



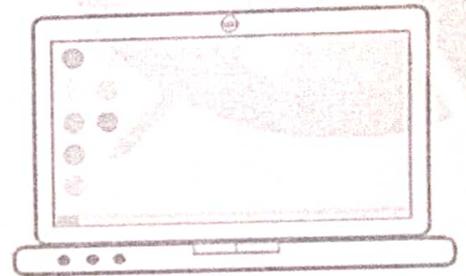
# MOBILE



# APPLICATION

# DEVELOPMENT

## Fundamentals of Android Application Development



*Dr. G. T. Jayadeva*  
**Dr. G. T. JAYADEVA**  
Principal B.E., M.Tech., Ph.D.

Adichunchanagiri Institute of Technology

**Nanjesh Bennur**

**Deepesh R**

*Dr. S. Sampath*

**Dr. S. SAMPATH**  
B.E., M.Tech., Ph.D.  
Professor & HOD  
Dept. of Information Science & Engg.  
A.I.T., Chikkamagaluru - 577102.

**JAMES D'sa**   
Education Series  
IEAE PUBLISHING  
House (IPH)  
[www.jeae.in/iph](http://www.jeae.in/iph)

IS

# Fundamentals of Android Application Development

By:  
Deepesh R  
Nanjesh Bennur



**IEAE**  
PUBLISHING  
HOUSE IPH  
&  
BOOKS DISTRIBUTORS  
[www.ieae.in/iph](http://www.ieae.in/iph)

ISBN 978-93-87396-05-0



9 789387 396050

3-32



# MOBILE



# APPLICATION

# DEVELOPMENT

## Fundamentals of Android Application Development



### Second Edition

**Nanjesh Bennur**  
**Deepesh R**  
**Niranjana Murthy**

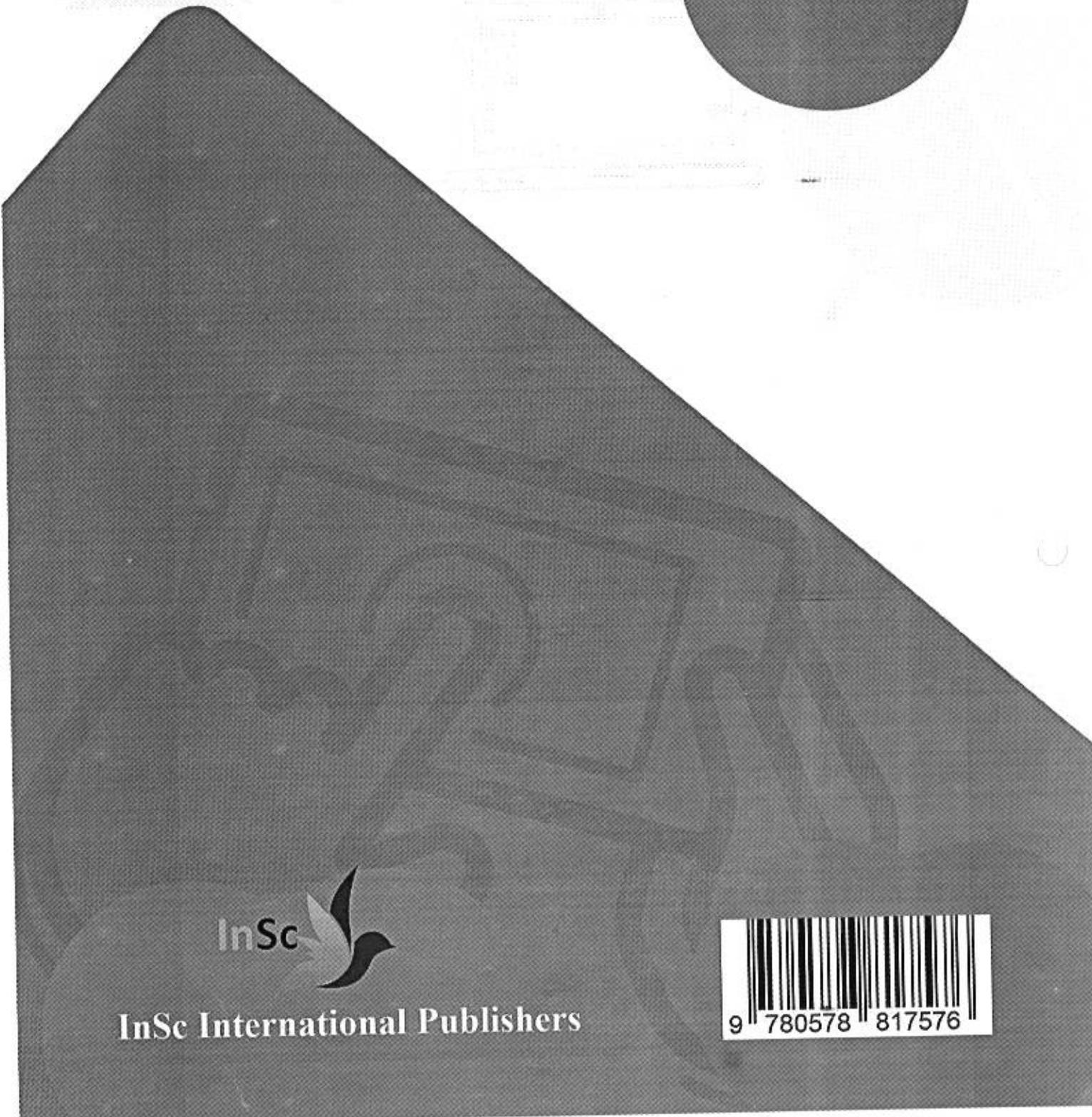
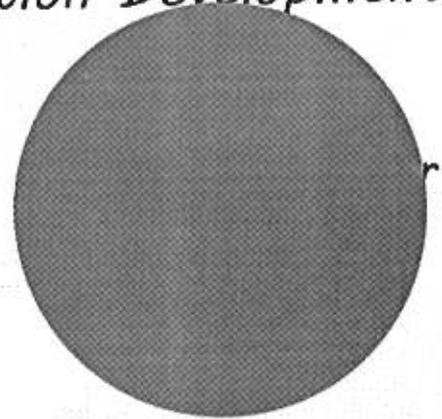
**Dr. S. SAMPATH**  
B.E., M.Tech., Ph.D.  
Professor & HOD  
Dept. of Information Science & Engg.  
A.I.T., Chikkamagaluru - 577102.



6

IS

# *Fundamentals of Android Application Development*



**InSc International Publishers**



# CONTENTS

SLNO.		Page no:
<b>Chapter 1</b>	<b>INTRODUCTION TO ANDROID AND SETTING UP ANDROID ENVIRONMENT</b>	<b>1-20</b>
1.1.1	Definition and origin of android	1
1.1.2	Flavors of Android	2
1.1.3	Difference between Tablet and Smartphone	4
1.1.4	Android architecture	5
1.1.5	Information about smart and normal phones	9
1.1.6	How different from iOS.	9
1.1	Setting up android environment	9
1.2.1	Hardware and software requirements	9
1.2.2	Software requirements	10
1.2.3	JDK and android SDK setup with tools	10
1.3	Introduction to different types apps	19
<b>Chapter 2</b>	<b>ANDROID PACKAGE KIT (APK), SOFTWARE DEVELOPMENT KIT (SDK), EMULATOR &amp; ANDROID DEBUG BRIDGE (ADB)</b>	<b>21-33</b>
2.1	APK, SDK and Emulator	21
2.1.1	Android Package Kit (APK)	21
2.1.2	Software Development Kit (SDK)	22
2.2	Emulator	23
2.2.1	Creating AVD	23
2.3	Android Debug Bridge (ADB)	28
2.3.1	Enable ADB debugging on your device	29
2.3.2	Connect to a device over Wi-Fi	29
2.3.3	Query for devices	30
2.3.4	Install an app	33
<b>Chapter 3</b>	<b>PROJECT STRUCTURE OF ANDROID</b>	<b>34-45</b>
3.1	Android Manifest File	34
3.2	XML and JAVA class	36
3.2.1	XML (user interface)	36
3.2.2	Java Class	36
3.3	Default packages	37
3.4	DDMS, Logcat and Console window	40
3.4.1	DDMS	40
3.4.2	LOG CAT	42
3.5	Debug and error or bug fixing	42
3.6	Gradle and build process of android app	43
<b>Chapter 4</b>	<b>ACTIVITY</b>	<b>46-67</b>
4.1	Activity Lifecycle	46
4.1.1	An activity has essentially four states	46
4.1.2	Different lifetime of an activity	47

4.1.3	Activity Methods	48
4.1.4	Activity state and ejection from memory	54
4.2	Navigating between activities	55
4.2.1	Starting one activity from another	55
4.2.2	Saving and restoring activity state	58
4.3	Declaring the activity in the manifest	61
4.4	Implementation of Activity Life Cycle	62
4.4.1	Implementation of Activity Lifecycle methods	64
4.5	Implementation of Buttons and Click Listeners	66
<b>Chapter 5</b>	<b>LAYOUTS, ATTRIBUTES, CONTROLS, EVENTS HANDLING</b>	<b>68-88</b>
5.1	Layouts	68
5.1.1	Declaration of layout	68
5.1.2	View and ViewGroup	69
5.1.3	Different types of Layouts	69
5.2	Writing XML	71
5.2.1	Load the XML resource	71
5.2.2	Android XML attributes (ID, width, height, weight, gravity, padding, margin)ID	72
5.3	Input Controls	77
5.3.1	Common Controls	78
5.4	Events Handling (Button events in Java, edit text and txt view)	79
5.4.1	Handling Java class for Button Listeners	79
5.4.2	Adding Text View and EditText	82
5.4.3	Imageview	85
5.5	Toast Messages	86
5.6	Context	87
5.6.1	Typical uses of context	87
<b>Chapter 6</b>	<b>PERMISSIONS, INTENTS,VIEWS AND OTHER FUNCTIONALIHES</b>	<b>89-105</b>
6.1	Permissions	89
6.1.1	Adding Permission to the manifest	89
6.1.2	Permission Models	90
6.2	Intents	90
6.2.1	Intent Structure	91
6.2.2	Types of intents	93
6.2.3	Implicit Intents	94
6.2.4	Explicit Intent	95
6.3	Web View	98
6.3.1	Basic usage of WebView	100
6.4	ImageView	102
6.4.1	Loading Image using Picasso library	103
6.5	Other functionalities	104
6.5.1	Zoom	104
6.5.2	Cookie and window management	104

6.5.3	Screen density	104
6.5.4	HTML5 Video support	105
<b>Chapter 7</b>	<b>DIALOGS, MENUS AND TOOLBARS</b>	<b>106-120</b>
7.1	Dialogs	106
7.1.1	Building an Alert Dialog	106
7.1.2	Dismissing a Dialog	108
7.2	Layout Inflater	111
7.3	Menu in Android	111
7.3.1	Defining a Menu in XML	112
7.3.2	Creating an Options Menu	114
7.3.3	Handling click events	116
7.4	Toolbar	118
7.4.1	Declare a Toolbar in the Layout File	119
<b>Chapter 8</b>	<b>BUNDLES, DATABASE AND BROADCASTING</b>	<b>121-142</b>
8.1	Bundle	121
8.1.1	Method Signature	122
8.1.2	On Activity Result	126
8.2	Introduction to Database	127
8.2.1	Definition of Schema and Contract	127
8.2.2	Create a Database Using a SQL Helper	128
8.2.3	Put Information into a Database	130
8.2.4	Read Information from a Database	130
8.2.5	Delete Information from a Database	131
8.2.6	Update a Database	132
8.2.7	Persisting Database Connection	132
8.2.8	SharedPreferences	133
8.3	Broadcast Receiver	134
8.3.1	Creating the Broadcast Receiver	135
8.3.2	Registering Broadcast Receiver	135
8.3.3	Broadcasting Custom Intents	137
8.3.4	Example for creating BroadcastReceiver	137
<b>Chapter 9</b>	<b>FRAGMENTS IN ANDROID</b>	<b>143-165</b>
9.1	Design Philosophy	144
9.2	Creating a Fragment	145
9.3	Adding a user interface	147
9.4	Creating a layout	148
9.5	Adding a fragment to an activity	149
9.6	Managing Fragments	151
9.7	Supporting Multiple Screens	157
9.7.1	Range of screens supported	158
9.7.2	How to Support Multiple Screens	159
9.8	Using configuration qualifiers	161

<b>Chapter 10</b>	<b>ANDROID ADAPTER AND POJO</b>	<b>166-181</b>
10.1	Adapter Hierarchy	166
10.2	Implementation of BaseAdapter	167
10.3	Array Adapter	171
10.4	POJO Class	176
10.4.1	Java Coding for POJO	176
<b>Chapter 11</b>	<b>HTTP IN ANDROID</b>	<b>182-206</b>
11.1	URLConnection	182
11.2	Secure Communication with HTTPS	183
11.3	Activities with HTTP	183
11.4	HTTP CLASSES	186
11.5	HTTP Constants	187
11.6	Fields	191
11.7	Async Tasks	200
11.7.1	AsyncTask's generic types	205
11.7.2	AsyncTask Execution	205
11.7.3	Cancelling a task	205
11.7.4	Threading rules	206
11.7.5	Memory observability	206
<b>Chapter 12</b>	<b>SERVICE AND JSON</b>	<b>207-227</b>
12.1	Different types of services	207
12.2	Basics of Service	208
12.3	Declaring a service in the manifest	210
12.4	Creating a started service	211
12.5	IntentService	212
12.6	Starting a service	217
12.7	Sending notifications to the user	219
12.8	Running a service in the foreground	219
12.9	Managing the lifecycle of a service	220
12.9.1	Implementing the lifecycle callbacks	221
12.9.2	Service lifecycle	222
12.10	JSON	224
12.10.1	JSON Syntax Rules	225
12.10.2	Valid Data Types	225
<b>Chapter 13</b>	<b>ASYNCTASK AND ASYNCTASK LOADER</b>	<b>228-234</b>
13.1	Steps involved in AsyncTask	228
13.2	AsyncTask Parameters	229
13.3	Executing AsyncTask	230
13.4	Cancelling AsyncTask	230
13.5	Cancelling AsyncTask	231
13.6	Starting A Loader	231

13.7	Restarting a Loader	232
13.8	LoaderManager Callbacks	233
13.9	AsyncTask Loader	233
13.10	AsyncTask Loader Usage	233
<b>Chapter 14</b>	<b>FIREBASE</b>	<b>235-262</b>
14.1	Firebase Message types	235
14.2	Message Targeting	237
14.3	Integrating Firebase Cloud Messaging	237
<b>Chapter 15</b>	<b>ADMOB, TRIGGER AND SCHEDULING</b>	<b>263-285</b>
15.1	AdMob	263
15.1.1	Type of Ads – Banner and Interstitial	263
15.1.2	Creating Ad Units	263
15.1.3	Creating New Project	264
15.1.4	Adding Banner Ad	270
15.1.5	Adding Interstitial Ad (Fullscreen Ad)	271
15.1.6	Enabling Test Ads	273
15.1.7	Ad View Listeners	273
15.2	Trigger	274
15.2.1	CREATE TRIGGER statement	275
15.2.2	SQLite triggers examples	276
15.2.3	SQLite BEFORE INSERT trigger example	276
15.2.4	SQLite AFTER UPDATE trigger example	278
15.2.5	DROP TRIGGER statement	280
15.3	Scheduling background task	280
15.3.1	JobScheduler API	281
15.3.2	Creating a job	282

*Note:*

*Example projects for all the chapters are available with source in following links:*

*github link: <https://github.com/deepeshand>*

*You tube link: <https://goo.gl/yYsbZK>*

# CHAPTER 1

## INTRODUCTION TO ANDROID AND SETTING UP ANDROID ENVIRONMENT

---

Operating Systems have developed a lot in last 15 years. Starting from black and white phones to recent smart phones or mini computers, mobile OS has come far away. Especially for smart phones, Mobile OS has greatly evolved from Palm OS in 1996 to Windows pocket PC in 2000 then to Blackberry OS and Android. One of the most widely used mobile OS these days is ANDROID.



Figure 1.1: Android bot

### 1.1.1 Definition and origin of android

Android is an mobile operating system based on Linux with a Java programming interface for mobile devices such as smartphones and tablet computers. It is developed by the Open Handset Alliance Led by Google.

Andrew E. Rubin (key person) at Open Handset Alliance founded Android Inc.. Android was founded in Palo Alto, California, United States in October, 2003 by Andrew E. Rubin (co-founder of Danger), Rich Miner (co-founder of Wildfire Communications, Inc.), Nick Sears (once VP at T-Mobile), and Chris White (headed design and interface development at WebTV) at Open Handset Alliance.

# C PROGRAMMING *for* PROBLEM SOLVING

*First Edition*

As per VTU Syllabus CBCS 2018 B.E. I/II Semester



**Nanjesh Bennur**

  
**Dr. S. SAMPATH**  
B.E., M.Tech., Ph.D.  
Professor & HOD  
Dept. of Information Science & Engg.  
A.I.T., Chikkamagaluru - 577102.



TBH Publishers & Distributors  
080-23422976/23525801/23525802

Advance Academic Publisher



Buyers/retailers can contact to

Available at  
**amazon**

Picture Credits



For more details, Visit [www.nbennur.in](http://www.nbennur.in) and if you have any startup ideas, please contact Nanjesh Bennur for technical and financial support.

He has published 26 research papers in reputed international journals and Conferences. He authored five books among them C programming book has reached the sales of around 800 copies till date. He chaired many international and National Conferences and also reviewer for many reputed journals. He obtained many research grants from various funding agencies like VGST, KSCST, etc. He is the Founder and Director of Institute for Exploring Advances in Engineering (IEAE) which is now called as Institute of Scholars (InSc), Unit of SDPL, Bengaluru. He is the cofounder of [pujaart.com](http://pujaart.com), an online idols/Murthis Buying Platform, Kolkata, West Bengal.



Nanjesh Bennur obtained his B.E. in Information Science and Engineering and M.Tech. in Computer Science and Engineering from Adichunchanagiri Institute of Technology, Chikkamagaluru, Karnataka. At present, he is working as an Assistant Professor in the Department of ISE, Adichunchanagiri Institute of Technology, Chikkamagaluru, Karnataka and doing his Ph.D under Visvesvaraya Technological University Belagavi.

**About Author**

# C Programming for Problem Solving

Second Edition

---

As per VTU Syllabus CBCS 2018 B.E. 1/11 Semester

---

Nanjesh Bennur  
Dr. C. K. Subbaraya

*So* *4*  
Dr. S. SAMPATH  
B.E., M.Tech, Ph.D.  
Professor & HOD  
Dept. of Information Science & Engg  
A.I.T., Chikkamagaluru - 577102.



InSc



---

# Institute of Scholars

---

InSc International Publishers  
Buy online at  
[www.insc.in/iph](http://www.insc.in/iph)

MRP: Rs.200/-

ISBN 978-1-954461-27-7



9 781954 461277

# CONTENTS

Page No.

<b>MODULE-1.....</b>	<b>1-52</b>
1 COMPUTER GENERATIONS.....	3
2 COMPUTER TYPES OR CATEGORIES.....	4
2.1 Computers for individuals.....	5
2.2 Computers for Organization.....	6
3 BIT, BYTE, UNICODE AND WORD.....	7
4 COMPUTER MEMORY AND ITS TYPES.....	8
4.1. Primary Memory.....	8
4.2. Secondary Memory.....	9
5 CENTRAL PROCESSING UNIT.....	10
6 PORTS AND CONNECTIONS.....	11
7 INPUT DEVICES AND OUTPUT DEVICES.....	12
7.1. Input devices.....	12
7.2. Output Devices.....	15
8 COMPUTERS IN A NETWORK.....	18
8.1. Types of Network.....	19
9 NETWORK HARDWARE.....	21
10 SOFTWARE AND TYPES.....	22
11 BASIC STRUCTURE OF C PROGRAM.....	24
12 EXECUTION OF C PROGRAM.....	25
12.1 Execution Steps in Windows System.....	27
12.2. Execution Steps in UNIX System.....	27
13 C TOKENS.....	28
13.1 Variables.....	28
13.2 Constants.....	29
14 DATA TYPES IN C.....	30
14.1. Different data types in C.....	30
14.2. Data type qualifier and modifier.....	32
14.3. Data Type Modifier.....	32
14.4.Type conversion / Type casting.....	32
15 EXPRESSIONS.....	34
16 OPERATORS IN C.....	36
16.1. Types of operator.....	36
16.2. Unary operator.....	36
16.3. Assignment operator.....	36
16.4. Arithmetic operators.....	37
16.5. Relational operator.....	38
16.6. Logical operators.....	40
16.7. Bitwise operator.....	41
16.8. Conditional operators.....	42
16.9. Special operators.....	43
16.10. Shorthand assignment operator.....	44
16.11. Increment and decrement operator.....	45
16.12.Precedence and associativity.....	45
16.13.Problems on increment and decrement.....	46

<b>MODULE-2.....</b>	<b>53-104</b>
1 MANAGING INPUT OUTPUT OPERATIONS.....	55
1.1. Input Output Functions.....	55
1.2 Formatted I/O functions.....	55
1.3. Unformatted I/O functions.....	55
1.4. Format specifiers.....	56
1.5. Simple Examples.....	57
1.6 Specifications in printf( ).....	59
2 STATEMENTS.....	62
3 CONDITIONAL OR BRANCHING STATEMENTS.....	62
3.1. if statement.....	63
3.2. if else statement.....	63
3.3. Nested if.....	64
3.4. Dangling else problem.....	65
3.5. Nested if else.....	65
3.6. Cascaded if else or else if ladder.....	67
3.7. switch statement.....	67
3.8. Nested switch.....	69
4 ITERATIVE STATEMENTS (LOOPS)	70
4.1. while loop.....	70
4.2. do while.....	71
4.3. Difference between while and do while.....	72
4.4. for loop.....	73
5 UNCONDITIONAL STATEMENTS (JUMP STATEMENTS).....	74
5.1.break and continue statement.....	74
5.2. goto statement.....	75
5.3. return statement.....	75
6 TERNARY OPERATOR.....	76
7 PROGRAMMING EXAMPLES.....	76
7.1. Pseudocode , Algorithm and flowchart.....	77
7.2. Basic Programming Examples.....	78
7.3. Common Programming Examples.....	87
8 FINDING ROOTS OF A QUADRATIC EQUATION.....	98
9 COMPUTATION OF BINOMIAL COEFFICIENTS.....	101
10 PLOTTING OF PASCALS TRIANGLE.....	102
 <b>MODULE-3.....</b>	 <b>105-154</b>
1 ARRAYS.....	107
1.1. One dimensional array.....	107
1.2. Two dimensional array.....	109
1.3. Disadvantages of arrays.....	110
1.4. Programming examples.....	111
2 CHARACTER ARRAY AND STRINGS.....	120
2.1 Definition and basics of string.....	120
2.2. Array of strings / multi dimensional strings.....	122
2.3. String functions/ string operations.....	123
2.4. String length.....	124
2.5. String compare.....	125
2.6. String copy.....	126
2.7. String concatenation.....	128

2.8. String Reverse.....	129
2.9. Other operations on string.....	130
2.10. Arithmetic operations on Character.....	131
2.11. Width specification in printf with respect to strings.....	131
2.12. Programming examples on strings.....	132
3 SEARCHING USING ARRAYS.....	136
3.1. Linear Searching.....	136
3.2. Binary Searching.....	138
3.3 Difference between linear and binary searching.....	143
4 SORTING USING ARRAYS.....	143
4.1 Bubble sorting.....	143
4.2 Selection sorting.....	148
4.3. Difference between bubble sort and selection sort.....	152
<b>MODULE-4.....</b>	<b>155-190</b>
1 FUNCTIONS.....	157
1.1. Function definition.....	157
1.2. Types of function.....	157
1.3. Location of function in a program.....	160
1.4. Structure of a function.....	161
1.5. Types of function based on parameters.....	164
1.6. Parameter passing mechanisms.....	166
2 RECURSIVE FUNCTIONS.....	180
2.1. Basics of recursion.....	180
2.2. Programming Examples.....	181
3 FACTORIAL OF A NUMBER.....	184
4 FIBONACCI SERIES.....	186
<b>MODULE-5.....</b>	<b>191-224</b>
1 STRUCTURE.....	193
1.1. Basics of structure.....	193
1.2. Array of structure.....	196
1.3. Nested structure.....	198
1.4. Structure and Functions.....	200
1.5. Type definition.....	202
1.6. Programming examples.....	202
2 POINTER.....	209
2.1. Pointers and functions.....	210
2.2. Pointers and arrays.....	210
2.3. Character pointer and functions or pointers to the strings.....	212
2.4. Pointer to pointer.....	214
2.5. Address arithmetic.....	215
2.6. Advantages and disadvantages of pointer.....	216
2.7. Programming examples.....	217
2.8. Dynamic memory allocation.....	218
3 PREPROCESSOR DIRECTIVES.....	220
3.1. #include.....	220
3.2. #define.....	220
3.3. #undef.....	221
3.4. Compiler control directives.....	222

3.5. #ifdef.....	222
3.6. #ifndef.....	222
3.7. #error.....	223
3.8. #pragma.....	223
<b>VIVA TOPICS.....</b>	<b>225-238</b>
<b>C PROGRAMMING LABORATORY BASICS.....</b>	<b>239-244</b>
<b>LAB PROGRAMS: PART A.....</b>	<b>245-254</b>
<b>LAB PROGRAMS: PART B.....</b>	<b>255-270</b>
<b>MODULE WISE QUESTIONS.....</b>	<b>281-290</b>



Intelligent Data Engineering and Analytics pp 551–564

## Clustering Diagnostic Codes: Exploratory Machine Learning Approach for Preventive Care of Chronic Diseases

K. N. Mohan Kumar , S. Sampath, Mohammed Imran & N. Pradeep

Conference paper | First Online: 30 August 2020

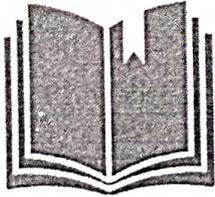
442 Accesses | 1 Citations

Part of the *Advances in Intelligent Systems and Computing* book series (AISC, volume 1177)

### Abstract

High prevalence of chronic diseases along with poor health condition and the rising diagnosis and treatment costs necessitates concentration on prevention, early detection and disease management. In this paper correlation among the chronic diseases is examined with the help of diagnostic codes using unsupervised Machine Learning (ML) approaches. ML approaches pave the way to accomplish this objective. Healthcare data is categorized into clinical, Medi-claim, drugs and emergency information. In this work, Medi-claim data is used for exploring five types of chronic disorders such as diabetes, Heart, Kidney, Liver and Cancer. Medi-claim data is acceptable because of its legitimacy, volume and demography qualities. Hierarchical Condition Category (HCC) and International Classification of Diseases (ICD) based coding of med claim data are perfect with guaranteed informational index, this nature of ICD and HCC code urged us to work with Medi-claim records. The categorization of chronic and non-chronic diseases is built up through HCC codes utilizing different clustering techniques such as partitional, hierarchical and Fuzzy-K means clustering. The model is evaluated using various metrics such as Homogeneity, Completeness, V-measure, Adjusted Rand index, Adjusted Mutual Information. Among all the clustering techniques used K means and K means random have shown promising results. A compelling end on clustering of chronic diseases is made, remembering the clinical significance.

**Dr. S. SAMPATH**  
B.E., M.Tech., Ph.D.  
Professor & HOD  
Dept. of Information Science & Engg.  
A.I.T., Chikkamagaluru - 577102.



# Robust Methods Using Graph and PCA for Detection of Anomalies in Medical Records

Published in NETWORKING COMMUNICATION AND DATA KNOWLEDGE ENGINEERING, VOL 1 on January 31, 2020

WEB OF SCIENCE (FREE ACCESS)

### REVIEW BADGES

- X 0 pre-pub reviews
- X 0 post-pub reviews

### IDENTIFIERS

- publons.com/was-op/p/39311971/
- doi.org/10.1007/978-3-030-38040-3\_39

### NAVIGATE

- Abstract
- Contributors
- Metrics
- Peer review
- Publication History
  - 2020 in NETWORKING COMMUNICATION AND DATA KNOWLEDGE ENGINEERING VOL 1
  - 2020 in innovative Data Communication Technologies and Application ICIDCA Lecture Notes on Data Engineering and Communications Technologies (LNDECT 46)

VIEW CITING ARTICLES

### ABSTRACT

Wellbeing in basic words is normalcy in health of human body and disease is unusual condition that influences typical working of human body with no outer wounds. Health care is about the aversion of maladies by finding and treatm

### AUTHORS

Kumar, K. N. Mohan, Sampath, S.

### PUBLONS USERS WHO'VE CLAIMED - I AM AN AUTHOR

Dr S. SAMPATH

### CONTRIBUTORS ON PUBLONS

- 1 author

### METRICS

Publons score (from 0 scores)

Altmetric

Web of Science Core Collection Citations

0

### CONTRIBUTE



SCORE PUBLICATION



ADD REVIEW

**Dr. S. SAMPATH**  
 B.E., M.Tech., Ph.D.  
 Professor & HOD  
 Dept. of Information Science & Engg.  
 A.I.T., Chikkamagaluru - 577102.



Dayananda Sagar Institution®

# DAYANANDA SAGAR ACADEMY OF TECHNOLOGY & MANAGEMENT

(Affiliated to VTU, Belgaum & Approved by AICTE, New Delhi)  
(CSE, ISE, ECE, EEE, MECH 5 Branches Accredited by NBA New Delhi - Validity: 26-07-2018 to 30-06-2021)  
Opp. Art of living, Udayapura, Kanakapura main road, Bangalore-560 082



## FIRST INTERNATIONAL CONFERENCE

ON

## ADVANCED TECHNOLOGIES IN INTELLIGENT CONTROL, ENVIRONMENT, COMPUTING & COMMUNICATION ENGINEERING (ICATIECE-2019)

On 19<sup>th</sup> & 20<sup>th</sup> March, 2019



# Certificate



This is to certify that **Mr./Ms./Dr. RAKESH S RAJ**

of

**DEPT. OF ISE, AIT, CHICKMAGLUR**

has presented a paper

Titled **COMPARISON OF SUPPORT VECTOR MACHINE AND NAIVE BAYES CLASSIFIERS.**  
FOR PREDICTING DIABETES

in the

*"First International Conference on Advanced Technologies in Intelligent Control, Environment, Computing & Communication Engineering"*

ICATIECE -2019, held on 19<sup>th</sup> & 20<sup>th</sup> March 2019 at Dayananda Sagar Academy of Technology & Management, Bengaluru-82.

*Keshav*

Mr. Keshav Bapat  
Chair, IEEE Bangalore Section  
Bangalore

*Sumitra*

Dr. K A Sumitra Devi  
Steering Committee Chair, T, Chikkamagaluru - 577102.  
Dean Academics

Professor & HOD

Dr. B.R Lakshminantha  
General Chair

Principal

*Sampath*

Dr. S. SAMPATH  
B.E., M.Tech., Ph.D.

9

# Programming in C & Data Structures

PCDS

First  
Edition  
(Professional)

Nanjesh Bennur  
Dr. G. Anjan Babu  
Dr. C. K. Subbaraya

PROGRAMMING IN C & DATA STRUCTURE

It has become appallingly obvious that our  
technology has exceeded our humanity.

—Albert Einstein

Programming in C & Data Structures  
First Edition (Professional)



Max Retail Price  
Rs. 395 /-

Excelent Publishing House  
Kishanganj, Viswanthi, New Bypass - 19, 077  
Contact : 9910948516, 9959187102  
E-mail : ephpubservicest@gmail.com

Dept. of Information Science  
A.I.T., Chikkamagaluru - 577102.

# Contents

## Part-I

### Fundamentals of C programming

#### Chapter 1 - Introduction to C

- 1.1 History of C language
- 1.2 Features of C language
- 1.3 Uses of C language
- 1.4 Level of C language
- 1.5 C as structured language

#### Chapter 2 - Basic concepts of C programming

- 2.1 C program and its structure
- 2.2 C tokens
- 2.3 Data types in C
- 2.4 Data type qualifier and modifier
- 2.5 Backslash constants or escape sequences
- 2.6 Format specifiers
- 2.7 Type casting
- 2.8 Declaration, Assignment and Initialization
- 2.9 Input and output functions
  - 2.9.1 Formatted I/O functions
  - 2.9.2 Unformatted I/O functions
- 2.10 Width specification in printf()
- 2.11 Difference between
- 2.11 Programming examples

#### Chapter 3 – Expressions and operators in C

- 3.1 Expressions and its types
- 3.2 Operator and its types
- 3.3 Unary operators
- 3.4 Assignment operators
- 3.5 Arithmetic operators
- 3.6 Relational operators
- 3.7 Logical operators
- 3.8 Bitwise operators
- 3.9 Conditional operators
- 3.10 Special operators
- 3.11 Shorthand assignment operators
- 3.12 Increment and decrement operator
- 3.13 Precedence and associativity
- 3.14 Problems on increment and decrement

## **Chapter 4 – Statements in C**

- 4.1 Statements and its types
- 4.2 Conditional statements
  - 4.2.1 if statement
  - 4.2.2 if else statement
  - 4.2.3 Nested if statement
  - 4.2.4 Nested if else statement
  - 4.2.5 Cascaded if else or else if ladder
  - 4.2.6 switch statement
  - 4.2.7 Nested switch statement
- 4.3 Iterative statements (loops)
  - 4.2.1 while loop
  - 4.2.1 do while loop
  - 4.2.3 for loop
- 4.4 Unconditional statements (jumps)
  - 4.3.1 break and continue
  - 4.3.2 goto statement
  - 4.3.3 return statement
- 4.5 Ternary operator
- 4.6 Programming examples

## **Chapter 5 - Arrays**

- 5.1 Arrays and its types
- 5.2 One dimensional arrays
- 5.2 Two dimensional arrays
- 5.3 Disadvantages of arrays
- 5.4 Applications of arrays
  - 5.4.1 Binary searching
  - 5.4.2 Sum of polynomial
  - 5.4.2 Operations on matrices including sparse matrix
- 5.5 Additional Programming examples

## **Chapter 6 - Strings**

- 6.1 Strings
- 6.2 Array of strings or multidimensional strings
- 6.3 Sting functions or string operations
- 6.4 String length
- 6.5 String compare
- 6.6 String copy
- 6.7 String concatenation
- 6.8 String reverse
- 6.9 Other operations on string
- 6.10 Programming examples

## **Chapter 7 – Functions**

- 7.1 Function definition
- 7.2 Types of function
- 7.3 Location of function in a program
- 7.4 Structure of a function
- 7.5 Register and static variable
- 7.6 Types of functions based on parameters
- 7.7 Parameter passing mechanisms
- 7.8 Recursive functions
- 7.9 Programming examples
- 7.10 Implementation of simple calculator functions

## **Chapter 8 – Structure, Union and Enumeration**

- 8.1 Basics of structure
- 8.2 Array of structure
- 8.3 Nested structure
- 8.4 Structure and functions
- 8.5 Type definition
- 8.6 Programming examples
- 8.9 Implementation of Bank application using structure
- 8.6 Union
- 8.7 Enumeration

## **Chapter 9 – Files**

- 9.1 File and its types
- 9.2 Opening and closing of file
- 9.3 Input operations of file
  - 9.3.1 fscanf( )
  - 9.3.2 fgetc( )
  - 9.3.3 getw( )
  - 9.3.4 fgets( )
  - 9.3.5 fread( )
- 9.4 Output operations on file
  - 9.4.1 fprintf( )
  - 9.4.2 fputc( )
  - 9.4.3 putw( )
  - 9.4.4 fputs( )
  - 9.4.5 fwrite( )
- 9.5 Functions for selecting records randomly
  - 9.5.1 fseek( )
  - 9.5.2 ftell( )
  - 9.5.3 fgetpos( )
  - 9.5.4 rewind( )
  - 9.5.5 fsetpos( )
  - 9.5.6 feof( )
- 9.6 Programming examples

## **Chapter 10 – Pointers**

- 10.1 Pointer definition
- 10.2 Pointers and functions
- 10.3 Pointers and arrays
- 10.4 Pointers and strings or character pointer
- 10.5 Pointer to pointer
- 10.6 Address (Pointer) arithmetic
- 10.7 Programming Examples

## **Chapter 11 – Preprocessor Directives**

- 11.1 #include
- 11.2 #define
- 11.3 #undef
- 11.4 Compiler control directives
- 11.5 #ifdef
- 11.6 #ifndef
- 11.7 #error
- 11.8 #pragma

## **Chapter 12 – Pseudocode, Algorithms, Flowcharts, Algorithm complexity**

- 12.1 Pseudocode and its purpose
- 12.2 Keywords used in pseudocode
- 12.3 Pseudocode and algorithms
- 12.4 Pseudocode examples
- 12.5 Algorithms and its characteristics
- 12.6 How to write an algorithm?
- 12.8 Flowchart and its symbols
- 12.7 Algorithm analysis
- 12.8 Algorithm complexity
- 12.9 Time complexity
- 12.10 Asymptotic notations

# Part-II

## Fundamentals of Data structures

### Chapter 1 – Introduction to data structures

- 1.1 Data structure definition
- 1.2 Primitive and non primitive data structures
- 1.3 Linear and non linear data structures
- 1.4 Abstract Data Type (ADT)

### Chapter 2 – Stack

- 2.1 Stack and its operations
- 2.2 Implementation of stack operations using static array
  - 2.2.1 peek( )
  - 2.2.2 isfull( )
  - 2.2.3 isempty( )
  - 2.2.4 push( )
  - 2.2.5 pop( )
  - 2.2.6 Program
- 2.3 Implementation of stack operations using dynamic array
  - 2.3.1 push( )
  - 2.3.2 pop( )
  - 2.3.2 display( )
  - 2.3.3 Program
- 2.4 Multiple stacks
- 2.5 Applications of stack
  - 2.5.1 Parenthesis checker
  - 2.5.2 Reversing the array elements/list or stack content
  - 2.5.3 Conversions of expressions
  - 2.5.4 Evaluation of expressions

### Chapter 3 – List

- 3.1 Linked list and its types
- 3.2 Singly linked list and its operations
  - 3.2.1 Insertion
  - 3.2.2 Deletion
  - 3.2.3 Display
  - 3.2.4 Search
  - 3.2.5 Program
- 3.3 Doubly linked list and its operations
  - 3.2.1 Insertion
  - 3.2.2 Deletion
  - 3.2.3 Display
  - 3.2.4 Search
  - 3.2.5 Program

- 3.4 Differences between singly and doubly linked list
- 3.5 Circularly linked list
  - 3.5.1 Circularly linked list using singly linked list
  - 3.5.2 Circularly linked list using doubly linked list
- 3.6 Applications of list
  - 3.6.1 Sparse matrix representation using list
  - 3.6.2 Polynomial addition using lists

#### **Chapter 4 – Queues**

- 4.1 Queues and its types
- 4.2 Operations of simple queue
  - 4.2.1 isempty( )
  - 4.2.2 isfull( )
  - 4.2.3 enqueue( )
  - 4.2.4 dequeue( )
  - 4.2.5 Program
- 4.3 Operations of single ended priority queue
  - 4.3.1 Inserting an element
  - 4.3.2 Deleting an element
  - 4.3.3 Program
- 4.4 Operations of double ended priority queue
  - 4.4.1 Inserting an element
  - 4.4.2 Deleting an element
  - 4.4.3 Program
- 4.5 Operations of circular queue
  - 4.5.1 Inserting an element
  - 4.5.2 Deleting an element
  - 4.5.3 Program
- 4.6 Queue data structure using stack
- 4.7 Applications of queue

#### **Chapter 5 – Trees**

- 5.1 Trees and terms used in trees
- 5.2 Properties of Binary tree and its representation
- 5.3 Basic operations in trees
  - 5.3.1 Search
  - 5.3.2 Insert
  - 5.3.3 Delete
  - 5.3.4 Preorder traversing
  - 5.3.5 Inorder traversing
  - 5.3.6 Postorder traversing
- 5.4 Binary search tree
- 5.5 Binary search trees (BST) operations
  - 5.5.1 Insert
  - 5.5.2 Delete
  - 5.5.3 Traverse
  - 5.5.4 Search
  - 5.5.5 Height of BST

- 5.5.6 Program
- 5.6 Threaded Binary tree
- 5.7 AVL tree
- 5.8 Selection trees
- 5.9 Red Black trees
- 5.10 Splay trees
- 5.11 Forests

## **Chapter 6 – Graphs**

- 6.1 Graph and terms used in graph
- 6.2 Basic operations of graph
  - 6.2.1 Adding vertex
  - 6.2.2 Adding edge
  - 6.2.3 Display vertex
  - 6.2.4 Program
- 6.3 Tree traversing
  - 6.3.1 Depth First Search (DFS)
  - 6.3.2 Breadth First Search (BFS)
  - 6.3.3 Program

## **Chapter 7 – Heaps**

- 7.1 Heaps
- 7.2 Binomial heaps
- 7.3 Fibonacci heaps
- 7.4 Pairing heaps

# MODULE –I

## Introduction to C Language

Pseudocode solution to problem, Basic concepts in a C program, Declaration, Assignment & Print statements, Types of operators and expressions etc, programming examples.

  
**Dr. C. T. JAYADEVA**  
Principal ~~\_\_\_\_\_~~ B.E.,M.Tech.,Ph.D.  
Adichunchanagiri Institute of Technology  
CHIKKAMAGALURU-577102