Practical Classes 1 and 2:

XML, DTD: Exercises

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Exercise 1

- Create an XML document with the following sample real estate data

  - Root element *real-estate* will contain a sequence of sub-elements *agencies*, *owners*, *properties* and *flats*, all with an empty content

  - Ensure well-formedness

Exercise 2

- Create an internal DTD for the previous XML document
    - Ensure its validity
    - Then try to break it

Exercise 3

- Move the previous DTD to an external file and validate the XML document again

Exercise 4

- Extend the previous DTD such that…
  - Elements *agencies*, *owners*, *properties* and *flats* can now contain particular *agency*, *owner*, *property* and *flat* elements respectively
    - Agency = name, e-mail, phone
    - Owner = name
    - Property = name, description, number of flats, features, owner reference
    - Flat = name, description, features, property reference
  - Use attributes for references, otherwise elements
  - Use only CDATA and #PCDATA for content and values

- Extend the XML document such that it contains 1 sample agency, 1 owner, 1 property, and 2 flats
  - Ensure well-formedness and validity

Exercise 5

- Modify both the DTD and XML:

  - Description of properties...

    – may now contain a text with references to flats

    – E.g.: *...<flatReference flatName="A1001">...</flatReference>...*

  - Description of flats...

    – now contains a structured description with an arbitrary, but still well-formed XML fragment

Exercise 6

- Extend both the DTD and XML:

  - Agencies, owners and properties must now have right one *address* (directly after their *name*)

  - Each address consists of:
    - Street and number
    - Postal code
    - State
    - Country

  - Respect the order, but note also that country is optional and when missing, postal code must be placed at the end (i.e. after state and not before)

Exercise 7

- Modify both the DTD and XML:

  - Address, e-mail and phone records of agencies may now be specified in an arbitrary order

  - Ensure that there are at least *2* flats

  - If *features* (of properties and flats) are specified, then at least *2* and at most *5* of them are provided

Exercise 8

- Extend both the DTD and XML:
  - Flats can now be associated with internal records
  - Each record contains…
    - Date and additional textual information, or
    - sequence of at lest one nested record

Exercise 9

- Modify and extend both the DTD and XML:
    - Add language attribute to the root element
        - The value needs to be fixed to *EN*
    - Add comfort level attribute to flats
        - Only *A*, *B*, *C*, *D*, *E* or *F* values are allowed
        - *F* is the default value
    - References to owners of properties are now optional

Exercise 10

- Modify and extend both the DTD and XML:
  - Add attributes with unique artificial identifiers to owners, properties and flats
    - E.g. *o1, o2* in case of owners etc.
  - Transform all the existing references from names to these new identifiers
  - Use *ID* and *IDREF* data types
- Try to violate the referential integrity

Exercise 11

- Extend both the DTD and XML:

  - Insert the following fragment into a *description* of a selected *flat* in a way that it is not interpreted as XML

    - *Button*

    - Use entities

  - Declare a new parsed entity for the superscript of *2* and use it as well

    - Unicode *U+00B2* (178)

Exercise 12

- Extend the XML document:
  - Insert the following fragment into a description of one of the flats using a *CDATA* section:
    - *Button*
  - Generate a date of one of the flat records using a PHP processing instruction:
    - *echo date("Y-m-d");*
  - Add comments to visually separate individual parts of the document

Exercise 13

- Modify the DTD schema:
  - Using parameter entities and conditional sections, declare 2 modes for the content of owners:
    - Verbose
      - Everything
    - Standard
      - Everything except the description
  - Activate the standard mode and adjust the XML document appropriately