The German Specialist Lexicon

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Aims of the Project

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- German Specialist Lexicon similar to the UMLS „Specialist Lexicon“
- Lexical data model covering the German biomedical terminology
- „good“ lexical coverage focusing the clinical sublanguage
- Mappings between spelling variants, synonyms and abbreviations
- Software toolkit for lexicon querying and manipulation similar to the LVG functions

German biomedical language "Specialties"

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- Numerous inflection forms
  - nouns, adjectives, verbs depending on
    - gender
    - inflection classes
    - word order
    - syntactic context
- Spelling variants
  - Karzinom, Carcinom
- German/Greek/Latin synonyms
  - Nieren-, Nephr-, Ren-
- Homonyms
- Latin phrases with complete Latin inflection
  - Ulcus duodeni
- nominal compounds
  - Duodenalulkus

Suppositions of the Project

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- Modelling structure and functions of the „Specialist Lexicon (UMLS)“ as close as possible
- Data storage in XML and in SQL
- JAVA-Programming

General Architecture

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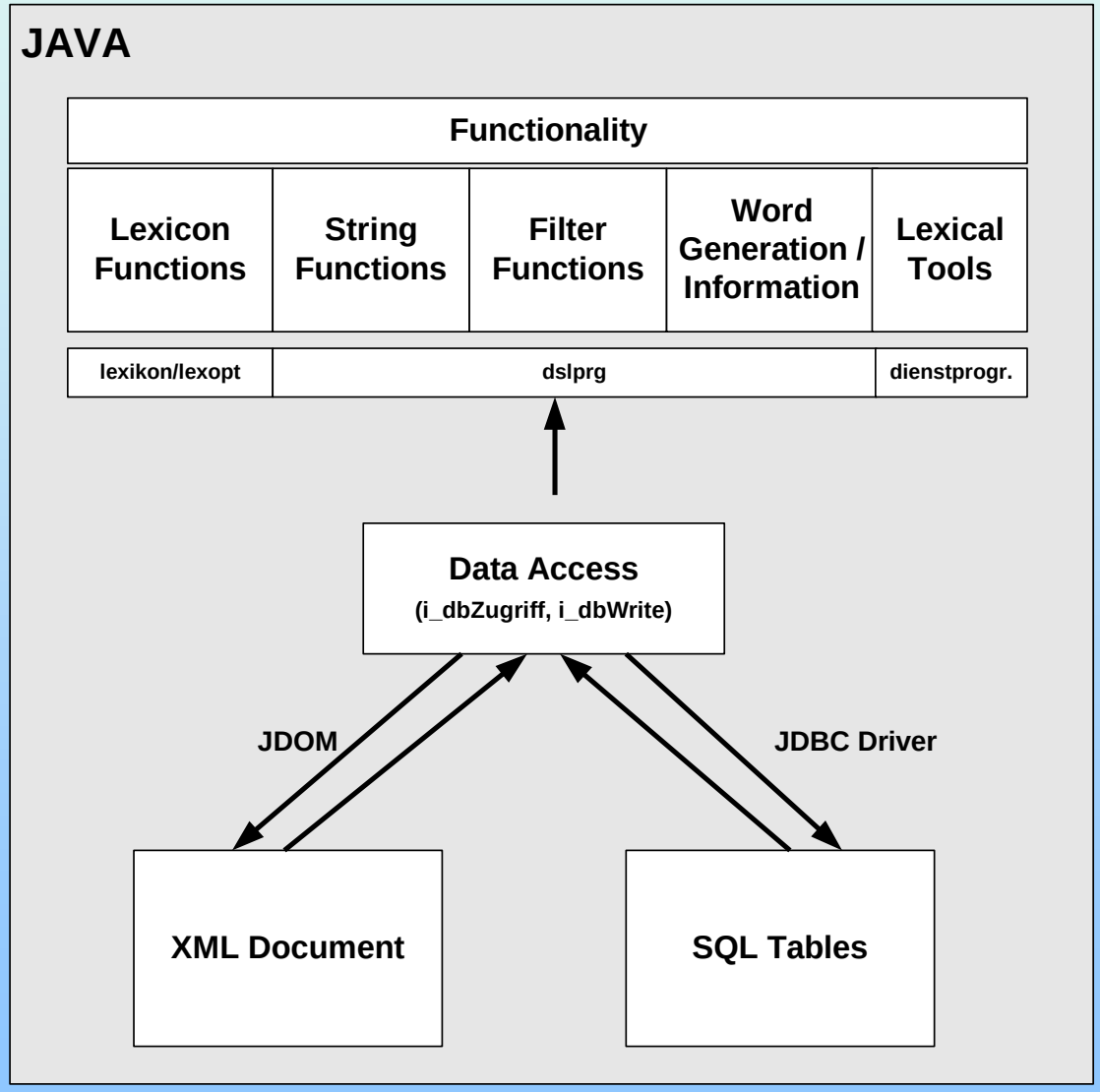

XML Data Structure

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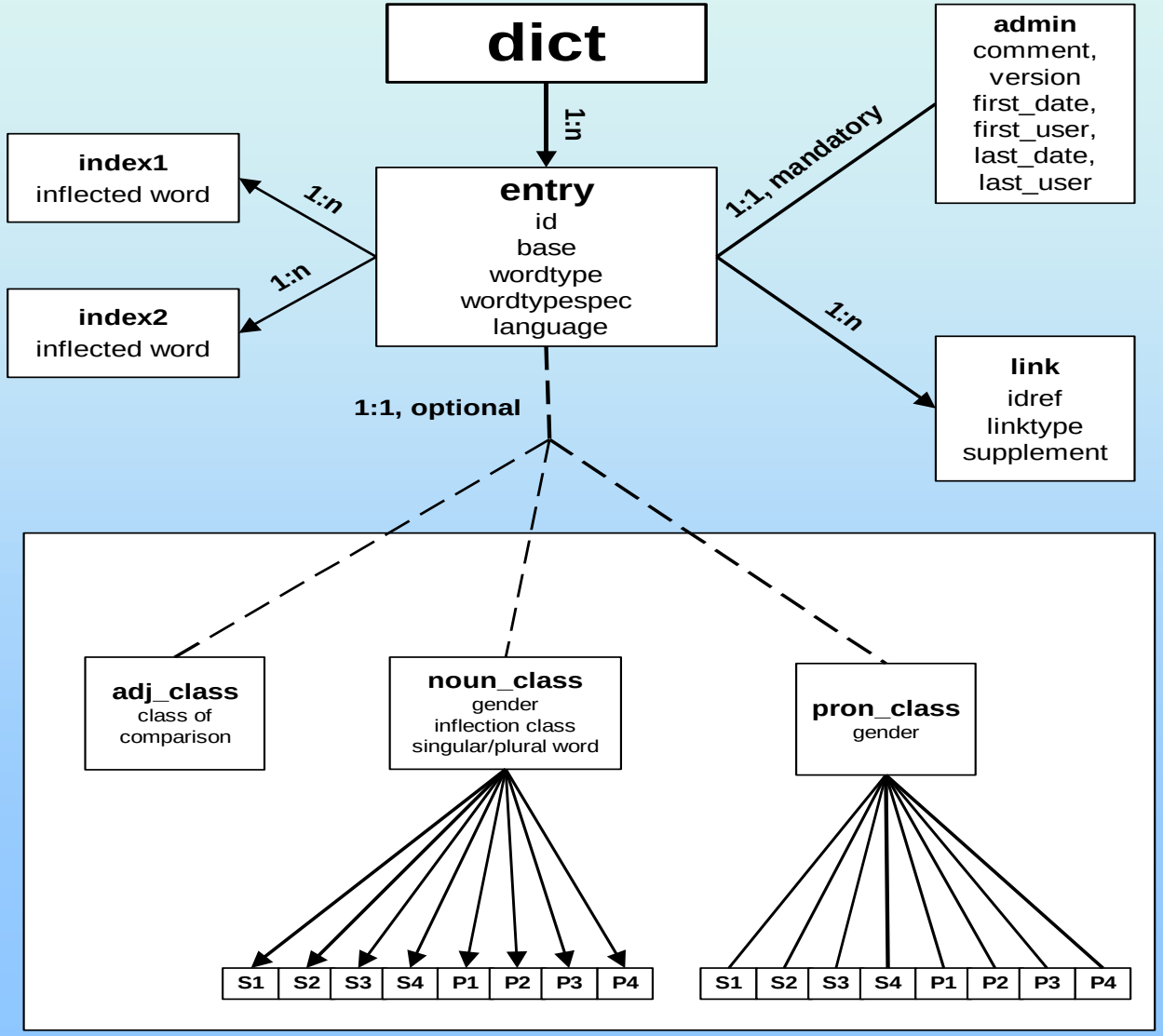

XML Document Type Definition (DTD)


```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<!ELEMENT dict (e+)>

<!ELEMENT e (cont,(noun_class|pron_class|adj_class),link*)>
<!ATTLIST e id ID #REQUIRED
        language (d|lat|engl|gr|lu) #REQUIRED
                wordtype CDATA #REQUIRED
                wordtypespec CDATA #REQUIRED
        version  CDATA #REQUIRED
        sg_pl (true|false|null) #IMPLIED
                casus_prep CDATA #IMPLIED
                ambig (true|false) #REQUIRED>


<!ELEMENT cont (#PCDATA)>

<!ELEMENT noun_class (exception*)>
<!ATTLIST noun_class            gen (m|f|n|u) #REQUIRED
                                nclass  CDATA #REQUIRED>

<!ELEMENT pron_class (exception*)>
<!ATTLIST pron_class            gen (m|f|n|u) #REQUIRED>

<!ELEMENT exception EMPTY>
<!ATTLIST exception             numerus (Sg|Pl) #REQUIRED
                                casus  (Nom|Dat|Gen|Akk) #REQUIRED
                                                word  CDATA #REQUIRED>


<!ELEMENT adj_class EMPTY>
<!ATTLIST adj_class             aclass CDATA #IMPLIED
                                                position (rel|abs|colour) #IMPLIED>



<!ELEMENT link EMPTY>
<!ATTLIST link                                  idref IDREF #IMPLIED
                                                linktype CDATA #REQUIRED
                                                constitutive CDATA #REQUIRED
                                                idstring CDATA #REQUIRED>
```

(Abstract) Classes	Wordtype (Part of Speech)	Wordtype Specification
Noun-Class	Noun	Noun
		Proper Name
		Acronym
		Numeral
		Adjective
		Abbreviation
		Phrase
Adj-Class	Adjective	Adjective
		Abbreviation
		Participle
		Numeral
		Proper Name
		Comparative
		Superlative
Pron-Class	Determiner	Defined Determiner
		Undefined. Determiner
	Pronoun	Reflexive Pronoun
		Relative Pronoun
		Possessive Pr. etc.
Verb	Verb	Verb
Non-Inflected	Preposition	Preposition
		Abbreviation
	Conjunction	Conjunction
		Abbreviation
	Adverb	Adverb
		Abbreviation
		Phrase
	Symbol	Arithmetic operator
		Arabic digit
		Roman digit etc.

SQL Table Structure

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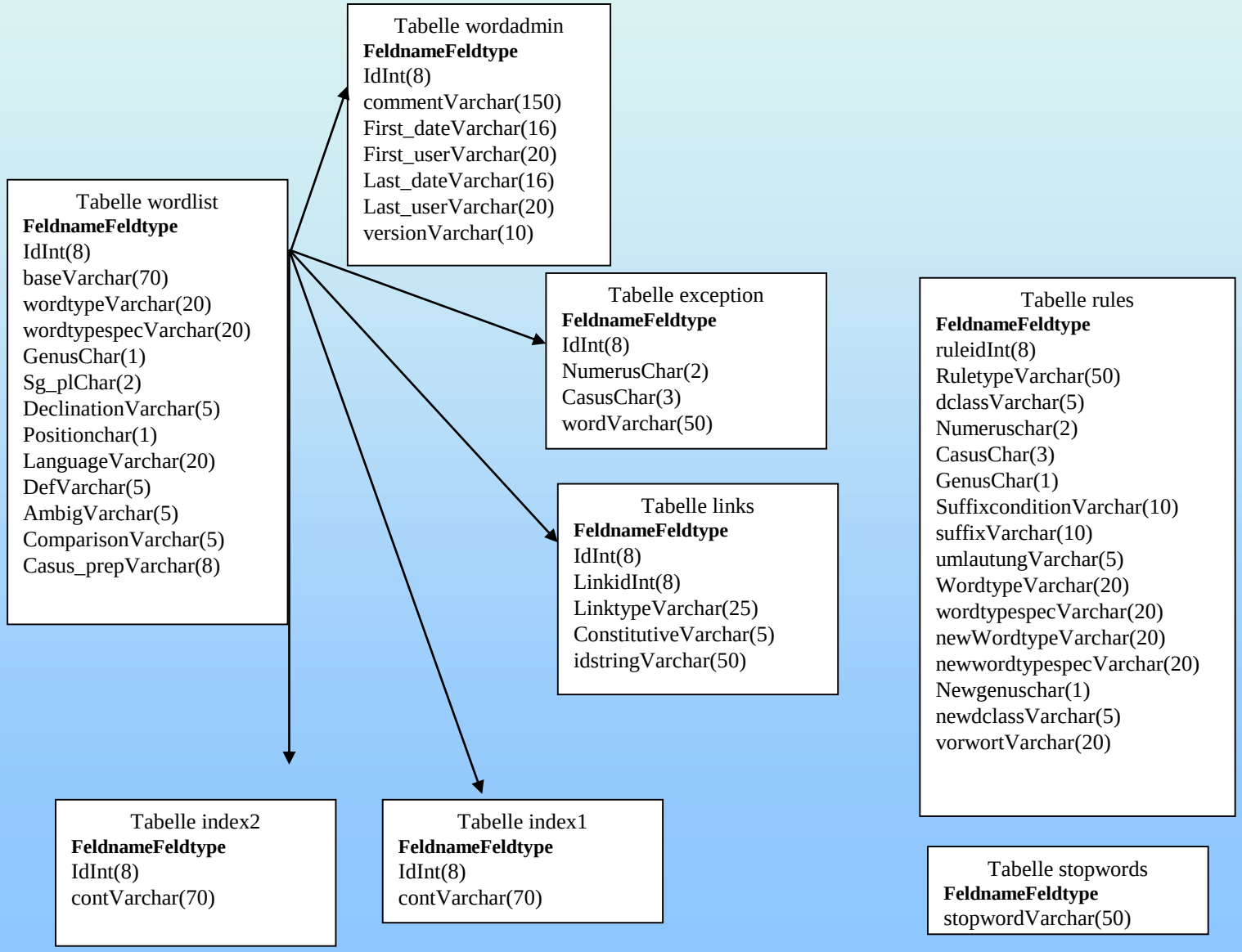

DSL Functions

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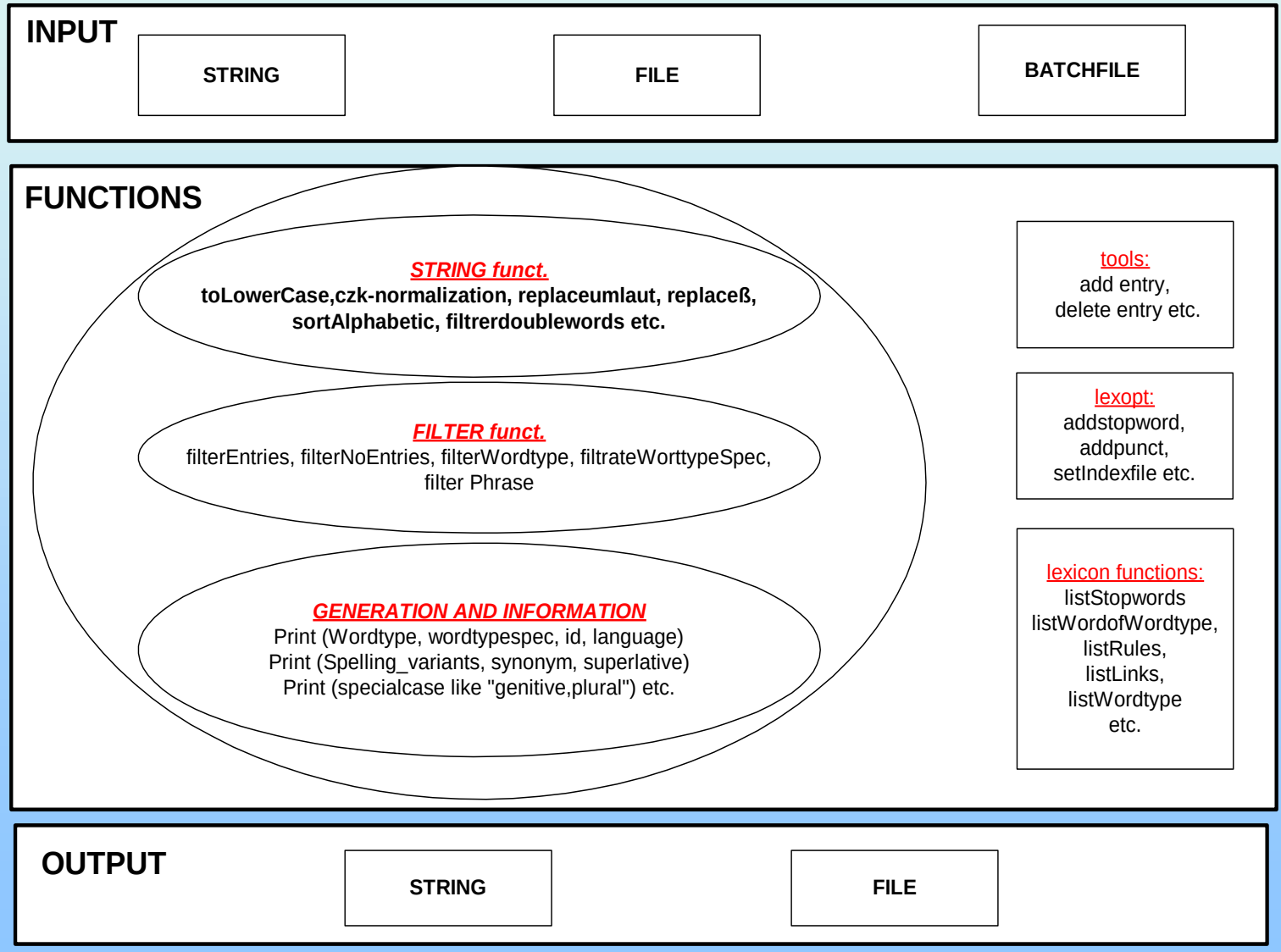

Input - Output

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dsl **-in** eine große absolute Arrhythmie **-out** e 0 1

eine|eine|32677
eine|eine|32758
eine|ein|33028
große|groß|25851
absolute|absolut|25390
Arrhythmie|Arrhythmie|864

dsl **–konfig** ktest.txt

Batch

dsl **-infile** test.txt **-out text**

dieser Satz abbilden drei aktive Stadien mit weil seine gebildeten Addison AHB A

dsl –in Haus -out 0 1 **–outfile** output.txt

Piping

Functions

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```
dsl -in eine große absolute Arrhythmie -fct 0 1 -out e 0 1

eine|eine|32677
eine|eine|32758
eine|ein|33028
grosse|groß|25851
absolute|absolut|25390
arrhythmie|Arrhythmie|864
```

-fct

0 = lowerCase

1 = replaceß

```
dsl -in eine große absolute Arrhythmie -fct 14 -out 0 1

eine|32677
eine|32758
ein|33028
groß|25851
absolute Arrhythmie|32952
```

-fct

14 = filterPhrase

```
dsl -in eine große absolute Arrhythmie -fct 12(adj|noun) -out 0 1

groß|25851
absolut|25390
Arrhythmie|864
```

-fct

12 = getWordtype

Functions

dsl -lexfct 6

functionname / id for function

---

lowercase / 0
replaceß / 1
replaceumlaut / 2
czkNorm / 3
filtercomments / 4
filterdiacret / 5
filterpunctuation / 6
filterspecchar / 7
sortalphabetic / 8
convertCharEnc / 81
inUnicode / 82
filterDoublewords / 9
getEntries / 10
getNoEntries / 11
getWordtype / 12
getWordtypespec / 13
filterPhrase / 14
filterStopwords / 15
filterWordtype / 16
filterWordtypespec / 17

Output-Parameter

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```
dsl -infile test.txt -out text

dieser Satz abbilden drei aktive Stadien mit weil seine gebildeten Addison AHB A
```

complete text

```
dsl -in eine große absolute Arrhythmie -out e 0 1

eine|eine|32677
eine|eine|32758
eine|ein|33028
große|groß|25851
absolute|absolut|25390
Arrhythmie|Arrhythmie|864
```

one line for each id

```
dsl -infile test.txt -outln e4 e2 e7 e12

drei|Satz|mit|AHB
```

one line for each input line

```
dsl -infile test.txt -outln e4.1 e2.38 e7 e12.46

33036|Sätze|mit|Anschlussheilbehandlung/8451
```

one line for each input line with desired parameters

Output-Parameter

dsl -lexfct 5

Outputname / Id for output
---
baseform / 0
id / 1
language / 2
version / 3
ambig / 4
first_date / 5
first_user / 6
last_date / 7
last_user / 8
comment / 9
worttype / 10
worttypespec / 11
dclass / 12
aclass / 13
genus / 14
cas / 15
Sg/Pl / 16
S1 / 31
S2 / 32
S3 / 33
S4 / 34
P1 / 35
P2 / 36
P3 / 37
P4 / 38
comparative / 39
superlative / 40
spellingvariant / 41
synonym / 42
participlepresent / 43
participleperfect / 44
shortform / 45
longform / 46
parts / 47
adjective / 48
generatedwords / 49
inflectinginformation / 50
baseform / 51
linksfrom / 52
linksto / 53
allinks / 54

Lexicon Functions

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dsl -lexfct 7

lexicalfunctionname / id
---
listLinks / 1
listWordtype / 2
listWordtypespec / 3
listRules / 4
listOutputfields / 5
listDSLfunction / 6
listLexfct / 7
listeDSLOpt / 8
listtools / 9
listpunctuation / 10
listHybrid / 11
listspecsign / 12
listcommentchar / 13
listspecchar / 14
listSeparator / 15
listPipechar / 16
ListCharacterset / 17
listSCreplacement / 18
listDiacret / 19
listHybridopt / 20
listDB / 21
listDBwrite / 22
listIndexfile / 23
listminimumlength / 24
listVersion / 25
listStopwords / 26
listambigwords / 30
listwordsstartswith / 31
listwordendswith / 32
listwordsOFwordtype / 33
listwordsOFwordtypespec / 34

DSL - Tools

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dsl -lexfct 9

tools
---
add index1
add index2
modify index
add entry
delete entry
modify entry
delete rule
add rule
delete exception
add exception
modify exception
add link
delete link
add stopword
delete stopword

xmlsql admin
xmlsql entry
xmlsql exception
xmlsql link
xmlsql rules
xmlsql stopwords
switchDB (1 = SQL, 2 = XML)
switchDBWrite
switchIndex

Options

dsl -lexfct 8
optionname / Information
---
addspecsign / ErgänzeSonderzeichen z.B. $
delspecsign / LöscheSonderzeichen
adddia / ErgänzeDiakretikum
deldia / LöscheDiakretikum
addpunct / ErgänzeInterpunktion
delpunct / LöscheInterpunktion
addhyb / ErgänzeZwitter
delhyb / LöscheZwitter
addstopword / ErgänzeStopword
delstopword / LöscheStopword
addcomm / ErgänzeKommentar
delcomm / LöscheKommentar
addspecchar / ErgänzeSonderbuchstabe z.B. â
delspecchar / LöscheSonderbuchstabe
setIndexfile / SetzeAktuelleIndexdatei (1 = Standard, 2 = erweiterte Indexdatei)
setPipechar / SetzePipezeichen
setSCreplacement / Sonderzeichen werden ersatzlos gestrichen True/False
setSeparator / Setze Worttrennzeichen
setHybridropt / 0 wird belassen, 1 wird ersatzlos ersetzt, 2 wird mit Blanc ersetzt

Summary

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Results

- 30.000 entries
  - most of them nouns and adjectives
  - determiners, pronouns, adverbs, conjugations, prepositions and numbers
  - infinitives of verbs as base for participles
  - taken from the ICD-10 tabular list and alphabetical index
- Lexical functions like LVG
  - command line interface
- Available from DIMDI for scientific research, no costs

Missing:

- Functions for decomposition of compound nouns
- Verbs and conjugation …
- An user friendly graphical interface
- Connection to UMLS