Design Recipes

In this course, we teach an approach to program design based on recipes. **Each design recipe is applicable to certain problems, and systematizes the process of designing solutions to those problems.**

There are four core recipes that handle most of the design work, additional recipes handle variations of the core recipes for particular kinds of problems. A list of the recipes presented in this course is shown below; clicking on the links provides a detailed description of the recipe.

Core Recipes	Data Driven Variants	Control Driven Variants	Abstraction
How to Design Functions (HtDF) Design any function.	Functions on 2 One-of Data Functions where 2 arguments have a one-of in their type comments.	Function Composition	From Examples Produce an abstract function given two similar functions.
How to Design Data (HtDD) Produce data definitions based on structure of the information to be represented.		Backtracking Search	From Type Comments Produce a fold function given type comments.
Data Driven Templates Produce template for a data definition based on the form of the type comment.		Generative Recursion	
How to Design Worlds (HtDW) Produce interactive programs that use `big-bang`.		Accumulators: - recover information lost in recursion - tail recursion - maintain a work list	Using Abstract Functions
		`for-each` Loops	
		Template Blending	

Examples of the Interaction Between the Recipes

One good way to review the first 7 weeks of the course is to be sure that you can design data of every form across the top, and can design functions and worlds corresponding to every cell in the body of the table.

This table will be filled in as the term progresses.

form of data	primitive		defined by data definition						
	atomic		non-distinct	distinct	interval	enumeration	itemization	compound	arbitrary sized (list)
HtDD type + template	String	Image	city-name (3c,	"red" true	seat-num (3f,	letter-grade (3g, solution)	countdown (3h, solution)	student-A (4i, solution)	quidditch-A (5c,

			solution)		solution)				solution)
HtDF	yell (2c, solution)	tall (2f, solution)	best (3d, solution)	n/a	aisle (3i, solution)	bump-up (3j, solution)	countdown-to-display (3k, solution)	student-B (4i, solution)	quidditch-B (5e, solution)
HtDW	n/a	n/a	cat (4c, 4d, 4f, 4g, solution)	n/a	n/a	n/a	n/a	cowabunga (4j, solution)	making-rain-filtered (6g, solution)
2x one of	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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