

Java Programming Lab Manual

Asadullah Shah

Zeeshan Bhatti



IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

JAVA PROGRAMMING LAB MANUAL

Editors

**Asadullah Shah
Zeeshan Bhatti**

**Department of
Kulliyah of Information & Communication Technology
International Islamic University Malaysia**

January 2011



IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, **2011**.
©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Bibliography p.
Includes Index
ISBN

ISBN: 978-967-418-086-7

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN. BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan

TABLE OF CONTENTS

Dedication	v
Preface	xi
Acknowledgement	xiii
Chapter 1: Introduction to Java	15
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 2: Compiling and Executing Java Code	21
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 3: Introduction to Data Types in Java	27
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 4: Arithmetic and Relational Operators	33
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 5: Relational and Logical Operators	39
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 6: Bitwise Operators and Type Casting	45
- Asadullah Shaikh	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 7: Conditional Statements	51
- Asadullah Shaikh	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 8: If-Else Statements	55
- Asadullah Shaikh	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 9: The If-Else-If Statements	61
- Asadullah Shaikh	
- Zeeshan Bhatti	
- Asadullah Shah	

Chapter 10: Switch Statement	67
- Asadullah Shaikh	
- Zeeshan Bhatti	
- Asadullah Shah	
	73
Chapter 11: Loops	
- Agha Javed Phatan	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 12: Do-While Loops	79
- Agha Javed Phatan	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 13: For Loops	85
- Agha Javed Phatan	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 14: Loop Pitfalls and Exercise	93
- Agha Javed Phatan	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 15: Nested Loops	99
- Agha Javed Phatan	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 16: Arrays in Java	105
- Waseem Javaid Soomro	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 17: Two Dimensional Arrays	111
- Waseem Javaid Soomro	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 18: Strings	119
- Waseem Javaid Soomro	
- Zeeshan Bhatti	
- Asadullah Shah	

Chapter 19: Methods of String Class	127
- Waseem Javaid Soomro	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 20: Object and Classes	135
- Waseem Javaid Soomro	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 21: Constructors	141
- Dil Nawaz Hakro	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 22: User defined Methods	147
- Dil Nawaz Hakro	
- Zeeshan Bhatti	
- Asadullah Shah	viii
Chapter 23: Arguments Passing	155
- Dil Nawaz Hakro	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 24: Return Statement	163
- Dil Nawaz Hakro	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 25: Working with Classes	169
- Dil Nawaz Hakro	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 26: Multiple Classes	177
- Muniba Shaikh	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 27: Method Overloading and Overriding	185
- Muniba Shaikh	
- Zeeshan Bhatti	
- Asadullah Shah	

Chapter 28: Modifiers for class data	191
- Muniba Shaikh	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 29: Inner Classes	199
- Muniba Shaikh	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 30: Comparison between different class types	207
- Muniba Shaikh	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 31: Exception Handling	215
- Kamran Khowaja	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 32: Throw & Throws Keyword	223
- Kamran Khowaja	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 33: Local Block and Static Block	231
- Kamran Khowaja	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 34: Abstract Classes	237
- Dini Oktarina Dwi	
- Zeeshan Bhatti	
- Asadullah Shah	
Chapter 35: Interfaces	245
- Dini Oktarina Dwi	
- Zeeshan Bhatti	
- Asadullah Shah	

Chapter 29

Inner Classes

Muniba Shaikh, Zeeshan Bhatti, Asadullah Shah

Abstract

Inner or nested classes means when a class is defined within the body of another class. These are very powerful means of controlling how data is represented and used in a program. In this chapter the students will learn the basics of using nested classes and how they can be instantiated. Java uses another type of classes that are called Anonymous classes, means class without a name and they are also discussed in this chapter.

29.1 Inner class or Nested class

An inner or nested classes means class within a class. The key attributes of inner call are:

- An Inner class can be *public*, *private*, *protected*, *static* or Non-Static.
- To create an object of inner class, two steps are needed:
 - The Inner class object cannot be created until the outer class object is created or an outer class is loaded into the memory.
 - The Inner class object will be created in correspondence with the outer class object.

```
Outer out = new Outer();
```

```
Outer.Inner in = out.newInner();
```

- Zero or more objects can be created on the basis of single Outer object for example:

```
class Outer{
```