

# Table of Content

Table of Content .....	i
Copyright.....	v
Dedication .....	vi
Preface.....	vi
Structure of This Book.....	vii
A Note on the Source Code.....	viii
Acknowledgments.....	viii
Where to Find More Information.....	ix
Typographical Conventions.....	ix
Chapter 1. Basic C++ Programming .....	1
1.1 How to Write a C++ Program .....	1
1.2 Defining and Initializing a Data Object .....	6
1.3 Writing Expressions .....	9
1.4 Writing Conditional and Loop Statements .....	13
1.5 How to Use Arrays and Vectors .....	19
1.6 Pointers Allow for Flexibility .....	23
1.7 Writing and Reading Files.....	26
Chapter 2. Procedural Programming.....	30
2.1 How to Write a Function .....	30
2.2 Invoking a Function.....	35
2.3 Providing Default Parameter Values .....	43
2.4 Using Local Static Objects .....	45
2.5 Declaring a Function Inline .....	47
2.6 Providing Overloaded Functions.....	48
2.7 Defining and Using Template Functions.....	49
2.8 Pointers to Functions Add Flexibility .....	52
2.9 Setting Up a Header File.....	54
Chapter 3. Generic Programming.....	57
3.1 The Arithmetic of Pointers.....	57
3.2 Making Sense of Iterators.....	62
3.3 Operations Common to All Containers .....	65
3.4 Using the Sequential Containers .....	66
3.5 Using the Generic Algorithms.....	69
3.6 How to Design a Generic Algorithm .....	71
3.7 Using a Map .....	77
3.8 Using a Set.....	78
3.9 How to Use Iterator Inserters.....	80
3.10 Using the iostream Iterators .....	81
Chapter 4. Object-Based Programming.....	85
4.1 How to Implement a Class .....	86
4.2 What Are Class Constructors and the Class Destructor? .....	89
4.3 What Are <code>mutable</code> and <code>const</code> ? .....	94
4.4 What Is the <code>this</code> Pointer?.....	97
4.5 Static Class Members.....	99
4.6 Building an Iterator Class.....	102
4.7 Collaboration Sometimes Requires Friendship .....	106
4.8 Implementing a Copy Assignment Operator .....	108
4.9 Implementing a Function Object .....	109
4.10 Providing Class Instances of the iostream Operators .....	111
4.11 Pointers to Class Member Functions .....	112
Chapter 5. Object-Oriented Programming.....	117
5.1 Object-Oriented Programming Concepts.....	117

5.2 A Tour of Object-Oriented Programming .....	119
5.3 Polymorphism without Inheritance .....	123
5.4 Defining an Abstract Base Class .....	125
5.5 Defining a Derived Class.....	128
5.6 Using an Inheritance Hierarchy .....	133
5.7 How Abstract Should a Base Class Be?.....	135
5.8 Initialization, Destruction, and Copy .....	136
5.9 Defining a Derived Class Virtual Function .....	138
5.10 Run-Time Type Identification .....	141
Chapter 6. Programming with Templates .....	144
6.1 Parameterized Types.....	145
6.2 The Template Class Definition .....	147
6.3 Handling Template Type Parameters .....	148
6.4 Implementing the Template Class .....	150
6.5 A Function Template Output Operator .....	155
6.6 Constant Expressions and Default Parameters.....	156
6.7 Template Parameters as Strategy .....	160
6.8 Member Template Functions .....	161
Chapter 7. Exception Handling.....	164
7.1 Throwing an Exception .....	164
7.2 Catching an Exception.....	165
7.3 Trying for an Exception.....	167
7.4 Local Resource Management.....	170
7.5 The Standard Exceptions .....	172
Appendix A. Exercise Solutions .....	176
Exercise 1.4 .....	176
Exercise 1.5 .....	177
Exercise 1.6 .....	179
Exercise 1.7 .....	180
Exercise 1.8 .....	181
Exercise 2.1 .....	182
Exercise 2.2 .....	183
Exercise 2.3 .....	184
Exercise 2.4 .....	185
Exercise 2.5 .....	186
Exercise 2.6 .....	187
Exercise 3.1 .....	188
Exercise 3.2 .....	190
Exercise 3.3 .....	191
Exercise 3.4 .....	194
Exercise 4.1 .....	196
Exercise 4.2 .....	197
Exercise 4.3 .....	198
Exercise 4.4 .....	199
Exercise 4.5 .....	202
Exercise 5.1 .....	205
Exercise 5.2 .....	208
Exercise 5.3 .....	209
Exercise 5.4 .....	210
Exercise 6.1 .....	210
Exercise 6.2 .....	212
Exercise 7.1 .....	216
7.2 Exercise 7.2.....	217
7.3 Exercise 7.3.....	218

Appendix B. Generic Algorithms Handbook.....	220
accumulate() .....	221
adjacent_difference() .....	221
adjacent_find().....	221
binary_search() .....	221
copy().....	222
copy_backward() .....	222
count().....	222
count_if() .....	222
equal() .....	222
fill ( ) .....	223
fill_n() .....	223
find() .....	223
find_end() .....	223
find_first_of() .....	224
find_if().....	224
for_each().....	224
generate() .....	224
generate_n() .....	225
includes() .....	225
inner_product() .....	225
inplace_merge() .....	226
iter_swap() .....	226
lexicographical_compare() .....	226
max(), min().....	227
max_element() , min_element().....	227
merge().....	227
nth_element().....	228
partial_sort(), partial_sort_copy().....	228
partial_sum().....	229
partition(), stable_partition().....	229
random_shuffle() .....	229
remove(), remove_copy() .....	230
remove_if(), remove_copy_if() .....	230
replace(), replace_copy() .....	231
replace_if(), replace_copy_if() .....	231
reverse(), reverse_copy() .....	231
rotate(), rotate_copy() .....	231
search() .....	232
search_n() .....	232
set_difference() .....	233
set_intersection().....	233
set_symmetric_difference() .....	233
set_union( ) .....	233
sort(), stable_sort().....	234
transform() .....	234
unique(), unique_copy().....	235