Steve Tockey

Foreword by Meilir Page-Jones

Return Construct Software Lagisweet Construct Software Construct Softw



Maximizing the Return on Your Software Investment

This plantering book highlights critical, overlooked skills worded by true software

professionals."

Contents

	r-oreword	XXI
	Preface	XXV
PART ONE:	INTRODUCTION AND FOUNDATIONS	1
CHAPTER 1:	Return on Software: Maximizing the Return on You	
	Software Investment	3
	Software on Purpose	3
	Waste Not, Want Not	5
	The Primary Message	6
	A Secondary Message: Software Engineering Versus Computer Science	7
	An Overview of the Book	9
	Summary	10
	Self-Study Questions	11
CHAPTER 2:	Business on Purpose	13
	Why Are Companies in Business, Anyway?	13
	Business Decisions in For-Profit Organizations	18
	Business Decisions in Not-for-Profit Organizations	19
	Business Decisions in Your Own Personal Finances	20
	Summary	20
	Self-Study Questions	21
CHAPTER 3:	The Fundamental Concepts of	
	Business Decisions	23
	Proposals	23
	Cash-Flow Instances and Cash-Flow Streams	24
	Cash-Flow Diagrams	26
	Developing Cash-Flow Streams	28
	Summary	32
4.5	Self-Study Questions	33

CHAPTER 4:	The Business Decision-Making Process	3
	Introducing the Business Decision-Making Process	35
	Understand the Real Problem	37
	Define the Selection Criteria	39
	Identify All Reasonable Technically Feasible Solutions (the Proposals)	40
	Evaluate Each Proposal Against the Selection Criteria	4
	Select the Preferred Proposal	42
	Monitor the Performance of the Selected Proposal	42
	Summary	44
	Self-Study Questions	44
CHAPTER 5:	Interest: The Time Value of Money	47
	Time Is Money	47
	Interest	48
	Naming Conventions in Interest Formulas	50
	Simple Interest	50
	Discrete Compounding of Interest	52
	Single-Payment Compound-Amount (F/P)	54
	Single-Payment Present-Worth (P/F)	58
	Equal-Payment-Series Compound-Amount (F/A)	60
	Equal-Payment-Series Sinking-Fund (A/F)	62
	Equal-Payment-Series Capital-Recovery (A/P)	64
	Equal-Payment-Series Present-Worth (P/A)	66
	Summarizing the Formulas	67
	Some Other Handy Relationships	67
	Summary	69
	Self-Study Questions	69
CHAPTER 6:	Other Interest(ing) Calculations	73
	Using Different Interest Periods and	
	Compounding Frequencies	73
	The Relationship Between Cash-Flow Instances	_
	and Compounding Interval	78
	Continuous Compounding, Discrete Payment	81
	Determining Actual Interest Rates	82

Contents i

	Paying off a Loan Through a Single,	
	Lump-Sum Payment	84
	Separating Interest and Principal in Loan Payments	85
	Paying Off a Loan Early Through Higher Payments	87 91
	Interest Rates Might Not Be What They Seem	91 94
	Summary Self-Study Questions	94 94
CHAPTER 7:	Equivalence	97
	A Simple Comparison of Two Proposals	97
	Simple Equivalence	100
	Equivalence with Varying Cash-Flow Instances	101
	Equivalence Under Different Interest Rates	103
	Summary	106
	Self-Study Questions	106
CHAPTER 8:	Bases for Comparison	109
	Comparing Cash-Flow Streams	110
	A Simple Example	110
	Present Worth, PW(i)	112
	Future Worth, FW(i)	114
	Annual Equivalent, AE(i)	116
	Internal Rate of Return, IRR	117
	Payback Period	119
	Project Balance, PB(i)	121
	Capitalized Equivalent Amount, CE(i)	123
	Summary	124
	Self-Study Questions	125
CHAPTER 9:	Developing Mutually Exclusive Alternatives	127
	Relationships Between Proposals	127
	Alternatives	129
	Developing Mutually Exclusive Alternatives	129
	The "Do Nothing" Alternative	132
	Example Proposals	133
	Summary	135
	Self-Study Questions	136

PART TWO:	MAKING FOR-PROFIT BUSINESS DECISIONS	139
CHAPTER 10:	For-Profit Decision Analysis	141
	Minimum Attractive Rate of Return (MARR)	141
	Before- and After-Tax MARRs	143
	The Basic For-Profit Decision Process	144
	Decisions Based on Total Versus Differential Cash-Flow Streams	144
	Present Worth on Incremental Investment	147
	IRR on Incremental Investment	149
	Comparisons Based on Total Cash-Flow Streams	151
	Rank on Rate of Return	153
	Summary	154
	Self-Study Questions	155
CHAPTER 11:	Planning Horizons and Economic Life	157
	Planning Horizons	158
	Capital Recovery with Return, CR(i)	158
	Economic Life	160
÷	Finding the Economic Life of an Asset	162
	Special Cases in Economic Life	164
	Economic Lives and Planning Horizons	164
	Summary	168
	Self-Study Questions	169
CHAPTER 12:	Replacement and Retirement Decisions	17
	Replacement Decisions	171
	Sunk Cost and Salvage Value, Special Issues in Replacement Decisions	172
	The Outsider's Viewpoint: Addressing Sunk Cost and Salvage Value	173
	An Example of Replacement Analysis	174
	Retirement Decisions	178
	Summary	18:
	Self-Study Questions	182

PART THREE:	ADVANCED FOR-PROFIT DECISION TECHNIQUES	185
CHAPTER 13:	Inflation and Deflation	187
	Inflation and Deflation	188
	Price Indices: Measuring Inflation and Deflation	189
	Popular Price Indices	190
	The Inflation Rate	192
	Purchasing Power and Inflation	194
	Accounting for Inflation	196
	Actual Dollar Versus Constant Dollar Analysis	198
	Mr. Kinkaid's Adventure in Actual and	
	Constant Dollars	200
	Planning a Retirement	201
	Summary	206
	Self-Study Questions	207
CHAPTER 14:	Depreciation	211
	Introduction to Depreciation	212
-	Actual Depreciation	212
	Depreciation Accounting	213
	Value-Time Functions	214
	Book Value	215
	Depreciation Methods	216
	Depreciation Methods Before 1981	217
	Declining-Balance Depreciation	218
	Accelerated Cost Recovery System (ACRS), 1981–1986	223
	Modified Accelerated Cost Recovery System	220
	(MACRS), 1987 and Later	226
	Units-of-Production Depreciation	228
	Depletion	229
	Other Aspects of Depreciation Accounting Not	
	Discussed Here	229
	Summary	230
	Self-Study Questions	230

CHAPTER 15:	General Accounting and Cost Accounting	233
	General Accounting	234
	Cost Accounting	245
	Determining Unit Cost	249
	Summary	260
	Self-Study Questions	260
CHAPTER 16:	income Taxes and After-Tax Cash-Flow Streams	265
	What Are Taxes?	266
	Federal Income Taxes for Corporations	266
	Federal Income Taxes for Individuals	268
	Effective Income Tax Rates	269
	Calculating After-Tax Cash-Flow Streams	270
	Tax Credits	274
	Inflation and After-Tax Cash-Flow Streams	275
	Summary	276
	Self-Study Questions	277
CHAPTER 17:	The Consequences of Income Taxes on	
	Business Decisions	279
	Interest Expenses and Income Taxes	280
	Interest Income and Income Taxes	281
	Depreciation Method and Income Taxes	282
	Depreciation Recovery Period and Income Taxes	285
	Capital Gains and Losses for Corporations	286
	Gain or Loss When Selling or Scrapping Depreciable Assets	287
	Comparing Financing Methods in After-Tax Cash-Flow Terms	288
	After-Tax Analysis of Replacements	293
	Summary	293
	Self-Study Questions	294

PART FOUR:	MAKING DECISIONS IN GOVERNMENT AND NONPROFIT ORGANIZATIONS	297
CHAPTER 18:	Making Not-for-Profit Business Decisions	299
	Software and Governments	299
	Software and Nonprofit Organizations	302
	Decision Analysis in Government and Nonprofit Organizations	303
	Benefit-Cost Analysis for a Single Proposal	303
	Benefit-Cost Analysis for Multiple Proposals	308
	Cost-Effectiveness Analysis	311
	Summary	314
	Self-Study Questions	314
PART FIVE:	PRESENT ECONOMY	317
CHAPTER 19:	Break-Even Analysis	319
	Decision Variables and Objective Functions	319
	Break-Even Analysis with Two Alternatives	320
	Break-Even Analysis with Three Alternatives	323
	General Case Break-Even Analysis	325
	Summary	329
	Self-Study Questions	329
CHAPTER 20:	Optimization Analysis	331
	Introducing Optimization	331
	Optimizing a Single Alternative with a Single Decision Variable	332
	Optimizing Multiple Alternatives with a Single Decision Variable	334
	Optimizing a Single Alternative with Multiple Decision Variables	336
4	Optimizing Multiple Alternatives with Multiple	
	Decision Variables	337
	Summary	337
	Salf-Study Quactions	338

PART SIX:	ESTIMATION, RISK, AND UNCERTAINTY	341
CHAPTER 21:	Basic Estimation Concepts	343
	What Is an Estimate?	343
	Why Estimate?	344
	Estimates and Probabilities	344
	Estimates and Uncertainty	347
	The Cone of Uncertainty: Uncertainties Change over Time	350
	Expressing Estimate Uncertainty	358
	The Cone of Uncertainty in Light of a	
	Fixed Schedule	360
	Summary	362
	Self-Study Questions	362
CHAPTER 22:	General Estimation Techniques	367
	Expert Judgment Estimation	367
	Estimation by Analogy	369
	Bottom-Up Estimation	371
	Estimation by Statistical Methods	374
	Estimating by Multiple Methods	377
	Make Assumptions Explicit	379
	Summary	380
	Self-Study Questions	381
CHAPTER 23:	Allowing for Inaccuracy in Estimates	383
	Knowledge Drives Estimation Accuracy	384
	Allowing for Inaccuracy in Estimates	384
	Allowing for Inaccuracy Using Conservative	205
	Decision Criteria	385
	More Effective Strategies	389
	Considering Ranges of Estimates	390
	Sensitivity Analysis	392
	Delay Final Decisions	397
	Summary	399
	Self-Study Questions	399

	Contents	ΧV
CHAPTER 24:	Decision Making Under Risk	403
	Expected Value Decision Making	404
	Expectation Variance in Decision Making	405
	Monte Carlo Analysis	407
	Decision Trees	411
	The Expected Value of Perfect Information	416
	Summary	420
	Self-Study Questions	420
CHAPTER 25:	Decision Making Under Uncertainty	425
	The Payoff Matrix	426
	The Laplace Rule	427
	The Maximin Rule	428
	The Maximax Rule	428
	The Hurwicz Rule	429
	The Minimax Regret Rule	430
	Summary of the Decision Rules	432
	Summary	433
	Self-Study Questions	434
PART SEVEN:	MULTIPLE-ATTRIBUTE DECISIONS	437
CHAPTER 26:	Decisions Based on Multiple Attributes	439
	Different Kinds of "Value"	439
	Choosing the Attributes	441
	Selecting Measurement Scales	442
	Dimensionality of the Decision Techniques	447
	Noncompensatory Decision Techniques	447
	Compensatory Decision Techniques	449
	Summary	459
	Salf-Study Ouactions	150

xvi Contents

PART EIGHT:	SUMMARY	465
CHAPTER 27:	Closing Remarks	467
	A Review of the Book	467
	The Primary Message	470
	A Secondary Message: Software Engineering Versus Computer Science	475
	Summary	475
	Self-Study Questions	476
APPENDIX A:	Software Project Work Breakdown Structures	477
APPENDIX B:	Interest Tables	485
APPENDIX C:	Linear Interpolation	521
APPENDIX D:	Derivatives	525
APPENDIX E:	Introduction to Probability and Statistics	531
APPENDIX F:	Answers to Selected Self-Study Questions	545
APPENDIX G:	Glossary	581
	References	603
	Index	607