

BNF400o



An Application Using Writer as a GUI for Creating and Maintaining [e]BNFs

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Overview



- Introduction
 - BNF, eBNF
 - Rail track diagrams
- Features
 - Functionality
 - Usability
- Demonstration
- Roundup



Introduction, 1



- Has been created by one of my students, *Franz Hohenegger*, at "WU Wien"
- Purpose
 - Make it easy to edit and convert [e]BNF
 - Allows the definition of variants of [e]BNF
 - Find or define a XML document type and supply converters from/to that format
- Target users
 - Programmers and language designers

Introduction, 2



- BNF
 - Backus-Naur-Form
 - Used to define the syntax of languages
 - Programming Languages
 - IETF RFC's for defining protocols
 - OOO for defining protocols
 - ANSI SQL 92, e.g.
 - <http://www.contrib.andrew.cmu.edu/~shadow/sql/sql2bnf.aug92.txt>
 - XML for defining the markup language
- eBNF
 - Many variants "e"xtending BNF



Introduction, 3



- "Rail track diagrams"
 - Easy to comprehend
 - Graphical syntax diagrams, from [e]BNF
 - Have been used in the documentation of programming languages
 - Easy, but not quite as easy to program or to create nice looking ones
 - Either create one's own individual scripts
 - Or use utilities of other programmers
 - Usually not well documented
 - Not supporting all possible features of eBNFs
 - Cannot create error-free and nice looking diagrams



Introduction, 4



- "Rail track diagrams" (continued)
 - ooRexx development
 - "Open Object Rexx" opensourced by IBM
 - The supplied IBM documentation is full of easy to comprehend rail track diagrams
 - Can only be maintained as ASCII-diagrams (!)
 - Complex syntaxes turn out to be error-prone, if maintained manually
 - A burden becoming too high over time
 - One strong opinion is to define a [e]BNF, but to not create the ASCII-based diagrams by hand
 - Having a tool that creates error-free and nice looking rail track diagrams may be very helpful !



eBNF and Rail Diagram, 1 (ASCII Characters)



```
MainElement ::= SubElement1 SubElement2 Misc1*  
SubElement1 ::= Misc2+
```

ASCII

MainElement:

```
>--| SubElement1 |--SubElement2--+-----+-----<  
      | V +-----+ |  
      | V      | |  
      +--+Misc1-+++
```

SubElement1:

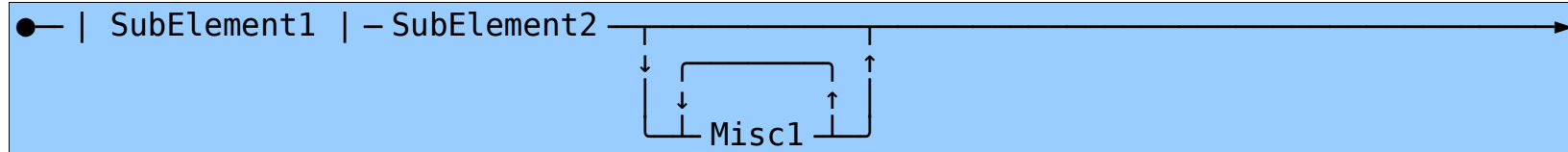
```
+-----+  
V      |  
>--+Misc2-+-----<
```

eBNF and Rail Diagram, 2 (Unicode Characters)

```
MainElement ::= SubElement1 SubElement2 Misc1*  
SubElement1 ::= Misc2+
```

Unicode

MainElement:



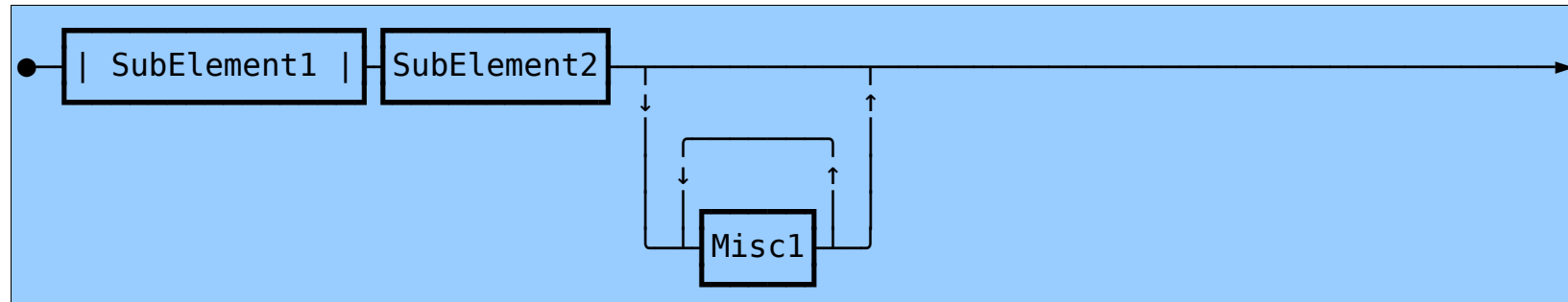
SubElement1:



eBNF and Rail Diagram, 3 (Unicode Characters, Boxed)

```
MainElement ::= SubElement1 SubElement2 Misc1*  
SubElement1 ::= Misc2+
```

„Pretty Unicode“
MainElement:



SubElement1:



XML, 1



- [e]BNF definitions
 - Almost 50 years old
 - [e]BNF definitions as pure (7-Bit ASCII) text
- Adding explicitly structural information
 - XML markup
 - Allows the application of XML parsers and XSLT
 - If expressive enough, then it could be used as repository format for all kind of [e]BNFs!
 - Intermediate format for rendering
 - Base format for comprehensive eBNFs



XML, 2



- The DITA XML projekt
 - Topic-based authoring
 - <http://dita.xml.org>
 - Use subtyping to add new information types
 - Become able to take advantage of the DITA Open Toolkit
 - Jean-Louis Faucher's "DocMusings"
 - Experiments with rail track diagrams for the documentation needs of the ooRexx project
 - <http://oorexx.svn.sourceforge.net/viewvc/oorexx/incubator/DocMusings/>



eBNF as Dita XML



```
MainElement ::= SubElement1 SubElement2 Misc1*  
SubElement1 ::= Misc2+
```

XML

```
<?xml version="1.0" encoding="UTF-8"?>  
  <!-- Original BNF lines:  
    MainElement ::= SubElement1 SubElement2 Misc1*  
    SubElement1 ::= Misc2+  
  -->  
<syntaxdiagram xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"  
  xsi:noNamespaceSchemaLocation="/home/rony/xml/ditaSchema.xsd">  
  <title>MainElement</title>  
  <groupseq>  
    <var>SubElement1</var>  
    <var>SubElement2</var>  
    <groupseq importance="optional">  
      <repsep/>  
      <var>Misc1</var>  
    </groupseq>  
  </groupseq>  
  <title>SubElement1</title>  
  <groupseq>  
    <groupseq>  
      <repsep/>  
      <var>Misc2</var>  
    </groupseq>  
  </groupseq>  
</syntaxdiagram>
```

"BNF4OOo" Prerequisites



- Tool is an ooRexx application/macro
 - Needs the opensource *ooRexx* from
 - <http://build.oorexx.org> (latest Linux versions needed)
 - <http://www.oorexx.org/download.html>
 - Needs the *BSF4ooRexx* package from
 - <http://wi.wu-wien.ac.at/rgf/rexx/bsf4oorexx/current/>
 - Installation all in all: 20 seconds
- "BNF4OOo" is hosted at SourceForge
 - Homepage (with svn checkout available)
 - <http://sourceforge.net/projects/bnf4ooo/>
 - `svn co https://bnf4ooo.svn.sourceforge.net/svnroot/bnf4ooo bnf4ooo`



BNF4Shell.rex, 1



- Command-line interface
 - Interactive rendering of [e]BNFs
 - Batch oriented processing of [e]BNFs
- Simple to use
 - Uses settings supplied as text files
 - *.properties
 - GUI editing possible: "rexx OptionGUI.rex"
 - Settings can be overridden by supplying them as switches on the command line



BNF4Shell.rex, 2



```
rony@rony-laptop:~$ rexx BNF4Shell.rex -help
```

```
known options are:
```

```
-BNFVERSION filepath (default: selection in OptionGUI.rex)
-DIAGRAM "ASCII"|"UNICODE"|"PRETTYUNICODE" (default: selection in OptionGUI.rex)
-INPUT filepath (default: cmd/shell)
-LOGLEVEL "TRACE"|"DEBUG"|"INFO"|"WARN"|"ERROR"|"FATAL" (default: WARN)
-MODE "BNF2DIAGRAM"|"BNF2XML"|"XML2BNF" (default: BNF2DIAGRAM)
-OUTPUT filepath (default: cmd/shell)
```

```
rony@rony-laptop:~$
```

BNF4Shell.rex, 3

```
rony@rony-laptop:/media/root_e/rony/Vortraege/2010/201008-00o/BNF400o/code$ rexx BNF4Shell.rex -diagram UNICODE
```

```
-----  
-----  
Please enter your BNF-Lines:   BNF-version: EBNF-XML  
-----
```

```
MainElement ::= SubElement1 SubElement2 Misc1*  
SubElement1 ::= Misc2+
```

```
-----  
-----  
MainElement:
```



```
SubElement1:
```



```
-----  
-----  
rony@rony-laptop:/media/root_e/rony/Vortraege/2010/201008-00o/BNF400o/code$
```

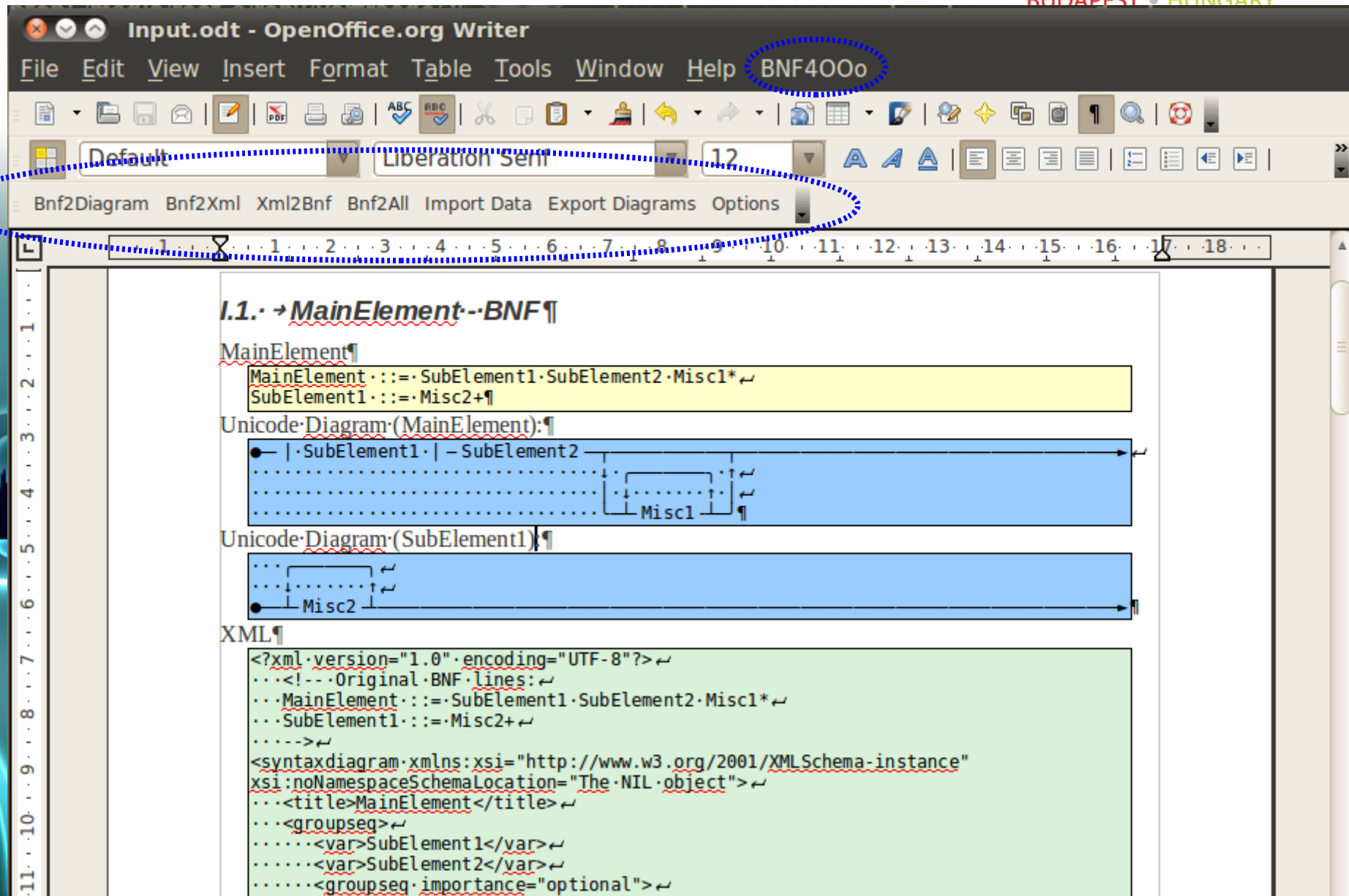

Writer as GUI, 1



- OpenOffice.org Writer
 - Can be employed as a GUI
 - Supply toolbars to
 - Import text files containing [e]BNFs
 - Use the formatting features to highlight
 - [e]BNFs
 - Diagrams
 - XML renderings
 - Error messages
 - Render [e]BNFs to different representations
 - Use documents as a storage and catalog
 - Export created diagrams as graphics



Writer as GUI, 2



Input.odt - OpenOffice.org Writer

File Edit View Insert Format Table Tools Window Help BNF400o

Default Liberation Serif 12

Bnf2Diagram Bnf2Xml Xml2Bnf Bnf2All Import Data Export Diagrams Options

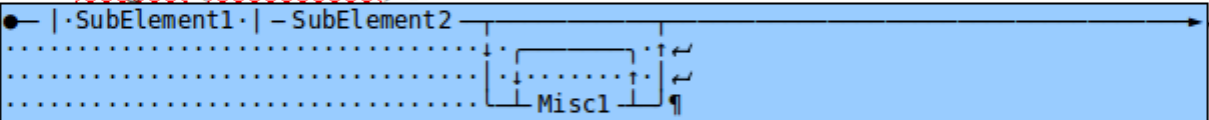
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1.1. → MainElement--BNF¶


MainElement¶

```
MainElement ::= SubElement1·SubElement2·Misc1*↵  
SubElement1 ::= Misc2+¶
```

Unicode·Diagram·(MainElement):¶



Unicode·Diagram·(SubElement1):¶



XML¶

```
<?xml·version="1.0"·encoding="UTF-8"?>↵  
···<!--·Original·BNF·lines:↵  
···MainElement ::= SubElement1·SubElement2·Misc1*↵  
···SubElement1 ::= Misc2+↵  
···-->↵  
···<syntaxdiagram·xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"  
···xsi:noNamespaceSchemaLocation="The·NIL·object">↵  
···<title>MainElement</title>↵  
···<groupseq>↵  
·····<var>SubElement1</var>↵  
·····<var>SubElement2</var>↵  
·····<groupseq·importance="optional">↵
```

BNF400o Options, 1

General Options

Select BNF-version:

Choose range for actions: document paragraph selection

Choose diagram type: ascii unicode prettyUnicode

Use all diagram types in Bnf2All yes

Print file information when importing data yes

General | Appearance | BNF-Version | Image-Charsets | Image-Export

Save | Quit



BNF400o Options, 2

General	Appearance Options
Appearance	Paragraph Styles
BNF-Version	BNF
Image-Charsets	Font: DeJaVu Sans Mono
Image-Export	Font Size: 9
	Font Color: 000000
	Background C... FFFFCC
	diagram
	Font: DeJaVu Sans Mono
	Font Size: 9
	Font Color: 000000
	Background C... 99CCFF
	XML
	Font: DeJaVu Sans Mono
	Font Size: 9
	Font Color: 000000
	Background C... D9F1D9
	error
	Font: DeJaVu Sans Mono
	Font Size: 9
	Font Color: 000000
	Background Co... FF9696
	Diagram Options
	Minimum length of diagram: 83
	Numbering Options
	Choose numbering style for 1.Lvl: ROMAN_UPPER 2
	Choose numbering style for 2.Lvl: ARABIC 4
	Choose numbering style for 3.Lvl: CHARS_UPPER_LETTER 0
	Save
	Quit



BNF400o Options, 3

EBNF-RFC_#822 BNF-ALGOL_60 sasd ABNF-RFC_#2234 EBNF-XML customBNF-FRH

Name: EBNF-XML remove this version

Definitions

Type: independentDefinition String: ::= remove

add

Structural Instructions

Concatenation: (If Field is empty then space/tab is used)

Terminator: (If Field is empty then next def-Line ends this def-Line)

Instructions

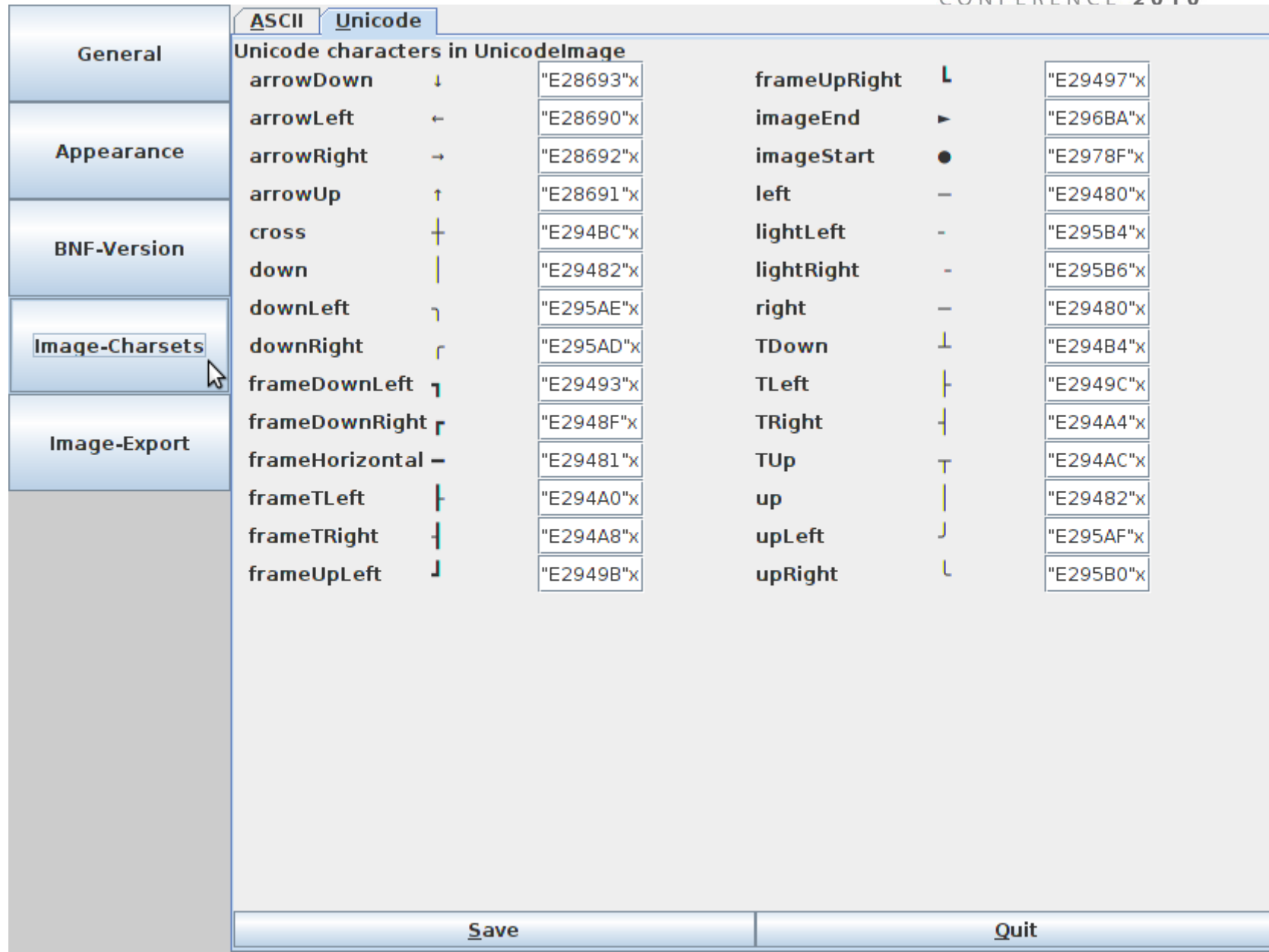
Type: comment	Position: circumfix	String: /*	Strin... */	remove
Type: nonTerminal	Position: circumfix	String: "	Strin... "	remove
Type: except	Position: infix	String: -		remove
Type: range	Position: circumfix	String: [Strin...]	remove
Type: loop	Position: suffix	String: +		remove
Type: optionalLoop	Position: suffix	String: *		remove
Type: xor	Position: infix	String:		remove
Type: group	Position: circumfix	String: (Strin...)	remove
Type: optional	Position: suffix	String: ?		remove
Type: default	Position: circumfix	String: ~	Strin... %	remove
Type: nonTerminal	Position: circumfix	String: '	Strin... '	remove

add

Save Quit



BNF400o Options, 4



The screenshot shows the 'Image-Charsets' dialog box in OpenOffice.org. The 'Unicode' tab is active, displaying a list of Unicode characters and their corresponding hex codes. The 'Image-Charsets' option is highlighted in the left sidebar.

Character Name	Symbol	Hex Code	Character Name	Symbol	Hex Code
arrowDown	↓	"E28693"x	frameUpRight	⤴	"E29497"x
arrowLeft	←	"E28690"x	imageEnd	▶	"E296BA"x
arrowRight	→	"E28692"x	imageStart	●	"E2978F"x
arrowUp	↑	"E28691"x	left	—	"E29480"x
cross	⊕	"E294BC"x	lightLeft	-	"E295B4"x
down		"E29482"x	lightRight	-	"E295B6"x
downLeft	↙	"E295AE"x	right	—	"E29480"x
downRight	↘	"E295AD"x	TDown	⊥	"E294B4"x
frameDownLeft	⌞	"E29493"x	TLeft	┌	"E2949C"x
frameDownRight	⌟	"E2948F"x	TRight	┐	"E294A4"x
frameHorizontal	—	"E29481"x	TUp	└	"E294AC"x
frameTLeft	┌	"E294A0"x	up		"E29482"x
frameTRight	┐	"E294A8"x	upLeft	↖	"E295AF"x
frameUpLeft	⌞	"E2949B"x	upRight	↗	"E295B0"x

Buttons: Save, Quit



BNF400o Options, 5

General	Saving Options
Appearance	Font Size: <input type="text" value="20"/>
BNF-Version	Graphic-Format: <input type="text" value=".png"/>
Image-Charsets	Prefixes for Filename: <input checked="" type="checkbox"/> date <input checked="" type="checkbox"/> time <input checked="" type="checkbox"/> user
Image-Export	Filename: <input type="text" value="diagram name"/>
	Saving Directory: <input type="text" value="/home/rony/Desktop/BNF400o"/> <input type="button" value="browse directory"/>
	<input type="button" value="Save"/> <input type="button" value="Quit"/>



Demonstration



- Do we have enough time ?



State of the Project, 1



- Development Environment
 - Linux (Ubuntu)
 - ooRexx
 - BSF4ooRexx
 - OOo
 - Latest version with English user interface
- Target platforms
 - Linux
 - Windows (eventually)



State of the Project, 2



- Programming the hard part
 - Done
- OOo Writer as GUI
 - Almost done
 - Needs some bug-fixing
 - Paragraph styles work only in the English OOo UI
 - Needs one more export function
 - Export [e]BNF, XML to file system
- Documentation
 - In process, will take a couple of weeks

Roundup



- "BNF4OOo"
 - "Backus-Naur-Form for OpenOffice.org"
 - Easy to setup, easy to use and quite a versatile (conversion) tool
 - Can be used interactively using Writer as an Editor/GUI
 - Toolbar
 - Menu
 - Can be used standalone as well
 - REXX program "BNF4Shell.rex"
 - Interactive shell
 - Can be used quietly as a command-line utility



Credits



- "BNF400o" has been created by Franz Hohenegger at WU Wien
 - <http://sourceforge.net/projects/bnf400o/>
 - svn co <https://bnf4000.svn.sourceforge.net/svnroot/bnf4000> bnf4000
- The ooRexx development team
- The Apache Software Foundation's (ASF) Jakarta project "Bean Scripting Framework (BSF)"

