$$\Sigma$$ A Library for Ansi Common Lisp

Christopher Mark Gore cgore@cgore.com http://www.cgore.com

April 24, 2013

Contents

1	Cop	yright		9
2	$Th\epsilon$	Behave	e Package	11
	2.1		S	12
		2.1.1	The Behavior Macro	12
		2.1.2	The Spec Macro	12
		2.1.3	The Should Macro	12
		2.1.4	The Should-Not Macro	12
		2.1.5	The Should-Be-Null Macro	12
		2.1.6	The Should-Be-A Macro	12
		2.1.7	The Should= Macro	12
		2.1.8	The Should/= Macro	12
		2.1.9	The Should< Macro	12
		2.1.10	The Should> Macro	12
		2.1.11	The Should<= Macro	12
		2.1.12	The Should>= Macro	12
		2.1.13	The Should-Eq Macro	12
		2.1.14	The Should-Not-Eq Macro	12
		2.1.15		12
		2.1.16		12
		2.1.17	The Should-Equal Macro	12
			The Should-Not-Equal Macro	12
		2.1.19	The Should-EqualP Macro	12
		2.1.20		12
		2.1.21	The Should-String= Macro	12
		2.1.22	The Should-Not-String= Macro	12
		2.1.23	The Should-String/= Macro	12
		2.1.24	The Should-Not-String/= Macro	12
		2.1.25		12
		2.1.26	The Should-Not-String Macro	12
			The Should-String> Macro	12
			The Should-Not-String> Macro	12
			The Should-String<= Macro	12
		2 1 30	The Should-Not-String<= Macro	12

4 CONTENTS

	2.1.31	The Should-String>= Macro	12
	2.1.32	The Should-Not-String>= Macro	12
	2.1.33	The Should-String-Equal Macro	12
	2.1.34	The Should-Not-String-Equal Macro	12
	2.1.35	The Should-String-Not-Equal Macro	12
	2.1.36	The Should-Not-String-Not-Equal Macro	12
		<u> </u>	12
		<u> </u>	12
			12
		<u> </u>	12
			12
		<u> </u>	12
			12
		<u> </u>	12
		Ŭ	
The	Contro	ol Package	13
3.1	Macro	s	14
	3.1.1	The AIf Macro	14
	3.1.2	The A?If Macro	14
	3.1.3	The AAnd Macro	14
	3.1.4	The A?And Macro	14
	3.1.5	The ALambda Macro	14
	3.1.6		14
	3.1.7		14
	3.1.8		14
	3.1.9		14
	3.1.10		14
	3.1.11		14
	3.1.12		14
	3.1.13		14
	3.1.14		14
	3.1.15		14
			14
	3.1.17		14
	3.1.18		14
			14
			14
	3.1.22	=	14
	-		14
		-	14
			14
			14
3.2			14
J. <u>_</u>			14
	3.2.1	The Conjoin Function	14
		2.1.32 2.1.33 2.1.34 2.1.35 2.1.36 2.1.37 2.1.38 2.1.39 2.1.40 2.1.41 2.1.42 2.1.43 2.1.44 The Controllar Macrollar Macroll	2.1.32 The Should-Not-String>= Macro 2.1.33 The Should-String=Equal Macro 2.1.35 The Should-Not-String-Equal Macro 2.1.36 The Should-Not-String-Not-Equal Macro 2.1.37 The Should-Not-String-Not-Equal Macro 2.1.38 The Should-Not-String-LessP Macro 2.1.39 The Should-String-GreaterP Macro 2.1.39 The Should-Not-String-GreaterP Macro 2.1.40 The Should-Not-String-GreaterP Macro 2.1.41 The Should-Not-String-Not-GreaterP Macro 2.1.42 The Should-Not-String-Not-GreaterP Macro 2.1.43 The Should-Not-String-Not-LessP Macro 2.1.44 The Should-Not-String-Not-LessP Macro 2.1.45 The Should-Not-String-Not-LessP Macro 2.1.46 The Should-Not-String-Not-LessP Macro 3.1.1 The All Macro 3.1.2 The A?If Macro 3.1.2 The A?If Macro 3.1.3 The AAnd Macro 3.1.4 The A?And Macro 3.1.5 The ALambda Macro 3.1.6 The A?Lambda Macro 3.1.7 The ABlock Macro 3.1.8 The A?Block Macro 3.1.9 The A?Cond Macro 3.1.10 The A?Cond Macro 3.1.11 The AWhen Macro 3.1.11 The AWhen Macro 3.1.12 The A?When Macro 3.1.13 The AWhile Macro 3.1.14 The A?While Macro 3.1.15 The DeleteF Macro 3.1.16 The Do-While Macro 3.1.17 The Do-Until Macro 3.1.18 The For Macro 3.1.19 The Multicond Macro 3.1.10 The Swap-Unless Macro 3.1.22 The Swap-Unless Macro 3.1.23 The Swap-Unless Macro 3.1.24 The Swap-Unless Macro 3.1.25 The Until Macro 3.1.26 The While Macro 3.1.27 The Swap-Unless Macro 3.1.28 The Swap-Unless Macro 3.1.29 The Swap-Unless Macro 3.1.20 The Walticond Macro 3.1.21 The Ospose Function 3.21 The Compose Function

CONTENTS 5

		3.2.3	The Curry Function
		3.2.4	-
		3.2.4	The Disjoin Function
		3.2.6	•
		3.2.7	The RCompose Function
		3.2.8	The RCurry Function
		3.2.9	The Unimplemented Function
	3.3	Generi	cs
		3.3.1	The Duplicate Generic
4	The	Numer:	ic IN OWN FILE Package 15
	4.1		s
		4.1.1	The DivF Macro
		4.1.2	The MultF Macro
	4.2	Functi	
	7.2	4.2.1	The Bit? Function
		4.2.2	The Fractional-Part Function
		4.2.3	The Fractional-Value Function
		4.2.4	
		4.2.4	5 5
			The Nonnegative? Function
		4.2.6	The Nonnegative-Integer? Function
		4.2.7	The Positive-Integer? Function
		4.2.8	The Product Function
		4.2.9	The Sum Function
		4.2.10	The Unsigned-Integer? Function
	4.3	Types	
		4.3.1	The Nonnegative-Float Type
		4.3.2	The Nonnegative-Integer Type
		4.3.3	The Positive-Float Type
		4.3.4	The Positive-Integer Type
5	The	OS Pa	ckage 17
9	5.1		ons
	5.1		
		5.1.1	The Perl Function
		5.1.2	The Python Function
		5.1.3	The Read-File Function
		5.1.4	The Read-Lines Function
		5.1.5	The Ruby Function
	5.2	Param	
		5.2.1	The *Perl-Path* Parameter
		5.2.2	The *Python-Path* Parameter
		5.2.3	The *Ruby-Path* Parameter

6 CONTENTS

6	The	Proba	bility Package 19
	6.1	Macro	s
		6.1.1	The Decaying-Probabiliity? Macro
	6.2	Functi	ons
		6.2.1	The Probability? Function
	6.3	Types	
		6.3.1	The Probability Type 19
7	The	Rando	m Package 21
	7.1		s
		7.1.1	The NShuffle Macro
	7.2	Functi	ons
		7.2.1	The Gauss Function
		7.2.2	The Random-Argument Function
		7.2.3	The Coin-Toss Function
		7.2.4	The Random-In-Range Function
		7.2.5	The Random-In-Ranges Function
		7.2.6	The Random-Range Function
		7.2.7	The Randomize-Array Function
		7.2.8	The Random-Array Function
	7.3		ics
		7.3.1	The Random-Element Generic
		7.3.2	The Shuffle Generic
8	The	Seque	nce Package 23
	8.1	Macro	s
		8.1.1	The Arefable? Macro
		8.1.2	The NConcF Macro
		8.1.3	The Nthable? Macro
		8.1.4	The Set-NthCdr Macro
	8.2	Functi	ons
		8.2.1	The Array-Values Function
		8.2.2	The Nth-From-End Function
		8.2.3	The Sequence? Function
		8.2.4	The Empty-Sequence? Function
		8.2.5	The Join-Symbol-To-All-Following Function 24
		8.2.6	The Join-Symbol-To-All-Preceeding Function 24
		8.2.7	The List-To-Vector Function
		8.2.8	The Set-Equal Function
		8.2.9	The Simple-Vector-To-List Function
		8.2.10	The Sort-Order Function
		8.2.11	The The-Last Function
		8.2.12	The Vector-To-List Function
	8.3		ics
		8.3.1	The Best Generic
		8.3.2	The Minimum Generic

CONTENTS	7	

		8.3.3	The Minimum? Generic	24
		8.3.4	The Maximum Generic	24
		8.3.5	The Maximum? Generic	24
		8.3.6	The Sort-On Generic	24
		8.3.7	The Slice Generic	24
		8.3.8	The Split Generic	24
		8.3.9	The Worst Generic	24
9	The	String	g Package	25
			ons	25
		9.1.1	The Character-Range Function	25
		9.1.2	The Character-Ranges Function	25
		9.1.3	The Escape-Tildes Function	26
		9.1.4	The Replace-Char Function	26
		9.1.5	The StrCat Function	26
		9.1.6	The StrMult Function	26
		9.1.7	The String-Join Function	26
		9.1.8	The Stringify Function	26
		9.1.9	The To-String Function	26
	9.2		ds	26
	0.2	9.2.1	The Split Methods	26
			-	
10			Series Package	27
	10.1		5	27
			The Snap-Index Macro	27
	10.2		ons	27
			The Array-Raster-Line Function	27
			The Distance Function	27
		10.2.3	The Norm Function	27
		10.2.4	The Raster-Line Function	27
		10.2.5	The Similar-Points? Function	27
		10.2.6	The Time-Series? Function	27
		10.2.7	The Time-Multiseries? Function	27
		10.2.8	The TMSref Function	27
		10.2.9	The TMS-Dimensions Function	27
		10.2.10	The TMS-Raster-Line Function	27
		10.2.11	The TMS-Values Function	27
	10.3			27
			The Time-Multiseries Type	27
11	The	Truth	Package	29
			ons	29
	11.1		The [?] Function	29
			The Toggle Function	29
	11 9		CS	29
	11.2		The ? Generic	29 29
		11.2.1	THE : Generic	∠9

8		CONTENTS

2 The Utilities Package	31
12.1 Variables	31
12.1.1 The *Sigma-Packages* Variable	31
12.2 Functions	31
12.2.1 The Use-All-Sigma Function	31
-	

Copyright

Copyright © 2005 - 2013, Christopher Mark Gore, Soli Deo Gloria, All rights reserved.

8729 Lower Marine Road, Saint Jacob, Illinois 62281 USA.

Web: http://cgore.com Email: cgore@cgore.com

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- Neither the name of Christopher Mark Gore nor the names of other contributors may be used to endorse or promote products derived from this software without specific prior written permission.

This software is provided by the copyright holders and contributors "as is" and any express or implied warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose are disclaimed. In no event shall the copyright holder or contributors be liable for any direct, indirect, incidental, special, exemplary, or consequential damages (including, but not limited to, procurement of substitute goods or services; loss of use, data, or profits; or business interruption) however caused and on any theory of liability, whether in contract, strict liability, or tort (including negligence or otherwise) arising in any way out of the use of this software, even if advised of the possibility of such damage.

The Behave Package

2.1	N /I	acros
Z	IVI	acros

- 2.1.1 The Behavior Macro
- 2.1.2 The Spec Macro
- 2.1.3 The Should Macro
- 2.1.4 The Should-Not Macro
- 2.1.5 The Should-Be-Null Macro
- 2.1.6 The Should-Be-A Macro
- 2.1.7 The Should= Macro
- 2.1.8 The Should/= Macro
- 2.1.9 The Should Macro
- 2.1.10 The Should> Macro
- 2.1.11 The Should<= Macro
- 2.1.12 The Should>= Macro
- 2.1.13 The Should-Eq Macro
- 2.1.14 The Should-Not-Eq Macro
- 2.1.15 The Should-Eql Macro
- 2.1.16 The Should-Not-Eql Macro
- 2.1.17 The Should-Equal Macro
- 2.1.18 The Should-Not-Equal Macro
- 2.1.19 The Should-EqualP Macro
- 2.1.20 The Should-Not-EqualP Macro
- 2.1.21 The Should-String= Macro
- 2.1.22 The Should-Not-String= Macro
- 2.1.23 The Should-String/= Macro

The Control Package

3.1	Macros
-----	--------

- 3.1.1 The Alf Macro
- 3.1.2 The A?If Macro
- 3.1.3 The AAnd Macro
- 3.1.4 The A?And Macro
- 3.1.5 The Alambda Macro
- 3.1.6 The A?Lambda Macro
- 3.1.7 The ABlock Macro
- 3.1.8 The A?Block Macro
- 3.1.9 The ACond Macro
- 3.1.10 The A?Cond Macro
- 3.1.11 The AWhen Macro
- 3.1.12 The A?When Macro
- 3.1.13 The AWhile Macro
- 3.1.14 The A?While Macro
- 3.1.15 The DeleteF Macro
- 3.1.16 The Do-While Macro
- 3.1.17 The Do-Until Macro
- 3.1.18 The For Macro
- 3.1.19 The Forever Macro
- 3.1.20 The Multicond Macro
- 3.1.21 The OpF Macro
- 3.1.22 The Swap Macro
- 3.1.23 The Swap-Unless Macro

The Numeric IN OWN FILE Package

- 4.1 Macros
- 4.1.1 The DivF Macro
- 4.1.2 The MultF Macro
- 4.2 Functions
- 4.2.1 The Bit? Function
- 4.2.2 The Fractional-Part Function
- 4.2.3 The Fractional-Value Function
- 4.2.4 The Integer-Range Function
- 4.2.5 The Nonnegative? Function
- 4.2.6 The Nonnegative-Integer? Function
- 4.2.7 The Positive-Integer? Function
- 4.2.8 The Product Function
- 4.2.9 The Sum Function
- 4.2.10 The Unsigned-Integer? Function
- 4.3 Types
- 4.3.1 The Nonnegative-Float Type
- 4.3.2 The Nonnegative-Integer Type
- 4.3.3 The Positive-Float Type
- 4.3.4 The Positive-Integer Type

The OS Package

5.1 Functions

- 5.1.1 The Perl Function
- 5.1.2 The Python Function
- 5.1.3 The Read-File Function
- 5.1.4 The Read-Lines Function
- 5.1.5 The Ruby Function

5.2 Parameters

- 5.2.1 The *Perl-Path* Parameter
- 5.2.2 The *Python-Path* Parameter
- 5.2.3 The *Ruby-Path* Parameter

The Probability Package

- 6.1 Macros
- 6.1.1 The Decaying-Probabiliity? Macro
- 6.2 Functions
- **6.2.1** The Probability? Function
- 6.3 Types
- 6.3.1 The Probability Type

The Random Package

- 7.1 Macros
- 7.1.1 The NShuffle Macro
- 7.2 Functions
- 7.2.1 The Gauss Function
- 7.2.2 The Random-Argument Function
- 7.2.3 The Coin-Toss Function
- 7.2.4 The Random-In-Range Function
- 7.2.5 The Random-In-Ranges Function
- 7.2.6 The Random-Range Function
- 7.2.7 The Randomize-Array Function
- 7.2.8 The Random-Array Function
- 7.3 Generics
- 7.3.1 The Random-Element Generic
- 7.3.2 The Shuffle Generic

The Sequence Package

- 8.1.1 The Arefable? Macro
- 8.1.2 The NConcF Macro
- 8.1.3 The Nthable? Macro
- 8.1.4 The Set-NthCdr Macro

8.2 Functions

- 8.2.1 The Array-Values Function
- 8.2.2 The Nth-From-End Function
- 8.2.3 The Sequence? Function
- 8.2.4 The Empty-Sequence? Function
- 8.2.5 The Join-Symbol-To-All-Following Function
- 8.2.6 The Join-Symbol-To-All-Preceeding Function
- 8.2.7 The List-To-Vector Function
- 8.2.8 The Set-Equal Function
- 8.2.9 The Simple-Vector-To-List Function
- 8.2.10 The Sort-Order Function
- 8.2.11 The The-Last Function
- 8.2.12 The Vector-To-List Function

8.3 Generics

- 8.3.1 The Best Generic
- 8.3.2 The Minimum Generic
- 8.3.3 The Minimum? Generic
- 8.3.4 The Maximum Generic

The String Package

The String package contains useful tools for working with strings.

9.1 Functions

9.1.1 The Character-Range Function

The character-range function returns a list of characters from the *start* to the *end* character. Note that this is returning a list, not a string.

Syntax

```
(character-range start\ end) \Longrightarrow '(start\ ...\ end)
```

Arguments and Values

Start The character to start the range with, inclusive.

End The character to end the range with, inclusive.

Examples

```
(character-range #\a #\e) \Longrightarrow '(#\a #\b #\c #\d #\e) (character-range #\e #\a) \Longrightarrow '(#\a #\b #\c #\d #\e)
```

9.1.2 The Character-Ranges Function

The character-ranges function is a convenience wrapper for character-range function, concatenating several calls and making the resultant list contain only unique instances.

Syntax

```
(character-ranges start_1 \ end_1 \ldots \Longrightarrow '(character_1 \ldots)
```

Arguments and Values

 $Start_n$ The character to start the nth range with, inclusive.

 End_n The character to end the nth range with, inclusive.

Examples

```
(character-ranges #\a #\c #\x #\z) \Longrightarrow '(#\a #\b #\c #\x #\y #\z) (character-ranges #\a #\c #\a #\c) \Longrightarrow '(#\a #\b #\c)
```

- 9.1.3 The Escape-Tildes Function
- 9.1.4 The Replace-Char Function
- 9.1.5 The StrCat Function
- 9.1.6 The StrMult Function
- 9.1.7 The String-Join Function
- 9.1.8 The Stringify Function
- 9.1.9 The To-String Function
- 9.2 Methods
- 9.2.1 The Split Methods

The Time-Series Package

10.1	Macros
10.1.1	The Snap-Index Macro
10.2	Functions
10.2.1	The Array-Raster-Line Function
10.2.2	The Distance Function
10.2.3	The Norm Function
10.2.4	The Raster-Line Function
10.2.5	The Similar-Points? Function
10.2.6	The Time-Series? Function
10.2.7	The Time-Multiseries? Function
10.2.8	The TMSref Function
10.2.9	The TMS-Dimensions Function
10.2.10	The TMS-Raster-Line Function
10.2.11	The TMS-Values Function
10.3	Types
1031	The Time-Multiseries Type

The Truth Package

- 11.1 Functions
- 11.1.1 The [?] Function
- 11.1.2 The Toggle Function
- 11.2 Generics
- 11.2.1 The? Generic

The Utilities Package

- 12.1 Variables
- 12.1.1 The *Sigma-Packages* Variable
- 12.2 Functions
- 12.2.1 The Use-All-Sigma Function