Sanchay

An NLP Platform for Indian Languages

Anil Kumar Singh <anil@research.iiit.ac.in>
Language Technologies Research Centre
International Institute of Information Technology
Hyderabad, India

Sanchay: A collection of APIs and tools for NLP

- Focuses on Indian languages
- Includes GUI based interfaces for annotation
  - Like Syntactic Annotation Interface
  - Parallel markup interface

Some Features

- Object oriented
- Reusable and flexible/customizable components
- Every component an API
- No commitment to one specific architecture or theoretical framework
- GUIs for as many things as possible
- Open source

Major Components

- APIs for language resources
- Data structures for usual kinds of data
- Basic GUI components (table, tree, etc.)
- Annotation interfaces
- Sentence alignment tool
- Language and encoding identification tool
- A multi-purpose editor for NLP and Indian languages
- A computational phonetic model for Indian language scrpits

Resources

- Atomic resources
  - Raw corpus
- Aggregate resources
  - Parallel corpus

Some GUI Components

- Enhanced Tree
- Enhanced Table
- Tree Viewer

Implementation of NLP Algorithms/Techniques

- Sentence alignment
- Language and encoding identification
- N-Gram modelling
- Dictionary Trie

Data Components

- Trees representing SSF, XML, etc.
- A generalized table
- Properties manager

Utilities

- File splitter
  - For different kinds of corpora
- Find/replace/extract
  - Uses regular expressions
  - Can work in batch mode
- Preprocessing of raw text
- Many others

Support for Indian Languages

- Works without installing fonts
- Many major Indian languages supported
- Uses a collection of free fonts
- Font listing according to the language and encoding

Interfacing with Other NLP Platforms/Libraries

- Not yet done, but planned:
  - GATE
  - OpenNLP
  - Mallet
- Tried a Hindi POS tagger using OpenNLP MaxEnt package

Future Work

- Generalized support for XML based annotation
- Applications like spell checker for Indian languages

Sanchay Editor

A Text Editor for Indian Languages

Anil Kumar Singh <anil@research.iiit.ac.in>

Language Technologies Research Centre

International Institute of Information Technology

Hyderabad, India

Text Editor for Indian Languages

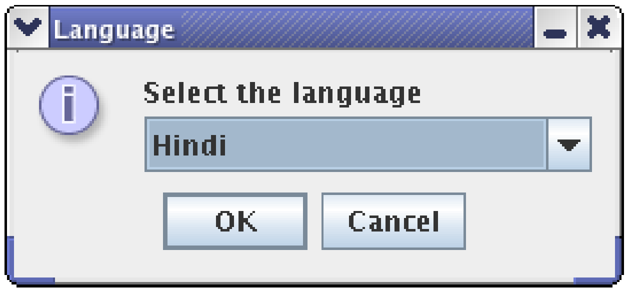
- Support for most of the major Indian languages
- Customizable support for encodings
  - Default: UTF-8

Start

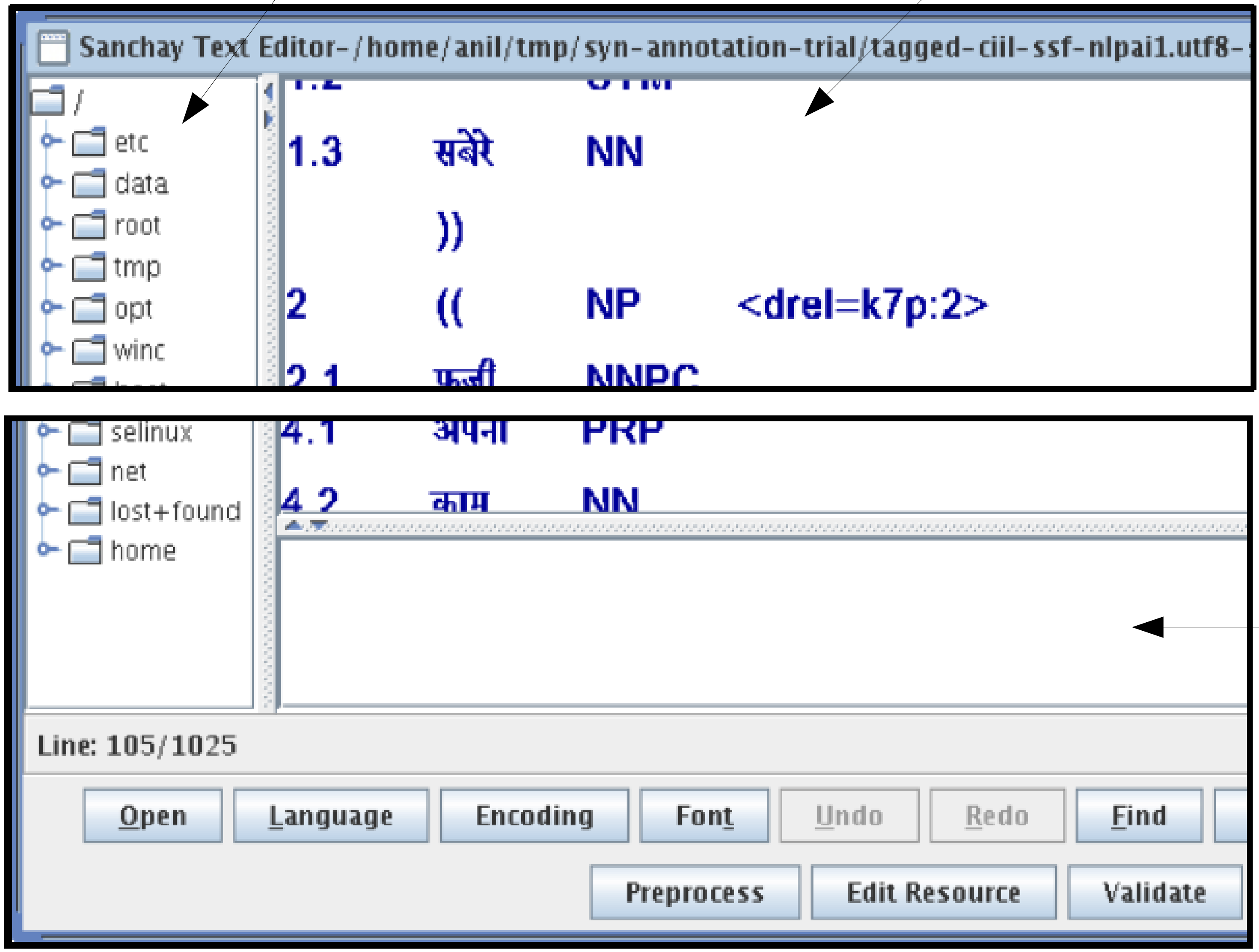
- Go to the Sanchay directory
- On Linux
    - **sh sanchay-editor.sh**
- On Windows
    - Double click on **sanchay-editor.bat**
    - Or **sanchay-editor** (if DOS extensions not visible)

Select Language

- You will see a dialog for selecting the language



Editor

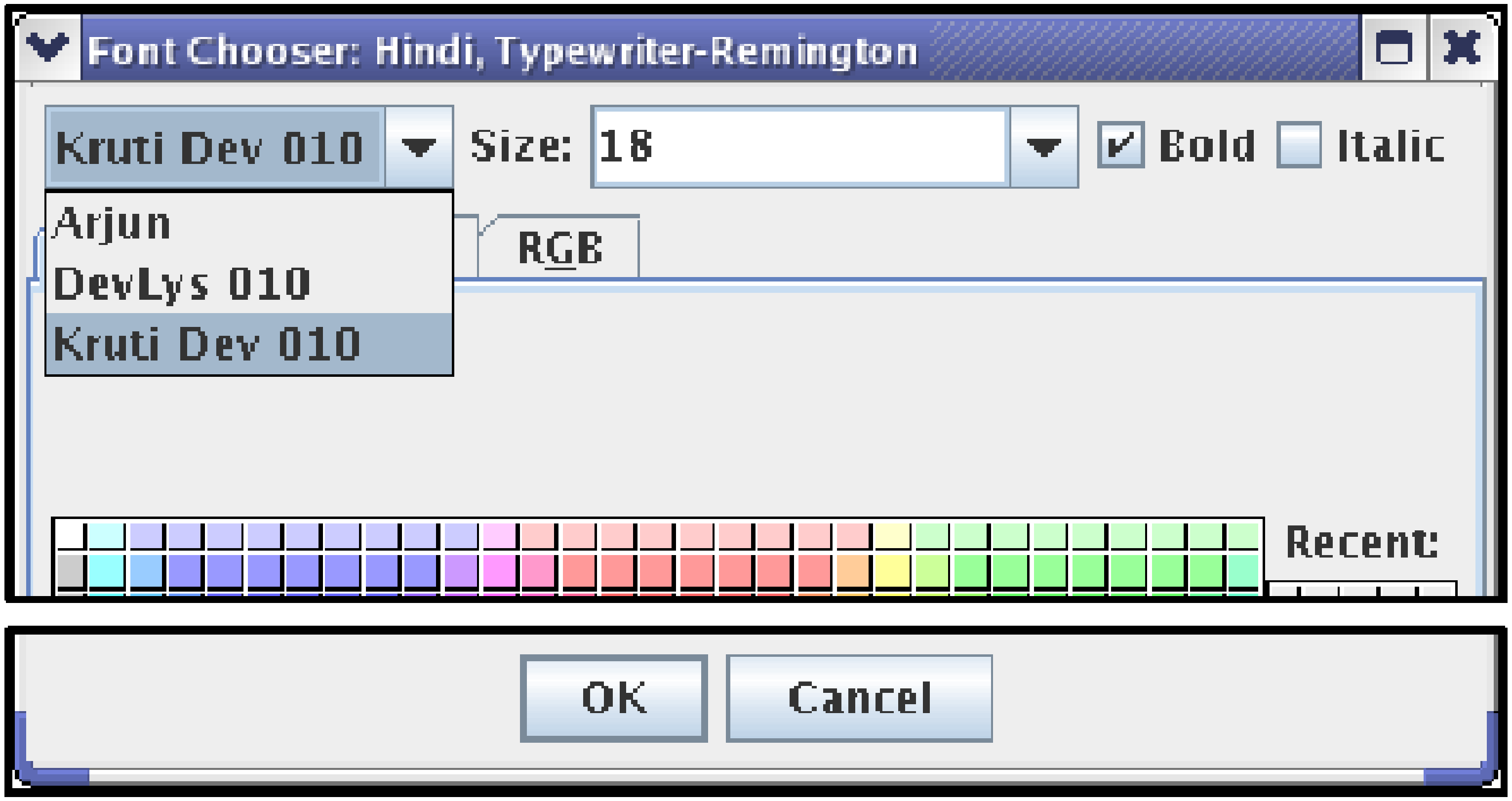


```
1.3     सबेरे    NN
        ))
2       ((      NP      <drel=k7p:2>
2.1     फजी     NNPC
4.1     अपना    PRP
4.2     काम     NN
```

Line: 105/1025

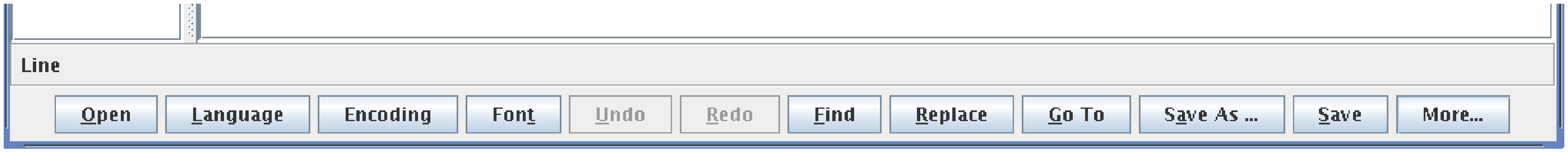
Font Selection

- Fonts are listed according to the language and the encoding



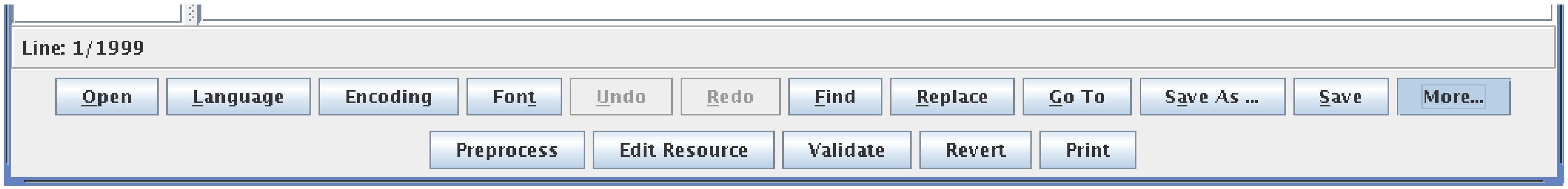
Commands

- Open file
- Switch language
- Switch encoding
- Select font
- Undo/redo
- Find
- Replace
- Go to line (number)
- Save As
- Save



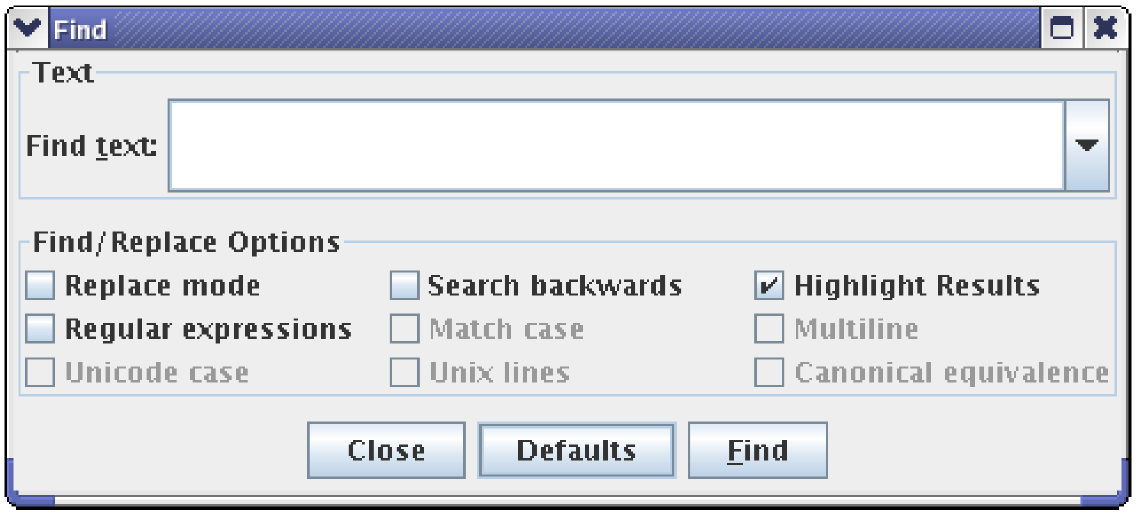
More Commands

- Preprocess
  - Sentence segmentation
  - Tokenization
- Edit resource
  - Open Syntactic Annotation Interface if file in SSF format
- Validate format (say, SSF)
- Revert to previously saved file
- Print



Find/Replace

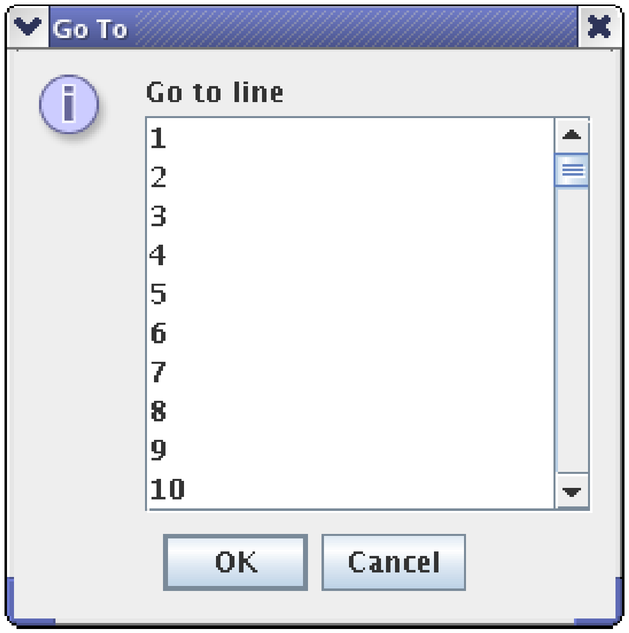
- Possible to search with regular expressions
  - Using the Java syntax



- [ ] Replace mode
- [ ] Search backwards
- [x] Highlight Results
- [ ] Regular expressions
- [ ] Match case
- [ ] Multiline
- [ ] Unicode case
- [ ] Unix lines
- [ ] Canonical equivalence

Go to

- Go to a specific line number



More to Come

- Many extensions to the editor
  - Under construction

Sanchay Syntactic Annotation Interface

Anil Kumar Singh

<anil@research.iiit.ac.in>

Language Technologies Research Centre

International Institute of Information Technology

Hyderabad, India

Introduction

- Sanchay: A collection of APIs and tools for NLP
- Includes GUI based interfaces for annotation
    - Like Syntactic Annotation Interface

Syntactic Annotation Interface

- Can view or edit:
  - POS tagging
  - Chunking
  - Feature structures of words or chunks
    - Morphological information
    - Kaaraka or dependency relationships
- Many other things
  - Anything in the form of a tree
  - (Optional) Where a node can have feature structures

Overview

- System requirements and Installation
- Working modes
  - Stand-alone or task mode
- Setting up the tasks
- Starting the interface
- Viewing annotation
- Editing annotation
- Comparing annotation

System Requirements

- JDK-1.5 (or JRE-1.5) installed on your system
- Preferably >1 GHz processor and >256 MB RAM
- You may like to specify the memory allocated for JVM (see later), if you have more RAM
- Tested on Linux and Windows

Installation

- Untar the Sanchay.tgz file somewhere on your system
  - Or unzip the Sanchay.zip file
- There should be a **Sanchay** directory
- That’s all for installation!

Working Modes

- You can work in two modes
  - Stand-alone mode
    - Directly open a the corpus file (Browse)
    - Some assumptions: e.g., specific separators
  - Task mode
    - Select the task group
    - Then select the task

Which Mode is Better?

- Stand-alone is better if
    - You don't know how to set up tasks
    - You don't want to set up tasks
    - You only need to use the interface occasionally
- Task mode is better if
    - You use the interface quite often or on many files
    - You need to customize certain things

Working in Stand-alone Mode-I

- On Linux
  1. On the console, go to the Sanchay directory
  2. Run the shell script

     sh syn-ann-stand-alone.sh
- On Windows
  1. Go to the Sanchay directory
  2. Double click on

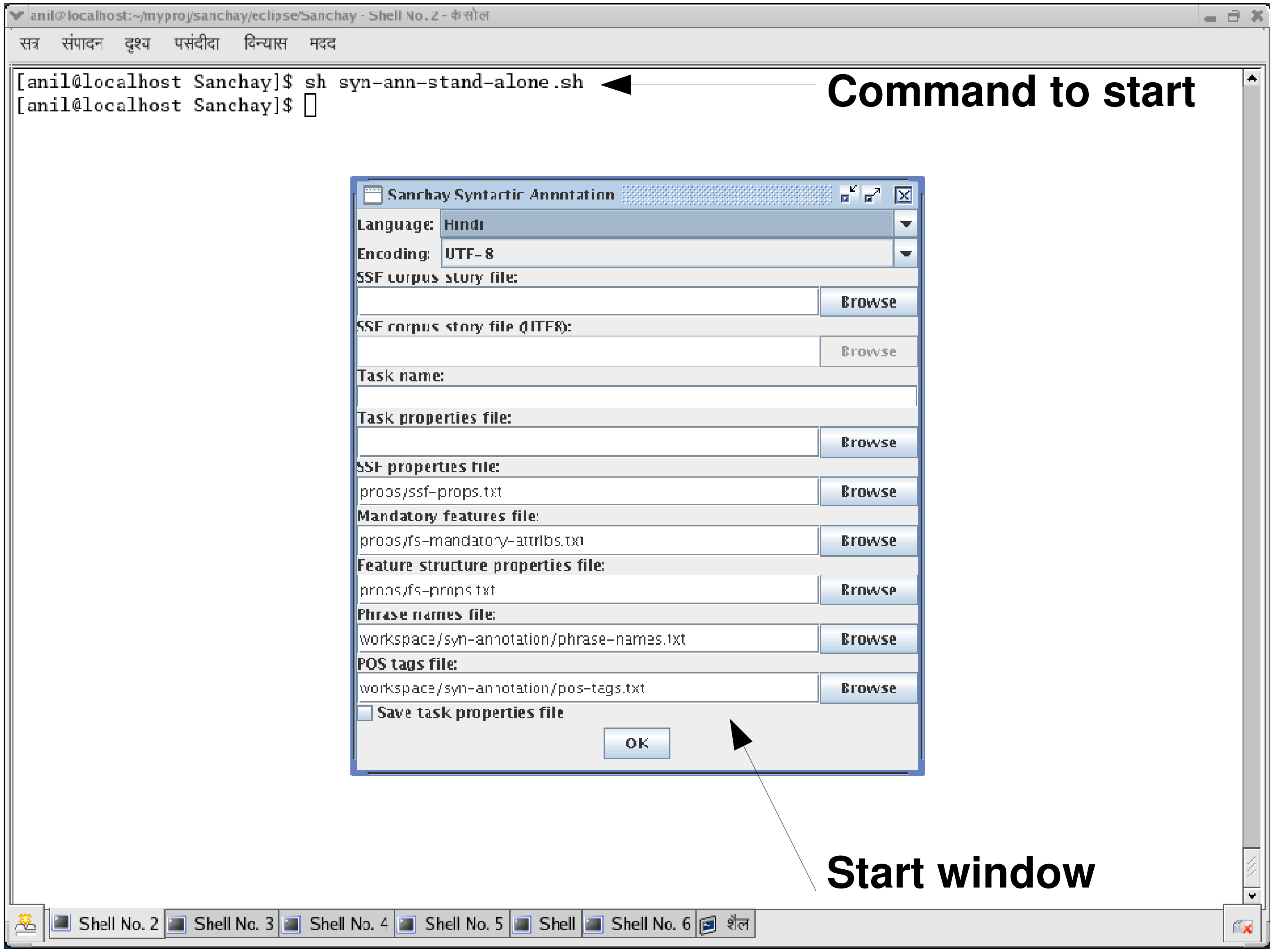
     syn-ann-stand-alone.bat

     Or **syn-ann-stand-alone** (if DOS extensions are not displayed)

Working in Stand-alone Mode-II

- You will see the task properties window
- Select the language and encoding
- Select the corpus file to be annotated
  - By clicking on the first (top) Browse button
- Normally, you don't have to fill in anything else
- Click on the OK button to start work
- You will see the work window where one sentence from the task data file will be displayed

Working in Stand-alone Mode-III



```
[anil@localhost Sanchay]$ sh syn-ann-stand-alone.sh
[anil@localhost Sanchay]$ 
```

Sanchay Syntactic Annotation

Language: Hindi

Encoding: UTF-8

SSF corpus story file:

SSF corpus story file (UTF8):

Task name:

Task properties file:

SSF properties file: props/ssf-props.txt

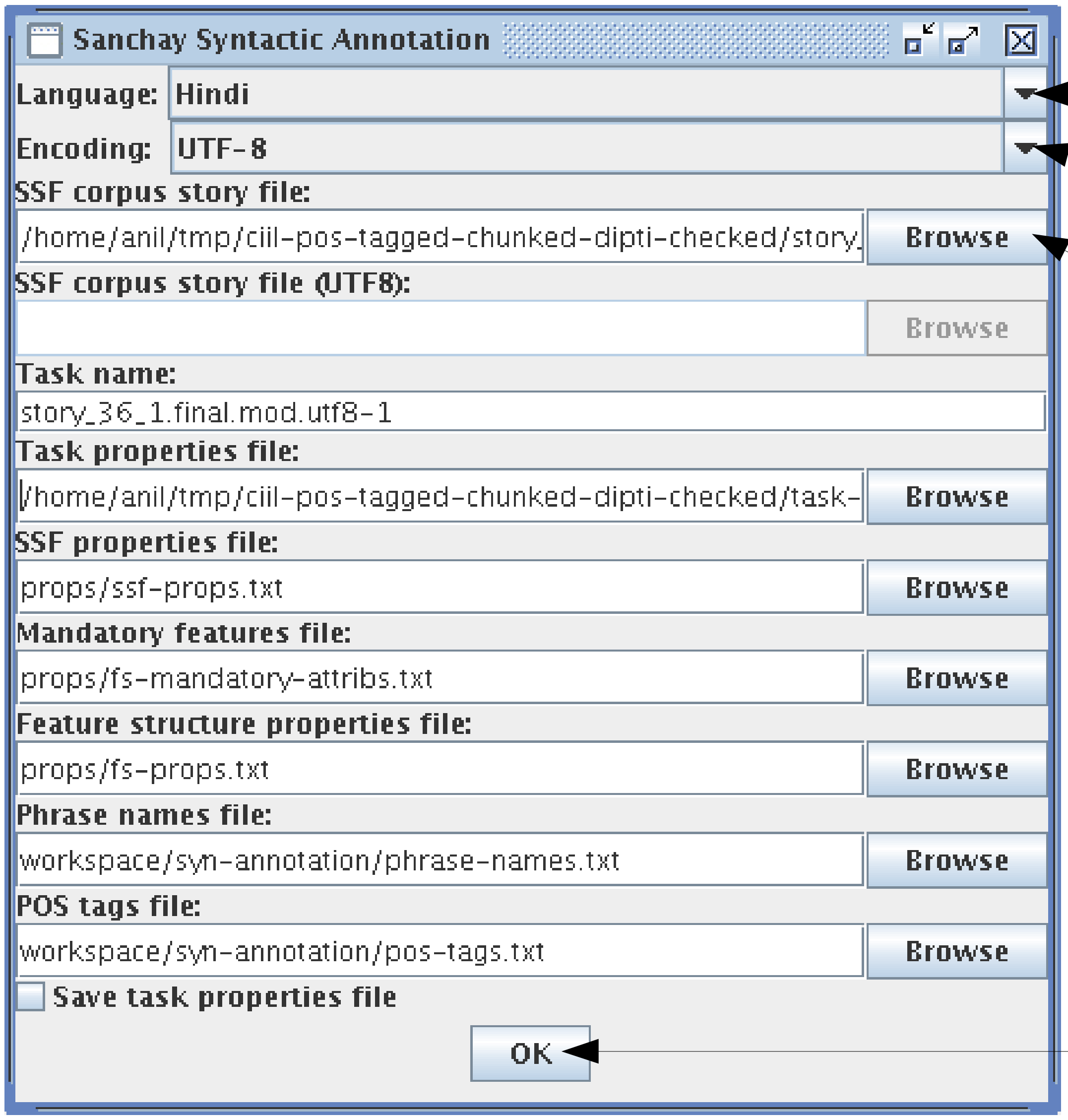
Mandatory features file: props/fs-mandatory-attribs.txt

Feature structure properties file: props/fs-props.txt

Phrase names file: workspace/syn-annotation/phrase-names.txt

POS tags file: workspace/syn-annotation/pos-tags.txt

The Main Window (Stand-alone)



Sanchay Syntactic Annotation

Language: Hindi

Encoding: UTF-8

SSF corpus story file: /home/anil/tmp/ciil-pos-tagged-chunked-dipti-checked/story

SSF corpus story file (UTF8):

Task name: story_36_1.final.mod.utf8-1

Task properties file: /home/anil/tmp/ciil-pos-tagged-chunked-dipti-checked/task-

SSF properties file: props/ssf-props.txt

Mandatory features file: props/fs-mandatory-attribs.txt

Feature structure properties file: props/fs-props.txt

Phrase names file: workspace/syn-annotation/phrase-names.txt

POS tags file: workspace/syn-annotation/pos-tags.txt

Select language

Select encoding

Browse to select corpus file

Click to start work

Task Setup-I

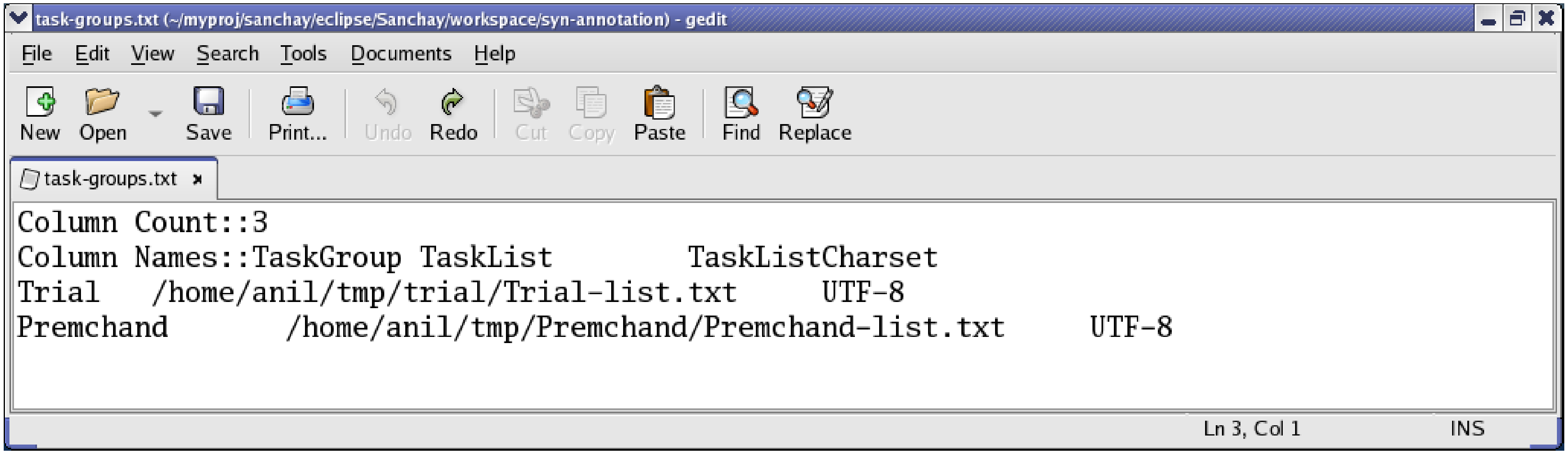
- Annotation performed on ‘tasks’
- Details about a task in a properties file
- Task data located inside:
  - **Sanchay/workspace/syn-annotation** (default)
  - Or any other directory on your system
- You can form tasks groups
- (Preferably) One directory for each task group

Task Setup-II

- E.g., an **nlpai-tasks** directory for NLPAI ML contest tasks
- Each ‘task’ represents a part of the (to be) annotated corpus
  - A ‘story’ or a part of the ‘story’
- A list of task groups is kept in a file **task-groups.txt** in **syn-annotation** directory
- Each entry in this file refers to one task list

Task Setup-III

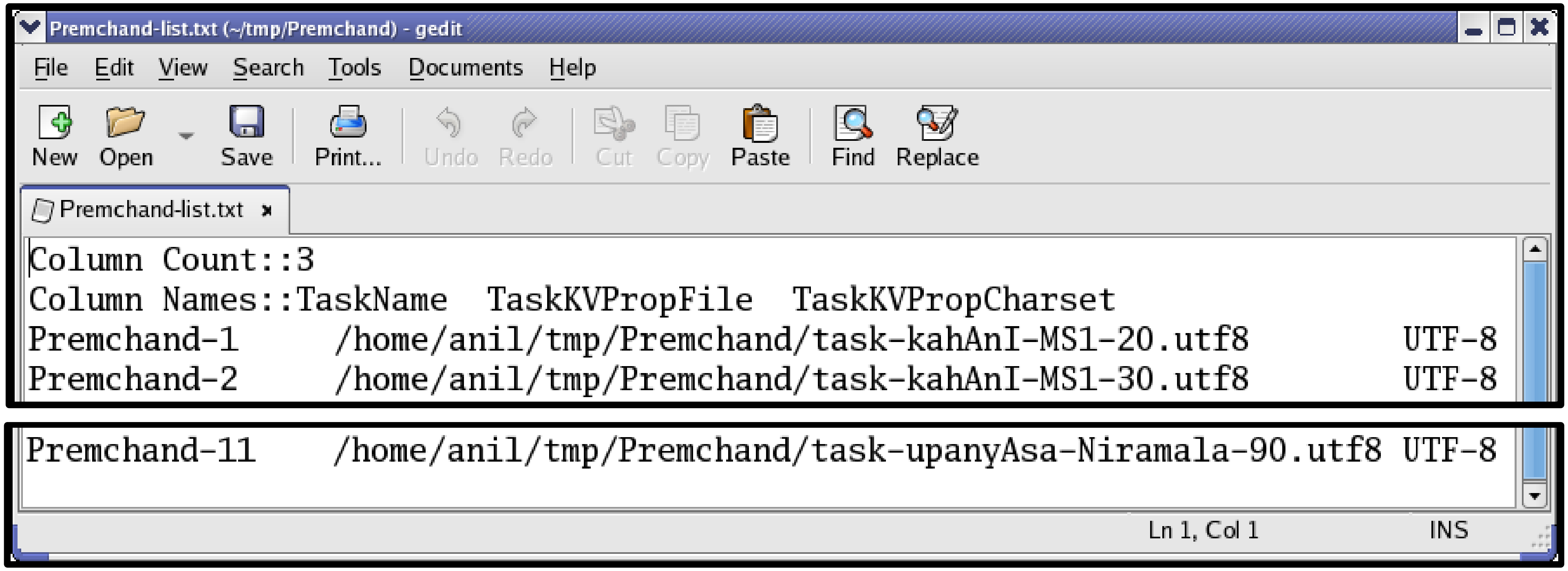
- **task-groups.txt** has tab separated fields
  - Task group name, task list file path and charset of this file (default UTF-8)


task-groups.txt (~/myproj/sanchay/eclipse/Sanchay/workspace/syn-annotation) - gedit
File Edit View Search Tools Documents Help
New Open Save Print... Undo Redo Cut Copy Paste Find Replace
task-groups.txt
Ln 3, Col 1
INS

```
Column Count::3
Column Names::TaskGroup TaskList        TaskListCharset
Trial    /home/anil/tmp/trial/Trial-list.txt     UTF-8
Premchand        /home/anil/tmp/Premchand/Premchand-list.txt     UTF-8
```

Task Setup-IV

- Each task list file, say **Premchand-list.txt** has tab separated fields
  - Task name, task properties file path and charset of this file (default UTF-8)


Premchand-list.txt (~/tmp/Premchand) - gedit
File Edit View Search Tools Documents Help
New Open Save Print... Undo Redo Cut Copy Paste Find Replace
Premchand-list.txt
Ln 1, Col 1 INS

```
Column Count::3
Column Names::TaskName  TaskKVPropFile  TaskKVPropCharset
Premchand-1     /home/anil/tmp/Premchand/task-kahAnI-MS1-20.utf8        UTF-8
Premchand-2     /home/anil/tmp/Premchand/task-kahAnI-MS1-30.utf8        UTF-8
```

```
Premchand-11    /home/anil/tmp/Premchand/task-upanyAsa-Niramala-90.utf8 UTF-8
```

Task Properties Files-I

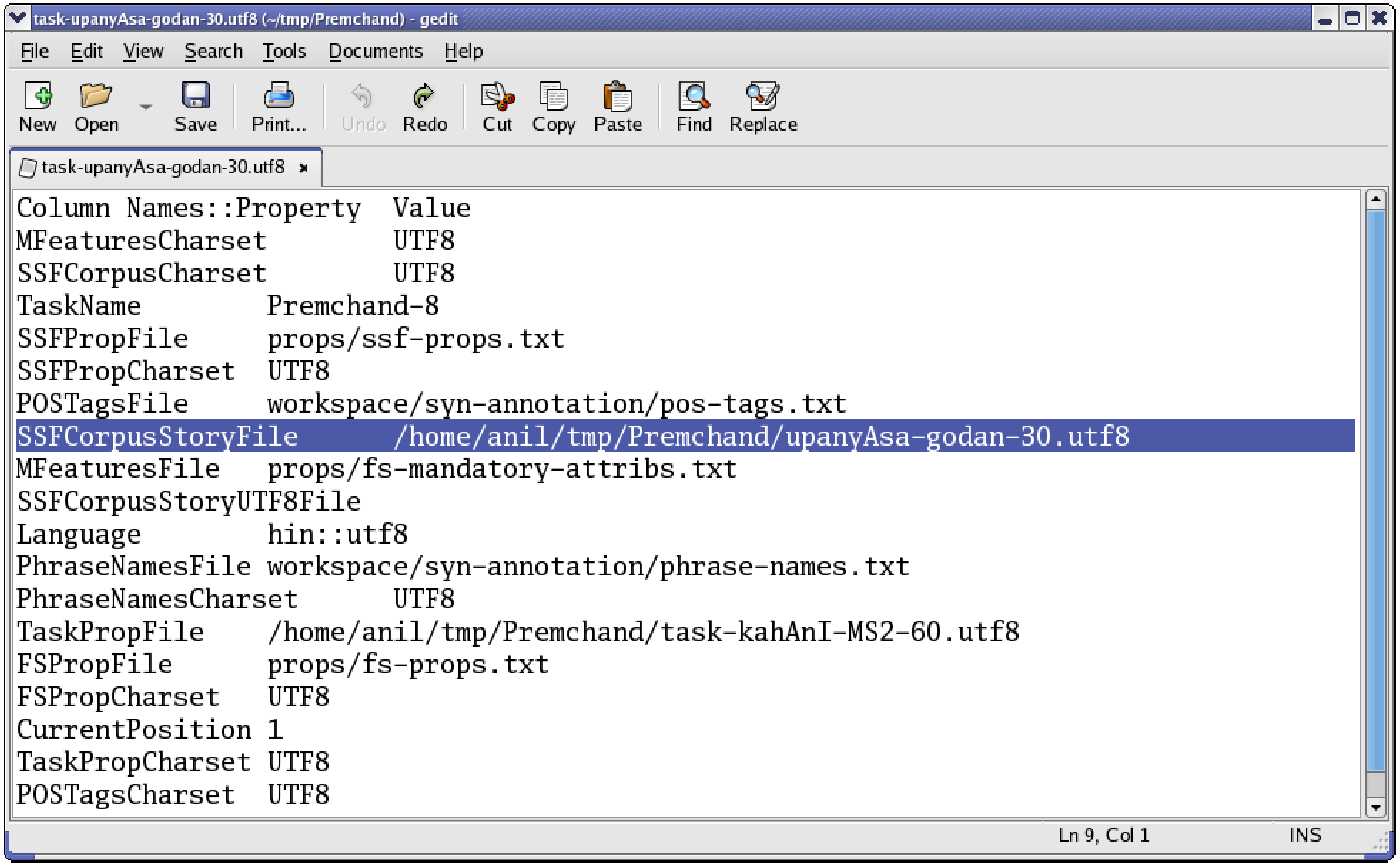
- Each task has a properties file with key-value pairs
- Three main keys for setting up new tasks
  - TaskName
  - SSFCorpusStoryFile
  - TaskPropFile
  - Language: language & encoding code, separated by '::'
    - Hindi (UTF-8) will be specified as hin::utf8
  - Language and encoding codes listed in:
    - Sanchay/props/languages.txt
    - Sanchay/props/encodings.txt

Task Properties Files-II

- E.g., for **Premchand-8**
  - There is an entry in **Premchand-list.txt**
  - There is a task properties file, say, **task-upanyAsa-godan-30.utf8**
    - Note the prefix **'task-'**
  - There is the corpus ‘story’ part, say, **upanyAsa-godan-30.utf8**
    - The actual corpus data file

Task Properties Files-III

- **task-upanyAsa-godan-30.utf8** has key-value pairs


task-upanyAsa-godan-30.utf8 (~/tmp/Premchand) - gedit
File Edit View Search Tools Documents Help
New Open Save Print... Undo Redo Cut Copy Paste Find Replace
task-upanyAsa-godan-30.utf8
Ln 9, Col 1
INS

```
Column Names::Property  Value
MFeaturesCharset        UTF8
SSFCorpusCharset        UTF8
TaskName        Premchand-8
SSFPropFile     props/ssf-props.txt
SSFPropCharset  UTF8
POSTagsFile     workspace/syn-annotation/pos-tags.txt
SSFCorpusStoryFile      /home/anil/tmp/Premchand/upanyAsa-godan-30.utf8
MFeaturesFile   props/fs-mandatory-attribs.txt
SSFCorpusStoryUTF8File
Language        hin::utf8
PhraseNamesFile workspace/syn-annotation/phrase-names.txt
PhraseNamesCharset      UTF8
TaskPropFile    /home/anil/tmp/Premchand/task-kahAnI-MS2-60.utf8
FSPropFile      props/fs-props.txt
FSPropCharset   UTF8
CurrentPosition 1
TaskPropCharset UTF8
POSTagsCharset  UTF8
```

Notes about Encoding or Font

- The default encoding is UTF-8
- Sorry, but ISCII won’t work currently
  - Let’s hope it will soon
- You might need to convert corpus files to UTF-8 or WX etc.

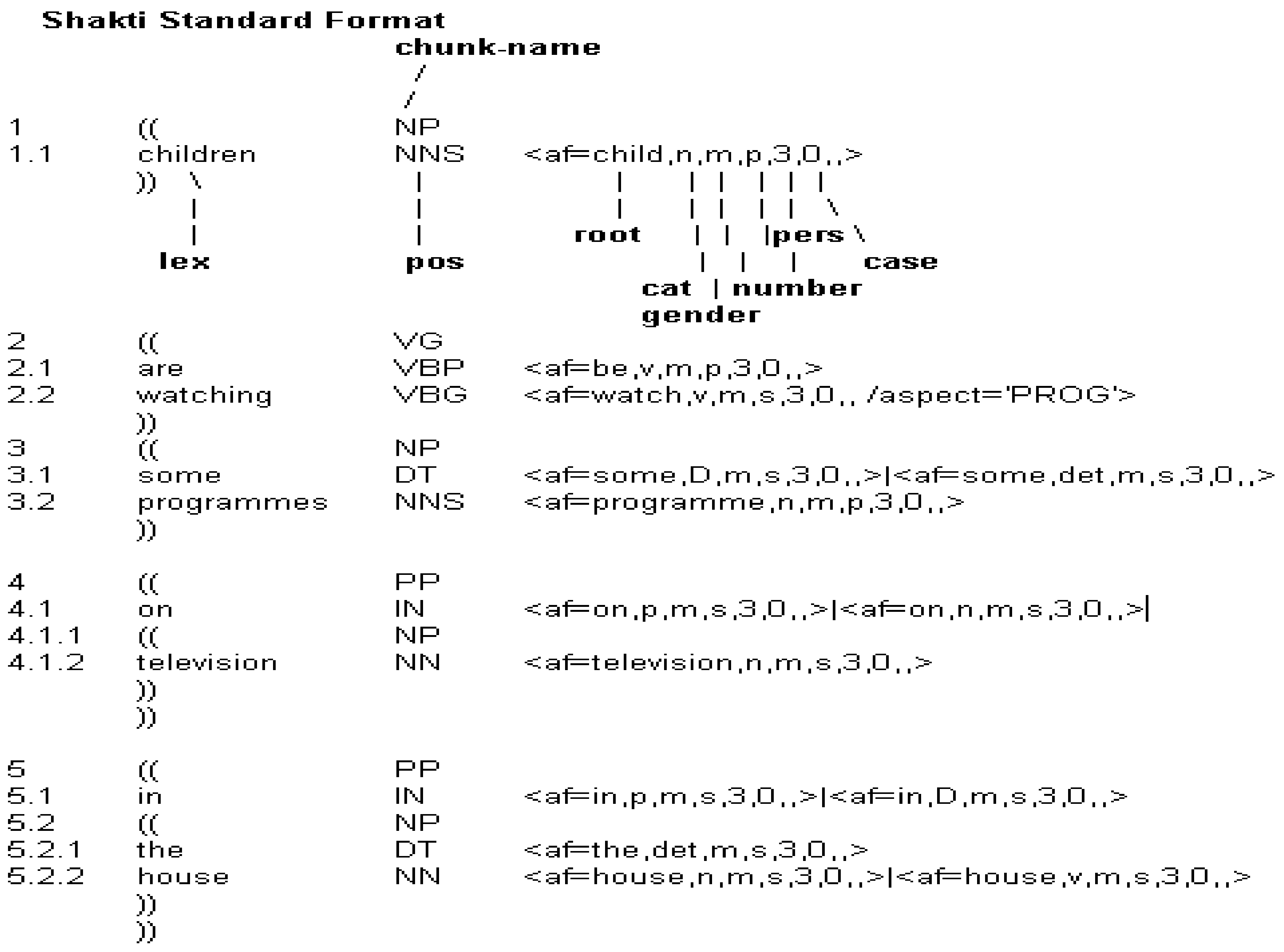
Corpus Data Format Disclaimer

- The interface only accepts data in correct SSF format
  - Actually, raw data (simple text) is also accepted, but is converted into SSF (see the next slide)
- SSF is Shakti Standard Format
  - A CFG (Context Free Grammar) tree like format with the addition that every node can have feature structures for carrying morphological and dependency relation information, among other things

WARNING - Using Raw Data

- The task data files can also be in raw form
  - **ONE SENTENCE PER LINE**
- If start work on a task with raw data
  - You get a message about raw data
  - You are asked to make sure each sentence is on a separate line
  - You are presented with a text editor for this
- A preprocessing program is run on the raw data to break up the sentence and to do tokenization, but you may have to check for errors

SSF



```
   Shakti Standard Format
                               chunk-name
                                 /
                                /
1          ((                  NP
1.1        children            NNS     <af=child,n,m,p,3,0,,>
           ))  \                |              |     | |  | | |
                |               |              |     | |  | |  \
                |               |          root      | |  |pers \
             lex                pos                  |  |  |     case
                                                  cat | number
                                                  gender
2          ((                  VG
2.1        are                 VBP     <af=be,v,m,p,3,0,,>
2.2        watching            VBG     <af=watch,v,m,s,3,0,, /aspect='PROG'>
           ))
3          ((                  NP
3.1        some                DT      <af=some,D,m,s,3,0,,>|<af=some,det,m,s,3,0,,>
3.2        programmes          NNS     <af=programme,n,m,p,3,0,,>
           ))

4          ((                  PP
4.1        on                  IN      <af=on,p,m,s,3,0,,>|<af=on,n,m,s,3,0,,>|
4.1.1      ((                  NP
4.1.2      television          NN      <af=television,n,m,s,3,0,,>
           ))
           ))

5          ((                  PP
5.1        in                  IN      <af=in,p,m,s,3,0,,>|<af=in,D,m,s,3,0,,>
5.2        ((                  NP
5.2.1      the                 DT      <af=the,det,m,s,3,0,,>
5.2.2      house               NN      <af=house,n,m,s,3,0,,>|<af=house,v,m,s,3,0,,>
           ))
           ))
```

Corpus Data File-I

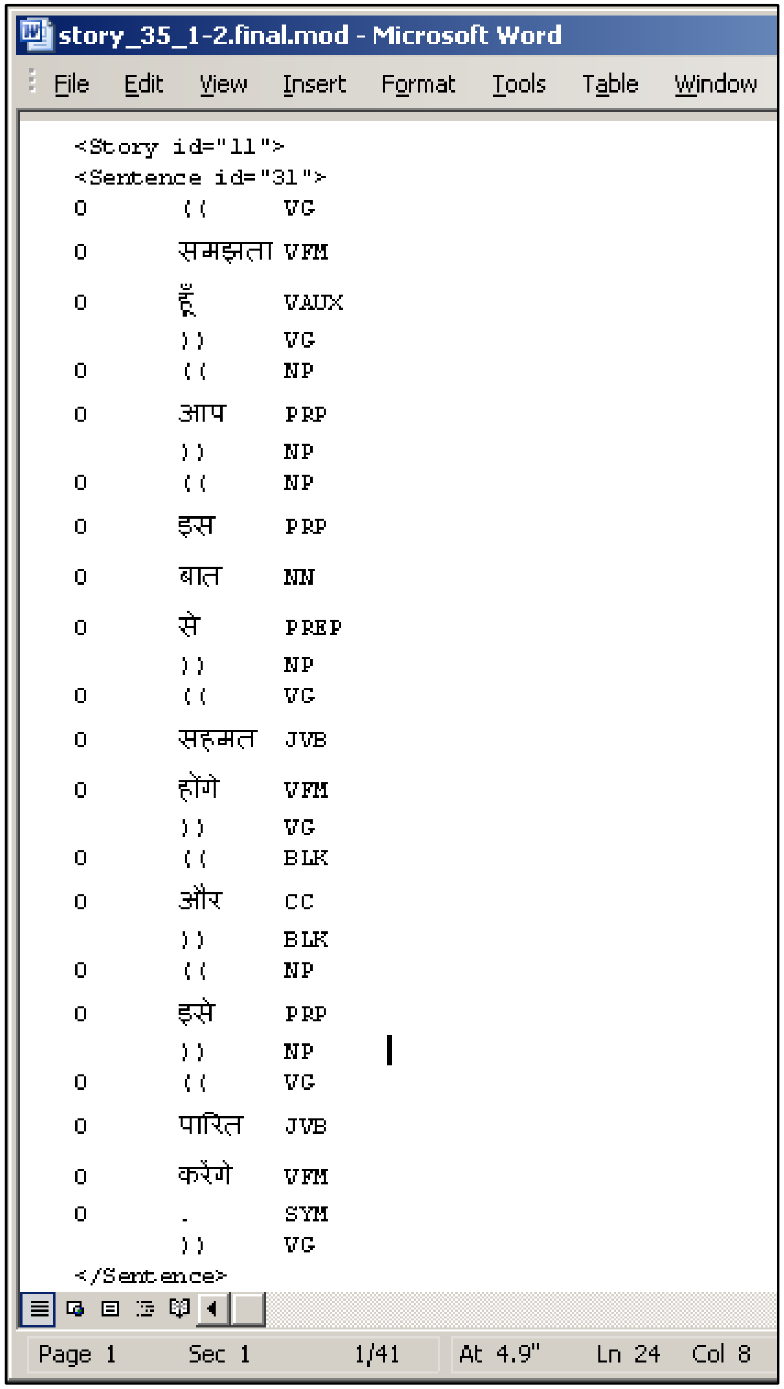
- Everything between **<Story></Story>** tags
  - This tag is optional now
- Story can have an id: **<Story id="1">**
- A sentence between **<Sentence></Sentence>** tags
- Sentences must have an id: <Sentence id="1">

Corpus Data File-II

- Four fields in SSF format
  1. The node id (in way deprecated since the SSF API works on the basis of brackets)
     - These ids are usually automatically allocated
     - If not, some number should be there (say, 0)
  2. Starting (“((”) or ending (“))”) brackets for chunks or the word for a lexical item
  3. The chunk name for a chunk or the POS tag for a lexical item
  4. The feature structure for the node (chunk or lexical item)

Corpus Data File-III

- A sample data file
  - **story_35_1-2.final.mod.utf8**


story_35_1-2.final.mod - Microsoft Word
File Edit View Insert Format Tools Table Window
Page 1 Sec 1 1/41 At 4.9" Ln 24 Col 8

```
<Story id="11">
<Sentence id="31">
0       ((      VG
0       समझता   VFM
0       हूँ      VAUX
        ))      VG
0       ((      NP
0       आप      PRP
        ))      NP
0       ((      NP
0       इस      PRP
0       बात     NN
0       से      PREP
        ))      NP
0       ((      VG
0       सहमत    JVB
0       होंगे    VFM
        ))      VG
0       ((      BLK
0       और      CC
        ))      BLK
0       ((      NP
0       इसे      PRP
        ))      NP
0       ((      VG
0       पारित    JVB
0       करेंगे   VFM
0       .       SYM
        ))      VG
</Sentence>
```

Working in Task Mode-I

- On Linux
  1. On the console, go to the Sanchay directory
  2. Run the shell script

     sh syn-ann-task-mode.sh
- On Windows
  1. Go to the Sanchay directory
  2. Double click on

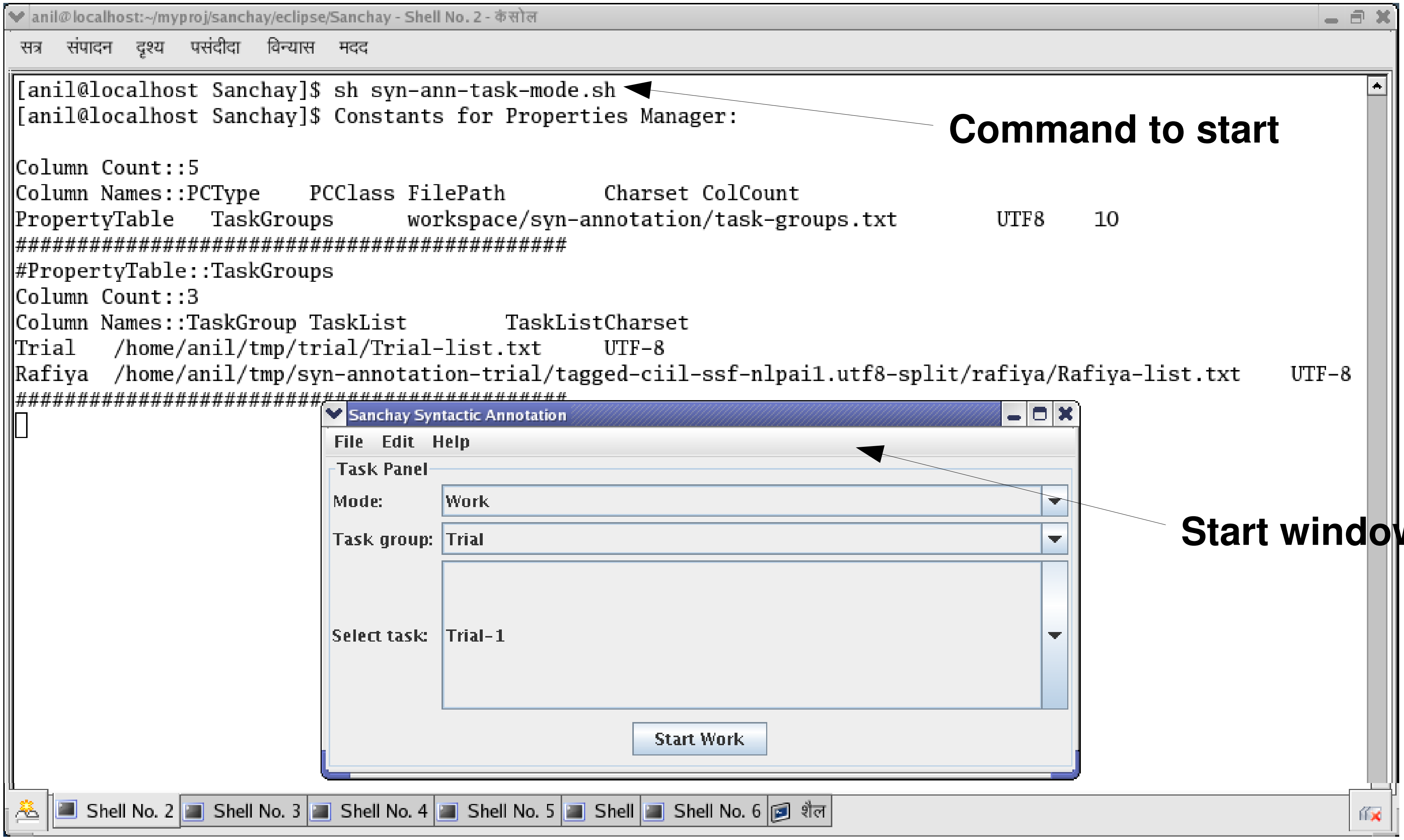
     syn-ann-task-mode.bat

     Or **syn-ann-task-mode** (if DOS extensions are not displayed)

Working in Task Mode-II

- You will see the task window
- You can select the task group and the task that you want to view/edit
- Select the task, click on the **Start Work** button
- You will see the work window where one sentence from the task data file will be displayed
- You can now perform/edit annotation

Working in Task Mode-III



anil@localhost:~/myproj/sanchay/eclipse/Sanchay - Shell No. 2 - कसोल
सत्र संपादन दृश्य पसंदीदा विन्यास मदद

```
[anil@localhost Sanchay]$ sh syn-ann-task-mode.sh
[anil@localhost Sanchay]$ Constants for Properties Manager:

Column Count::5
Column Names::PCType    PCClass FilePath        Charset ColCount
PropertyTable   TaskGroups      workspace/syn-annotation/task-groups.txt        UTF8    10
#############################################
#PropertyTable::TaskGroups
Column Count::3
Column Names::TaskGroup TaskList        TaskListCharset
Trial   /home/anil/tmp/trial/Trial-list.txt     UTF-8
Rafiya  /home/anil/tmp/syn-annotation-trial/tagged-ciil-ssf-nlpai1.utf8-split/rafiya/Rafiya-list.txt    UTF-8
#############################################
```

Mode: Work

Task group: Trial

Select task: Trial-1

The Main Window (Task Mode)

Dummy menus

(Don’t work right now)

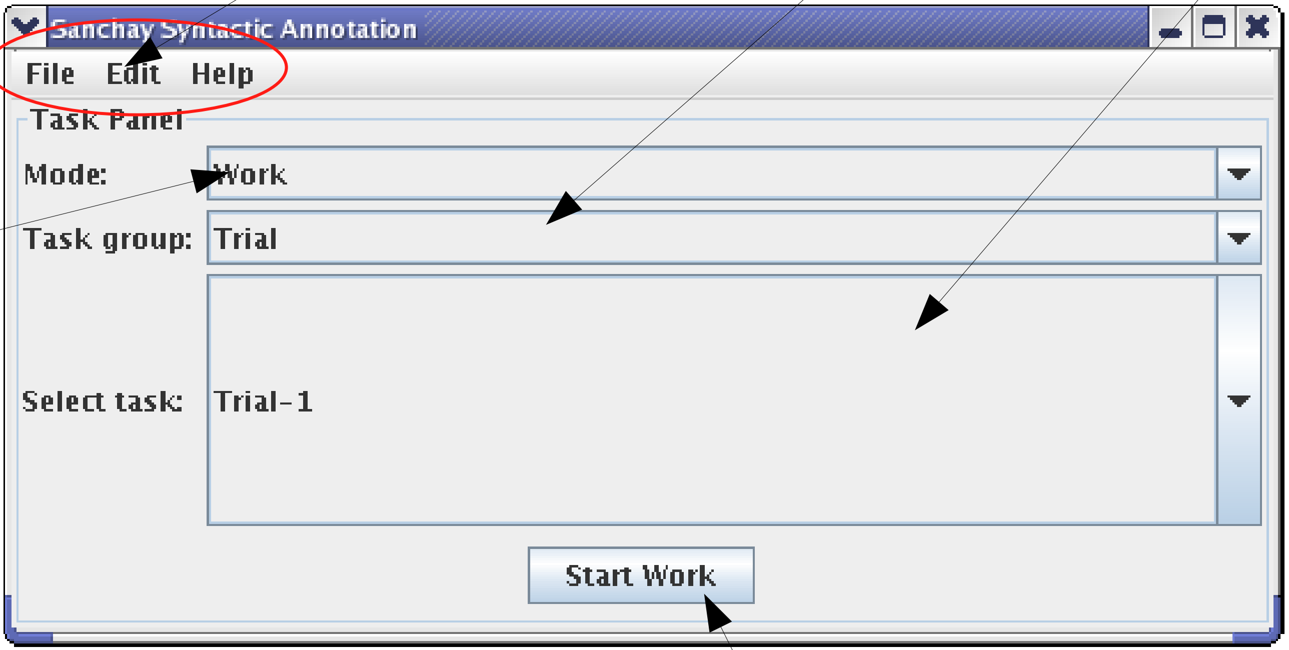
Select a task group

Select a task

Working

(annotation)

mode



Sanchay Syntactic Annotation

Mode: Work

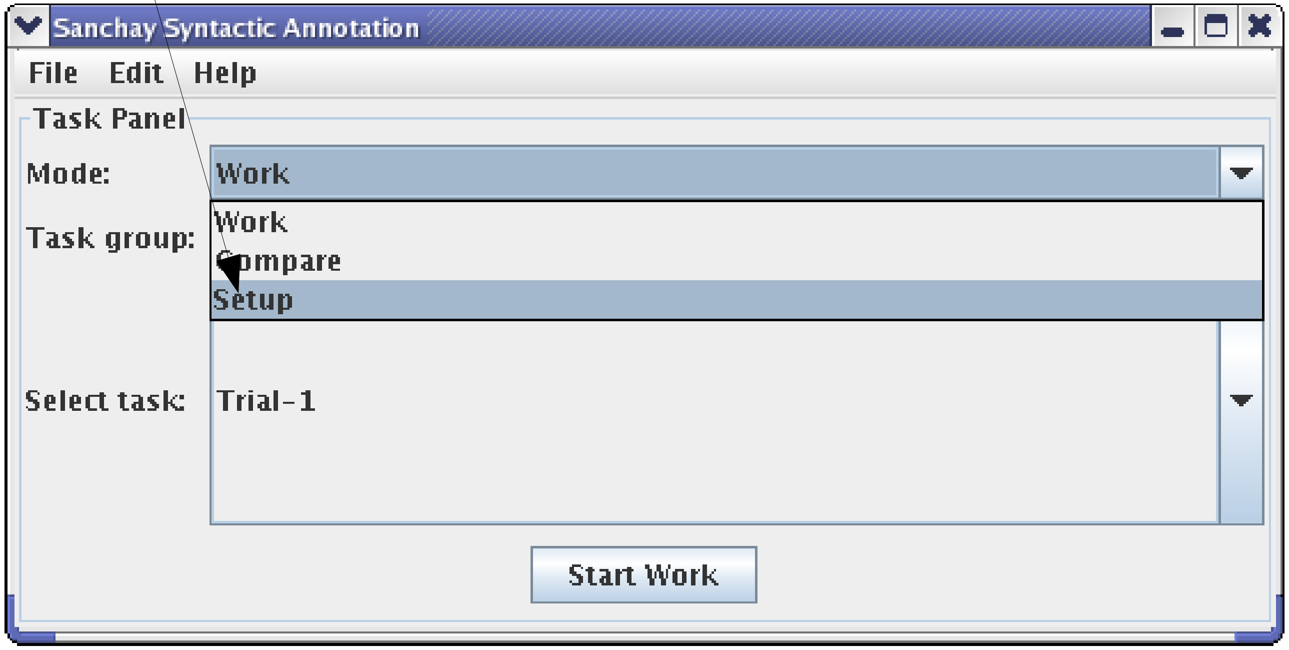
Task group: Trial

Select task: Trial-1

Click to start working

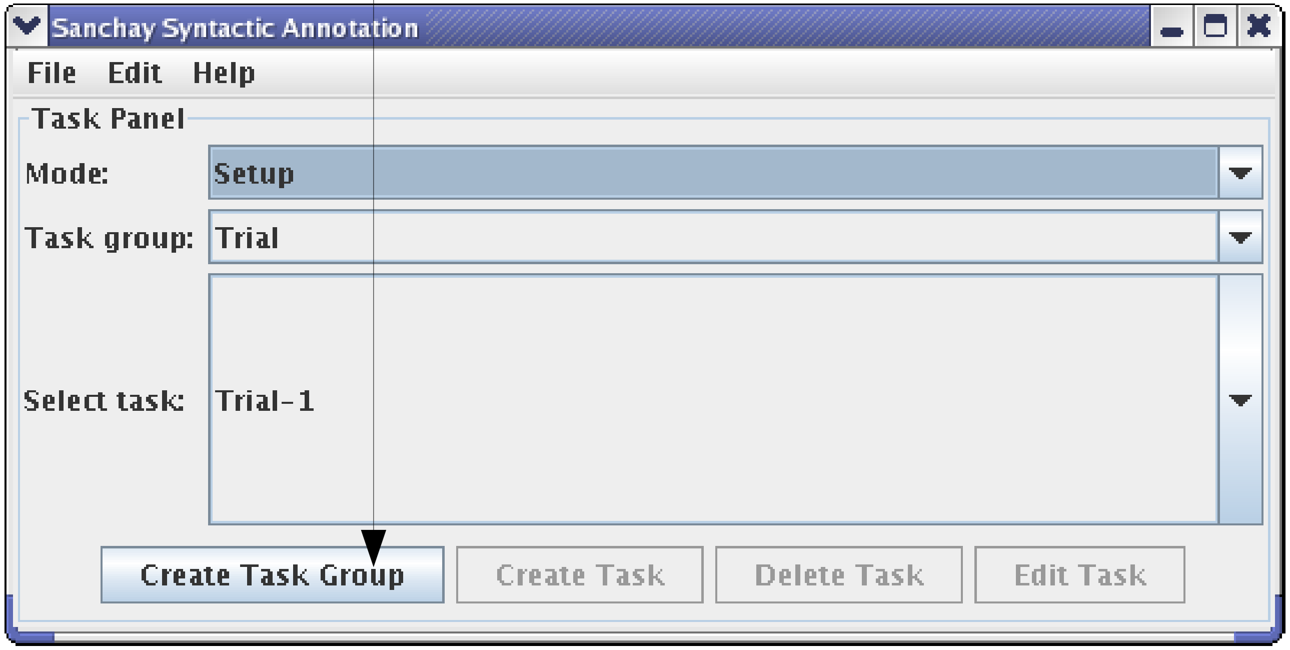
Creating Task Groups-I

- There is a program to easily setup tasks
- Select Setup mode from start window



•Creating Task Groups-II

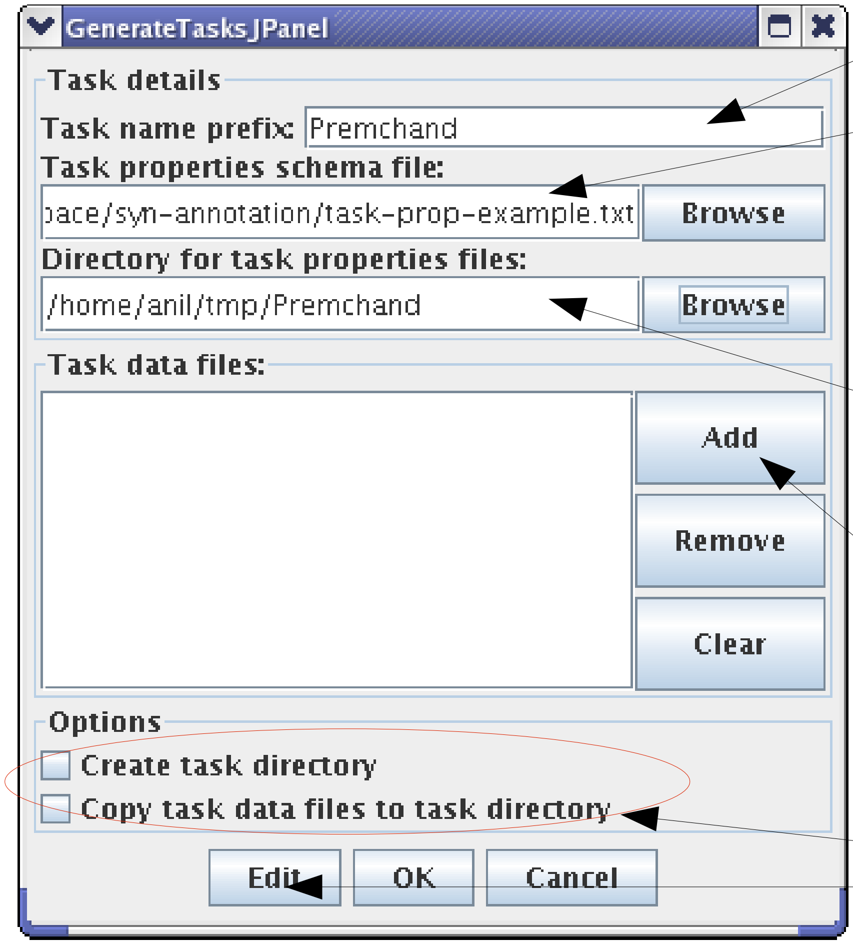
- Click on **Create Task Group** button



Mode: Setup
Task group: Trial
Select task: Trial-1

•Creating Task Groups-III

- Fill in the task group details



GenerateTasksJPanel

Task details

Task name prefix: Premchand

Task properties schema file: pace/syn-annotation/task-prop-example.txt

Directory for task properties files: /home/anil/tmp/Premchand

Task data files:

Options

Create task directory

Copy task data files to task directory

Task group name

Task properties template (an example properties file which will be copied with some fields being changed)

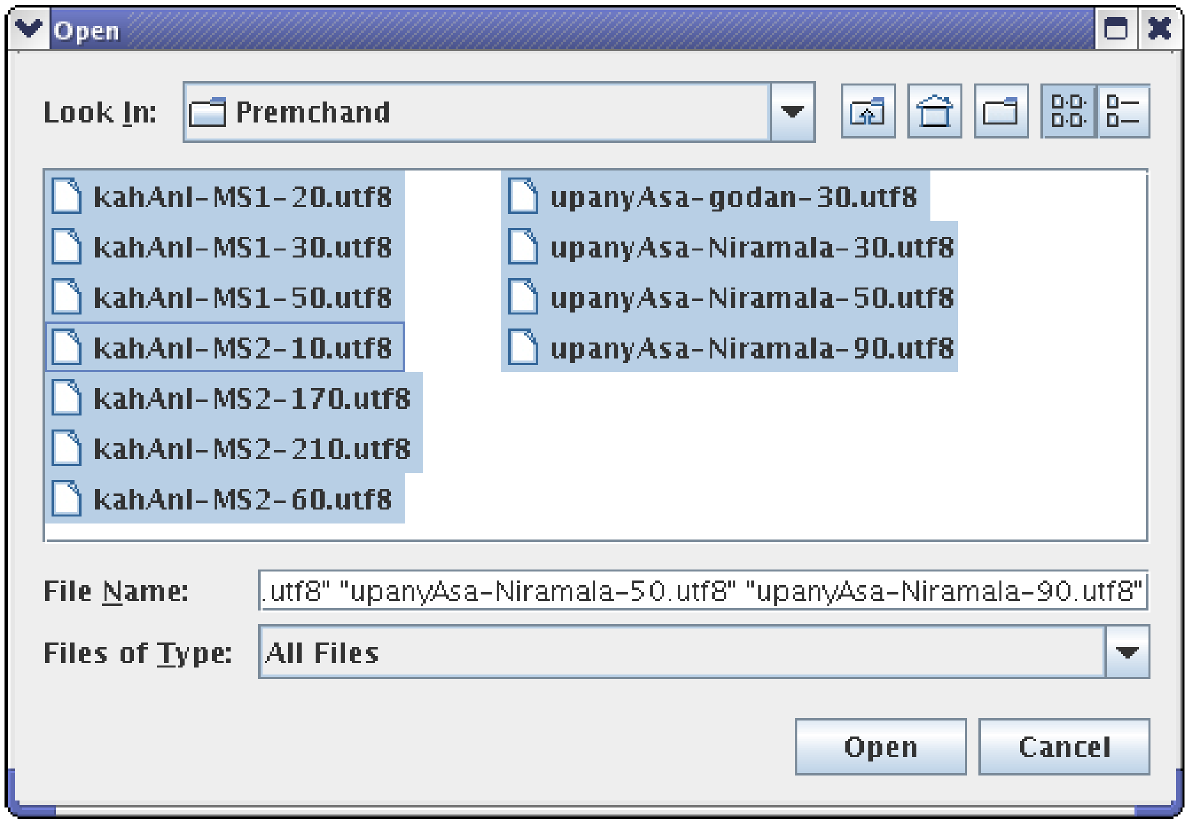
Directory where task properties files will be stored

Add task data (corpus) files

Currently not available

•Creating Task Groups-IV

- Adding corpus data files after clicking on **Add**



Open

Look In: Premchand

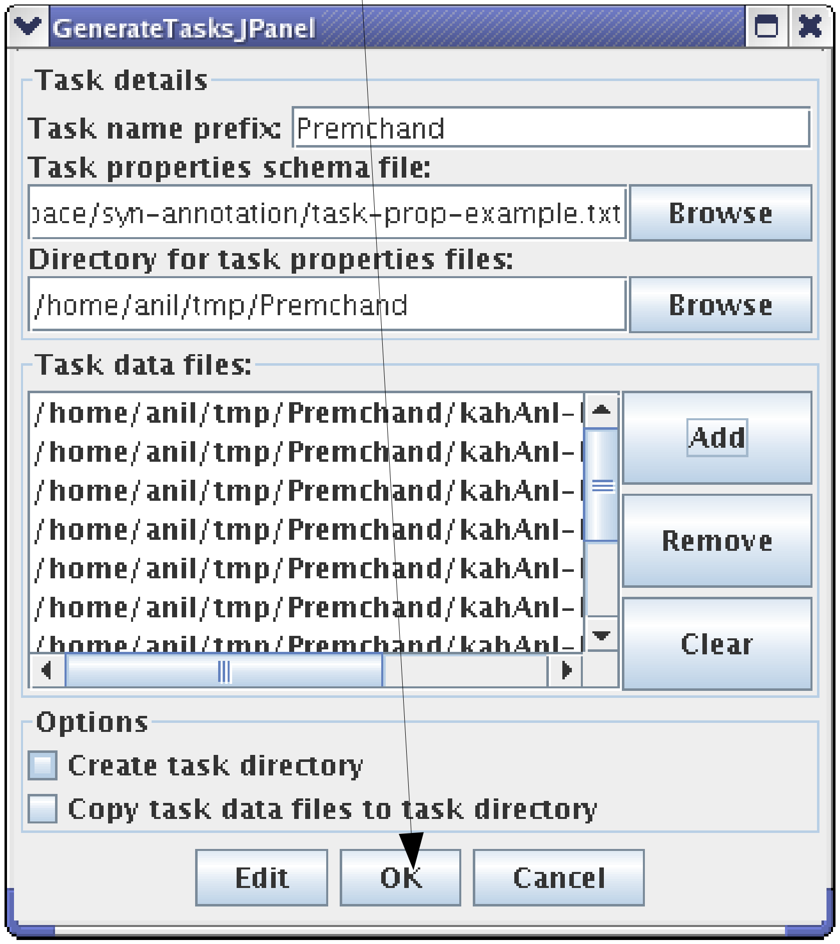
kahAnI-MS1-20.utf8
kahAnI-MS1-30.utf8
kahAnI-MS1-50.utf8
kahAnI-MS2-10.utf8
kahAnI-MS2-170.utf8
kahAnI-MS2-210.utf8
kahAnI-MS2-60.utf8
upanyAsa-godan-30.utf8
upanyAsa-Niramala-30.utf8
upanyAsa-Niramala-50.utf8
upanyAsa-Niramala-90.utf8

File Name: .utf8" "upanyAsa-Niramala-50.utf8" "upanyAsa-Niramala-90.utf8"

Files of Type: All Files

•Creating Task Groups-V

- Finish creating groups



GenerateTasksJPanel

Task details

Task name prefix: Premchand

Task properties schema file:

pace/syn-annotation/task-prop-example.txt

Directory for task properties files:

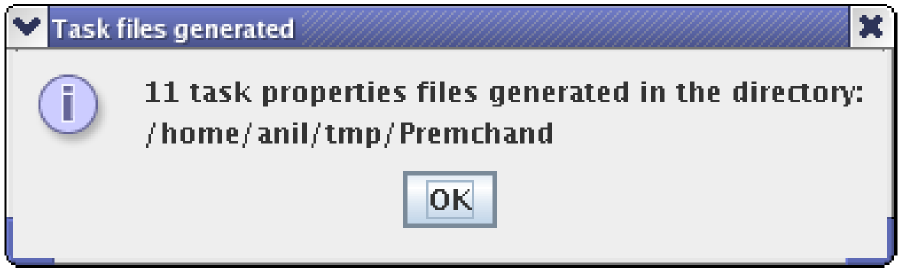
/home/anil/tmp/Premchand

Task data files:

/home/anil/tmp/Premchand/kahAnl-
/home/anil/tmp/Premchand/kahAnl-
/home/anil/tmp/Premchand/kahAnl-
/home/anil/tmp/Premchand/kahAnl-
/home/anil/tmp/Premchand/kahAnl-
/home/anil/tmp/Premchand/kahAnl-
/home/anil/tmp/Premchand/kahAnl-

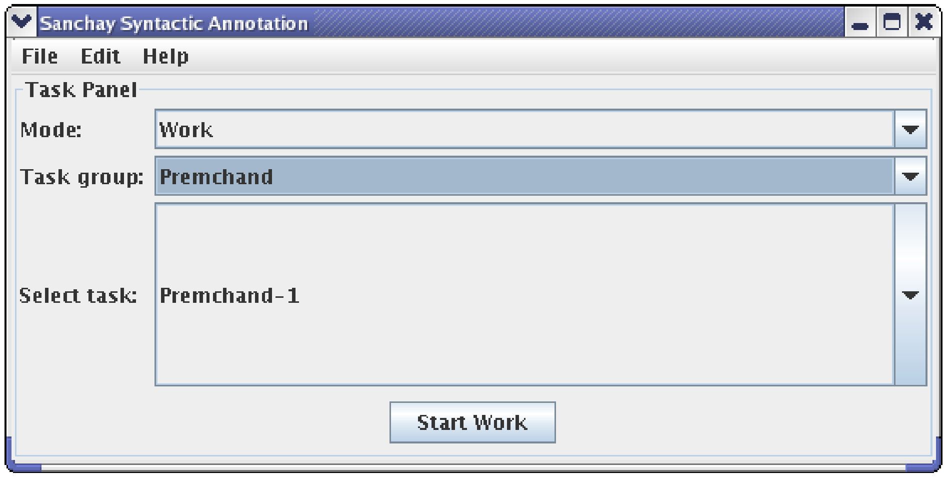
Options

☐ Create task directory
☐ Copy task data files to task directory



Task files generated

11 task properties files generated in the directory:
/home/anil/tmp/Premchand



Sanchay Syntactic Annotation

Task Panel

Mode: Work

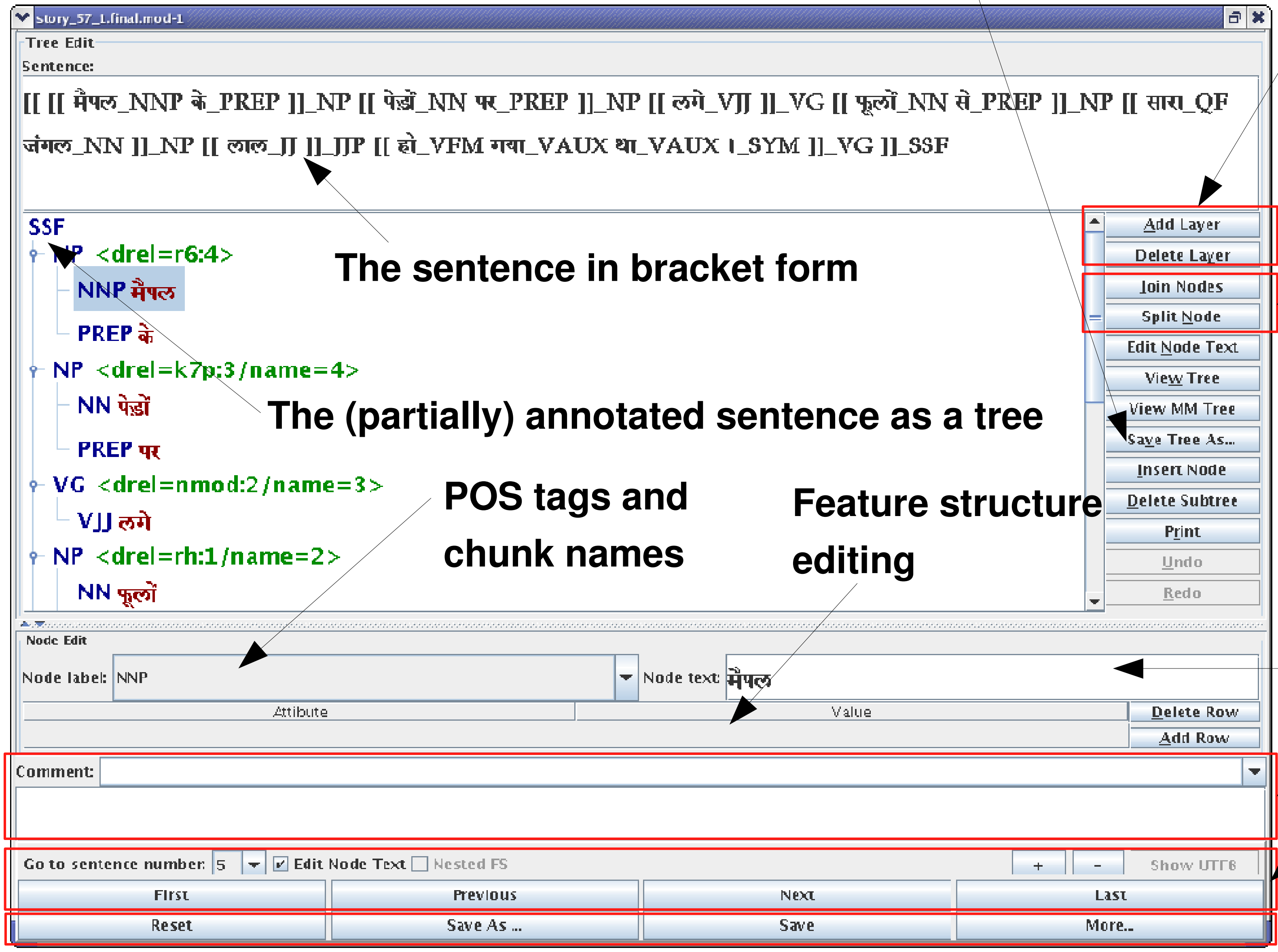
Task group: Premchand

Select task: Premchand-1

Working Directory Disclaimer

- Currently Sanchay will work only if you start it from the **Sanchay** directory
- Thus, you can’t create shortcuts somewhere else unless you take care that the current directory gets changed to **Sanchay** before the above script is run

Viewing Annotation



story_57_1.final.mod-1

Tree Edit

Sentence:

[[[[मैपल_NNP के_PREP]]_NP [[पेड़ों_NN पर_PREP]]_NP [[लगे_VJJ]]_VG [[फूलों_NN से_PREP]]_NP [[सारा_QF जंगल_NN]]_NP [[लाल_JJ]]_JJP [[हो_VFM गया_VAUX था_VAUX ।_SYM]]_VG]]_SSF

```
SSF
  NP  <drel=r6:4>
    NNP मैपल
    PREP के
  NP  <drel=k7p:3/name=4>
    NN पेड़ों
    PREP पर
  VG  <drel=nmod:2/name=3>
    VJJ लगे
  NP  <drel=rh:1/name=2>
    NN फूलों
```

Node Edit

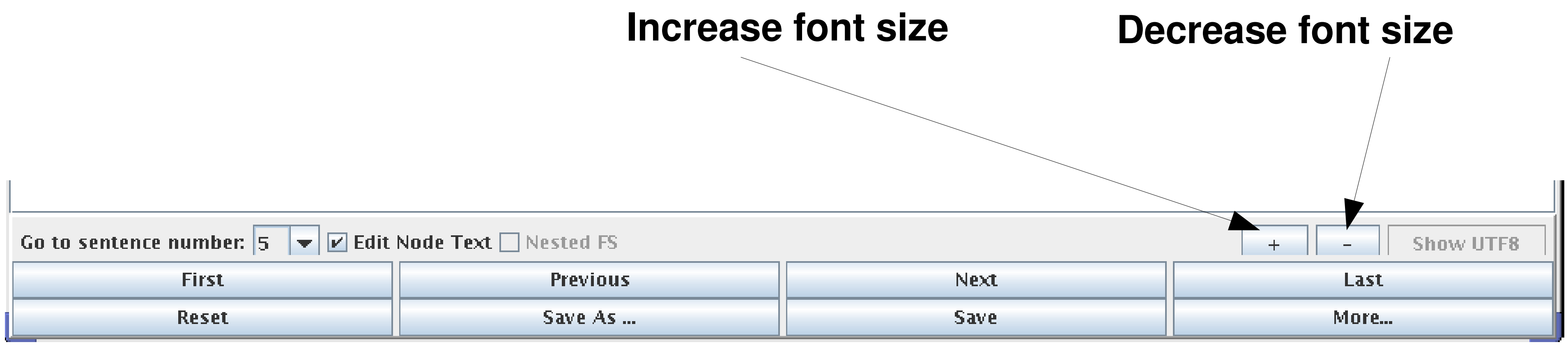
Node label: NNP   Node text: मैपल

Comment:

Go to sentence number: 5   ☑ Edit Node Text   ☐ Nested FS

Increase/Decrease Font Size

- You can change the font size by clicking on these buttons



Navigation

- At a time only one sentence is displayed in the work widow
- Using the buttons in the navigation bar, you can **go to** any sentence in the task
  - First, Previous, Next, Last
  - Or any specific sentence by selecting its number from the list (combo box)

POS Tagging

- Select (say, by clicking) a lexical item (word) in the tree area
- You will see the list of possible POS tags in the **Node label** list (combo box)
- From the **Node label** list, select a tag
- The new POS tag for the word will be displayed in the tree area

Chunks vs. Phrases

- The interface allows arbitrary nesting
  - PP inside an NP, which is itself inside an NP
- But by chunking we mean only one level
  - A chunk can be NP, VG etc. and can only contain lexical items inside it, not chunks
  - No recursion
  - NP -> The book on the table
    - But not
      - NP -> NP PP **or** PP -> Prep NP

Phrases or Recursion Not Allowed

- It is assumed that only chunks will be annotated
- Everything (for the time being) will be in terms of
  - Words, POS tags, chunks, feature structures

Forming Chunks

- You want to chunk "*The red book*"
- Select these words together in order
- You can do this by pressing the Ctrl or Shift and clicking on the words
- Click on **Add Layer** button
- A new node will be created and the words you selected will become child nodes of this node

Naming Chunks

- Select the chunk node (say, NP)
- You will see the list of possible chunk names in the **Node label** list (combo box)
- From the **Node label** list, select a chunk name
- The new chunk name for the chunk will be displayed in the tree area

Removing Chunks

- Now suppose a chunk is wrongly formed
- Select the chunk node (say, NP)
- Click on **Delete Layer** button
- The chunk node will be removed
- The words will move up in the tree

Forming and Removing

- For any rearrangement of words into chunks, you will have to use combinations of **form** and **remove** chunk operations
- Note that words to be combined into a chunk should be on the same level
- You may have to bring them on the same level by removing those chunks they are currently parts, if any

Combining Chunks

- You want to combine two chunks
- Remove the first chunk as explained above
- Remove the second chunk
- Combine the words of the two chunks into one chunk

Splitting Chunks

- You want to split one chunk into two
- Remove the chunk
- Select some words and form a new chunk
- Select the rest of the words into another chunk

Feature Structure Annotation-I

- Beyond tagging and chunking
- Every node (word or chunk) in the tree can have a feature structure

Feature Structure

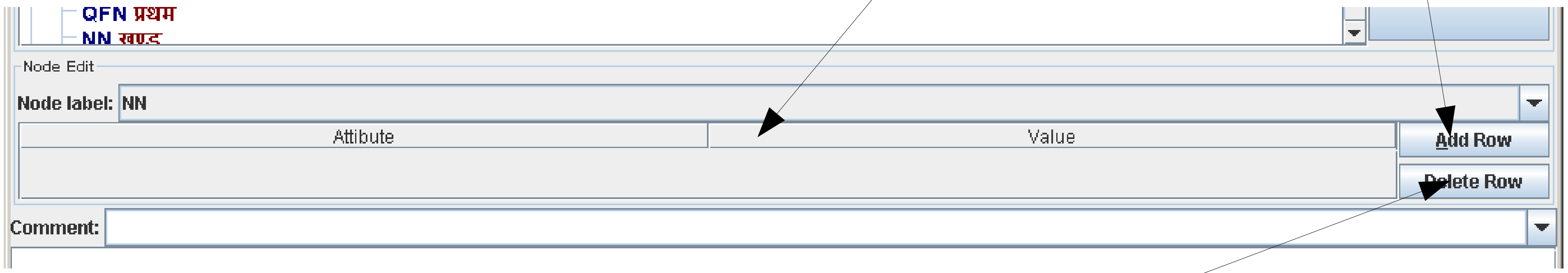
- A feature structure has attribute value pairs
- Some attributes may be mandatory
- The attribute value can itself be a feature structure
  - Usually it will just be a string
  - The current interface assumes only string values

Feature Structure Annotation-II

- When you select a node in the tree, you will see a feature table showing the attributes and values
  - May be empty

Feature table

Add attribute



Delete attribute

Adding Attributes

- Select the node for which you want to add an attribute
- You will see the attribute table below the **Node label**
- Click on the **Add Row** button
- There will be a new row representing a new attribute in the feature table

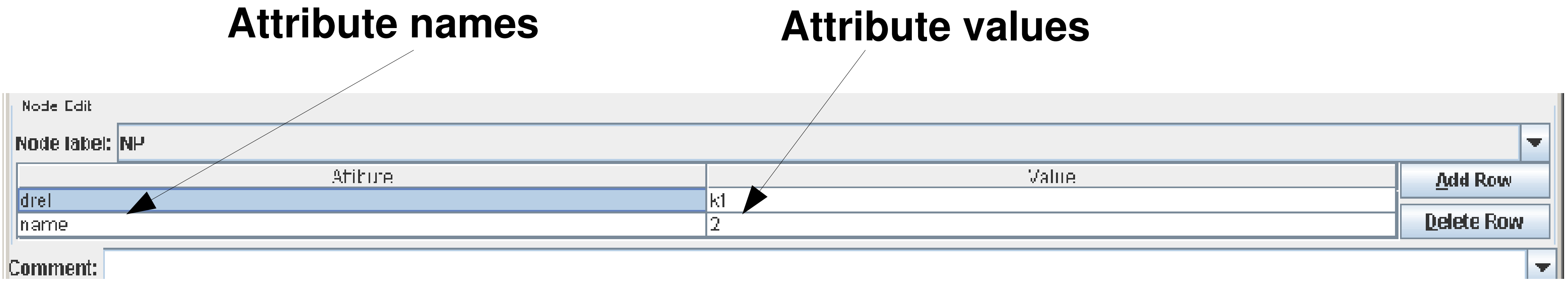
Naming Attributes

- In the feature table, select the attribute (which may have no name if it was just created)
  - By clicking on the table cell under the **Attribute** column
- Type the new name and press enter
- When you click on a node other than the currently selected one in the tree, the new attribute will appear near the node

Setting/Changing Attribute Values

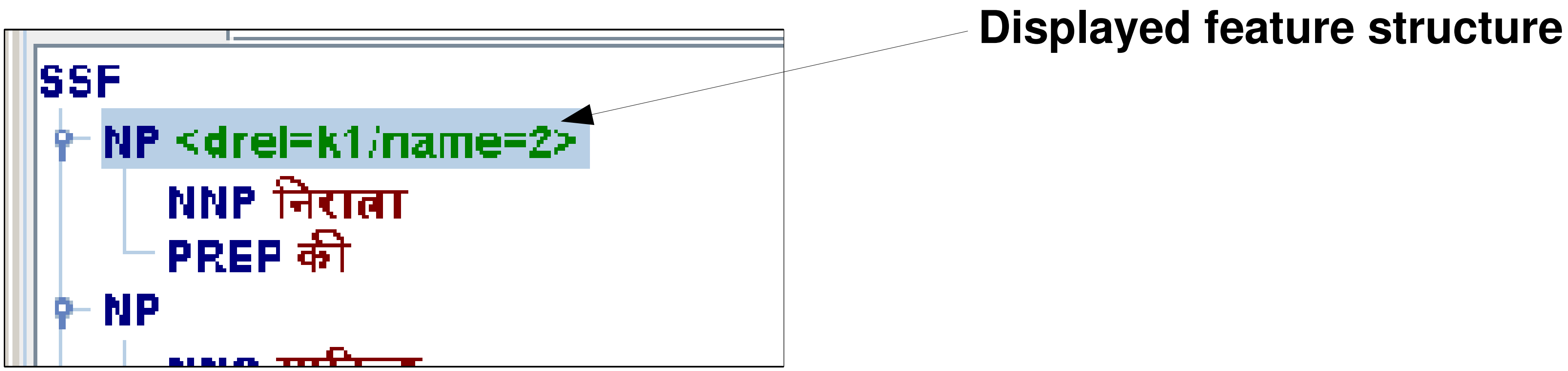
- In the feature table, select the attribute value (which may be empty)
  - By clicking on the table cell under the **Value** column
- Type the new value and press enter
- When you click on a node other than the currently selected one in the tree, the new attribute value will appear near the node

Attribute-Value Pairs



Node label: NP

Atribute	Value
drel	k1
name	2



```
SSF
  NP <drel=k1/name=2>
     NNP निराला
     PREP की
  NP
```

Deleting Attributes

- In the feature table, select the row for the attribute you want to delete
  - By clicking any cell in the row
- Click on the **Delete Row** button in the feature table
- When you click on a node other than the currently selected one in the tree, you can see that the attribute has been deleted

Syntactic Annotation

- By syntactic annotation we mean marking up dependency relations
  - Say, kaaraka relations

Kaaraka Relations-I

- The main thing is
  - **Which node has what relation with which other node**
- The node which ‘has the relation’ is given an attribute called **drel** whose value (say, **k1** or kartaa) will be the kaaraka relation
- The with which it has the relation is given an attribute called **name**
- The names should have unique values (across a sentence)

Kaaraka Relations-II

- Name uniquely identifies a chunk with which other chunks are related
- This name is referred to in the value of the **drel** attribute of the chunk which has a relation with the named chunk
- This is done by adding the name to the value of the drel attribute, separated by a colon

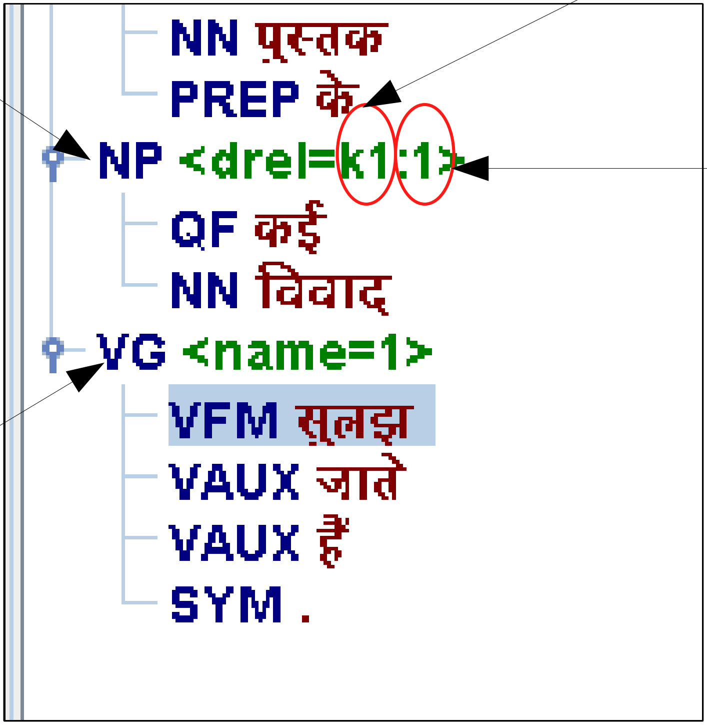
Kaaraka Relations-III

Chunk which has a relation

The kaaraka relation (k1)

Reference to the named chunk

Named chunk with which there is a relation

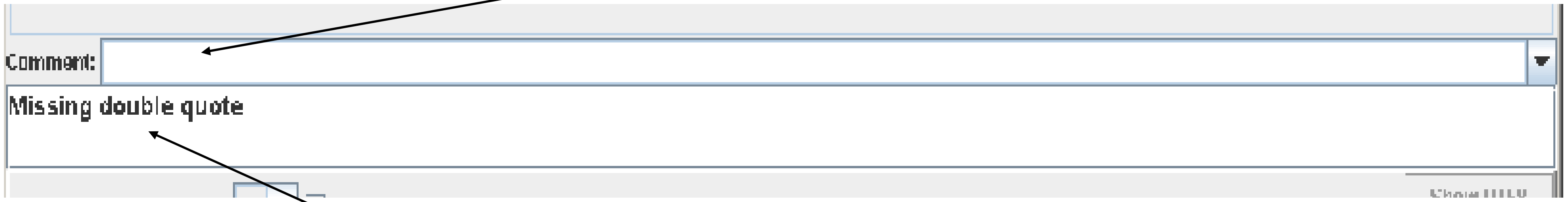


```
    NN पुस्तक
    PREP के
NP <drel=k1:1>
    QF कई
    NN विवाद
VG <name=1>
    VFM सुलझ
    VAUX जाते
    VAUX हैं
    SYM .
```

Comments

- For any sentence, if there is any (say, linguistic) issue which needs to be noted down, you can add a comment
  - Or a typing/grammatical mistake etc.

Frequent (reusable) comment



Missing double quote

Comment

Reusable Comments

- In the combo box above the comment text box, you can type comments which are needed frequently
  - So that you don’t have to type them again and again
- Once you have entered them in the combo box, you can just select them later from the list (combo box) and they will appear in the comment text box

Saving

- There are three buttons for ‘saving’
- **Save** actually saves the complete task
  - The one you will mostly use
- **Save Tree As** saves one sentence in (SSF format, text file) wherever you want
- **Save As** saves the complete task in another format wherever you want
  - XML currently not implemented

Reset and Clear

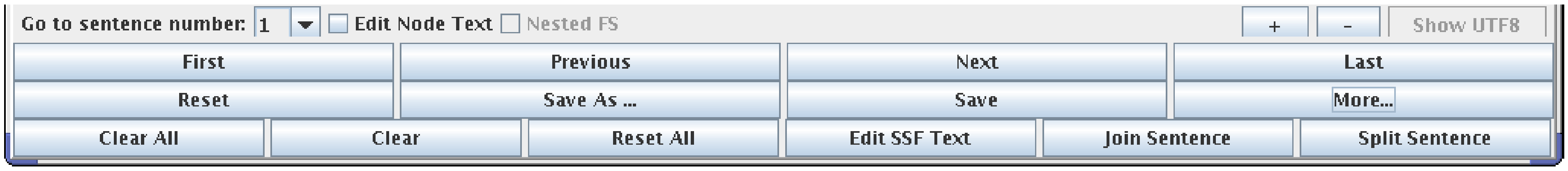
- **Reset** will discard recent work and display the sentence read from the saved task
- **Clear** will clear tagging and chunking and will present the current sentence as a sequence of words
- **Reset All** will discard all the work you did after pressing **Save** and read the whole task again from the task file

Caution

- Use **Reset**, **Clear** and **Reset All** buttons carefully

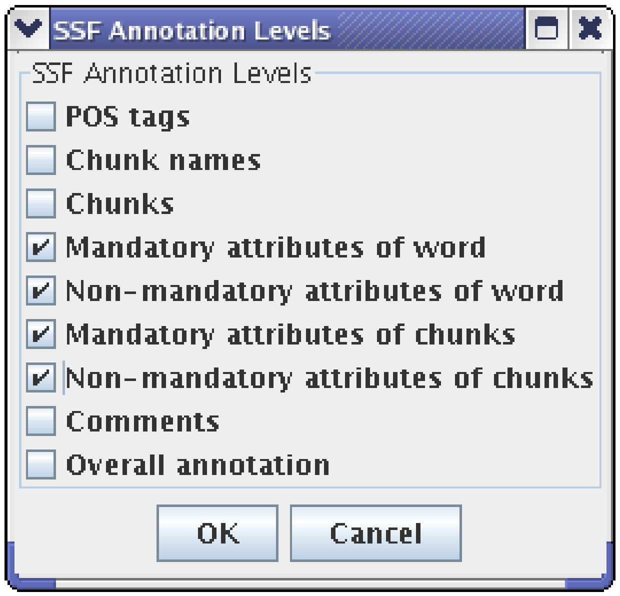
More...

- You can see some more buttons by clicking on **More**
- **Clear All** for clearing some annotation level (see next slide) from all sentences in the task
- **Clear** for clearing some annotation level (see next slide) from the current sentence
- **Reset All** for reloading all sentences in the task
- **Join Sentence** and **Split Sentence**



Clear Annotation Levels

- Clicking on **Clear** and **Clear All** will show you a dialog to select the annotation levels which you want to clear
- A combination of specific levels can be cleared



SSF Annotation Levels

SSF Annotation Levels

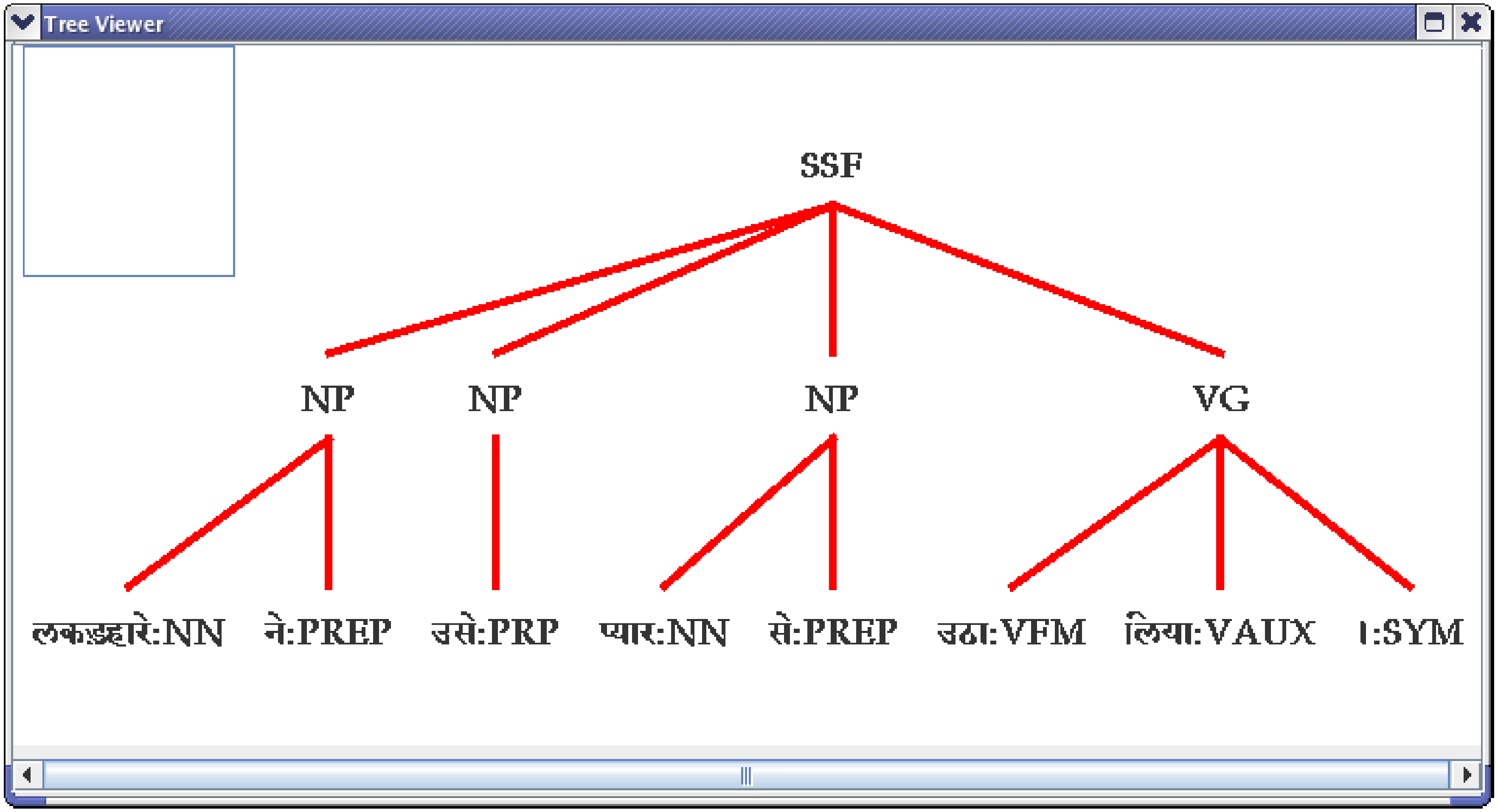
- [ ] POS tags
- [ ] Chunk names
- [ ] Chunks
- [✓] Mandatory attributes of word
- [✓] Non-mandatory attributes of word
- [✓] Mandatory attributes of chunks
- [✓] Non-mandatory attributes of chunks
- [ ] Comments
- [ ] Overall annotation

Bracket Form

- A tree based representation of sentence chunking or parsing
- (Possibly nested) brackets mark the chunks or phrases
  - For us, only chunks
- Allows you to see the chunking horizontally, rather than vertically (as in a tree)

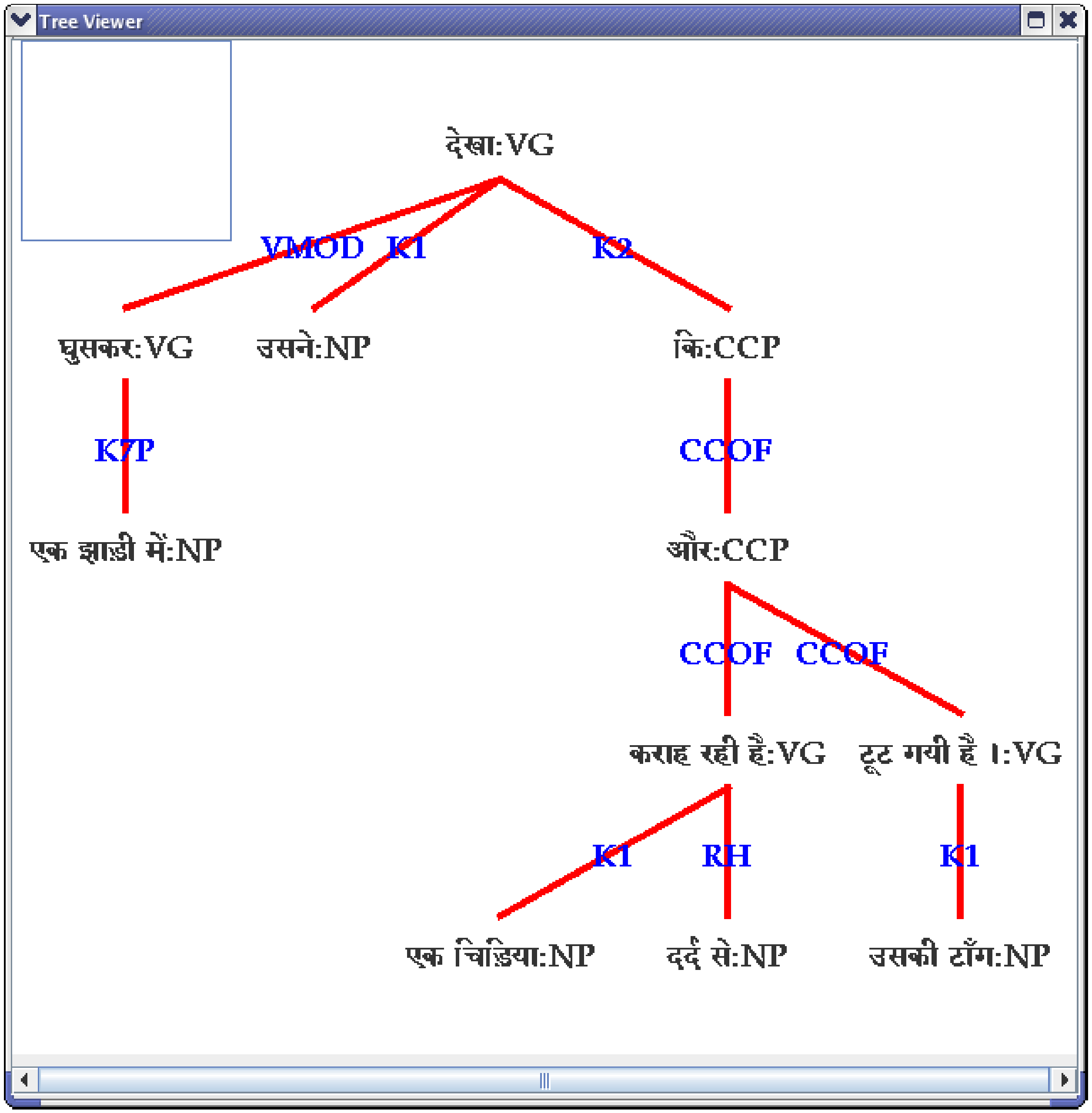
•Tree Viewer: Phrase Structure

- To view the phrase structure tree, click on **View Tree**



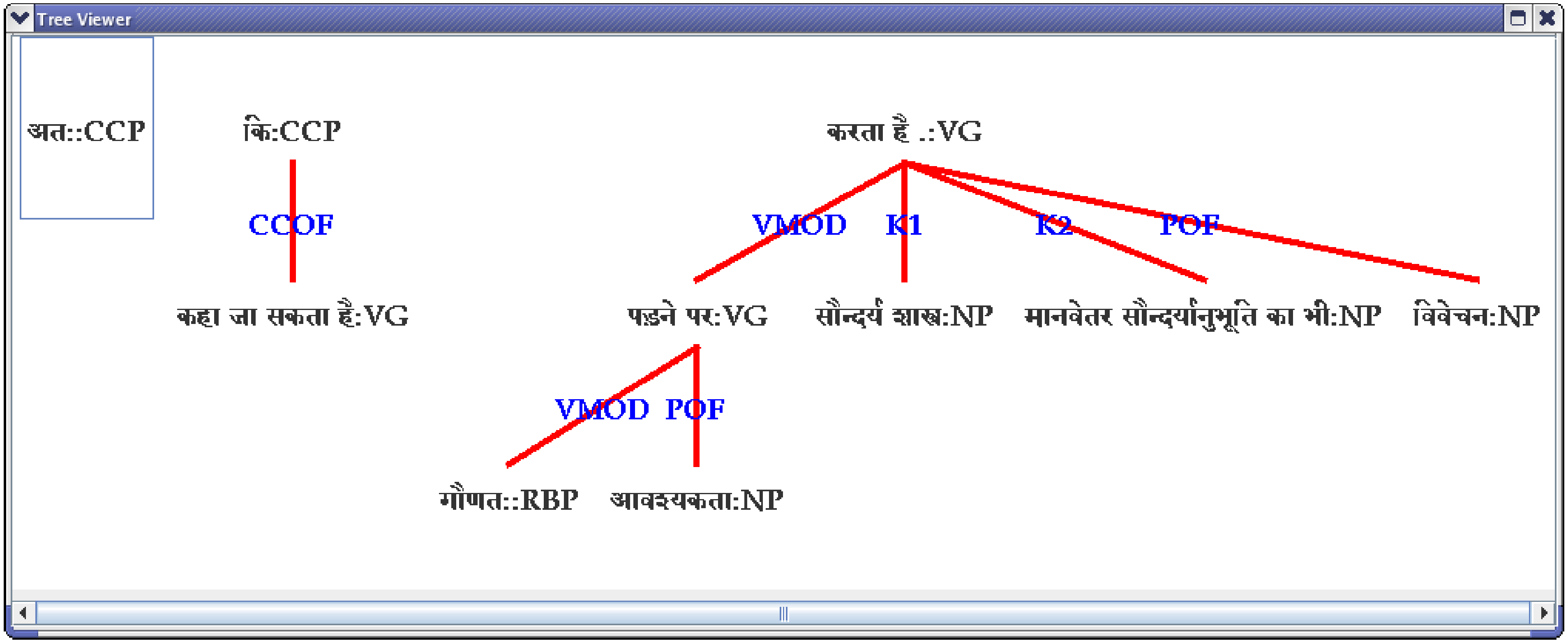
•Tree Viewer: Modifier-Modified Tree

- To view the modifier-modified tree, click on **View MM Tree**



•Modifier-Modified Tree

- Some of the mistakes in annotation might become apparent just by looking at the MM-tree
  - Disconnected sub-trees



•Other Kinds of Annotation

- Use the same interface for other kinds of annotation
  - Where the data can be represented as a tree (optionally) with nodes having feature structures

•Example: Named Entities

- Open the file
  - workspace/syn-annotation/phrase-names.txt
- Change the list
  - So that phrase names are named entity types
- You may or may not use POS tags and feature structures

•Other Examples

- Similarly, you can adopt the interface for marking up
  - Multi-word expressions
  - Temporal expressions
  - Dependency relations
    - Other than kaaraka relations (default)
  - Etc.

Increasing JVM Memory-I

- The memory allocated by default to JVM (heap size) may not be enough, given the RAM on your system
- Suppose you have 512MB RAM, you might want to allocate more memory to JVM to make Sanchay run faster
- Change the **run-syntactic-annotation.sh** or **run-syntactic-annotation.bat** script

Increasing JVM Memory-II

- Edit the shell/batch files used for starting the interface
- Use the –Xms option to specify the initial heap size
- Use the –Xmx option to specify the maximum heap size
- Example
  - java –Xms128m –Xmx256m …

Concluding Disclaimer

- **Sanchay** is at present continuously evolving
- Parts of it are being used for practical work, but the design has yet to stabilize
- There can be radical changes
- Fortunately, the data created by you will be usable even in future, as it is in a standard format

- Any comments/bugs
  - Mail at

    anil@research.iiit.ac.in