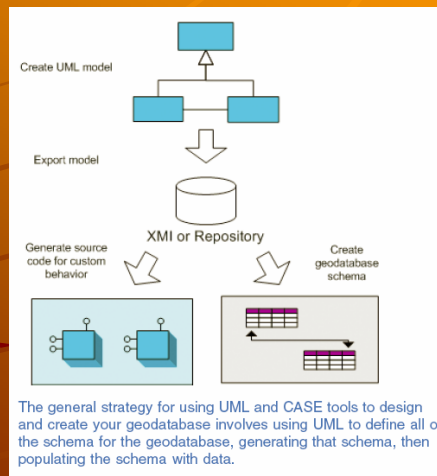
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The prices' and values' register contents

The following data are being recorded in the prices' and values' register:

- Real estate's price and/or value,
- Real estate's address,
- Numbers of parcels being estate's components,
- Estate's type,
- Estate's area,
- The date of authenticated deed signing or the date of real estate valuation,
- Other data concerning real estates.

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The schema of geodatabase creating, applying CASE tools (Perencsik, 2004)

Create UML model

Export model

XMI or Repository

Generate source code for custom behavior

Create geodatabase schema

The general strategy for using UML and CASE tools to design and create your geodatabase involves using UML to define all of the schema for the geodatabase, generating that schema, then populating the schema with data.

The modelling procedure

The modelling procedure consists of three stages:

+ The register's database schema in UML notation building (Visio 2003 and *ArcInfo UML model* template)

+ The UML model export into XML/XMI format, including model check (Visio 2003 and *ESRI XMI Export* add-on)

+ The database automatic creation (ArcCatalog)

UML

UML (Unified Modelling Language) is a graphic modelling language enabling real world's object-oriented visualisation and documentation.

UML is used for different systems' description in various aspects of human activities, for example for database designing.
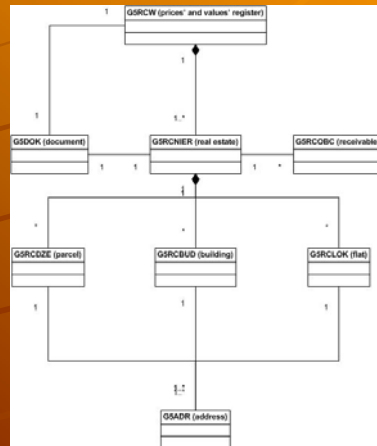
The prices' and values' register database in UML notation

Creating the prices' and values' register general model, according to instruction G-5

Adding attributes to objects, to create detailed model,

Creating domains (*CodedValueDomain*),

Defining objects corresponding to ArcGIS rules.

The prices' and values' register objects and relationships among them according to the technical instruction G-5

The example of object – land parcel (G5RCDZE), including its attributes

Domena_UZG domain (defining land use)

«CodedValueDomain»**Domena_UZG**

+FieldType : esriFieldType = esriFieldTypeInteger
+MergePolicy : esriMergePolicyType = esriMPTDefaultValue
+SplitPolicy : esriSplitPolicyType = esriSPTDefaultValue
+grunty orne - R : esriFieldTypeInteger = 1
+sady - s : esriFieldTypeInteger = 2
+łaki trwałe - Ł : esriFieldTypeInteger = 3
+pastwiska trwałe - Ps : esriFieldTypeInteger = 4
+grunty rolne zab. - B-R, B-Ł, B-Ps : esriFieldTypeInteger = 5
+grunty pod stawami - Wśr : esriFieldTypeInteger = 6
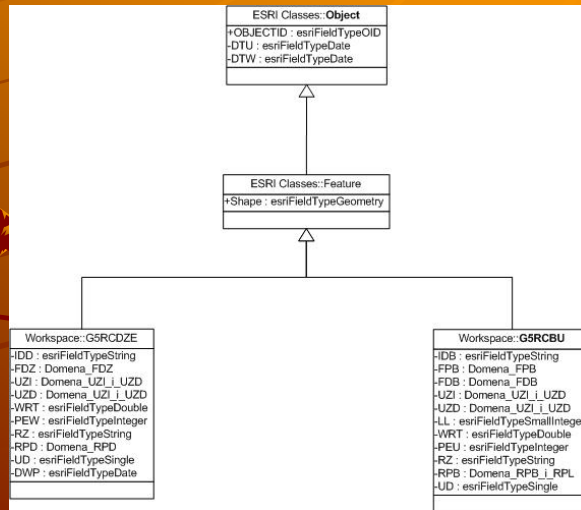+rowy - W : esriFieldTypeInteger = 7

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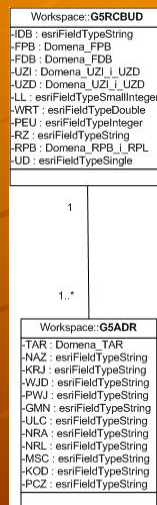## The modelling of nonspatial object - flat (G5RCLOK)

ESRI Classes::Object

+OBJECTID : esriFieldTypeOID
-DTU : esriFieldTypeDate
-DTW : esriFieldTypeDate

Workspace::**G5RCLOK**

-IDL : esriFieldTypeString
-FPL : Domena_FPL
-FDL : Domena_FDL
-UZI : Domena_UZI_i_UZD
-UZD : Domena_UZI_i_UZD
-KON : esriFieldTypeSingle
-LIZ : esriFieldTypeSmallInteger
-WRT : esriFieldTypeDouble
-PEU : esriFieldTypeDouble
-PPP : esriFieldTypeDouble
-LPP : esriFieldTypeSmallInteger
-RPP : Domena_RPP
-RPL : Domena_RPB_i_RPL
-UD : esriFieldTypeSingle

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The objects of spatial reference modelling (parcel and building)

Link between address (G5RCADR) and building (G5RCBUD)

The prices' and values' register database export into XMI/XML format

- The database of prices' and values' register UML model verification with *SemanticsChecker* macro, that checks correspondence to ArcInfo UML model,
- UML model export into XMI/XML format (using *ESRI XMI Export* Add-On)

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The data import into ArcGIS

- Empty database creation with ArcCatalog
- The XMI file of prices' and values' register UML model import with *Schema Wizard* tool application (ArcCatalog)

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Three important „structures" imported into ArcGis

Three important „structures" imported into ArcGis are:

- The objects of feature class (having spatial reference) - parcel (*G5RCDZE*) and building (*G5RCBUD*)
- The objects of object class (nonspatial objects) – for example flat (*G5RCLOK*), address (*G5RCADR*) or document (*G5RCDOK*)
- Links - for example *Binary Association* between address (*G5RCADR*) and parcel (*G5RCDZE*) or *Generalization* linking parcel (*G5RCDZE*), building (*G5RCBUD*) and flat (*G5RCLOK*) objects into ArcInfo objects (Feature Class or Object Class)

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Comments

- The prices' and values' register schema described in [Instruction, 2003] may be easily drawn with Unified Modelling Language, but it does not automatically correspond with ArcInfo UML model
- For building such a corresponding model, it is necessary to define object class, feature class and relationships,
- To obtain complete prices' and values' register model, all of it objects and relationships should be taken into account,
- If we don't do it, we will obtain correct but not complete geodatabase for prices' and values' register for real estates.

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