AGILE
Automatic Generation of Instructions in Languages of Eastern Europe

Title  
Lexical-morphological specifications and resources for the initial demonstrator

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Abstract:

This document contains results of seven partial tasks: LSPEC1 (specification of a lexical entry), MORP1-Bu, MORP1-Cz and MORP1-Ru (description of morphological resources for Bulgarian, Czech and Russian, respectively), and LEXN1-Bu, LEXN1-Cz and LEXN1-Ru (description of lexical entries used in the first stage of the AGILE project). In the part describing the (ideal) lexical entry (LSPEC1), the theoretical basis for handling the free word order and the consequences for the lexicon are sketched. In the next section, a stock-taking of available morphological resources for the three languages is done and in the next section the current state of the lexicons of the single languages is described.

More information on AGILE is available on the project web page and from the project coordinators:

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1. Introduction

The AGILE project involving three Slavonic languages (Bulgarian, Czech and Russian) is to develop a suite of software tools to assist technical writers in the production of software manuals. It is a continuation of DRAFTER project developed for English and French. As the three new languages are typologically different from the previous ones, the research can bring interesting results.

Work Package 4 is devoted to building lexical and morphological resources as a component part of the Initial Demonstrator, and to specifying the requirements on lexical and morphological resources for the final prototype in the three languages for the chosen domain. However, typological differences between the original languages and those addressed in the present project (concerning, for example, morphology and the freeer word order) will necessitate substantial modifications in the form and the contents of lexical entries.

This task has three main objectives. First, it delivers a full specification of the kinds of information to be included in a lexical entry, of the form of such an entry and its linkage to the upper model. Second, it aims to specify morphological components for Bulgarian, Czech and Russian, either by defining new modules or by defining an interface between an existing morphological module and the format required by the sentence generator. Third, it defines lexicons for Bulgarian, Czech and Russian covering the chosen domain of the Initial Demonstrator.

2. LSPEC1—Description of a lexical entry

Every entry contains information from different levels of sentence description. It describes the morphological properties of the word, syntactic information, which is for example valence frame of a verb (and possibly also of an adjective or noun), information about the case required by a preposition, type of a pronoun, or numeral, etc.

One of the main differences between English and Slavonic languages is the free word order in the latter ones. It was decided to exploit the Praguian theory for handling the topic-focus articulation: it is based on the so called “systemic ordering”, which describes the order of the main verb, participants and adverbials in an unmarked sentence for a particular language (see [Sgall et al (1986)]). In sentences with non-empty topic, the surface word order can differ from the systemic ordering. For every language, a set of rules can be found that describe the change of word order in the surface structure (see [Hajičová et al. (1995)]).

To make use of the theory we have to be able to do the mapping between participants in the underlying structure and subject, objects and complements in the surface structure. This sort of information must be contained in the lexicon—see the section 0 for more detailed description. Thus, the lexical entry in the AGILE project will differ from lexical entries of DRAFTER, although in the first stage only few changes were made.

1.1 Linkage to upper model

In the first stage of the project the LOOM knowledge representation language was used, in which the linkage to upper model was defined. Every concept is connected with the lexicon either by specifying the lexical item directly, or by listing of desired features of the lexical
entry assigned to the concept. We can see examples of the linkage on the following examples:

\begin{penman}
\annotateconcept{PROPERTY-ASRIPTION}
  \lexitems{
    \be
  }
\annotateconcept{PROCESS}
  \lexfeatures{
    \nominalization
  }
\end{penman}

In the first example, the copula ‘be’ is assigned to concept of PROPERTY-ASRIPTION, in the second example it is required that the concept PROCESS is expressed by means of nominalization. The variable :lex-item points to a lemma in the lexicon, while the variable :lex-features points to a list of features characterizing every lemma. The two methods of linking the lexicon with the upper model can be combined, as we can see in the next example:

\begin{penman}
\annotateconcept{LIKING}
  \lexfeatures{
    \like
  }
  \lexitems{
    \like\-verb
  }
\end{penman}

In the second stage of the work, LOOM was replaced by CLOS, in which this linkage module is missing. It is necessary to develop this module for every language involved in the project. In the experiments that have been done up to now, the lexical items to be used were listed in every SPL:

\begin{penman}
\example{
  \name{D0-TEXT1-CZ-4}
  \generatedform{"Příkazy jsou snadný."}
  \targetform{"Příkazy jsou snadné."}
  \logicalform{
    \s / PROPERTY-ASRIPTION
    \lex be
    :domain (D1 / object :lex prikaz :number plural)
    :range (R1 / scalable-quality :lex snadny))
  }
  \setname{D0-TEXT1}
}
\end{penman}

In this example, it was necessary to say explicitly that PROPERTY-ASRIPTION is realized by the lexical item BE.

3. **MORP1—Available morphological resources**

As Slavonic languages are inflectionally very rich, it was decided to use external morphology. This means that KPML calls an external function and sends it a lemma or word stem and the desired form as parameters. The function returns a string—the surface realization of the morphological form.
3.1 Bulgarian

3.1.1 Description of morphological resources available for Bulgarian

Several systems for morphological processing have been developed in Bulgaria for the last fifteen years. Most of them were research oriented. The systems listed below are the most suitable for practical use in generation because of their relative completeness and practical orientation.

The system "MORPHO-ASSISTANT" [Simov et al. (1990)], developed in Linguistic Modeling Laboratory-BAS, performs morphological analysis and synthesis. Extensive morphological knowledge is represented as feature structures in Prolog. The system works under DOS. Its dictionary contains 60000 base forms.

The system "TWOL" [Paskaleva (1997)], also developed in the Linguistic Modeling Laboratory-BAS, is based on a finite-state model (Kimmo&Xerox model) for morphological analysis and generation. It is implemented in the programming language C. The system works under DOS and UNIX. Its dictionary contains 30000 base forms.

The system BULMORPH [Totkov et al. (1988), Totkov G., Krushkov Hr., (1996)], developed in the University of Plovdiv, is a morphological processor for Bulgarian which performs morphological analysis and synthesis. Robust analysis for unknown words is available. The system is implemented using Pascal/DELPHI and works under DOS, WINDOWS’ 95/NT. A Dynamic Link Library (DLL) for WINDOWS’ 95/NT is maintained. The dictionary contains 67500 base forms. The processor is distributed by ELDA (European Language Resources Distribution Agency).

3.1.2 Resources chosen for AGILE

The System BULMORPH (University of Plovdiv) is the most appropriate for the project, because Dynamic Link Library (DLL) for WINDOWS’ 95/NT allows an easy interface between different Windows applications. The system generates more than 1,400,000 word forms using the dictionary of the base forms. The size of both system and dictionary is up to 320 KB.

BULMORPH supports 187 different inflectional types classified in lexical categories as follows: 75 for the nouns, 14 for the adjectives, 41 for the pronouns, 11 for the numerals and 42 for the verbs. Every Bulgarian inflecting word can be classified as a member of one of these types. Specific types for proper nouns are added.

3.1.3 State of interfacing to KPML

An interface between BULMORPH and KPML allowing the use of external for KPML DLL has been experimented by Bateman and Krushkov. The experiments were made by use of Harlequin Lisp. The next step is to specify the input for different functions, supported by DLL.

3.1.4 Morphological description of each lexical category appearing in target texts

The morphological features of each lexical category were determined on the basis of the corpus analysis (WP3). Some lexical categories (e.g. pronouns) and morphological features are missing due to the fact that they do not occur in the Initial Demonstrator texts.
**Verbs**
- Basic form
- Aspect (imperfective, perfective)
- Tense (present, simple past, future)
- Number (singular, plural)
- Person (1p. sg, 2p. sg, 3p. sg, 1p. pl, 2p. pl, 3p. pl)
- Voice (active, passive)
- Mood (Indicative, Imperative)

**Nouns**
- Gender (masculine, feminine, neuter)
- Number (singular, plural)
- Article (for masculine - full and short form)

**Adjectives**
- Gender (masculine, feminine, neuter)
- Number (singular, plural)
- Article (for masculine - full and short form)

**Numerative**
- Type (ordinal)
- Gender (masculine, feminine, neuter)
- Number (singular, plural)

### 3.2 Czech

#### 3.2.1 Available resources
For Czech there is a huge morphological lexicon available. It contains ca 200,000 entries from which more than 70 million forms can be generated. The generation includes also the most common regular derivations—it still has to be decided whether we will exploit this capability. This lexicon has been used in several industrial applications, e.g. ASPI—a full-text searching system for lawyers (running under DOS and Windows), in a two-level morphology system developed at Xerox (running under Solaris and Linux), now it is used for tagging the Czech National Corpus (running under Solaris, Linux and Windows).

#### 3.2.2 Short overview of Czech morphology
Czech is a language with rather rich inflection. The grammatical categories are given in Error! Unknown switch argument. and their distribution among the single POSs in Error! Unknown switch argument..
In traditional grammar books, only three genders are listed: masculine, feminine and neuter, and the animateness is another feature occurring only at masculine. In practical applications, however, it is more convenient to work with four genders.

As for the dual number, there are only some vestiges of it in the declension of nouns, but the only case where we have to mark the number as dual because of the adjective-noun agreement is the feminine instrumental: for example the word oko ‘eye’ has regular plural forms oka (with different meaning) and dual forms očí. Though the gender of this word is neuter, the dual forms have the agreement with feminine forms of adjectives and thus they can be understood as feminine plural forms. The only exception is the Instrumental, where the adjective has a special, dual form (see Table 2).

<table>
<thead>
<tr>
<th>Nominative</th>
<th>Neuter plural</th>
<th>Feminine plural</th>
<th>Feminine dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genitive</td>
<td>velká oka</td>
<td>velké očí</td>
<td></td>
</tr>
<tr>
<td>Dative</td>
<td>velkým okům</td>
<td>velkým očím</td>
<td></td>
</tr>
<tr>
<td>Accusative</td>
<td>velká oka</td>
<td>velké očí</td>
<td></td>
</tr>
<tr>
<td>Vocative</td>
<td>velká oka</td>
<td>velké očí</td>
<td></td>
</tr>
<tr>
<td>Locative</td>
<td>velkých okách</td>
<td>velkých očích</td>
<td></td>
</tr>
<tr>
<td>Instrumental</td>
<td>velkými oky</td>
<td></td>
<td>velkýma očima</td>
</tr>
</tbody>
</table>

Table 2: Plural and dual forms of the word oko

The tense of the indicative is present or future, the tense of participles is present or past. We mark even the indicative of perfective verbs as present, though the meaning is future.
The future tense is reserved for verbs of motion that have both present tense and simple future (e.g. jdu—půjdu ‘I go—I will go’, nesu—ponesu ‘I carry—I will carry’), and for the verb být ‘to be’.

**Error! Unknown switch argument.** shows that one word can have many grammatical forms. An adjective, for example, has 342 grammatical forms, but many of them are of course homonymous (e.g. the form jarń has 27 meanings).

<table>
<thead>
<tr>
<th>Noun</th>
<th>Gender</th>
<th>Number</th>
<th>Case</th>
<th>Person</th>
<th>Tense</th>
<th>Degree</th>
<th>Negation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjective</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Pronoun</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Numeral</td>
<td>x</td>
<td>(x)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Finite verb</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Participle</td>
<td>x</td>
<td>(x)</td>
<td>(x)</td>
<td>(x)</td>
<td>(x)</td>
<td>(x)</td>
<td>(x)</td>
</tr>
</tbody>
</table>

Table 3: Distribution of grammatical categories

### 1.1.3 State of interfacing to KPML

Nothing has been done up to now. It has not been decided yet whether we will (at least partly) re-use an existing software or whether we will create a new interface to the lexicon. The two-level morphology system cannot be used, as it only runs in Unix. Most probably we will use flex and C procedures that are used for tagging the corpus and will develop a new interface to KPML.

### 1.3 Russian

#### 1.3.1 The structure of morphological index

The morphological information in AGILE conforms to the elaborate classification system for Russian morphology developed by Zaliznjak [Zaliznjak(1977)]. The index consists of a specifying string, a numerical class of declension or conjugation, an alternation mark, an accentuation index and additional features. A specifying string is an abbreviation which denotes the part of speech of the lexical item, nouns have information on their gender (м. ж. с), verbs on their aspect (св, нсв, св-св). In addition intransitive verbs have the нп mark. The declension class varies from 0 to 8 for nouns, 1-6 for adjectives and pronouns, 1-17 for verbs. Alternation in the stem is denoted by * or **. An accentuation index is a Latin character from a to f (the most of words in the register of the Initial Demonstrator have an accent in their stem which is in a static position for all forms of the word; this is denoted by the accentuation index а). Additional features mark the most frequent deviations from the standard declension schemes.

The complete treatment of this index is provided in [Zaliznjak (1977)]. A further extension here over the above is the inclusion of lists of stems; this provides data for selection between different types of stems in the case of stem alternation, for example, in the case of verbs, infinitival and personal stems are listed in the lexical item, in order to conform with the requirements of the external morphological module.
1.1.2 Application programmer interface to the morphological generator

The implementation of the morphological generator is based on a library of classes which describe grammatical features of Russian words. This preexisting system is based on quite different principles than the generation grammar [Sharoff (1995)]. In the course of the project it has been ported to the Common Lisp Object System (CLOS) Common LISP. Non-Latin characters are being represented here by the standard Windows encoding Win-CP1251 and by Unicode in the application of the Harlequin Common LISP.

1.1.2.1 Morphological classes and initialization of their instances

The basic class of the morphological generator is \texttt{rusword}, described below:

\begin{verbatim}
(defclass rusword ()
  ((stemlist :type list :initarg :stemlist :accessor stemlist)
   (morph-info :type list :initarg :morph-info :accessor morph-info)
   (morph :accessor morph :initform (gentemp "morph")))
\end{verbatim}

with the list of stems,

\begin{verbatim}
  (stem :type string :initarg :stem :accessor stem)
\end{verbatim}

with the morphological index,

\begin{verbatim}
  (flex :type string :initarg :flex :accessor flex)
\end{verbatim}

and current values:

\begin{verbatim}
  (wordform :type string :accessor wordform))
\end{verbatim}

Classes which are derived from the \texttt{rusword} include the class of declinable words and the class of verbs (including participial forms):

\begin{verbatim}
(defclass declinword (rusword)
  ((gender :initarg :gender :initform '(#\m) :accessor gender)
   (rnumber :initarg :rnumber :initform '(sing) :accessor rnumber)
   (rcase :initarg :rcase :initform '(nom) :accessor rcase)
   (form :initarg :form :initform 'simple :accessor form)))
\end{verbatim}

Its subclasses are classes of noun, pronoun and adjective (they have no additional slots).

Slots of the class of verbs define its characteristics:

\begin{verbatim}
(defclass verb (rusword)
  ((person :initarg :person :initform 1 :accessor person)
   (rnumber :initarg :rnumber :initform '(sing) :accessor rnumber)
   (tense :initarg :tense :initform 'present :accessor tense)
   (aspect :initarg :aspect :initform 'МСВ :accessor aspect)
   (form :initarg :form :initform 'infinite :accessor form)
   (gender :initarg :gender :initform '(#\m) :accessor gender)
   (reflexive :initarg :reflexive :accessor reflexive)
   (adj :type adjective :initarg :adj :accessor adj)))
\end{verbatim}

The last slot of verbs holds an adjective corresponding to a participial form of this verb.

A special function is designed for initialization of instances of the above-mentioned classes. It analyzes the content of the string with a morphological index and creates an instance of a corresponding class:

\begin{verbatim}
(defun make-word (stemlist morph-string)
  (case (car morph-string)
    ((МО ЖО СО ЖО-МО) (make-noun stemlist morph-string))
    ((МЕСТ) (make-pronoun stemlist morph-string)))
\end{verbatim}
1.1.1.2 Generation methods

The most important generic function for generation of word forms is `generate-form`, which is specialized for declinable words and verbs. In the former case it receives keyword parameters for case, number and gender:

```
(defmethod generate-form ((r declinword) &key (rcase (rcase r))
                         (rnumber (rnumber r)) (gender (gender r)))

Keyword parameter supplied to `generate-form`, which is specialized for verbs, include person, number, tense, reflexivity and form (the latter belongs to the list of `(finite infinite imperative active-participle passive-
participle adv-participle passive); adv-participle means deepprichastic-
advverbal participle; passive means a special short form of a passive past participle, which
used in building passive forms); for participial forms case and gender may be specified:

```
(defmethod generate-form ((r verb) &key (person (person r))
                         (rnumber (rnumber r)) (form (form r)) (tense (tense r))
                         (reflexive (reflexive r)) (rcase '(nom)) (gender '#\"
```

Several methods of the above-mentioned morphological classes provide specialized
access which is relevant to generation of forms, they are called by `generate-form`,
though they maybe irrelevant for external applications; in particular:

- `selectstem` helps in selection of a stem from the list of possible stems
  according to morphological features;
- `setflex` calculates a flex which conforms to current morphological features;
- `generate` generates a word form which conforms to current morphological features;
- `generate-paradigm ((r noun))` iterates a call to generate for number and case through the noun paradigm
- `generate-paradigm ((r adjective))` iterates a call to generate for cases sequentially of masculine, feminine genders in singular number, then for cases of plural number

1.1.3 Examples of calls to the morphological generator

1.1.3.1 Declension

```
(setq komanda (make-word '("команд") '(ж 1 a)))
(generate-form komanda :rcase '(acc) :rnumber '(sing))
=> "команду"
(generate-paradigm komanda)
"команда"
"команды"
"команде"
"команду"
"командой"
"команде"
"команды"
```
1.1.1.2 Conjugation

(setq vybratj (make-word '("выбра" "выбери") '(
(св 6 a))
(generate-form vybratj :form 'adv-participle :tense 'past)
=> "выбрав"
(generate-form vybratj :form 'imperative :rnumber '(plur))
=> "выберите"
(setq nazhatj (make-word '("нажа" "нажм") '(
(св 14 b -м-)))
(setq knopka (make-word '("кнопк" "кнопок") '(
(ж 3 * a)))
(generate-form knopka :rcase ' (acc) :rnumber ' (sing))
=> "кнопку"
(generate-form knopka :rcase ' (gen) :rnumber ' (plur))
=> "кнопок"

(setq kombinatsija (make-word '("кombinati") '(
(ж 7 a)))
(generate-form kombinatsija :rcase ' (acc) :rnumber ' (sing))
=> "кombинацию"

(setq nazhatie (make-word '("нажати") '(
(с 7 a)))
(generate-form nazhatie :rcase ' (inst) :rnumber ' (sing))
=> "нажатием"

(setq imja (make-word '("им" "имен") '(
(с 8 a)))
(generate-form imja :rcase ' (acc) :rnumber ' (sing))
=> "им" 
(generate-form imja :rcase ' (inst) :rnumber ' (sing))
=> "именем"

(setq oblastj (make-word '("област") '(
(ж 8 a)))
(generate-form oblastj :rcase ' (inst) :rnumber ' (sing))
=> "областю"

(setq menju (make-word '("меню") '(
(с 0 a)))
(generate-form menju :rcase ' (prepos) :rnumber ' (sing))
=> "меню"

(setq granichny (make-word '("граничи") '(
(п 1 a)))
(generate-form granichny :rcase ' (acc) :rnumber ' (sing) :gender '(
(#\ж))
=> "граничиющую"

(setq krivaja (make-word '("кряв") '(
(п ж 1 b)))
(generate-form krivaja :rcase ' (gen) :rnumber ' (sing))
=> "крявой"

(setq odin (make-word '("одн" "один") '(
(п-мы 3 * b)))
(generate-form odin :rcase ' (inst) :rnumber ' (sing) :gender '(
(#\м))
=> "одним"
(generate-form odin :rcase ' (nom) :rnumber ' (sing) :gender '(
(#\м))
=> "один"
(generate-form nazhatj :form 'imperative :rnumber '(plur))
=> "нажмите"

(setq zapustitj (make-word '("запустить" "запусти") '(св 4 a)))
(generate-form zapustitj :form 'imperative :rnumber '(plur))
=> "запустите"
=> "запущенной"
=> "запустившейся"

(setq narisovatj (make-word '("нарисовать" "нарису") '(св 2 a)))
(generate-form narisovatj :form 'infinite)
=> "нарисовать"
=> "нарисованного"
=> "нарисовавшего"

(setq pojavljatsja (make-word '("появляться" "появляться") '(нсв 1 b -ся)))
=> "появляющейся"
(generate-form pojavljatsja :form 'finite :tense 'present :person 3 :rnumber '(plur))
=> "появляются"

1.1.4 Interface of the morphological generator to KPML

Interfacing KPML to an external morphological generator has been used, in particular, within the TechDoc multilingual generation system for instructional texts [Rösner & Stede (1994)]. There are several extensive computational treatments of German morphology and so, in TechDoc, the Penman generator was modified, so that an external component—the German morphological component Morphix [Finkler & Neumann (1988)]—intervened between Penman's internal code for producing morphological forms and the construction of the constituent tree containing the final generated strings. In the present model of the Russian morphological interface the full use of the object-oriented approach has been adopted.

During grammar traversal, certain choices result in the specification of morphological properties, for example, in the Russian grammar when a direct complement is inserted, it is supplied with the realization statement: (inflectify directcomplement accusative). Then, when morphology is not being handled by a multilingual grammatical description in the form of a system network, then the KPML method:
REALIZE-INFLECTIFY (chosen-word inflection-feature-list lg)

is called. This has been specialized for Russian so that the features selected from the grammar are analyzed and mapped appropriately for calls to the external lexical form generation procedures described above. The lexical item for the chosen is retrieved by the KPML function:
(SETQ word-from-lexicon (fetch-lexicon-info Chosen-Word 'instance)))
Morphological properties and the list of stems are retrieved from the lexical item, and if they are present an object carrying morphological information is created by a call to the morphological generator function make-word:

```
(when (and property-list stem)
  (setq morph-object (make-word stem property-list))
)
```

Later on this method provides mapping of grammatical features, which have been selected by the grammar, into morphological properties handled by the morphological generator. This is done by appending the existing list of morphological features with the keywords followed by a corresponding morphological feature, for example:

```
(if (member 'imperative Grammatical-Feature-List)
  (SETQ morph-feature-list (append '(:form imperative)
    morph-feature-list)))
(if (intersection '(plural-form plural) Grammatical-Feature-List)
  (SETQ morph-feature-list (append '(:rnumber (plur))
    morph-feature-list)))
```

Then the morphological object together with the morphological features list are supplied as parameters to the generic function generate-form, which is specialized by the morphological object:

```
(SETQ spelling (apply 'generate-form (cons morph-object morph-
  feature-list)))
```

If fonts for displaying Cyrillic characters in KPML has not been provided, the string in Cyrillic characters which is output by morphological generator is converted to a string of their standard Latin equivalents by calling:

```
(if (not *cyrillic-display-loaded*)
  (SETQ spelling (transliterate spelling))))
```

```
(defconstant *cyrillic-characters* (coerce
  "абвгдеёжзийклмнопрстуфхцчшщъэюя" 'list))
(defconstant *latin-characters* '("a" "b" "v" "g" "d" "e" "zh"
  "z" "i" "j" "k" "l" "n" "o" "p" "r" "s" "t" "u" "f" "kh"
  "ts" "ch" "sh" "sch" "y" "j" "e" "ju" "ja"))
(defconstant *transliteration-pairs* (pairlis *cyrillic-
  characters* *Latin-characters*))
(defun transliterate (cyr-string)
  (apply 'concatenate (append '(string) (mapcar #'(lambda (x) (or
    (cdr (assoc x *transliteration-pairs*)) (string x))) (coerce
    cyr-string 'list))))))
```

4. LEXN1—Definition of the initial lexicon

4.1 Bulgarian

4.1.1 Description of available resources for Bulgarian language

Several Bulgarian computer lexicons have been developed in Bulgaria for the last years. Most of them were research oriented and realized not as a stand-alone machine-readable lexicons, but as parts of systems for morphological processing. The systems listed below are the most suitable for practical use in generation.

The system "MORPHO-ASSISTANT" [Simov et al. (1990)] performs morphological analysis and synthesis. The morphological knowledge is represented as feature structures in Prolog. The embedded dictionary contains 60000 base forms. The system works under DOS.
The system "TWOL" [Paskaleva (1997)] is based on a finite-state model for morphological analysis and generation. It is implemented in the programming language C. The system dictionary contains 30000 base forms. TWOL works under DOS and UNIX. Both systems were developed in Linguistic Modeling Laboratory - BAS.

The system BULMORPH [Totkov et al. (1988), Totkov G., Krushkov Hr.,(1996)] developed at the University of Plovdiv is a morphological processor for Bulgarian which performs morphological analysis and synthesis. Robust analysis for unknown words is available. The system is implemented using Pascal/DELPHI. It works under DOS, WINDOWS’ 95/NT. A Dynamic Link Library (DLL) for WINDOWS’ 95/NT is maintained. The dictionary contains 67500 base forms. The processor is distributed by ELDA (European Language Recourses Distribution Agency).

4.1.2 Lexical resources chosen for Bulgarian: Morphological Dictionary.

The dictionary embedded in the BULMORPH [Totkov G., Krushkov Hr.,(1996)] is intended to be used in next stage of the project. It has the following basic characteristics: format: ASCII; 67500 entries divided into 231 inflectional types (proper nouns incl.), morphosyntactic information for each entry, and a morphological processor BULMORPH (MS DOS and WINDOWS) for morphological analysis and generation. Each entry consists of: Base form; Pattern; Inflectional type number.

The dictionary is being distributed by ELDA (European Language Recourses Distribution Agency).

4.1.3 Description of the lexical items appearing in the target texts

The Bulgarian lexicon for the Initial demonstrator phase is a small internal-type lexicon with respect to KPML.

The lexicon contains all the Bulgarian word forms for the Initial Demonstrator. They were added to the English CADCAM terms. The lexical entries for verbs are imperative forms. Some nouns have defective and nondefective forms so there are separate lexical entries for them marked with a special tag.

A typical lexical item in the Bulgarian lexicon includes the following slots: name, spelling, features, properties, sample-sentence, for example:

(LEXICAL-ITEM
 :NAME IZBIRAM
 :SPELLING "izberete"
 :SAMPLE-SENTENCE "izberete Pline"
 :FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
 :EDITOR "DOCHEV")

4.1.3.1 Name

This slot contains an identifier of a lexical item. This value is referred by SPL :lex keywords and lexify statements in the grammar.
4.1.3.2 Spelling

Currently the necessary wordform for the output is taken from this slot. It will not be used in the Bulgarian grammar, if an external morphological module is loaded.

4.1.3.3 Features

This slot contains features, which are used by the Bulgarian grammar. For the purposes of the Initial Demonstrator all the lexical features of the Bulgarian entries were copied from the appropriate English lexemes. It has a very restricted set of values. Basically, for nouns it is filled with features (NOUN COMMON-NOUN), for verbs — (VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB).

4.1.3.4 Properties

For the purposes of the Initial Demonstrator this slot is used only to express the plural form of the nouns. It is activated by the English grammar systems for irregular plural forms of the nouns.

(LEXICAL-ITEM
   :NAME LINIA
   :SPELLING "linia"
   :FEATURES (PLURALFORM IRR NONE-OF-THATCOMP-TYPIC NONSUBSTITUTE COUNTABLE NOT-NOMINALIZATION COMMON-NOUN NOUN)
   :PROPERTIES ((PLURALFORM "linii"))
   :EDITOR "DOCHEV")

4.1.3.5 Sample-sentence

This slot contains a context in which this item occurs in Bulgarian sentences.

4.2 Czech

4.2.1 Available resources

As it was mentioned above, for the topic-focus articulation we need the information on underlying structure of a sentence. For this purpose we will exploit a small lexicon containing the syntactic description of all word classes. It is being developed as a test bed for theoretical research, mainly on verb valency. It is implemented in DATR and contains 4,810 entries:

- nouns 2469
- adjectives 401
- pronouns 40
- numerals 1035
- verbs 345
- adverbs 401
- prepositions 73
- conjunctions 39
- interjections 3
The Czech lexicon uses the following attributes and values:

- **base form**: of the word, possibly with an index
- **gloss**: a short description of the meaning or an example of usage of the word
- **morphological information**: all possible forms of the word and other morphological information
- **syntactic information**: the category, the frame, information about passivization, and other information necessary for the analysis/generation

The syntactic part of the lexical structure is very diverse, as different parts of speech bring to a sentence different pieces of syntactic information. The only syntactic attribute that all the parts of speech posses is the syntactic category (<syn cat>).

In the following sections we will describe the syntactic properties of all the categories.

### 1.1.1.1 Verbs

We will explain the structure on an example. The word *bát se* (to be afraid) with the frame *bát se čeho/že/aby* (to be afraid of/that) is encoded in the lexicon in the following way:

Bát_1:

- `<gloss>` == bojí se strašidel;
- ... že nepřijdou;
- ... aby nepřišli

- `<mor>` == BÁT
- `<syn>` == RSE_F[2clzcla]@.

The base form serves as a node in the DATR hierarchy. The gloss, as it is unique for every word, must be inserted for every word separately. The mor and syn information, however, can be inherited from a supernode—in this case the morphological information is inherited from a node BÁT (we will only use the information on aspect) and the syntactic information from the node RSE_F[2clzcla]@. As an output of the DATR theory we get this result:

Bát_1:

- `<gloss>` = bojí se strašidel;
- ... že nepřijdou;
- ... aby nepřišli
- `<mor aspect>` = imperf
- `<syn cat>` = V
- `<syn type>` = main
- `<syn refl>` = se
- `<syn subj surf>` = NPnom
- `<syn subj deep>` = Actor
- `<syn subj oblig>` = oblig_deletable
- `<syn 1_obj surf>` = NPgen, CLže, Claby
- `<syn 1_obj deep>` = Patient
- `<syn 1_obj oblig>` = optional
- `<syn pass>` = no.

The syntactic part informs that the category of the word is V (verb), its type is ‘main verb’, the verb is intrinsic reflexive (i.e. it requires the reflexive particle *se*), and cannot occur in the
passive voice. Further, it describes the valency frame of the verb: The frame has two members—Actor and Patient in the underlying structure, which play roles of the subject and an object in the surface structure. Their surface forms are a noun phrase in Nominative for the subject, and a noun phrase in Genitive or a clause connected by the conjunction Že (that) or a clause connected by the conjunction aby (so that) for the object. Actor is obligatory in the deep structure but deletable on the surface, while Patient is optional.

### 1.1.1.2 Nouns

The syntactic category of a noun is **N**, it can also be reflexive and it can have a frame. Beside the five verbal inner participants and an obligatory free modification, noun can have **Partitive**, **Appurtenance** and **Identity** participant. All these members of the frame play roles of attributes in the sentence:

- Janův příjezd domů Jan’s arrival home
- svoboda projevu freedom of expression
- právo shromažďovat se/na svobodu projevu right to gather/for freedom of expression

### 1.1.1.3 Adjectives

The syntactic category of adjectives is **A**, and they belong to several types. In the lexicon, the type is an attribute in the syntactic structure (syn type) with the following values:

- **plain** The ‘real’ adjectives describing properties of other objects.
- **vact** Verbal active adjectives—or long active participles, like dělající (doing), píšící (writing), etc.
- **vpass** Verbal passive adjectives—or long passive participles, like dělaný (being done), psaný (written), etc.
- **aposst** Possessive adjectives derived from nouns: otcův (father’s), matčin (mother’s).

The plain and verbal adjectives can be reflexive and they can have a frame. Their frames are very similar to those of verbs; they only do not contain **Subject**. The verbal passive adjectives cannot be reflexive, but they can have a frame. The frames of both the active and passive verbal adjectives can be derived from the corresponding verb frame—the frame of the active adjective from the active frame, and the frame of passive adjective from the passive frame by deleting the subject.

### 1.1.1.4 Pronouns

Pronouns do not have a syntactic category of their own; they are either nouns or adjectives. They have, however, syntactic type which differentiate them from these two categories.

### 1.1.1.5 Numerals

Numerals have the syntactic category **Num**, but only some of words traditionally categorized as numerals bear this category. The others are nouns or adjectives or adverbs. Like pronouns, they have syntactic type.

---

1 For the verbs that can be passivized, we only list the types of passive construction, as these constructions can be derived after an algorithm described in [Skoumalová (1998)].
1.1.1.6 Adverbs

The syntactic category of adverbs is Ad. The adverbs can have syntactic type which determines the type of a deictic adverb (i.e. adverbial pronouns) like *kde* (where), *tam* (there), etc. Beside the type they also have an attribute called syn sem. This attribute determines the semantics of the adverb, which is necessary for analysis/generation of adverbials (free modifications).

1.1.1.7 Prepositions

Prepositions have the syntactic category Prep and two more syntactic attributes: syn case determines the case of following noun phrase and syn sem determines the semantics of the whole prepositional phrase. This semantic information is again used for generation of free modifications.

1.1.1.8 Conjunctions

Conjunctions have the syntactic category Conj and their syntactic type is subord, coord or coord+aux. The last value occurs at the conjunctions *aby* and *kdyby*, which are in fact contracted forms of a conjunction and the auxiliary verb *byt* (to be) in conditional.

1.1.1.9 Particles and Interjections

These two classes have only the syntactic category Part and Interj, respectively, and they do not have any other attributes.

1.1.2 Current state of the Czech lexicon

In the first stage of the project we were using the original DRAFTER lexicons, in which we made only minor changes: we translated the base forms to Czech, we added the morphology where necessary, but in the features list we only changed the morphological forms. Example of several entries:

```plaintext
(LEXICAL-ITEM
 :NAME   SPUSTIT
 :SPELLING   "spustit"
 :FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB IRR
 UNITARYSPELLING INFLECTABLE
 VERB PASTPARTCIPLEFORM
 FIRSTSINGULARFORM SECONDSINGULARFORM THIRDSINGULARFORM
 FIRSTPLURALFORM SECONDPLURALFORM THIRDPLURALFORM)
 :PROPERTIES   ((PASTPARTCIPLEFORM "spustil")
 (FIRSTSINGULARFORM "spustím")
 (SECONDSINGULARFORM "spustíš")
 (THIRDSINGULARFORM "spustí")
 (FIRSTPLURALFORM "spustíme")
 (SECONDPLURALFORM "spustíte")
 (PLURALFORM "spustí")))
```
(LEXICAL-ITEM
  :NAME snadny
  :SPELLING "snadný"
  :FEATURES (ADJECTIVE DEGREE-ADJ IRR
              COMPARATIVEFORM SUPERLATIVEFORM)
  :PROPERTIES ((COMPARATIVEFORM "snazší")
                (SUPERLATIVEFORM "nejsnazší"))
)

(LEXICAL-ITEM
  :NAME BOD
  :SPELLING "bod"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLES
              IRR PLURALFORM)
  :PROPERTIES ((PLURALFORM "body"))

1.3 Russian

1.3.1 The structure of a lexical item

The complete specification of information to be included in the lexical entry in the Russian lexicon is relatively limited in the Initial Demonstrator. Now it includes basic classification features which are used by the Russian grammar, as well as morphological information which conforms to the elaborate classification system for Russian morphology developed by Zaliznjak [Zaliznjak (1977)]. The structure of morphological information is described in [Sharoff (1998)].

A typical lexical item in the Russian lexicon includes the following slots: name, spelling, features, properties, sample-sentence and comments, for example:

(LEXICAL-ITEM
  :NAME IMYA
  :FEATURES (NOUN COMMON-NOUN)
  :SAMPLE-SENTENCE "imya fajla (risunka)"
  :PROPERTIES ("им" "имен") (с 8 а))
  :COMMENTS "the file (drawing) name"
)

1.1.1.1 Name

This slot contains an identifier of a lexical item. This value is referred by SPL :lex keywords and lexify statements in the grammar. Two special names are: &-LINKER (for a comma) and ELLIPSISZERO (for items without lexical realization, such as a/the articles of English in the Russian grammar).

1.1.1.2 Spelling

This slot is not currently used in the Russian grammar, if an external morphological module is loaded.
1.1.1.3 Features

This slot contains features, which are used by the Russian grammar. For the purposes of the Initial Demonstrator it has a very restricted set of values. Basically, for nouns it is filled with features \( \text{NOUN COMMON-NOUN} \), for verbs — \( \text{VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB} \).

1.1.1.4 Properties

For the purposes of the Initial Demonstrator this slot contains a string with morphological information: the list of stems and the morphological index of a lexical item. The list of stems provides data for selection between different types of stems in the case of stem alternation, for example, in the case of verbs, infinitival and personal stems are listed in the lexical item, in order to conform with the requirements of the external morphological module. The morphological index consists of a specifying string, a numerical class of declension or conjugation, an alternation mark, an accentuation index and additional features. This structure is described in greater detail in [Sharoff (1998)].

1.1.1.5 Sample-sentence

This slot contains a context in which this item occurs in Russian sentences.

1.1.1.6 Comment

This slot contains an English sentence which corresponds to the Russian sentence shown in the sample-sentence slot.

5. Conclusion

For every language involved in the project, there are suitable resources that can be used for the morphological analysis. In the next stage of the project it is necessary to create the interface between the existing resources and KPML (for Bulgarian and Czech) and to refine the lexical features of single entries.
References


Appendix A: Content of the Bulgarian lexicon

(LEXICAL-ITEM
  :NAME CENTRIRANE-NONDET
  :SPELLING "centrirane"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLES)
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME CHERTANE
  :SPELLING "chertane"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLES)
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME CHETVARTI
  :SPELLING "chetvartata"
  :FEATURES (ARABICPROP ORDINAL)
  :PROPERTIES ((ARABICPROP 4))
  :EDITOR "KAMENKA")

(LEXICAL-ITEM
  :NAME CHISLO
  :SPELLING "chislo"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLES)
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME DEVETI
  :SPELLING "devetata"
  :FEATURES (ARABICPROP ORDINAL)
  :PROPERTIES ((ARABICPROP 1))
  :EDITOR "KAMENKA")

(LEXICAL-ITEM
  :NAME DOLNO
  :SPELLING "dolno"
  :SAMPLE-SENTENCE "dolno podravniavane"
  :FEATURES (NOT-PREDICATEONLY NONE-OF-SIZE-PROVENANCE-MATERIAL-COLOUR-AGE INTRINSIC DEGREE-ADJ MORE-MOST NOT-CASEPREPOSITIONS ADJECTIVE)
:EDITOR "NEVENA")

(LEXICAL-ITEM
  :NAME FUNKTSIONALEN
  :SPELLING "funktsionalnija"
  :SAMPLE-SENTENCE "funktsionalen red"
  :FEATURES (NOT-PREDICATEONLY NONE-OF-SIZE-PROVENANCE-MATERIAL-
               COLOUR-AGE INTRINSIC DEGREE-ADJ MORE-MOST NOT-CASEPREPOSITIONS
               ADJECTIVE)
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME GORNO
  :SPELLING "gorno"
  :SAMPLE-SENTENCE "gorno podravniavane"
  :FEATURES (NOT-PREDICATEONLY NONE-OF-SIZE-PROVENANCE-MATERIAL-
               COLOUR-AGE INTRINSIC DEGREE-ADJ MORE-MOST NOT-CASEPREPOSITIONS
               ADJECTIVE)
  :EDITOR "NEVENA")

(LEXICAL-ITEM
  :NAME I
  :SPELLING "i"
  :SAMPLE-SENTENCE "Izberete A I izberete B"
  :FEATURES (SENTENCECONJUNCTION ADDITIVE CONJUNCT NOT-
               PUNCTUATION NOT-SUBORDINATOR LINKER)
  :EDITOR "NEVENA")

(LEXICAL-ITEM
  :NAME ILI
  :SPELLING "ili"
  :SAMPLE-SENTENCE "Bjalo ili cherno?"
  :FEATURES (SENTENCECONJUNCTION ADDITIVE CONJUNCT NOT-
               PUNCTUATION NOT-SUBORDINATOR LINKER)
  :EDITOR "NEVENA")

(LEXICAL-ITEM
  :NAME i-LINKER
  :SPELLING "i"
  :SAMPLE-SENTENCE "Vavedete s i mashtab "
  :FEATURES (PUNCTUATION SENTENCECONJUNCTION ADDITIVE CONJUNCT
               NOT-SUBORDINATOR LINKER)
(LEXICAL-ITEM
  :NAME IME-DET
  :SPELLING "imeto"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLEES)
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME IZBIRAM
  :SPELLING "izberete"
  :FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME KAM
  :SPELLING "kam"
  :SAMPLE-SENTENCE "kam sredata"
  :FEATURES (NOT-OBJECTNOTREQUIRED NOT-PPOBJECT LOCATION-VERB PREPOSITION)
  :EDITOR "Nevena")

(LEXICAL-ITEM
  :NAME KATO
  :SPELLING "kato"
  :SAMPLE-SENTENCE "..kato natisnete.."
  :FEATURES (NONE-OF-LOCATION-CONCESSION-MATTER-PURPOSE-ROLE-REASON PREPOSITION)
  :EDITOR "Nevena")

(LEXICAL-ITEM
  :NAME KOMANDA
  :SPELLING "komandata"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLES DEFART)
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME KOMANDEN
  :SPELLING "komandnija"
  :FEATURES (OUTCLASSIFY-DEGREE-ADJ)
  :EDITOR "DOCHEV")
(LEXICAL-ITEM
  :NAME KRAEN
  :SPELLING "krainata"
  :FEATURES (ARABICPROP ORDINAL)
  :PROPERTIES ((ARABICPROP 1))
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME LINIA
  :SPELLING "linia"
  :FEATURES (PLURALFORM IRR NONE-OF-THATCOMP-TYPIC NONSUBSTITUTE COUNTABLE NOT-NOMINALIZATION COMMON-NOUN NOUN)
  :PROPERTIES ((PLURALFORM "linii"))
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME LINIATA
  :SPELLING "liniata"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLEES)
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME MASTAB
  :SPELLING "mastaba"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLEES)
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME MASTAB-NONDET
  :SPELLING "mastab"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLEES)
  :EDITOR "DOCHEV")

(LEXICAL-ITEM
  :NAME MENU
  :SPELLING "menu"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLEES))

(LEXICAL-ITEM
  :NAME MLINE
  :SPELLING "MLINE"
Here is a synopsis of our findings.
SAMPLE-SENTENCE "OTGORE NA LINIJATA"
:FEATURES (OBJECTNOTREQUIRED PP OBJECT LOCATION-VERB PREPOSITION)
:EDITOR "Nevena")

(LEXICAL-ITEM
 :NAME OTDOLU
 :SPELLING "otdolu"
 :SAMPLE-SENTENCE "OTDOLU NA LINIJATA"
 :FEATURES (OBJECTNOTREQUIRED PP OBJECT LOCATION-VERB PREPOSITION)
 :EDITOR "Nevena")

(LEXICAL-ITEM
 :NAME POSLE
 :SPELLING "sled tova"
 :SAMPLE-SENTENCE "Sled tova izberete..."
 :FEATURES (NOT-SENTENCECONJUNCTION CAUSAL CONJUNCTIVE NOT-
 PUNCTUATION NOT-SUBORDINATOR LINKER)
 :EDITOR "Nevena")

(LEXICAL-ITEM
 :NAME PARVI
 :SPELLING "parvata"
 :FEATURES (ARABICPROP ORDINAL)
 :PROPERTIES ((ARABICPROP 1))
 :EDITOR "KAMENKA")

(LEXICAL-ITEM
 :NAME PETI
 :SPELLING "petata"
 :FEATURES (ARABICPROP ORDINAL)
 :PROPERTIES ((ARABICPROP 5))
 :EDITOR "Dochev")

(LEXICAL-ITEM
 :NAME PLAVASHTO
 :SPELLING "plavashtoto"
 :SAMPLE-SENTENCE "plavashtoto menu"
 :FEATURES (NOT-PREDICATEONLY NONE-OF-SIZE-PROVENANCE-MATERIAL-
 COLOUR-AGE INTRINSIC DEGREE-ADJ MORE-MOST NOT-CASEPREPOSITIONS
 ADJECTIVE)
 :EDITOR "DOCHEV")
(LEXICAL-ITEM
  :NAME PLINE
  :SPELLING "PLINE"
  :FEATURES (NOUN NOUN))

(LEXICAL-ITEM
  :NAME PODRAVNIAVAM
  :SPELLING "podravnite"
  :FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
  :EDITOR "Dochev")

(LEXICAL-ITEM
  :NAME PODRAVNIAVANE
  :SPELLING "podravniavaneto"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLES)
  :EDITOR "Dochev")

(LEXICAL-ITEM
  :NAME PODRAVNIAVANE-NONDET
  :SPELLING "podravniavane"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLES)
  :EDITOR "Dochev")

(LEXICAL-ITEM
  :NAME POIAVIAVAM-SE
  :SPELLING "se poiavi"
  :FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
  :PROPERTIES ((IMPERATIVE "se poiavi"))
  :EDITOR "Dochev")

(LEXICAL-ITEM
  :NAME POJAVJAVA-SE
  :SPELLING "se pojavjava"
  :FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
  :PROPERTIES ((IMPERATIVE "se poiavi"))
  :EDITOR "Dochev")

(LEXICAL-ITEM
  :NAME POLILINIA
  :SPELLING "poliliniata"
  :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLES)
  :EDITOR "Dochev")
(LEXICAL-ITEM
 :NAME POLILINIA-NONDET
 :SPELLING "polilinia"
 :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLEES)
 :EDITOR "Dochev")

(LEXICAL-ITEM
 :NAME POLYLINE
 :SPELLING "POLYLINE"
 :FEATURES (NOUN NOUN))

(LEXICAL-ITEM
 :NAME PROMENIAM
 :SPELLING "promenite"
 :FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
 :EDITOR "Dochev")

(LEXICAL-ITEM
 :NAME PROZOREC
 :SPELLING "prozorets"
 :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLEES)
 :EDITOR "Dochev")

(LEXICAL-ITEM
 :NAME RETURN
 :SPELLING "Return"
 :FEATURES (NOUN PROPER-NOUN))

(LEXICAL-ITEM
 :NAME RED
 :SPELLING "red"
 :FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLES)
 :EDITOR "Dochev")

(LEXICAL-ITEM
 :NAME SAVE
 :SPELLING "save"
 :FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB S-D))

(LEXICAL-ITEM
 :NAME SAVE-DRAWING-AS
AGILE

LEXICAL-ITEM
:NAME V
:SPELLING "v"
:SAMPLE-SENTENCE "v komandnija red"
:FEATURES (NOT-OBJECTNOTREQUIRED NOT-PPOBJECT LOCATION-VERB PREPOSITION)
:EDITOR "NEVENA"

LEXICAL-ITEM
:NAME VAVEJDAM
:SPELLING "vavedete"
:FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:EDITOR "Kamenka"

LEXICAL-ITEM
:NAME VTORI
:SPELLING "vtorata"
:FEATURES (ARABICPROP ORDINAL)
:PROPERTIES ((ARABICPROP 1))
:EDITOR "Kamenka"

LEXICAL-ITEM
:NAME VID
:SPELLING "vida"
:FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLEES)
:EDITOR "Kamenka"

LEXICAL-ITEM
:NAME VIDPLDET
:SPELLING "vidovete"
:FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLEES)
:EDITOR "Kamenka"

LEXICAL-ITEM
:NAME ZADAVAM
:SPELLING "zadaite"
:FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB PASTFORM S-IRR)
:PROPERTIES ((PASTFORM "zadaite"))
:EDITOR "Kamenka"

LEXICAL-ITEM
:NAME ZATVARJAM
:SPELLING "zatvorete"
:FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:EDITOR "Kamenka")

(LEXICAL-ITEM
 :NAME ZAVURSHVAM
 :SPELLING "zavurshite"
 :FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
 :EDITOR "Kamenka")
Appendix B: Content of the Russian lexicon
(in-language :languages :RUSSIAN)

(LEXICAL-ITEM
 :NAME &-LINKER
 :SPELLING ","
 :FEATURES (PUNCTUATION SENTENCECONJUNCTION
 ADDITIVE CONJUNCT NOT-SUBORDINATOR LINKER)
 )

(LEXICAL-ITEM
 :NAME CHETVERTYJ
 :SPELLING "chetvertyj"
 :SAMPLE-SENTENCE "Ukazite chetvjer tuju to chku muljtilinii"
 :PROPERTIES (("четверт") (п l a))
 )

(LEXICAL-ITEM
 :NAME CHTOBY
 :SPELLING "chtoby"
 :SAMPLE-SENTENCE "Chtoby sokhranitj risunok"
 :PROPERTIES (("чтобы") (н))
 :COMMENTS "To save a drawing"
 )

(LEXICAL-ITEM
 :NAME DEVJATYJ
 :SPELLING "devjatyj"
 :SAMPLE-SENTENCE "Ukazite devjatuju tochku muljtilinii"
 :PROPERTIES (("девят") (п l a))
 )

(LEXICAL-ITEM
 :NAME DIALOGOVYJ
 :SPELLING "dialogovyj"
 :SAMPLE-SENTENCE "v dialogovom okne"
 :PROPERTIES (("диалогов") (п l a))
 :COMMENTS "in the L dialog box"
 )

(LEXICAL-ITEM
 :NAME EDINITSHNYJ
 :SPELLING "edinichnyj"
 :SAMPLE-SENTENCE "L sozdaet edinichnyj ili mnozhestvennye
 linejnye segmenty, yavlyayushchiesya otdelnymi ob-ektami"
 :FEATURES (IMPERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-
 VERB)
 :PROPERTIES (("единичн") (п l a))
 :COMMENTS "L creates single or multiple line segments that
 are separate objects"
 )

(LEXICAL-ITEM
 :NAME ELLIPSISZERO
 )

(LEXICAL-ITEM
:NAME GRANICHNYJ
:SPELLING "granichnyj"
:SAMPLE-SENTENCE "Ukazhite granichnuyu tochku"
:PROPERTIES ("граничный") (п 1 а))
:COMMENTS "Specify the endpoint"

(LEXICAL-ITEM
 :NAME I
 :SPELLING "i"
 :PROPERTIES ("и") (н))
 :COMMENTS "and"

(LEXICAL-ITEM
 :NAME ILI
 :SPELLING "ili"
 :PROPERTIES ("или") (н))
 :COMMENTS "or"

(LEXICAL-ITEM
 :NAME IMYA
 :SPELLING "imya"
 :SAMPLE-SENTENCE "imya fajla (risunka)"
 :PROPERTIES ("им" "имен") (с 8 а))
 :COMMENTS "the file (drawing) name"

(LEXICAL-ITEM
 :NAME INSTRUMENT
 :SPELLING "instrument"
 :SAMPLE-SENTENCE "v palitre L na paneli instrumentov L
 nazhmite knopku L"
 :PROPERTIES ("инструмент") (м 1 а))
 :COMMENTS "From the L flyout on the L toolbar, choose L"

(LEXICAL-ITEM
 :NAME EKRAN
 :SPELLING "ekran"
 :SAMPLE-SENTENCE "Na ekrane pojavitsja okno"
 :PROPERTIES ("экран") (м 1 а))
 :COMMENTS "Window appears"

(LEXICAL-ITEM
 :NAME IZMENITJ
 :SPELLING "IZMENITJ"
 :FEATURES (DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
 :PROPERTIES ("изменя" "измен"") (св 4 А))

(LEXICAL-ITEM
 :NAME JAVLJATJCJA
 :SPELLING "yavlyatjcsya"
 :SAMPLE-SENTENCE "kotorye yavlyayutsya otdeljnymi ob-ektami"
 :FEATURES (IMPERFECT)
 :PROPERTIES ("явля" (нсв 1 А -ся))
:COMMENTS "that are separate objects"

(LEXICAL-ITEM
:NAME KAZHDYJ
:SPELLING " kazhdyj "
:SAMPLE-SENTENCE "ukazhite granichnuyu tochku kazhdogo slozhnogo segmenta"
:PROPERTIES ("кажд") (п 1 а))
:COMMENTS "specify the endpoint of each polyline segment"

(LEXICAL-ITEM
:NAME KLAVISHA
:SPELLING " klavisha "
:SAMPLE-SENTENCE "nazhmite klavishu o dlya raboty s ob-ektom"
:PROPERTIES ("клавиша") (ж 5 А))
:COMMENTS "Enter o for Object"

(LEXICAL-ITEM
:NAME KNOPOKA
:SPELLING " knopka "
:SAMPLE-SENTENCE "nazhmite knopku OK"
:PROPERTIES ("кнопка") (ж 3 А))
:COMMENTS "choose OK"

(LEXICAL-ITEM
:NAME KOMANDA
:SPELLING " komand"
:SAMPLE-SENTENCE "zapustite komandu L"
:PROPERTIES ("команд") (ж 1 А))
:COMMENTS "start the L command"

(LEXICAL-ITEM
:NAME KOMBINATSIJA
:SPELLING " kombinatsiya"
:SAMPLE-SENTENCE "chtoby narisovatj kombinatsiyu linii s krivoj"
:PROPERTIES ("комбинация") (ж 7 А))
:COMMENTS "to draw a line and arc combination polyline"

(LEXICAL-ITEM
:NAME KONECHNYJ
:SPELLING " KONECHNYJ"
:PROPERTIES ("конечный") (п 1 а))
:COMMENTS "endpoint"

(LEXICAL-ITEM
:NAME KRIVAJA
:SPELLING " krivaya"
:SAMPLE-SENTENCE "slozhnaya krivaya"
:PROPERTIES ("крив") (п 1 В))
:COMMENTS "polyline"
(LEXICAL-ITEM
:NAME LINEJNYJ
:SPELLING "linejnyj"
:SAMPLE-SENTENCE "poslednij linejnyj segment"
:PROPERTIES ("линейный") (п 1 а)
:COMMENTS "the previous line segment"
)

(LEXICAL-ITEM
:NAME LINIYA
:SPELLING "liniya"
:SAMPLE-SENTENCE "Chtoby narisovatj liniyu"
:PROPERTIES ("линия") (ж 7 A)
:COMMENTS "To draw a line"
)

(LEXICAL-ITEM
:NAME MASSHTAB
:SPELLING "MASSHTAB"
:FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN COUNTABLE)
:PROPERTIES ("масштаб") (м 1 A)
)

(LEXICAL-ITEM
:NAME MENJU
:SPELLING "menyu"
:SAMPLE-SENTENCE "vybratj v menyu"
:PROPERTIES ("меню") (с 0 А)
:COMMENTS "choose from the File menu"
)

(LEXICAL-ITEM
:NAME MNOZHESTVENNYJ
:SPELLING "mnozhestvennyj"
:SAMPLE-SENTENCE "L sozdaet edinichnyj ili mnozhestvennye linejnye segmenty, yavlyayushchiesya otdelnymi obektami"
:FEATURES (IMPERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("множественное") (п 1 а)
:COMMENTS "L creates single or multiple line segments that are separate objects"
)

(LEXICAL-ITEM
:NAME MOZHNO
:SPELLING "mozhno"
:SAMPLE-SENTENCE "Mozhno nachatj novuyu liniyu v granichnoj tochke poslednego narisovannogo segmenta povtornym zapuskom komandy L"
:PROPERTIES ("можно") (н)
:COMMENTS "You can start a new line at the endpoint of the last line drawn by starting the L command again"
)

(LEXICAL-ITEM
:NAME MULJTILINIYA
)
AGILE

(SPELLING "muljtiliniya"
:FEATURES (OUTCLASSIFY-PROPERNOUN NOUN COMMON-NOUN)
:PROPERTIES ("мультилиния") (ж 7 а))

(LEXICAL-ITEM
:NAME NA
:SPELLING "na"
:PROPERTY-SAMPLE-SENTENCE "na ehkrane"
:PROPERTIES ("на") (н)
:COMMENTS "=0"
)

(LEXICAL-ITEM
:NAME NACHALJNYJ
:SPELLING "nachaljnyj"
:PROPERTY-SAMPLE-SENTENCE "Ukazhite nachaljnuyu tochku"
:PROPERTIES ("начальная") (н 1 а)
:COMMENTS "Specify the start point"
)

(LEXICAL-ITEM
:NAME NARISOVATJ
:SPELLING "narisovatj"
:PROPERTY-SAMPLE-SENTENCE "Chtoby narisovatj liniyu; Mozinho nachatj novuyu liniyu v granichnoj tochke poslednego narisovannogo segmenta povtornym zapuskom komandy L"
:FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("нарисовать" "нарису"") (св 2 А)
:COMMENTS "To draw a line; You can start a new line at the endpoint of the last line drawn by starting the L command again"
)

(LEXICAL-ITEM
:NAME NATSHATJ
:SPELLING "nachatj"
:PROPERTY-SAMPLE-SENTENCE "Mozinho nachatj novuyu liniyu v granichnoj tochke poslednego narisovannogo segmenta povtornym zapuskom komandy L"
:FEATURES (PERFECT)
:PROPERTIES ("начать" "начн") (св 14 В -н-)
:COMMENTS "You can start a new line at the endpoint of the last line drawn by starting the L command again"
)

(LEXICAL-ITEM
:NAME NAZHATIE
:SPELLING "nazhatie"
:PROPERTY-SAMPLE-SENTENCE "nazhatiem klavishi L v nachaljnoj tochke"
:FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("нажати") (с 7 а)
:COMMENTS "choose OK; and pressing L at the start point prompt"
AGILE
37

(LEXICAL-ITEM
:NAME NAZHATJ
:SPELLING " nazhatj "
:SAMPLE-SENTENCE "nazhmite knopku OK"
:FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("Нажмите кнопку OK")
:COMMENTS "choose OK; and pressing L at the start point prompt"
)

(LEXICAL-ITEM
:NAME NOVYJ
:SPELLING " novyj"
:SAMPLE-SENTENCE "Mozhno nachatj novuyu liniyu v granichnoj tochke poslednego narisovannogo segmenta povtornym zapuskom komandy L"
:PROPERTIES ("нovo") (п 1 а)
:COMMENTS "You can start a new line at the endpoint of the last line drawn by starting the L command again"
)

(LEXICAL-ITEM
:NAME OBLASTJ
:SPELLING " oblastj"
:SAMPLE-SENTENCE "Chtoby vychislitj oblastj ob~ekta"
:PROPERTIES ("область") (8 а)
:COMMENTS "To calculate the area of an object"
)

(LEXICAL-ITEM
:NAME OB~EKT
:SPELLING " ob-ekt "
:SAMPLE-SENTENCE "Chtoby vychislitj oblastj ob~ekta"
:PROPERTIES ("объект") (1 а)
:COMMENTS "To calculate the area of an object"
)

(LEXICAL-ITEM
:NAME ODIN
:SPELLING " odin"
:SAMPLE-SENTENCE "Zapustite komandu L, vospoljzovavshisj odnim iz sleduyushchikh sposobov"
:PROPERTIES ("один") (п-мс 3 а)
:COMMENTS "... using one of these methods"
)

(LEXICAL-ITEM
:NAME OKNO
:SPELLING " okno"
:SAMPLE-SENTENCE "v dialogovom okne"
:PROPERTIES ("окно") (c 1 * a)
:COMMENTS "in the L dialog box"
)

(LEXICAL-ITEM
:NAME OTDELJNYJ
:SPELLING " otdeljnyj"
:SAMPLE-SENTENCE "kotorye yavlyayutsya otdeljnymi ob~ektami"
AGILE

(PROPERTIES ("отдельн") (п l a))
:COMMENTS "that are separate objects"
)

(LEXICAL-ITEM
:NAME OTKRYTJ
:SPELLING " otkrytj"
:SAMPLE-SENTENCE "chtoby otkrytj risunok"
:FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("откр" "откро") (св 12 a))
:COMMENTS "to open a drawing"
)

(LEXICAL-ITEM
:NAME OTMENITJ
:SPELLING " otmenitj"
:SAMPLE-SENTENCE "Chtoby otmenitj (udalitj, steretj) poslednij linejnyj (pryamoj) segment"
:FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("отмени" "отмен") (св 4 a))
:COMMENTS "To undo the previous line segment"
)

(LEXICAL-ITEM
:NAME PALITRA
:SPELLING " palitra"
:SAMPLE-SENTENCE "v palitre L na paneli instrumentov L nazhmite knopku L"
:PROPERTIES ("палитр") (ж 1 a))
:COMMENTS "From the L flyout on the L toolbar, choose L"
)

(LEXICAL-ITEM
:NAME PANELJ
:SPELLING " panelj"
:SAMPLE-SENTENCE "v palitreL na paneli instrumentov L nazhmite knopku L"
:PROPERTIES ("папел") (ж 8 a))
:COMMENTS "From the L flyout on the L toolbar, choose L"
)

(LEXICAL-ITEM
:NAME PARALLELJNYJ
:SPELLING " paralleljnyj"
:SAMPLE-SENTENCE "L sozdaet mnozhestvennye paralleljnye lini"
:PROPERTIES ("параллельн") (п 1 a))
:COMMENTS "L creates multiple parallel lines"
)

(LEXICAL-ITEM
:NAME PEREJTI
:SPELLING " perejti"
:SAMPLE-SENTENCE "chtoby perejti v rezhim L"
:FEATURES (PERFECT VERB)
:PROPERTIES ("перей" "перейд" "переше") (св 7 B (9)
(PAST-IRREG)))
AGILE

:COMMENTS  "to switch to L mode"
)

(LEXICAL-ITEM
:NAME Pervyj
:SPELLING  " pervyj "
:SAMPLE-SENTENCE  "soedinyayushchej nachaljnuyu tochku
pervogo segmenta i (s) granichnuyu tochki ... "
:PROPERTIES  (("перв") (п 1 а))
:COMMENTS  "to connect the start point of the first segment
with the endpoint of the last segment"
)

(LEXICAL-ITEM
:NAME Pokazatj
:FEATURES  (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-
VERB)
:PROPERTIES  (("показа" "покаж") (cb 4 а))
:COMMENTS  "display"
)

(LEXICAL-ITEM
:NAME Poliliniya
:SPELLING  "poliliniya"
:SAMPLE-SENTENCE  "poliliniya; ukazhite granichnuyu tochku
kazhdoy polilinii"
:PROPERTIES  (("полилини") (ж 7 а))
:COMMENTS  "polyline; specify the endpoint of each polyline
segment"
)

(LEXICAL-ITEM
:NAME Poslednij
:SPELLING  " poslednij "
:SAMPLE-SENTENCE  "soedinyayushchej nachaljnuyu tochku
pervogo segmenta i (s) granichnuyu tochki poslednego segmenta;
poslednij linejnij (pryamoj) segment"
:PROPERTIES  (("последн") (п 2 а))
:COMMENTS  "to connect the start point of the first segment
with the endpoint of the last segment; the previous line
segment"
)

(LEXICAL-ITEM
:NAME Povtornyj
:SPELLING  " povtornyj"
:SAMPLE-SENTENCE  "Mozhno nachatj novuju liniyu v granichnoj
tochke poslednego narisovannogo segmenta povtornym zapuskom
komandy L"
:PROPERTIES  (("повторн") (п 1 а))
:COMMENTS  "You can start a new line at the endpoint of the
last line drawn by starting the L command again"
)

(LEXICAL-ITEM
:NAME Poyavitjsja
:SPELLING  " pojavitjsya"
:SAMPLE-SENTENCE  "Na ehkrane poyavitjsya dialogovoe okno"
:FEATURES  (PERFECT VERB)
:PROPERTIES  
("появиться" "появится")  (св 4 В -ся)
:COMMENTS  "The L dialog box appears"

(LEXICAL-ITEM
 :NAME  PRJAMOJ
 :SPELLING  " pryamoj"
 :SAMPLE-SENTENCE  "slozhnaya krivaya s pryamymi segmentami"
 :PROPERTIES  
("пряма")  (п 1 В))
:COMMENTS  "a polyline with straight segments"

(LEXICAL-ITEM
 :NAME  PUNKT
 :SPELLING  " punkt "
 :SAMPLE-SENTENCE  "vybrav punkt L v menyu L"
 :PROPERTIES  
("пункт")  (м 1 а))
:COMMENTS  "=0"

(LEXICAL-ITEM
 :NAME  PYATYJ
 :SPELLING  " pyatyj"
 :SAMPLE-SENTENCE  "Ukazite pyatuyu tochku multtilinii"
 :PROPERTIES  
("пята")  (п 1 а))

(LEXICAL-ITEM
 :NAME  RABOTA
 :SPELLING  " rabota "
 :SAMPLE-SENTENCE  "nazmhite klavishu o dlya raboty s obektom"
 :FEATURES  (VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
 :PROPERTIES  
("работа")  (ж 1 а))
:COMMENTS  "Enter o for Object"

(LEXICAL-ITEM
 :NAME  REZHIM
 :SPELLING  " rezhim "
 :SAMPLE-SENTENCE  "chtoby perejti v rezhim L"
 :PROPERTIES  
("режим")  (п 1 а))
:COMMENTS  "to switch to L mode"

(LEXICAL-ITEM
 :NAME  RISOVANIE
 :SPELLING  " risovanie"
 :SAMPLE-SENTENCE  "chtoby zaovershitj risovanie linii"
 :FEATURES  (VERB DO-VERB EFFECTIVE-VERB)
 :PROPERTIES  
("рисование")  (с 7 а))
:COMMENTS  "to complete the line"

(LEXICAL-ITEM
 :NAME  RISUNOK
 :SPELLING  " risunok "
 :SAMPLE-SENTENCE  "chtoby otkrytj (sokhranitj) risunok"
(LEXICAL-ITEM
 :NAME SEDJMOJ
 :SPELLING " sedjmoj"
 :SAMPLE-SENTENCE "Ukazite shestuju tochku muljtilinii"
 :PROPERTIES ("седьм") (п 1 а))
 :COMMENTS "a drawing"
)

(LEXICAL-ITEM
 :NAME SEGMENT
 :SPELLING " segment "
 :SAMPLE-SENTENCE "Ukazhite granichnuyu tochku sleduyushchego segmenta"
 :PROPERTIES ("сегмент") (п 1 а))
 :COMMENTS "Specify the endpoint of the next segment"
)

(LEXICAL-ITEM
 :NAME SHESTOJ
 :SPELLING " shestoj"
 :SAMPLE-SENTENCE "Ukazite shestuju tochku muljtilinii"
 :PROPERTIES ("шесть") (п 1 а))
)

(LEXICAL-ITEM
 :NAME SLEDUYUSHCHIJ
 :SPELLING " sleduyushchij"
 :SAMPLE-SENTENCE "Zapustite komandu L, vospoljzovavshisj odnim iz sleduyushchikh sposobov; Ukazhite granichnuyu tochku sleduyushchego segmenta"
 :PROPERTIES ("следующий") (п 2 а))
 :COMMENTS "... using one of these methods; Specify the endpoint of the next segment"
)

(LEXICAL-ITEM
 :NAME SNATSHALA
 :SPELLING " snachala"
 :SAMPLE-SENTENCE "Snachala narisujte linejnyj segment"
 :PROPERTIES ("сначала") (н))
 :COMMENTS "First draw the line segment"
)

(LEXICAL-ITEM
 :NAME SOEDINYATJ
 :SPELLING " soedinyatj"
 :SAMPLE-SENTENCE "soedinyayushchej nachaljnuyu ... i (s) granichnuyu tochki ... "
 :FEATURES (IMPERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
 :PROPERTIES ("соединя") (нсв 1 А))
 :COMMENTS "to connect the start point of the first segment with the endpoint of the last segment"
)

(LEXICAL-ITEM
LEXICAL-ITEM
:NAME SOKHURANITJ
:SPELLING "sokhranitj"
:SAMPLE-SENTENCE "Chtoby sokhranitj risunok"
:FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("сохрани" "сохрани") (св 4 А))
:COMMENTS "To save a drawing"

LEXICAL-ITEM
:NAME SOZDAVATJ
:SPELLING "sozdavatj"
:SAMPLE-SENTENCE "L sozdaet edinstvennyj ili mnozhestvennye linejnye segmenty, yavlyayushchiesya otdelnymi ob-ektami"
:FEATURES (IMPERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("создаёт" "создаёт") (кв 14 А))
:COMMENTS "L creates single or multiple line segments that are separate objects"

LEXICAL-ITEM
:NAME SPISOK
:SPELLING "spisok"
:SAMPLE-SENTENCE "Zapustite komandu L, vospoljzovavshisj odnim iz sleduyushchikh sposobov"
:PROPERTIES ("список" "список") (м 3 * а))
:COMMENTS "... using one of these methods"

LEXICAL-ITEM
:NAME SPOSOB
:SPELLING "sposob"
:SAMPLE-SENTENCE "Zapustite komandu L, vospoljzovavshisj odnim iz sleduyushchikh sposobov"
:PROPERTIES ("способ") (м 1 а))
:COMMENTS "... using one of these methods"

LEXICAL-ITEM
:NAME STILJ
:SPELLING "stilj"
:SAMPLE-SENTENCE "Zapustite komandu L, vospoljzovavshisj odnim iz sleduyushchikh sposobov"
:PROPERTIES ("стиль") (м 2 а))
:COMMENTS "... using one of these methods"

LEXICAL-ITEM
:NAME STROKA
:SPELLING "stroka"
:SAMPLE-SENTENCE "Ukazhite nachaljnuyu tochku"
:PROPERTIES ("строк") (ж 3 а))
:COMMENTS "Specify the start point"

LEXICAL-ITEM
:NAME TEPERJ
:FEATURES (PERFECT)
AGILE

":PROPERTIES  ("теперь") (н))
:COMMENTS  "now"
"

(LEXICAL-ITEM
 :NAME TOCHKA
 :SPELLING " tochka "
 :SAMPLE-SENTENCE "Ukazhite nachalnuyu tochku"
 :PROPERTIES  ("точк" "точек") (ж 3 * а))
 :COMMENTS  "Specify the start point"
"

(LEXICAL-ITEM
 :NAME TRETIJ
 :SPELLING " tretij"
 :SAMPLE-SENTENCE "Ukazite tretjju tochku muljtilinii"
 :PROPERTIES  ("треть трет") (п-мс 2 а))
"

(LEXICAL-ITEM
 :NAME UKAZATJ
 :SPELLING " ukazatj "
 :SAMPLE-SENTENCE "Ukazhite nachalnuyu tochku"
 :FEATURES  (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL- VERB)
 :PROPERTIES  ("указа" "указ"") (св 6 C))
 :COMMENTS  "Specify the start point"
"

(LEXICAL-ITEM
 :NAME V
 :SPELLING " v "
 :SAMPLE-SENTENCE "vybratj v (spiske, menyu), v komande L"
 :FEATURES  (PERFECT)
 :PROPERTIES  ("в") (н))
 :COMMENTS  "choose from the File menu, click on the file name in the L list; during the L command"
"

(LEXICAL-ITEM
 :NAME VOSJMOJ
 :SPELLING " vosjmoj"
 :SAMPLE-SENTENCE "Ukazite shestuju tochku muljtilinii"
 :PROPERTIES  ("восем") (п l B))
"

(LEXICAL-ITEM
 :NAME VTOROJ
 :SPELLING " vtoroj"
 :SAMPLE-SENTENCE "Ukazite vtoruju tochku muljtilinii"
 :PROPERTIES  ("втор") (п l B))
"

(LEXICAL-ITEM
 :NAME VVESTI
 :SPELLING "vvesti"
 :SAMPLE-SENTENCE "vybratj (punkt, imya fajla) v (spiske, menyu), "
AGILE

:FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("выбрать" "выбери") (св 7 А)
:COMMENTS "choose from the File menu; click on the file name in the L list; select an object"

(LEXICAL-ITEM
 :NAME VYBRATJ
 :SPELLING "vybratj"
 :SAMPLE-SENTENCE "vybratj (punkt, imya fajla) v (spiske, menuy),"
 :FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
 :PROPERTIES ("выбрать" "выбери") (св 6 А)
 :COMMENTS "choose from the File menu; click on the file name in the L list; select an object"
)

(LEXICAL-ITEM
 :NAME VYRAVNIVANIJE
 :FEATURES (NOUN)
 :PROPERTIES ("выравнивание") (св 7 А)
 :COMMENTS "justification"
)

(LEXICAL-ITEM
 :NAME VYROVNJATJ
 :FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
 :PROPERTIES ("выровнять") (св 1 А)
 :COMMENTS "justify"
)

(LEXICAL-ITEM
 :NAME VYTSHISLITJ
 :SPELLING "vychislitj"
 :SAMPLE-SENTENCE "Chtoby vychislitj oblastj ob-ekta"
 :FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
 :PROPERTIES ("вычисли" "вычислай") (св 4 А)
 :COMMENTS "To calculate the area of an object"
)

(LEXICAL-ITEM
 :NAME ZADAVATJ
 :SPELLING "ZADAVATJ"
 :FEATURES (PERFECT VERB)
 :PROPERTIES ("задава" "зада") (нсв 14 А)
 :COMMENTS "specify"
)

(LEXICAL-ITEM
 :NAME ZAKONTSHITJ
 :SPELLING "zakonchitj"
 :SAMPLE-SENTENCE "nazhmite klavishu L chtoby zakonchitj ili klavishu L chtoby zamknutj krivuyu"
 :FEATURES (PERFECT VERB)
 :PROPERTIES ("закончи" "законч") (св 4 А)
)
:COMMENTS "press L to end, or enter L to close the polyline"
)

(LEXICAL-ITEM
:NAME ZAPUSK
:SPELLING " zapusk "
:SAMPLE-SENTENCE "nazhmite klavishu c dlya zapuska komandy
Close, soedinyayushchej ...")
:FEATURES (VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("zapusk") (a L 1)
:COMMENTS "enter c for Close to connect ..."
)

(LEXICAL-ITEM
:NAME ZAPUSTITJ
:SPELLING " zapustitj "
:SAMPLE-SENTENCE "zapustite komandu L"
:FEATURES (PERFECT VERB DO-VERB EFFECTIVE-VERB DISPOSAL-VERB)
:PROPERTIES ("запустить" "запустил") (cB 4 A)
:COMMENTS "start the L command"
)

(LEXICAL-ITEM
:NAME ZATEM
:SPELLING " zatem "
:SAMPLE-SENTENCE "Zatem nazhmite knopku L"
:PROPERTIES ("затем") (i)
:COMMENTS "Then choose L"
)

(LEXICAL-ITEM
:NAME ZAVERSHTIJ
:SPELLING " zavershitj "
:SAMPLE-SENTENCE "chtoby zavershitj risovanie linii"
:FEATURES (PERFECT VERB)
:PROPERTIES ("завершить" "завершил") (cB 4 A)
:COMMENTS "to complete the line"
)

(LEXICAL-ITEM
:NAME SVERKHU
:SPELLING " sverkhu "
:SAMPLE-SENTENCE " vyberite vyravnivanie sverkhu, po tsentru
i snizu"
:PROPERTIES ("сверху") (k)
:COMMENTS "enter a justification from top, zero and bottom"
)

(LEXICAL-ITEM
:NAME PO-TSENTRU
:SPELLING " po tsentru"
:SAMPLE-SENTENCE " vyberite vyravnivanie sverkhu, po tsentru
i snizu"
:PROPERTIES ("по центру") (k)
:COMMENTS "enter a justification from top, zero and bottom"
(LEXICAL-ITEM
 :NAME SNIZU
 :SPELLING "snizu"
 :SAMPLE-SENTENCE "vyberite vyravnivanie sverkhu, po tsentru i snizu"
 :PROPERTIES ("снизу") (н))
 :COMMENTS "enter a justification from top, zero and bottom"
)

(LEXICAL-ITEM
 :NAME ZAKRJTJ
 :SPELLING "zakrytj"
 :SAMPLE-SENTENCE "zakrytj okno"
 :FEATURES (PERFECT VERB)
 :PROPERTIES ("закрыть" "закрыть") (св 12 А))
 :COMMENTS "to close the window"
)