$\operatorname{G53IDS}$ - Final Report

Embedded Domain Specific Language for Describing Recipes in Haskell

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Contents

1	Abs	stract and Acknowledgements			
2	Introduction and Motivation				
	2.1	Overview			
	2.2	Cooking with Computers			
	2.3	DSLs and Haskell			
3	Development Process				
	3.1	Project Management			
4	Combinators				
	4.1	Initial Definitions			
	4.2	Sequencing Problem			
	4.3	Conditionals			
	4.4	Transactions			
	4.5	Moving to a Tree of Actions			
	4.6	Final Definitions			
	4.7	Custom Combinators			
5	Deriving Equality				
	5.1	Topological Sorting			
	5.2	Quickspec			
6	Modelling a Kitchen				
	6.1	Stations			
	6.2	Scheduling			
		6.2.1 Linear Programming			
		6.2.2 Implementing Scheduler			
7	Recipe Properties				
	7.1	Folding Over Recipes			
	7.2	Time and Cost			
	7.3	Flavours			
	7.4	Generating New Recipes			
8	Evaluation and Testing				
	8.1	Test Recipes			
	8.2	QuickCheck			

ID:	425	1529 James Burte	on	
9	Summary and Reflections			
	9.1	Project Management	6	
	9.2	Contributions	6	
	9.3	Reflections	6	

10 Related Work

1 Abstract and Acknowledgements

$\mathbf{2}$ Introduction and Motivation

- 2.1 Overview
- Cooking with Computers
- DSLs and Haskell
- 3 Development Process
- Project Management
- **Combinators** 4
- **Initial Definitions** 4.1
- 4.2 Sequencing Problem
- Conditionals 4.3
- 4.4 **Transactions**
- 4.5 Moving to a Tree of Actions
- 4.6 Final Definitions
- 4.7 **Custom Combinators**
- **Deriving Equality** 5
- **Topological Sorting** 5.1
- 5.2Quickspec
- Modelling a Kitchen 6
- 6.1 Stations
- 6.2Scheduling
- 6.2.1 Linear Programming
- 6.2.2Implementing Scheduler
- Recipe Properties
- Folding Over Recipes 7.1
- 7.2 Time and Cost
- 7.3 **Flavours**

7.4

6

Generating New Recipes

- **Evaluation and Testing** 8
- 8.1 Test Recipes

References

[1] The Guardian. 2015. Future of food: how we cook. https://www.theguardian.com/technology/2015/sep/13/future-of-food-how-we-cook

- [2] Paul Hudak. Domain Specific Languages. Department of Computer Science, Yale University, December 15, 1997.
- [3] Michael Snoynman. O'Reilly Webcast: Designing Domain Specific Languages with Haskell. January 4, 2013. https://www.youtube.com/watch?v=8k_SU1t50M8
- [4] Simon Peyton Jones, Microsoft Research, Cambridge. Jean-Marc Eber, LexiFi Technologies, Paris. Julian Seward, University of Glasgow. Composing contracts: an adventure in financial engineering. August 17, 2000.
- [5] John Hughes. The Design of a Pretty-printing Library. Chalmers Teniska Hogskola, Goteborg, Sweden. 1995.
- [6] Simon Peyton Jones, Microsoft Research, Cambridge. Jean-Marc Eber, LexiFi Technologies, Paris. Julian Seward, University of Glasgow. Composing contracts: an adventure in financial engineering (PowerPoint Slides). August 17, 2000. https://www.microsoft.com/enus/research/publication/composing-contracts-an-adventure-in-financial-engineering/
- [7] Simon Peyton Jones. Into the Core Squeezing Haskell into Nine Constructors. September 14, 2016. https://www.youtube.com/watch?v=uR_VzYxvbxg
- [8] Graham Hutton. Fold and Unfold for Program Semantics. Department of Computer Science, University of Nottingham. September 1998.