JAGUAR DEVELOPER'S MANUAL

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Abstract

JAGUAR (JAva GUi for Applied Research) is a Java software tool providing an advanced text editor and graphical user interface (GUI) to manipulate DAKOTA (Design Analysis Kit for Optimization and Terascale Applications) input specifications. This document focuses on the technical background necessary for a developer to understand JAGUAR.

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Chapter 1 INTRODUCTION

Welcome to the JAGUAR developer guide. We will go through the underlying architecture so you can better understand how JAGUAR was built and how it works.

Section 1.1 PACKAGE OVERVIEW

JAGUAR 2.1 has been developed using Eclipse Helios 3.6.1, Windows 7 64-bit, JDK 6 64bit. Other configurations may also be compatible.

JAGUAR requires two projects to be checked out from the SVN repository located at https://dta.ran.sandia.gov/svn/dart/DART-WB-Core/trunk/

- 1. /gov.sandia.dart.jaguar The main project where JAGUAR lives.
- 2. /gov.sandia.dart.jaguar.feature Used to build JAGUAR for different platforms.

Section 1.2 PACKAGE HIERARCHY

The basic hierarchy structure:

- /gov.sandia.dart.jaguar/
 - o src/gov/sandia/dart/jaguar/
 - core
 - **form** graphical renderers of the internal model
 - **model** components that build up the model representation
 - **parse** better parse text into syntactical objects
 - editors
 - **application** overrides menus/look & feel etc. A lot of overrides.
 - **partition2** Text editor core
 - **intro** The welcome page
 - wizard
 - LHS Latin Hypercube Sampling (aka Sensitivity Analysis)
 - **newInputDeck** Create new inputdeck

- newInputDeckFromTemplate Create new input file from user created and JAGUAR standard templates.
- cheatsheet cheatsheet definitions
- o doc JAGUAR User's Manual / documentation
- o files dakreord, templates, dakota desc/nspec files
- icons the icon sets used in JAGUAR
- o sqa released process and test process notes
- o *jaguar.product* configurations used to build the binaries
- o *plugin.xml* defines the dependencies and plugin specifics

• /gov.sandia.dart.jaguar.feature/

- *build.properties* controls setting the permissions (specifically for Linux) and copying platform specific files to the generated binary.
- COPYRIGHT, LICENSE & README text files included in the binary.
- *Dakreorder, icons (and JRE (but unused))* other necessary files included in the binary.

Important files:

- editors/JaguarEditor.java
 - Dynamically generates *NIDR_guikeywds.h* (used for grammar generation)
 from internal files: dakota.input.desc and dakota.input.nspec
 - Creates the instances of the 5 tabs (*see addPages(*))



- Creates instance of JaguarTextEditor
- editors/partition2/JaguarSourceViewerConfiguration.java
 - Text editor magic: autocomplete, hover tool tip, and hyperlink
- editors/partition2/JaguarTextEditor.java
 - Highlights element at cursor position (see *updateHighlight()*)
 - o SaveAs & SaveAsTemplate override
 - Updates model and error from text (*see update(*))

Section 1.3 Reading in GRAMMAR

The grammar JAGUAR uses is a direct transfer from DAKOTA. This helps keep JAGUAR always up to date with new DAKOTA releases. A key feature of JAGUAR is to dynamically pull the grammar in and process the input deck according to the grammar specifications.

Relevant code can be found at: /gov.sandia.dart.jaguar/src/gov/sandia/dart/jaguar/editors/JaguarEditor.java

In method: getGrammarModelNIDR()



- Checks if *dakota.input.desc* and *dakota.input.nspec* exists in user given external Dakota path, otherwise will use internal version.
 - Internal versions located at /files/dakota.input.desc and /files/dakota.input.nspec
- Run nidrgen to generate guikeywds (used for reading in grammar)
 - o nidrgen -egG dakota.input.nspec dakota.input.desc
 - o stdout pipes into NIDR_guikeywds.h (located in
- Generate specsum (used for dakreorder future runs):
 - o nidrgen jspecsum dakota.input.nspec

Section 1.4 DISSECTING THE GRAMMAR FILE

The NIDR grammar file looks something like this:

```
kw 1[3] = {
      { "active_set_vector", 8, 0, 1, 0, 1567 },
      { "evaluation_cache", 8,0,2,0,1569 },
      {"restart_file",8,0,3,0,1571}
      },
kw_2[1] = {
      { "processors_per_analysis",9,0,1,0,1551,0,0.,0.,0.,0," {Number
of processors per analysis}
http://www.cs.sandia.gov/dakota/licensing/votd/html-
ref/InterfCommands.html#InterfApplicDF" }
      },
kw_3[4] = \{
      {"abort",8,0,1,1,1557,0,0.,0.,0.,0,"@[CHOOSE failure]
mitigation]"},
      {"continuation",8,0,1,1,1563},
      {"recover",14,0,1,1,1561},
      \{"retry", 9, 0, 1, 1, 1559\}
```

To decode the grammar, we go through each parameter (not all parameters need to be defined):

Parameters:

- 1: **keyword name –** The official name of this keyword
- 2: **kind** The integer value of *kind* is the summation of the binary values of the below representations:

		512	256	128	64	32	16	8	4	2	1
Integer	0x1									0	1
Real	0x2									1	0
String	0x3									1	1
Array	0x4								1		
Primary	0x8							1			
StrictLB	0x10					0	1				
CaneqLB	0x20					1	0				
LB	0x30					1	1				
StrictUB	0x40			0	1						
CaneqUB	0x80			1	0						
UB	0хс0			1	1						
TopLevelAtMostOnce	0x100	0	1								
TopLevelOnlyOnce	0x200	1	0								
TopLevelAtLeastOnce	0x300	1	1								

Meaning:

- Integer, Real, String Each keyword can be of anyone of these types of value, or not specified at all (meaning no value).
- Array Applied for keywords of type integer, real or string representing a list of values (i.e. 1.4,2.5,3.6,4.7 or 'a','b','y', 'z')
- **Primary** If false, represents this keyword is instead an alias. Only primary keywords are shown in JAGUAR GUI.
- **StrictLB, CaneqLB, LB** Represents lower bound (<, <=) limits exist. See bound values in later parameter definitions. Currently not fully utilized in JAGUAR.
- **StrictUB, CaneqUB, UB** Represents upper bound (>, >=) limits exist. See bound values in later parameter definitions. Currently not fully utilized in JAGUAR.

- **TopLevelAtMostOnce** Only applies for section keywords. Indicates only allows 0 or 1 instances (at most once).
- **TopLevelOnlyOnce** Only applies for section keywords. Indicates only allows 1 instances (only once).
- **TopLevelAtLeastOnce** Only applies for section keywords. Indicates only allows 1 or more instances (at least once).

For example, 0x7 would represent the keyword as an array of strings -- String (0x3) and Array (0x4).

For the developer's convenience, in ModelElement.java, there are methods prepended with "isKind" such as *isKindPrimary()* and *isKindArray()* used to query these values.

- 3: **Number of keywords –** Number of keywords contained in the pointer group.
- 4: **Alternate Group** Specifies which ModelGroup in the ModelContainer this element belongs to. This will not be referenced directly.
- 5: **Required –** Determines if this keyword is required to be valid
- 6: Alias Group not used
- 7: **Pointer Name** Refers to the keyword group (kw_#) containing the children keywords.
- 8: **Lower bound –** defines lower bound (for numbers)
- 9: **Upper bound –** defines upper bound (for numbers)
- 10: **Default Real** default number value (despite the internal name, it is for both real and integer values).
- 11: **Default String –** default string value.
- 12: Description

{"num_least_squares_terms",0x29,6,3,1,1627,kw_173,0.,0.,0.,0."[choose
response type]{{Least squares (calibration)} Number of least squares terms}
http://www.webaddress.com#RespFnLS"}

Default in Description: begin description with@: this specifies if this is in a group that it is the default

Header in Description: contained in between []

Pretty subgroup: contained in between { }

{{A}B}C : A = pretty Subgroup name, B = prettyName, C=rest of description

{D}E: D = prettyName, E = rest of description

13: Group description

{"conmin_frcg",8,9,11,1,177,kw_31,0.,0.,0.,0."[CHOOSE OPT method]","Optimization: Local, Derivative-based"}

Default in Group: begin description with @: this specifies it is the default

Header in Group: contained in between []

Group Name: rest of description

To clarify parameters 12 and 13, this is how they are used in the GUI:



Chapter 2 TEXT EDITOR

Section 2.1 OVERVIEW

JAGUAR uses the generated guikeywds file as the DAKOTA grammar to understand the input deck and to generate the graphical grammar interface.

The grammar is structured in a specific way which can be modeled this way:



ModelContainer pointer

ModelElement – the most important part of the grammar, containing essential metadata (name, value type, limits, prettyName, pointer to ModelContainer etc.). The keywords in the grammar are ModelElements. The pointer to a ModelContainer allows nested behaviors

ModelGrouping – contains a list of ModelElement, but only one of them can be chosen. In essence, a ModelGrouping can be viewed as a combo box, where only one item in the group can be selected.

ModelContainer – contains a list of ModelGrouping, which each has at most one ModelElement selected. This can be viewed as a list

This can be viewed in this way:



This is a view of a single ModelContainer node. In this example it has 3 ModelGroupings. ModelGroupings by themselves are not useful, but each needs to have one of the ModelElements selected. Notice it is often the case where a ModelGrouping only has one ModelElement in it. Remember, the sole purpose of ModelGrouping is to have one selected from possibly multiple ModelElement options.

Let's explore the elements from this sample input deck:

strategy single_method method pointer 'what'

strategy is a ModelElement. Let's take a look at it through a debug run:

⊿	•	this	ModelElement (id=351)				
		aliasGroup	1				
		arrayLengthContainer	null				
	\triangleright	beforeComment	"" (id=366)				
		changes	null				
		defaultInDescription	false				
		defaultInGroup	false				
		defaultReal	0.0				
	\triangleright	🚽 defaultString	"" (id=366)				
	\triangleright	e ^F description	" The strategy specifies the top level technique w				
		elementKeywordLength	-1				
		elementKeywordOffset	-1				
		elementValueOffset	-1				
		grouping	1				
		🚽 groupName	null				
		headerInDescription	null				
		headerInGroup	null				
		🔺 inGUI	true				
	\triangleright	inlineComment	"" (id=366)				
		instance_enabled	false				
		instance_value	null				
		🔺 kind	264				
		IowerBound	0.0				
	\triangleright	🔺 name	"strategy" (id=353)				
		numElements	10				
	\triangleright	parentGroupingReference	ModelGrouping (id=368)				
		pausePropChange	false				
	\triangleright	🔺 pointer	ModelContainer (id=378)				
	\triangleright	🖬 prettyName	"Strategy" (id=380)				
		prettySubgroupName	null				
		required	1				
		topLevel	true				
		upperBound	0.0				

Notice it has a pointer to a ModelContainer. That ModelContainer has a list of ModelGrouping:

🔺 🔺 pointer	ModelContainer (id=378)
a 🧧 elementData	Object[10] (id=383)
▷ 🔺 [0]	ModelGrouping (id=390)
þ 🔺 [1]	ModelGrouping (id=391)
▷ ▲ [2]	ModelGrouping (id=392)
þ 🔺 [3]	ModelGrouping (id=393)
▷ ▲ [4]	ModelGrouping (id=394)
۵ 👗 🔉	ModelGrouping (id=395)
þ 🔺 [6]	ModelGrouping (id=396)
[7]	ModelGrouping (id=397)
[8]	null
▲ [9]	null
♦ modCount	8
b a parentElement	ModelElement (id=351)
size	8

This is what the list looks like:

```
[, graphics , tabular_graphics_data , output_precision ,
iterator_servers , iterator_self_scheduling ,
iterator_static_scheduling , hybrid multi_start pareto_set
single_method ]
```

The ModelGrouping we are looking for that holds single_method is shown below. Notice it contains the list of ModelElements:

a 🔺 [7]	ModelGrouping (id=397)
🔺 🔳 elementData	Object[10] (id=422)
▷ 🔺 [0]	ModelElement (id=423)
Þ 🔺 [1]	ModelElement (id=424)
▷ 🔺 [2]	ModelElement (id=425)
þ 🔺 [3]	ModelElement (id=426)
▲ [4]	null
▲ [5]	null
▲ [6]	null
▲ [7]	null
▲ [8]	null
[9]	null
odCount	4
b a parentContainerReference	ModelContainer (id=378)
selectedElement	null
size	4

The ModelElement single_method:

4 🔺 [/]	ModelGrouping (id=397)
a 🗧 elementData	Object[10] (id=422)
▷ 🔺 [0]	ModelElement (id=423)
Þ 🔺 [1]	ModelElement (id=424)
▷ ▲ [2]	ModelElement (id=425)
a 🔺 [3]	ModelElement (id=426)
aliasGroup	55
🚽 arrayLengthContainer	null
b beforeComment	"" (id=366)
changes	null
defaultInDescription	true
defaultInGroup	false
defaultReal	0.0
b efaultString	"" (id=366)
description	" http://www.cs.sandia.gov/dakota/licensing/vot
🔺 elementKeywordLengt	-1
elementKeywordOffse	-1
elementValueOffset	-1
grouping	7
🚽 groupName	null
headerInDescription	null
headerInGroup	null
🔺 inGUI	true
inlineComment	"" (id=366)
instance_enabled	false
instance_value	null
🔺 kind	8
IowerBound	0.0
👂 🔺 name	"single_method" (id=438)
numElements	1
b arentGroupingRefere	ModelGrouping (id=397)
🔺 pausePropChange	false
pointer	ModelContainer (id=439)
prettyName	"Single method strategy" (id=440)
prettySubgroupName	null
🔺 required	1
topLevel	false
upperBound	0.0

Section 2.2 AUTOCOMPLETION

JAGUAR text editor's biggest feature is autocompletion. Autocomplete is triggered by pressing Ctrl-Space. However, there are two modes:

1. Autocomplete an existing word (character detected at cursor)



• The suggestions will only list what is valid to complete the previous word

2. Autocomplete from scratch



- The suggestions will list what is valid at the current position
- •

To understand JAGUAR's autocompletion features, we need to understand an important point: since the grammar has variable-depth, autocompletion needs to work for even elements listed earlier. For example:

```
method
    dot_bfgs
        optimization_type
```

When autocompleting after *optimization_type*, we could be interested in options at the following depths:

At optimization_type:

```
method
dot_bfgs
optimization_type
minimize
```

At dot_bfgs:

```
method
    dot_bfgs
        optimization_type
        linear_inequality_lower_bounds
```

At **method**:

```
method
    dot_bfgs
        optimization_type
    model_pointer = !!!
```

As you can see, autocompletion can yield many options. Let's take a look at the actual options available after *optimization_type*:



Four groups of suggestions are presented in order of decreasing locality. Let's take a closer look:

1. **First group** (*optimization_type in trailing gray*)

The first thing to notice is the trailing keyword in italicized grey ('optimization_type') which indicates the originator or parent, and is also highlighted in the text prior. The asterisk on the left indicates one of these required options should be selected (but currently none is selected).

2. **Second group** (*dot_bfgs in trailing gray*)

These are keywords that are valid and derived from *optimization_type*'s originator, *dot_bfgs.* Notice the type icons on the left, e.g., '1', '0.5', and 'A', indicating that integer, real, and string values respectively are valid.

3. Third group (method in trailing gray)

These are keywords that are valid directly in a *method* specification. Notice some have no type icons, representing keywords that do not require an associated value. The keyword *output* has a green dot icon, representing it has derived (child) keywords.

Since *method* is a top-level section keyword, all remaining section options appear in the fourth group.

4. Fourth group (section)

These are the top-level DAKOTA input sections (*strategy, method, variables, interface, responses*) that are applicable at the current context. Since main sections can be inserted anywhere, these are usually available for autocompletion, though DAKOTA syntax may restrict the number of them that can be created.

Section 2.3 DAKREORDER

Dakreorder processes an input deck and essentially returns a formatted version of it, namely expanded abbreviations and cleaned up syntax. Since the formatting changes the original text, dakreorder is only used on the inputdeck when going from text to UI view.

The dakreorder execution can be found in Importer.java runDakotaReorder() method and runs provided the pre-generated specsum file (See Section 1.3).

dakreord.exe specsum

It then accepts standard input, where the input deck is usually passed in. The standard output is the formatted text.

Chapter 3 GRAPHICAL INTERFACE

Section 3.1 BASIC TYPES

The graphical interface reads off the model and depending on the type of ModelElement, it will generate one of the following widgets:



- FormComment: If the element has comments (see 3.2.4)
- FormInstance: The selected section and the instances listed:



• **FormTable:** Whenever a field in section *Variables* is detected, its subelements will be drawn as columns in a table:

🚖 continuou	s_design 2					
descriptors	0.5 initial_point	0.5 lower_bounds	0.5 upper_bounds	A scale_types	0.5 scales	
1'		-2	2			
2'		-2	2			

- You can think of the keyword and values as transposed.
- FormChoice2: An updated dropdown using the opensource Nebula project's TableCombo

(<u>http://www.eclipse.org/nebula/widgets/tablecombo/tablecombo.php</u>) to render images and multi-column dropdowns.

```
📩 🔽 🛛 Details:
```

Options	
1	
8	
0	E
8	
	Options 1 8 0 8

To note, there are certain keywords that require more advanced dropdown rendering:



Notice there's a notion of category (the left dropdown), which is defined by the grammar definition (See Section 1.4). Also there are a few definitions that require a value, as shown as a text field on the right.



• **FormLeafText** This is the most basic element where the keyword is displayed. There are three main types:

V	graphics		
	output_precision	Optional Integer. Minimum value: 0 Default value: 0	
	tabular_graphics_file	Optional String.	Browse

- No value: the element has no value.
- **Has value**: the element has a value associated with it, either integer, real or string.
- **File value:** this element has a string value, but also allows the GUI to include a "Browse" button to easily select a file on the user's system. This is created by detecting the string "_file" at the end of the element name.
- FormPointer: In essence, this is a special type of FormLeafText since it is just a string valued element. This is created by detecting the string "_pointer" at the end of the element name.

۲	1	method pointer	🏐 test		-
			Instance	Options	
			🎯 test	0]

The hyperlink allows the user to go directly to the pointer. If it is not already defined, the user is prompted to create it:



It is also noteworthy to mention the forms are laid out using TableWrapLayout since it is able to maximize the width of the UI. However, each element must call setLayoutData() (otherwise unintuitive errors will arise!), namely setting how many columns each element should span. By default each element takes only 1 of the 7 total columns. Below is a picture showing how the 7 columns are set:

		Tinal_solutions Optional Integer. Minimum value: 0, Default value: 0					
*	\checkmark	<u>Details:</u>	Optimization: Plug-in	Ŧ	• A dl_solver 🔻	9	۲
		iterator_servers	Optional Integer. Default value: 0				0

Notice *dl_solver* uses each column for a UI widget. However, *iterator_servers*'s textfield covers 3 columns and thus aligns correctly.

It is also important to mention the TableWrapData has two modes TableWrapData.FILL and TableWrapData.FILL_GRAB, the latter grabs maximum horizontal spacing.

Section 3.2 GUI TOOLBAR



The graphical editor has a toolbar on the top right for users to quickly toggle/execute commands.

3.2.1 Дакота снеск



A quick way to invoke DAKOTA to check the input deck for errors. This is equivalent to running 'Check' via the Execute Problem tab.

3.2.2 PRETTY NAME



Each element in the grammar has a 'name' and a 'pretty name'. The 'name' is the actual text used in the input deck, whereas the pretty name is a user friendly description of the element.

algebraic_mappings	=	Algebraic mappings file
analysis_components	=	Additional identifiers for use by the analysis_drivers

3.2.3 ONLINE REFERENCE



Each element usually has a description, often with a hyperlink to the documentation. This is visible in the GUI on the right side when the button is selected:

0	graphics		0
	tabular graphics data		0
	Details not available wh	en disabled	
	output_precision	Optional Integer. Minimum value: 0 Default value: 0	0
10	iterator_servers	Optional Integer. Default value: 0	0
100	iterator_self_scheduling		0
10	iterator_static_scheduling		
V	Details:	single_method * *	
		sign_include	L

3.2.4 COMMENTS



It should be noted there are 2 types of comments the above example:

- 1. Inline (on the same line as a keyword)
- 2. Before (standalone comments, multiple counts allowed)

To note, there is no trailing comment support at the moment.

In the GUI, the comments are rendered appropriately when the button is selected:

id_method Optional String. id_method Optional String. id_model pointer Image: Compare String. id_model pointer Image: Compare String.	
 model pointer output 	
✓ output	
□ Details	

3.2.5 PUSH UP ELEMENTS



The JAGUAR GUI is simplified by pushup elements. These elements can be displayed in the current pane instead diving deeper in the tree to see them. This helps show the larger context in one view. Pushup elements can be collapsed by clicking on '*Details*'. The images below show JAGUAR with

push-up elements on (default) and off, respectively.

inter	face			
Î] 🕕	An interface specifies	how function evaluations will be performed in order to map a	set of parameters into a set of responses. <u>http://www.cs.sandia.gov/DAKOTA/licer</u>
-		id_interface	Optional String.	
		algebraic_mappings	Optional String.	
۲	V	analysis drivers	'rosenbrock'	Counter: 1
Θ		asynchronous		
		evaluation_servers	Optional Integer. Default value: 0	
			choose evaluation sched. *	
		analysis_servers	Optional Integer. Default value: 0	
			choose analysis sched. *	

In order to edit details within *analysis_drives*, we would normally need to go in and edit the fields:

analy	analysis_drivers									
Î	0	http://www.cs.sandia.gov/dakota/licensing/votd/html-ref/InterfCommands.html#InterfApplic								
	*	analysis_drivers	'rosenbrock'	Counter 1						
		analysis_components	Optional Array of strings.	Counter: 0						
		input_filter	Optional String.							
		output_filter	Optional String.							
	1	Details:	• direct	v						
		failure capture								
	17	deactivate								

However with pushup elements, we get a hybrid view of subelements on the same page. Notice the new section of *analysis_drivers* is now visible in the *interface* view:

face				
🛛 🕕 An interface specifie	es how funct	ion evaluations will be performed in o	rder to map a set of parameters into a set of	responses. <u>http://www.cs.sandia.c</u>
id_interface	Optiona	l String.		
algebraic_mapping	s Optiona	l String.		
analysis drivers	'rosenbr	ock'	Counter: 1	
 Details 				
🔲 analysis_cor	mponents	Optional Array of strings.		Counter: 0
input_filter		Optional String.		
🔲 output_filte	r	Optional String.		
📇 🗹 Details:		• direct		*
deactivate <u>asynchronous</u> Details not availa	able when d	isabled		
evaluation_servers	Optiona	l Integer. Default value: 0		
	🕕 ch	oose evaluation sched. *	-	
I No Details	-			
analysis_servers	Optiona	l Integer. Default value: 0	802	
	🕛 ch	oose analysis sched. *	*	
No Details				

By enabling pushup elements, elements one level deep will be pushed up into the current view. To go into the subelements (level 2), the user will have to click the hyperlinks on the pushed up element.

Chapter 4 UI TRANSITION

In the text editor, there are 3 main panels to manipulate the input deck:



- 1. Source the raw text input deck
- 2. GUI graphical representation of input deck
- 3. Execute/Visualize post processing of input deck

When JAGUAR is switching from text to GUI view, the source text must be parsed, validated and inserted into the model before generating the graphical view. As such, any erroneous keywords must be removed before rendering, otherwise they will be lost forever. JAGUAR prevents accidental deletion by prompting the user:

🞇 Invalid keywords	
Warning! Can not proceed unless these invalid ke	yword(s) are deleted:
invalue_value	
invalid_keyword	
	o back to source
	o back to source

The user has a choice to fix the keyword, or to continue with the invalid keywords removed.

Chapter 5 WIZARDS

<u>F</u> ile	<u>] E</u> dit <u>W</u> indow <u>H</u> elp				
	New		Þ	DAKOTA input file from template	
	Open File <u>.</u>		Þ	Sensitivity Analysis Wizard	
	<u>C</u> lose	Ctrl+W	P	DAKOTA input file	
	C <u>l</u> ose All	Ctrl+Shift+W	⊡	<u>O</u> ther	Ctrl+N

The wizards can be found in /gov.sandia.dart.jaguar/src/gov/sandia/dart/jaguar/wizard

Chapter 6 WELCOME SCREEN

This is the screen that users see by default and is a quick way to introduce the options.

Relevant files can be found at: /gov.sandia.dart.jaguar/src/gov/sandia/dart/jaguar/intro

□ Welcome 🛛
Jaguar VERSION 2.1
Welcome to Jaguar 2.1, the graphical user interface for creating, editing, and running DAKOTA studies.
Start Jaguar <u>Configure Jaguar</u> Before starting, set your preferences including the location of a DAKOTA executable (required for many features)
Tours
JAGUAR is built on the Eclipse Workbench. Before starting, use these guides to orient yourself first to key Eclipse features and then to Jaguar specifics.
 Eclipse Workbench Tour Guided Tour: Jaguar 101 Quick tour of key user interface elements Guided Tour: Create a DAKOTA Parameter Study A step-by-step guide to create a simple DAKOTA input file
Common JAGUAR/DAKOTA tasks
Create new DAKOTA input file Build your DAKOTA study from a basic outline Create input file from template Choose from the most common DAKOTA studies to create your input Launch Sensitivity Analysis Wizard Quickly create a parameter screening study
Beta Testing Troubleshooting
 Email your feedback or get help (jaguar-help@sandia.gov) Browse known Jaguar issues (real time JIRA tracking)
☑ Always show Welcome at start up

The welcome screen (main.html) is an html page with special tags that map to actions:

 $< a \ href=http://org.eclipse.ui.intro/runAction?class=gov.sandia.dart.jaguar.intro.NewLHSWizard&pluginld=gov.sandia.dart.jaguar>$

Additionally to note, the checkbox at the bottom "Always show Welcome at start up" is added through *introContent.xml* with this code:

<contentProvider id="gov.sandia.jaguar.alwaysdisplaycheckbox" class="org.eclipse.ui.intro.contentproviders.AlwaysWelcomeCheckbox" >

<text>AlwaysWelcomeCheckbox will not be displayed in Eclipse pre-3.5 binary....</text>

</contentProvider>

Chapter 7 CHEATSHEETS

Cheat sheets definitions can be found in /gov.sandia.dart.jaguar/cheatsheet and enabled in plugins.xml

For quick tutorials, Help -> Cheat Sheets

Help									
Welcome									
Key Assist Ctrl+Shift+L									
Cheat Sheets									
About Jaguar									
Cheat Sheet Selection									
Select the cheat sheet to open:									
Select a cheat sheet from the list:									
Jaguar Cneetsneets Creating a DAKOTA Study from Scratch									
Getting a bolice ra study non-schatch Getting around Jaguar									
Creating a DAKOTA Study from Scratch									
Select a cheat sheet from a <u>file</u> :									
Browse									
Enter the LIRL of a cheat sheet:									
· · · · · · · · · · · · · · · · · · ·									
(?) OK Cancel									

Cheatsheets are basically guided tutorials for the user to follow.

Jaguar - DART Workspace/Dakota input	t deck/text3	- Jaguar				And in case of	A REAL PROPERTY.		
Ele Edit Window Help							= 0	E Chest Sheets 23 R 7 P D	
Define Problem							0 A 0 ° 🗉	Creating a DAKOTA	
Sections	e	Interface	An interface specifies how	function evaluations will be performed in or	rder to map a set of parameters into a set of a	esponses.		Parameter Study	
MODEL (S) model (model)			http://www.cl.sandia.gov/ id_interface	DAKOTA/Scensing/ustd/html-ref.InterfCom munil Scing.	nmanda.html				
VARIABLES (variables) Autoriables		• 2	algebraic_mappings 01 analysis_drivers 70	endreck' Counter 1			Define How/Iteration Now change to the Define Flow/ Iteration tab where we'll specify a method that will iterate on the problem		
 interface (interface) analysis_drivers drivers 			Details analysis_compone	Cutional Array of storugs		Courte: #		previously specified. Select the method instance. For this example, under Details, choose method category Pasameter Studier, method	
RESPONSES (3) responses (responses)			input_filter					multidim, parameter, study (Multidimensional parameter study). In the Details, specify 8 partitions per	
		.4 2) - = ;	AL III Details	 direct 				vanable: 88, Click when complete Observe	
			B descrivets					Execute Problem Visualize Results Source	
			• •	synchronous Details not available w	hen disabled				
		.≞ ≞ ≣	evaluation_servers	Optional Integer. Default value 0 choose evaluation sched.*					
			No Details analysis_servers						
		A 0	🕑 🗵 No Details	choose analysis sched. * *	-				
Source 1 Define Problem () 2 Defin	e Flow/Iterati	ion 👂 🚯 Ex	cute Problem 🕨 🖲 Visua	alize Results					
Console 23							🔓 🛃 😁 🖬 = 📬 = 🕫		
Jaguar Conscie stdout: responses stdout: num_objective_funct stdout: no_gradients stdout: no_hessians	tions = 1								
Frocess has ended, but waiti Dakreord completed ok Dakreord content has errors,	, so will	nish capt	iring all output Makreord result						
<									

There are plans later on to incorporate dynamic help.

Chapter 8 TEMPLATES

To help users effectively create input decks, DAKOTA includes templates that can be used to quickly create standardized input decks that can later be edited. In addition, usercreated templates can also easily be saved and restored.



This is the template wizard. At the top half are the available templates, both user-created and JAGUAR's built-in templates. And at the bottom half a preview of the selected file.

The user templates can be found through PreferenceStore's *template_path*, whereas the JAGUAR built-in templates can be found */gov.sandia.dart.jaguar/files/templates*.

Chapter 9 VIEWS

Views in JAGUAR are single-purpose windows. The default JAGUAR has 3 views, the main editor (top left), Outline View (right) and Console View (bottom left).



Additional Views can be added through Window \rightarrow Show View.

	<u>W</u> indow <u>H</u> elp	_		
.i n	<u>N</u> ew Window New <u>E</u> ditor	-		
	Show <u>V</u> iew		Console	Alt+Shift+Q, C
	Reset Window Layout	₽ •	Outline Problems	Alt+Shift+Q, O Alt+Shift+O, X
	Preferences		<u>O</u> ther	Alt+Shift+Q, Q

Section 9.1 OUTLINE VIEW

The Outline View strips the input deck leaving only the keywords behind. This aids the user with a view of the input deck without values, comments and textual cosmetics.

Clicking into the tree allows quick reference to the Source View.

The source code can be found:

/gov.sandia.dart.jaguar/src/gov/sandia/dart/jaguar/editors/partition2/JaguarEditorOutli nePage.java



It shares the same code used in the GUI view's left sidebar, except it is configured to display all leaf nodes and only sections that are defined (Note: GUI view shows all sections (enabled or not) and only nodes with children).

Section 9.2 CONSOLE VIEW

The Console View shows supplemental information on what JAGUAR is running, which is usually dakreorder. This view is not required, and is most helpful when determining problems.



Chapter 10 CREATING BINARIES

Section 10.1 EXPORTING IN ECLIPSE

JAGUAR is able to export to multiple platforms: Windows, Mac OSX and Linux. Assuming all dependencies and fragments are configured correctly in /gov.sandia.dart.jaguar.feature/feature.xml, creating the binaries is as follows:

In /gov.sandia.dart.jaguar/Jaguar.product, under "Exporting", select "Eclipse Product export wizard".



Under Destination, Select "Directory" for creating the actually files/directories, or "Archive file" for a compressed form. For creating binaries, we usually use the "Archive file" option.



Next screen allows the user to select available platforms. JAGUAR 2.1 is tested on linux (gtk/x86), linux (gtk/x86_64), macosx (cocoa/x86), win32 (win32/x86), win32/x86_64).

Section 10.2 CREATING WINDOWS INSTALLER

To create Windows executable installer, Under "Destination", instead of archive, we export to the "Directory".

Product Configu	ration	
Configuration:	/gov.sandia.dart.jaguar/Jaguar.product -	Browse
Root directory:	Jaguar	
Synchronization		
Synchronization does not contain	of the product configuration with the product's defining plug-in ensures the stale data.	hat the plug-in
Synchron	ze before exporting	
Destination		
Directory:	c/Jaguartest\	Browse
Arghive file:	c:\Jaguar21Gold\Jaguar211.zip	Browse
Export Options		
Export source	Generate source bundles	
Generate met	adata repository	
Export for mu	Itiple platforms	
Allow for bin.	ry cycles in target platform	

On the platform page, select only "win32 (win32/x86)"

Use PackJacket (<u>http://packjacket.sourceforge.net/</u>) or create an appropriate installation XML for IzPack (<u>http://izpack.org</u>). I'm assuming we're using PackJacket.

Check the license file is in the correct place.

🖞 PackJack	et - Windows64bit		- 0 ×
File Insert	Help		
General Authors Language Panels Packa GUI Packaging Shortcuts User Input Processes	CheckeditelloPanel InfoPanel PacksPanel TargetPanel InstaliPanel UserInputPanel ProcessPanel SimpleFinishPanel	Licence File C:\IzPack\JaguarLicense.txt	Browse
Show Op	otional	Create XML	Create Installer

Check the Packs, especially check the "source Directory" matches where the exported JAGUAR folder is located, because that's where PackJacket is going to look to create the installer binary.

🔮 PackJacket - Windows64bit				- • ×
File Insert Help				
General Authors Language Panels Packaging Shortcuts User Input Processes	Edit	Remove	La Abarra	Down
Show Optional			Create XML	Create Installer
PackJacket - Wi File Insert Help Source File Source Directory Optional advan Rename Target Target Directory Overwrite Operating Sys Family All Name All Version All Architecture All	ndows64bit	6 Yaguar	Brief Cancel	X DWSE DWSE

Check that the Shortcut is set correctly:

🔮 PackJack	et - Windows64b	it			- 0 ×
File Insert	Help				
General Authors Language Panels Packs GUI Packaging Shortcuts User Input Processes	Group Structure Location Pre-select "D Make curren Jaguar Uninstall Jaguar	Jaguar Applicatons (recommended) Jesktop Shortcuts" Checkbox t user default to install shortcuts and Add	on 📝 Edit		- Delete
Show Op	itional			[Create XML Create Installer

Check icon and icon file path (make sure the paths after \$INSTALL_PATH match the "Root directory" you defined in the Export Wizard). Check "Place in" Program Group and Desktop only.

🙄 PackJacket - Windows64bit					
File Insert Help					
Name Jaguar		r III			
📝 Target File	\$INST	ALL_PATH/jaguar/Jaguar.exe 👻			
URL (Unix Only)	URL (Unix Only)				
Place in					
V Program Group	V Des	ktop 🕅 Startup			
Applications	📄 Sta	rt Menu			
Optional advanced t	features	5			
Description		Execute Jaguar			
Command Line Argu	ments				
Working Directory					
🔽 Icon File		\$INSTALL_PATH/jaguar/install/Jaguar.ico 🗸			
Icon Index		0			
Initial State Normal 👻					
Unix Specific					
Terminal Requires Sudo					
Create shortcut for all Users					
User with right permi	issions	root			
		Cancel VK			

Check icon and icon file path (make sure the paths after \$INSTALL_PATH match the "Root directory" you defined in the Export Wizard). Check "Place in" Program Group only.

🙄 PackJacket - Windows64bit				
File Insert Help				
Name	Uninst	all Jaguar		
🔽 Target File	\$INST/	ALL_PATH/Uninstaller/Uninstaller.jar	•	
URL (Unix Only)				
Place in				
📝 Program Group	📄 Des	ktop 🔲 Startup		
Applications	📄 Star	rt Menu		
 Optional advanced f 	eatures	3		
Description		Uninstall Jaguar		
Command Line Argu	ments			
Working Directory				
📝 Icon File		\$INSTALL_PATH/jaguar/install/uninstall.ic	0 🔻	
Icon Index		0		
Initial State		Normal 👻		
Unix Specific				
Terminal Requires Sudo				
Create shortcut for all Users				
User with right permi	ssions	root		
		Cancel	🖌 ок	

After all the settings are correctly configured, "Create Installer" and:

- For 32-bit, create .jar (will use izpack2exe to create 32-bit installer)
- For 64-bit, create .exe (creates a 64-bit installer if created in 64-bit environment)



For 32-bit, start a command prompt and go to \utils\wrappers\izpack2exe Sample execution:

```
"izpack2exe.exe --file=c:\IzPack\Jaguar2.1.jar --output=c:\IzPack\Jaguar.exe"
```

Section 10.3 CREATING MAC INSTALLER

Export to Directory from Eclipse, and use DMG Canvas (<u>www.araelium.com/dmgcanvas</u>) to create a Mac disk image (.dmg file) allowing users to easily install JAGUAR to their Applications folder. Make sure JAGUAR's reference is to the exported directory from Eclipse.



Section 10.4 RELEASING

Upload all the .zip archived files, .dmg installer and .exe installers to a new folder under <u>\\snl\Collaborative\DAKOTA\DART_GUI\CurrentPrototype</u>

Distribution

1 MS0899 Technical Librar	1	MS0899	Technical Library
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9536 (electronic copy)

