Contents

Int	trodu	ction	i											
1	Fou	ndations	s 1											
	1.1	Simple	data types											
		1.1.1	Integers in binary											
		1.1.2	Floating-point numbers											
		1.1.3	Characters and ASCII											
		1.1.4	Strings											
		1.1.5	Representations and types											
		1.1.6	Summary											
	1.2	Variable	es											
		1.2.1	Assignment											
		1.2.2	Mutable and immutable variables											
		1.2.3	Summary											
	1.3	Contro	structures											
		1.3.1	Conventional control structures											
		1.3.2	Control structures in computers											
		1.3.3	Summary											
	1.4	· · · · · · · · · · · · · · · · ·												
		1.4.1	Calling functions											
		1.4.2	Summary											
	1.5	Practic	ze											
2	Understanding VMs 27													
	2.1	Simple	VMs											
		2.1.1	The stack											
		2.1.2	Interpreter technique											
		2.1.3	VM1 implementation											
		2.1.4	REGVM implementation											
		2.1.5	Portability											
		2.1.6	Summary											
	2.2	Stack-b	pased VM											
		2.2.1	Comparisons											

CONTENTS

		2.2.2	Iterations															40
		2.2.3	Error handl	ing .														41
		2.2.4	Summary															43
	2.3													44				
		2.3.1	Frame poin															48
		2.3.2	Local stora	ge .														50
		2.3.3	Memory ma	_														51
		2.3.4	Frame stac	k														52
		2.3.5	Summary															57
	2.4	Practio	ce															59
3	Deb	ugging.	Optimisati	ion. a	nd T	est	s											63
•	3.1		uisites															63
	3.2		ools															63
	3.3		ging															64
		3.3.1	Process .															66
		3.3.2	Tools															67
		3.3.3	Summary															73
	3.4		sation															74
		3.4.1	Memory .															78
		3.4.2	Time															79
		3.4.3	Confusion r															81
		3.4.4	Summary															87
	3.5	Tests a	and testing															87
		3.5.1	Automated															91
		3.5.2	Summary		-							_						94
	3.6	Practio	e															94
4	Bil	dina an	d Evnorima	ntina														99
-	4.1	uilding and Experimenting L Prerequisites																
	4.2	-	mputer as h															99
	7.2	4.2.1	Hardware															
		4.2.2	The Pico .															
		4.2.3	Summary															
		4.2.4	Practice .															
	4.3		Output															
	1.5	4.3.1	The Pico p															
			Light switc															
		4.3.3	Programma															
		4.3.4	State mach	,														
		4.3.5	Circuit for															
		4.3.6	Pedestrian		_													
		4.3.7	Temperatu															
		4.3.8	Temperatur															