

brief contents

<i>preface</i>	xv
<i>special thanks</i>	xvii
<i>about the reader</i>	xix
<i>about the author</i>	xx
<i>conventions</i>	xxi
<i>about the cover</i>	xxii
<i>author online</i>	xxiii

Part I Basic concepts 1

1	<i>Python 3</i>
2	<i>Tkinter 12</i>
3	<i>Building an application 18</i>

Part 2 Displays 29

4	<i>Tkinter widgets 31</i>
5	<i>Screen layout 77</i>
6	<i>Events, bindings and callbacks 95</i>
7	<i>Using classes, composites and special widgets 120</i>
8	<i>Dialogs and forms 140</i>
9	<i>Panels and machines 199</i>
10	<i>Drawing blobs and rubber lines 237</i>
11	<i>Graphs and charts 276</i>
12	<i>Navigation 300</i>
13	<i>The window manager 306</i>

Part 3 Putting it all together... 311

- 14 *Extending Python* 313
- 15 *Debugging applications* 329
- 16 *Designing effective graphics applications* 338
- 17 *Programming for performance* 348
- 18 *Threads and asynchronous techniques* 361
- 19 *Distributing Tkinter applications* 374

Part 4 Appendices 381

- appendix A Mapping Tk to Tkinter* 383
- appendix B Tkinter reference* 425
- appendix C Pmw reference: Python megawidgets* 542
- appendix D Building and installing Python, Tkinter* 610
- appendix E Events and keysyms* 617
- appendix F Cursors* 621
- appendix G References* 625
- index* 629

contents

<i>preface</i>	xv	Dynamik callback handlers 107
<i>special thanks</i>	xvii	Adding events to work 108
<i>about the reader</i>	xix	Binding widget to dynamic data 108
<i>about the author</i>	xx	More techniques 109
<i>conventions</i>	xxi	Tkinter 110
<i>about the cover</i>	xxii	Tkinter 110
<i>author online</i>	xxiii	Tkinter 110
Part I Basic concepts 1		
1 Python 3		
1.1	Introduction to Python programming and a feature review 3	
	Why Python? 4, Where can Python be used? 5	
1.2	Key data types: lists, tuples and dictionaries 5	
	Lists 5, Tuples 7, Dictionaries 8	
1.3	Classes 9	
	How do classes describe objects? 9, Defining classes 9, Neat Python trick #10 9,	
	Initializing an instance 10, Methods 10, Private and public variables and	
	methods 11, Inheritance 11, Multiple inheritance 11, Mixin classes 11	
2 Tkinter 12		
2.1	The Tkinter module 12	
	What is Tkinter? 12, What about performance? 13, How do I use	
	Tkinter? 13, Tkinter features 14	
2.2	Mapping Tcl/Tk to Tkinter 14	
2.3	Win32 and UNIX GUIs 15	

- 2.4 Tkinter class hierarchy 16
- 2.5 Tkinter widget appearance 17

3 Building an application 18

- 3.1 Calculator example: key features 21
- 3.2 Calculator example: source code 21
- 3.3 Examining the application structure 27
- 3.4 Extending the application 28

Part 2 Displays 29

4 Tkinter widgets 31

- 4.1 Tkinter widget tour 31
 - Toplevel 32, Frame 33, Label 35, Button 36, Entry 37, Radiobutton 37, Checkbutton 38, Menu 39, Message 42, Text 43, Canvas 44, Scrollbar 45, Listbox 45, Scale 46
- 4.2 Fonts and colors 47
 - Font descriptors 47, X Window System font descriptors 47, Colors 48, Setting application-wide default fonts and colors 49
- 4.3 Pmw Megawidget tour 49
 - AboutDialog 50, Balloon 50, ButtonBox 51, ComboBox 52, ComboBoxDialog 53, Counter 54, CounterDialog 55, Dialog 56, EntryField 56, Group 57, LabeledWidget 58, MenuBar 59, MessageBar 59, MessageDialog 61, NoteBookR 61, NoteBookS 62, NoteBook 63, OptionMenu 64, PanedWidget 65, PromptDialog 66, RadioSelect 66, ScrolledCanvas 67, ScrolledField 68, ScrolledFrame 69, ScrolledListbox 70, ScrolledText 70, SelectionDialog 71, TextDialog 72, TimeCounter 73
- 4.4 Creating new megawidgets 73
 - Description of the megawidget 73, Options 74, Creating the megawidget class 74

5 Screen layout 77

- 5.1 Introduction to layout 77
 - Geometry management 78
- 5.2 Packer 79
 - Using the expand option 82, Using the fill option 82, Using the padx and pady options 84, Using the anchor option 84, Using hierarchical packing 84
- 5.3 Grid 86
- 5.4 Placer 90
- 5.5 Summary 94

6	<i>Events, bindings and callbacks</i>	95	103 binding mod ed gninempqjz	8.8		
6.1	Event-driven systems: a review	95	103 rruvovo bms fihh jlo	8.8		
	What are events?	96,	Event propagation	97,	Event types	97
6.2	Tkinter events	98	103 gnuad sonidam lsduV	8.8		
	Events	98	103 vleisqmcu gniboroz ro? woe bnaA	8.8		
6.3	Callbacks	102	103 dnuvysmud	8.8		
6.4	Lambda expressions	103	103 uad zsdvur hns eld6 pnuwG	8.8		
	Avoiding lambdas altogether	103	103 rruvovo s no pnuwG	8.8		
6.5	Binding events and callbacks	104	103 rruvovo s no pnuwG	8.8		
	Bind methods	104,	Handling multiple bindings	106		
6.6	Timers and background procedures	107	103 sub spiqco mpmA	8.8		
6.7	Dynamic callback handlers	107	103 eavmcs nolouZ	8.8		
6.8	Putting events to work	108	103 adom zub-vnuf	8.8		
	Binding widgets to dynamic data	108,	Data verification	111,		
	Formatted (smart) widgets	117	103 rruvovo gnifand sone	8.8		
6.9	Summary	119	103 rruvovo bseq?	8.8		
7	<i>Using classes, composites and special widgets</i>	120	103 yisunmud	8.8		
7.1	Creating a Light Emitting Diode class	120	103 truus hns elcwo	11		
	Let's try that again	126,	What has changed?	129		
7.2	Building a class library	129	103 eavmcs nolouZ	11		
	Adding a hex nut to our class library	131,	Creating a switch class	133,		
	Building a MegaWidget	136	103 adqng D-6	11		
7.3	Summary	139	103 rruvovo gnifand sone	11		
8	<i>Dialogs and forms</i>	140	103 yisunmud	11		
8.1	Dialogs	141	103 rruvovo gnifand sone	11		
	Standard dialogs	141,	Data entry dialogs	142,	Single-shot forms	146,
	Tkinter variables	152	103 rruvovo gnifand sone	11		
8.2	A standard application framework	155	103 rruvovo gnifand sone	11		
8.3	Data dictionaries	165	103 rruvovo gnifand sone	11		
8.4	Notebooks	172	103 rruvovo gnifand sone	11		
8.5	Browsers	175	103 rruvovo gnifand sone	11		
8.6	Wizards	184	103 rruvovo gnifand sone	11		
8.7	Image maps	191	103 rruvovo gnifand sone	11		
8.8	Summary	198	103 rruvovo gnifand sone	11		
9	<i>Panels and machines</i>	199	103 rruvovo gnifand sone	11		
9.1	Building a front panel	199	103 rruvovo gnifand sone	11		
9.2	Modularity	201	103 rruvovo gnifand sone	11		

9.3	Implementing the front panel	201	<i>201 implement front panel</i>	9
9.4	GIF, BMP and overlays	215	<i>215 present different types</i>	10
9.5	And now for a more complete example	220	<i>220 present more example</i>	10
9.6	Virtual machines using POV-Ray	232	<i>232 present virtual machine</i>	10
	And now for something completely different... #10 The Example	233	<i>233 present virtual machine</i>	10
9.7	Summary	236	<i>236 Summary</i>	10
10	Drawing blobs and rubber lines	237	<i>237 drawing blobs and lines</i>	
10.1	Drawing on a canvas	238	<i>238 drawing on canvas</i>	10
	Moving canvas objects	243	<i>243 moving canvas objects</i>	10
10.2	A more complete drawing program	244	<i>244 more complete program</i>	10
10.3	Scrolled canvases	251	<i>251 scrolled canvas</i>	10
10.4	Ruler-class tools	254	<i>254 building ruler class</i>	10
10.5	Stretching canvas objects	258	<i>258 stretching canvas objects</i>	10
10.6	Some finishing touches	262	<i>262 finishing touches</i>	10
10.7	Speed drawing	271	<i>271 speed drawing</i>	10
10.8	Summary	275	<i>275 Summary</i>	10
11	Graphs and charts	276	<i>276 graphs and charts</i>	
11.1	Simple graphs	276	<i>276 simple graphs</i>	10
11.2	A graph widget	279	<i>279 graph widget</i>	10
	Adding bargraphs	286	<i>286 adding bargraphs</i>	10
11.3	3-D graphs	292	<i>292 3D graphs</i>	10
11.4	Strip charts	296	<i>296 strip charts</i>	10
11.5	Summary	298	<i>298 Summary</i>	10
12	Navigation	300	<i>300 navigation</i>	
12.1	Introduction: navigation models	300	<i>300 introduction</i>	10
12.2	Mouse navigation	301	<i>301 mouse navigation</i>	10
12.3	Keyboard navigation: "mouseless navigation"	301	<i>301 keyboard navigation</i>	10
12.4	Building navigation into an application	302	<i>302 building navigation</i>	10
12.5	Image maps	305	<i>305 image maps</i>	10
12.6	Summary	305	<i>305 Summary</i>	10
13	The window manager	306	<i>306 window manager</i>	
13.1	What is a window manager?	306	<i>306 what is window manager</i>	10
13.2	Geometry methods	307	<i>307 geometry methods</i>	10
13.3	Visibility methods	308	<i>308 visibility methods</i>	10
13.4	Icon methods	309	<i>309 icon methods</i>	10

13.5	Protocol methods	309
13.6	Miscellaneous wm methods	310

Part 3 Putting it all together... 311

14 Extending Python 313

14.1	Writing a Python extension	313
14.2	Building Python extensions	316
	Linking an extension statically in UNIX	316
	Linking an extension statically in Windows	317
	Building a dynamic module in UNIX	317
	Building a dynamic module in Windows	318
	Installing dynamic modules	319
	Using dynamic modules	319
14.3	Using the Python API in extensions	319
14.4	Building extensions in C++	320
14.5	Format strings	321
14.6	Reference counts	324
14.7	Embedding Python	325
14.8	Summary	328

15 Debugging applications 329

15.1	Why print statements?	329
15.2	A simple example	330
15.3	How to debug	333
15.4	A Tkinter explorer	334
15.5	pdb	336
15.6	IDLE	336
15.7	DDD	337

16 Designing effective graphics applications 338

16.1	The elements of good interface design	339
16.2	Human factors	342
	Choosing fonts	343
	Use of color in graphical user interfaces	344
	Size considerations	346
16.3	Alternative graphical user interfaces	346
16.4	Summary	347

17 Programming for performance 348

17.1	Everyday speedups	348
	Program organization	349
	Using the Python optimizer	350
	Examining code	350

17.2	Tkinter performance 350	Keep it short! 350, Eliminate local variables 351, Keep it simple 351, Fast initialization 352, Throttling events 352
17.3	Python techniques 352	Importing modules 353, Concatenating strings 353, Getting nested loops right 354, Eliminate module references 354, Use local variables 355, Using exceptions 356, Using map, filter and reduce 356
17.4	Application profiling 357	
17.5	Python extensions 359	
17.6	Summary 360	

18 Threads and asynchronous techniques 361

18.1	Threading 361	Non-GUI threads 362, GUI threads 365
18.2	“after” processing 369	
18.3	Summary 373	

19 Distributing Tkinter applications 374

19.1	General issues in distributing applications 374	
19.2	Distributing UNIX applications 375	
19.3	Distributing Win32 applications 376	
19.4	Python distribution tools 379	

Part 4 Appendices 381

appendix A Mapping Tk to Tkinter 383

appendix B Tkinter reference 425

appendix C Pmw reference: Python megawidgets 542

appendix D Building and installing Python, Tkinter 610

appendix E Events and keysyms 617

appendix F Cursors 621

appendix G References 625

index 629