SEMESTER V

CORE PAPER - 5

MOBILE APPLICATIONS DEVELOPMENT

Objectives:

This course aims to provide the students with a detailed knowledge on Mobile Application Development and Deployment about Android programming from basics to building mobile applications for digital world.

UNIT I: INTRODUCTION TO ANDROID PLATFORM

Objective: To understand the basics of smart phones and android platforms.

Introduction to Mobile Application Development – Various platforms – Smart phones – Android platform: features – Architecture – Versions – ART (Android Runtime) – ADB (Android Debug Bridge) – Development environment/IDE: Android studio and its working environment – Emulator setup – Application framework basics – XML representation and Android manifest file – Creating a simple application.

UNIT II: ANDROID UI DESIGN

Objective: To understand the basic concepts of user interface related to app development.

GUI for Android: activities lifecycle – Android v7 support library – Intent: Intent object – Intent filters – Adding categories – Linking activities – User Interface design components – Basic Views – Picker Views – List View – Specialized Fragment – Gallery and Image View – Image Switcher – Grid View, Options Menu – Context Menu – Clock View –Web view – Recycler View.

UNIT III: DATA PERSISTENCE

Objective: To understand the important of data persistence in mobile environment.

Different Data Persistence schemes: Shared preferences – File Handling – Managing data using SQLite database – Content providers: user content provider – Android in build content providers.

UNIT IV: ANDROID SERVICES & NETWORK ENVIRONMENT

Objective: To understand the various services and network facilities provided by android platform.

Services: Introduction to services – Local service – Remote service – Binding the service –Communication between service and activity – Intent Service – Multi–Threading: Handlers – AsyncTask– Android network programming: HttpUrlConnection– Connecting to REST–based – SOAP based Web services – Broad cast receivers: LocalBroadcastManager– Dynamic broadcast receiver – System Broadcast – Telephony Manager: Sending SMS and making calls.

UNIT V: ADVANCED APPLICATIONS

Objective: To understand the various apps deployed and developed on by mobile platform.

Location based services: Google maps V2 services using Google API – Animations and Graphics: Property Animation – View Animations –Drawable Animations – Media and Camera API: Working with video and audio inputs – camera API – Sensor programming: Motion sensors – Position sensors – Environmental sensors – Publishing Android Apps: Guide lines – policies and process of uploading Apps to Google play.

TEXT BOOKS:

1. "Head First: Android Development", Dawn Griffiths, David Griffiths, OReilly, 1st Edition, 2015.

2. Barry Burd, "Android Application Development – All–in–one for Dummies", 2nd Edition, Wiley India, 2016.

REFERENCES:

1. "Professional Android™ Sensor Programming", Greg Milette,Adam Stroud, John Wiley and Sons, Inc 2012.

2. "Android 6 for Programmers, App Driven approach", Paul Deital, Harvey Deital, Alexander Wald, Prentice Hall, 2015.

CORE PAPER - 6

OPERATING SYSTEM

Objectives:

Enable the student to get sufficient knowledge on concepts, functions and various system resources of operating systems.

UNIT I: OPERATING SYSTEM BASICS

Objective: To understand the structure and functions of operating systems.

Basic Concepts of Operating System – Services of Operating System – Operating System Types – Computer System Operation – I/O Structure – Storage Structure – Memory Hierarchy – System Components – System Calls – System Programs – System Design and Implementation – Introduction to Process – Process State – Process Control Block – Process Scheduling – Operations on Process – Interprocess Communication – Communication in Client/Server Systems – Threads.

UNIT II: CPU SCHEDULING ALGORITHM AND PREVENTION

Objective: To understand the principles of scheduler, scheduler algorithms and Deadlock.

Introduction –Types of CPU Scheduler – Scheduling Criteria – Scheduling Algorithms – Semaphores – Classic Problems of Synchronization – Basic Concept of Deadlocks – Deadlock Characterization – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery of Deadlock.

UNIT III: STORAGE MANAGEMENT

Objective: To learn various memory management schemes.

Memory Management – Basics Concept of Memory – Address Binding – Logical and Physical Address Space – Memory Partitioning – Memory Allocation – Paging – Segmentation – Segmentation and Paging – Protection – Fragmentation – Compaction – Demand Paging – Page Replacement Algorithm – Classification of Page Replacement Algorithm .

UNIT IV: I/O SYSTEMS

Objective: To study I/O management, File system and Mass Storage Structure .

File System Storage – File Concept– File Access Methods – Directory Structure – File Sharing – File Protection – File System Implementation – File System Structure –

Allocation Methods – Free Space Management – Mass Storage Structure – Disk structure – Disk Scheduling and Management – RAID Levels.

UNIT V: CASE STUDIES

Objective: To learn the basics of UNIX, LINUX systems and perform administrative tasks on LINUX servers.

UNIX System – A Case Study – LINUX System – Case Study – Design Principles – Process Management – Scheduling – Memory Management – File Systems – Security
.

TEXT BOOKS:

1. "Operating System Concepts" –Abraham Silberschatz Peter B. Galvin, G. Gagne, Sixth Edition, Addison Wesley Publishing Co., 2003.
2. "Operating System" – William Stalling, Fourth Edition, Pearson Education,2003.

REFERENCES:

1. "Operating systems – Internals and Design Principles", W. Stallings, 6th Edition, Pearson.
2. "Modern Operating Systems", Andrew S.Tanenbaum, Second Edition, Addison WesleyPublishing Co., 2001.
3. "Fundamentals of Operating System", Prof. R. Sriddhar, Dynaram Publication, Bangalore Company.

CORE PAPER - 7

DESIGN AND ANALYSIS OF ALGORITHMS

Objectives:

The objective of the course is to teach techniques for effective problem solving in computing. The use of different paradigms of problem solving will be used to illustrate clever and efficient ways to solve a given problem. In each case emphasis will be placed on rigorously proving correctness of the algorithm.

UNIT –I: ALGORITHM AND ANALYSIS

Objective: Understanding various algorithm design techniques.
Elementary Data Structures: Stack – Queues – Trees – Priority Queue – Graphs – What is an Algorithm? – Algorithm Specification – Performance Analysis: Space Complexity – Time Complexity – Asymptotic Notation – Randomized Algorithms.

UNIT – II: DIVIDE AND CONQUER

Objective: This technique is the basis of efficient algorithms for all kinds of problems**.**

General Method – Binary Search – Recurrence Equation for Divide and Conquer – Finding the Maximum and Minimum–– Merge Sort – Quick Sort – Performance Measurement – Randomized Sorting Algorithm – Selection Sort – A Worst Case Optimal Algorithm – Implementation of Select2 – Stassen's Matrix Multiplications.

UNIT – III: THE GREEDY METHOD

Objective: This is a simple approach which tries to find the best solution at every step.

The General Method – Container Loading – Knapsack Problem – Tree Vertex Splitting – Job Sequencing with Deadlines – Minimum Cost Spanning Trees – Prim's Algorithm – Kruskal's Algorithm – An optimal Randomized Algorithm – Optimal Storage on Tapes – Optimal Merge Pattern – Single Source Shortest Paths.

UNIT – IV: DYNAMIC POGRAMMING, TRAVERSAL & SEARCHING

Objective: Providing a general insight into the dynamic programming approach.

The General Method – Multistage Graphs – All Pair Shortest Path – Optimal Binary Search Trees – String Editing – 0/1 Knapsack – Reliability Design – The Traveling Salesperson Problem. Techniques for Binary Trees – Techniques for Graphs – BFS – DFS.

UNIT – V: BACKTRACKING & BRANCH AND BOUND

Objective: Algorithm design paradigm for discrete and combinatorial optimization problems.

The General Method – The 8– Queens Problem – Sum of Subsets– Graph Coloring – Hamiltonian Cycles – Branch and Bound: General Method – LC Branch and Bound – FIFO Branch and Bound.

TEXT BOOKS:

1. "Fundamentals of Computer Algorithms", Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, Galgotia Publications, Second Edition 2015.
2. "Introduction to Algorithms", Coremen T.H., Leiserson C.E. and Rivest R.L., PHI Publications, Third Edition, 1998.

REFERENCES:

1. "Introduction to the Design and Analysis of Algorithms", AnanyLevitin, Pearson Education, 2nd Edition.
2. "Introduction to Algorithms" Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, Prentice Hall of India, New Delhi, Second Edition, 2007.
3. "Computer Algorithms – Introduction to Design & Analysis" Sara Baase and Allen Van Gelder, Pearson Education New Delhi, Third Edition, 2000.

CORE PRACTICAL - 5

MOBILE APPLICATIONS DEVELOPMENT LAB

1. Develop an application that uses GUI components, Font and Colors.

2. Develop an application that uses Intent and Activity.

3. Develop an application that uses Layout Managers and event listeners.

4. Write an application that draws basic graphical primitives on the screen.

5. Develop an application that makes use of RSS Feed.

6. Implement an application that implements Multi-threading.

7. Develop an application that create alarm clock.

8. Develop an application Using Widgets.

9. Implement an application that writes data to the SD card.

10. Implement an application that creates an alert upon receiving a message.

11. Develop an application that makes use of database.

CORE PRACTICAL - 6

OPERATING SYSTEM LAB

1. Basics of UNIX commands.

2. Shell Programming.

3. Implement the following CPU scheduling algorithms

    a) Round Robin b) SJF c) FCFS d) Priority

4. Implement all file allocation strategies

    a) Sequential b) Indexed c) Linked

5. Implement Semaphores

6.   Implement all File Organization Techniques

    a) Single level directory b) Two level c) Hierarchical d) DAG

7. Implement Bankers Algorithm for Dead Lock Avoidance

8. Implement an Algorithm for Dead Lock Detection

9. Implement e all page replacement algorithms

    a) FIFO b) LRU c) LFU

10. Implement Shared memory and IPC

11. Implement Paging Technique of memory management.

12. Implement Threading & Synchronization Applications.

INTERNAL ELECTIVE
PAPER-1
(to choose one out of 3)
A. DATA MINING

Objectives:

   To enable the students to understand the importance of Data Mining and its techniques with recent trends and tools.

UNIT I: DATA MINING BASICS

Objective: To understand about the basics of Data Mining and Data

What is Data Mining– Kinds of Data – Kinds of patterns – Technologies used for Data Mining– Major Issues in Data Mining– Data –Data Objects and Attribute types– Data Visualization– Measuring Data Similarity and Dissimilarity–Data Preprocessing– overview– Data Cleaning– Data Integration– Data Reduction– Data Transformation and Data Discretization.

UNIT II: DATA WAREHOUSING AND ONLINE ANALYTICAL PROCESSING

Objective: To understand about the methods of Data Warehousing

Data Warehouse– Basic concepts–Data Warehouse Modeling: Data Cube and OLAP– Data Warehouse Design and Usage– Data Warehouse Implementation– Data Generalization by Attribute–Oriented Induction– Data Cube Technology– Data Cube Computation Methods– Exploring Cube Technology–Multidimensional Data Analysis in cube space.

UNIT III: PATTERNS AND CLASSIFICATION

Objective: To understand about the techniques of Data Mining

Patterns– Basic concepts– Pattern Evaluation Methods–Pattern Mining: Pattern Mining in Multilevel– Multidimensional space–Constraint–Based Frequent Pattern Mining– Mining High Dimensional Data and Colossal patterns– Mining compressed or Approximate patterns– Pattern Exploration and Application. Classification– Decision tree Induction– Bayes Classification methods– Rule based Classification– Model Evaluation and selection– Techniques to Improve Classification Accuracy– Other Classification methods.

UNIT IV: CLUSTERING AND OUTLIER DETECTION

Objective: To understand about the importance of Cluster and outlier detection

Cluster Analysis– Partitioning Methods–Hierarchical Methods–Density–Based Methods– Grid–Based Methods – Evaluation of Clustering.– Clustering High – Dimensional Data–Clustering Graph and Network Data – Clustering with Constraints– Web Mining– Spatial Mining. Outlier Detection – Outliers and Outliers Analysis– Outlier Detection Methods–Outlier Approaches–Statistical–Proximity–Based– Clustering–Based– Classification Based – High–Dimensional Data.

UNIT V: RECENT TRENDS IN DATA MINING AND TOOLS

Objective: To improve the student's knowledge with recent trends and tools

Other Methodologies of Data Mining –Data Mining Applications–Data Mining Trends– Recent Data Mining Tools–Rapid miner–Orange–Weka–Knime–Sisense– Ssdt (SQL Server Data Tools)–Oracle–Rattle–Data melt–Apache Mahout.

TEXT BOOKS:

1. "Data Warehousing Fundamentals", PaulrajPonnaiah, Wiley Publishers, 2001.

2. "Data Mining: Concepts and Techniques", Jiawei Han, MichelineKamber, Morgan Kaufman Publishers, 2006.

3. "Introduction to Data mining with case studies", G.K. Gupta, PHI Private limited, New Delhi, 2008. 2nd Edition, PHI, 2011

REFERENCES:
1. "Advances in Knowledge Discover and Data Mining", Usama M. Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth RamasamyUthurusamy, the M.I.T. Press, 2007.
2. "The Data Warehouse Toolkit", Ralph Kimball, Margy Ross, John Wiley and Sons Inc., 2002
3. "Building Data Mining Applications for CRM", Alex Berson, Stephen Smith, Kurt Thearling, Tata McGraw Hill, 2000.
4. "Data Mining: Introductory and Advanced Topics", Margaret Dunham, Prentice Hall, 2002.
5. "Discovering Knowledge in Data: An Introduction to Data Mining", Daniel T. Larose John Wiley & Sons, Hoboken, New Jersey, 2004

INTERNAL ELECTIVE
PAPER-1
B. INFORMATION SECURITY

Objectives:

To enable the student to understand various methodologies available for securing information.

UNIT I: INFORMATION SECURITY BASICS

Objective: To understand the basic concepts of Information Security

Introduction – History – What is Information Security?– Critical Characteristics of Information– NSTISSC Security Model– Components of an Information System– Securing the Components– Balancing Security and Access– The SDLC– The Security SDLC.

UNIT II SECURITY INVESTIGATION

Objective: To understand the legal, ethical and professional issues in Information Security

Security– Business Needs– Threats– Attacks– Legal– Ethical and Professional Issues– Relevant U.S. Laws – International Laws and Legal Bodies – Ethics and Information Security – Codes of Ethics and Professional Organizations

UNIT III SECURITY ANALYSIS

Objective: To know about risk management

Risk Management – Introduction – An Overview of Risk Management – Risk Identification – Risk Assessment – Risk Control Strategies – Selecting a Risk Control Strategy – Quantitative versus Qualitative Risk Control Practices – Risk Management Discussion Points

UNIT IV SECURITY MODELS

Objective: To understand the technological aspects of Information Security

LOGICAL DESIGN– Blueprint for Security– Information Security Policy – Standards and Practices– ISO 17799/BS 7799– NIST Models– VISA International Security Model– Design of Security Architecture– Planning for Continuity – Security Physical Design –Firewalls –Security Technology– IDS–IPS–Honey Pots– Honey Nets–Padded cell Systems Scanning and Analysis Tools–Access Control Devices.

UNIT V: CRYPTOGRAPHY AND ETHICAL HACKING

Objective: To understand the concepts of Cryptography and Hacking methods

Cipher methods– Cryptographic Algorithms and Tools–Attacks on Cryptosystems– Hacking– Effects of Hacking– Hacker – Types of Hacker– Ethical Hacker–Hacktivism– Networking & Computer Attacks – Malicious Software (Malware) – Protection Against Malware– Intruder Attacks on Networks and Computers – Wireless Hacking– Windows Hacking– Linux Hacking Session.

TEXT BOOKS:

1. "Principles of Information Security", Michael E Whitman and Herbert J Mattord, 5th Edition, Vikas Publishing House, New Delhi, 2003.

2. "Fundamentals of Information Systems Security", David Kim,MichaelG.Solomon, 3rd Edition ,Jones & Bartlett Learning, October 2016.

3. "The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy", Patrick Engebretson, 2nd Edition, Syngress Basics Series – Elsevier, 2011.

4. "Hands-On Ethical Hacking and Network Defense", Michael T. Simpson, Kent Backman, James E. Corley, Second Edition, CENGAGE Learning, 2010.

REFERENCES:

1. "Handbook of Information Security Management", Micki Krause, Harold F. Tipton, sixth Edition, CRC Press LLC, 2004.

2. "Hacking Exposed", Stuart McClure, Joel Scrambray, George Kurtz, Tata McGraw–Hill, 2003.

3. "Computer Security Art and Science", Matt Bishop, 2ndEdition , Pearson/PHI, 2002.

INTERNAL ELECTIVE
PAPER-1
C. SOFTWARE TESTING

Objectives:

To study the concepts of software engineering with the aim of acquiring skills to develop Software applications, following all standardized procedures and techniques.

UNIT I: INTRODUCTION TO SOFTWARE TESTING

Objective: To understand the concept of software testing, and software quality

Fundamentals of software testing – need for software testing– Psychology of testing – various approaches – characteristics of testing – principles of testing – testing strategies – verification and validation – Defect and Prevention strategies.

UNIT II: SOFTWARE DEVELOPMENT MODEL AND TESTING

Objective: To learn to inspect and detect errors by going through each and every code segment

Water fall model– V–model– Spiral model– Agile model – Life cycle of testing– Static Testing – dynamic testing – White box testing – Block box testing – Regression testing – Integration Testing – System and Performance Testing – Usability Testing

UNIT III: FUNCTIONAL AND STRUCTURAL TESTING

Objective: To gain knowledge of various functional and structural testing techniques

Boundary Value Analysis – Equivalence Class Testing – Decision Table – Based Testing – Cause Effect Graphing Technique – Path testing –Cyclomatic Complexity –Graph Metrics – Data Flow Testing – Slice based testing

UNIT IV: TEST MANAGEMENT AND TOOLS

Objective: To understand basic concept of Software Management tools and object oriented testing

Test planning – cost–benefit analysis of testing – monitoring and control–Test reporting –Test control – Specialized testing – Object Oriented Testing – Automated Tools for Testing – Tool Selection and Implementation – Challenges in test automation – GUI Testing

UNIT V: SOFTWARE QUALITY AND SOFTWARE QUALITY ASSURANCE

Objective: To understand basic concept of Software quality and software quality assurance

Introduction to software quality and software quality assurance – basic principles about the software quality and software quality assurance – Planning for SQA – various models for software product quality and process quality – SCM – RAD – System Documentation

TEXT BOOKS:

1. "Software Testing– A Craftsman's Approach" – Paul C. Jorgensen – Second Edition – CRC Press 2008

2. "Software Testing", – Ron Patton, Second Edition –Sams Publishing, Pearson Education, 2007.

3. "Software Testing– A Craftsman's Approach" – Paul C. Jorgensen, Second Edition – CRC Press, 2008

REFERENCES:

1. "Software Testing and Analysis: Process, Principles and Techniques" – Mauro Pezze, Michal Young – Wiley India , 2008

2. "Software Engineering" – K.K. Aggarwal&Yogesh Singh – New Age International Publishers – New Delhi, 2003.

3. "Software Testing – Principles and Practices" –SrinivasanDesikan and Gopalaswamy Ramesh, Pearson Education, 2006.

SKILL BASED SUBJECT

PAPER-3

SOFTWARE ENGINEERING

Objectives:

This course is intended to provide the students with an overall view over Software Engineering discipline and with insight into the processes of software development.

UNIT–I: INTRODUCTION TO EVOLVING SOFTWARE

Objective: Introduces the concepts and methods required for the construction of large software intensive systems.

Evolving Role of Software – Nature of Software – Software Engineering – The Software Process– Software Engineering Practices – Software Myths – A Generic View of Process Model – Process Assessment and Improvement – Process Models : Waterfall Model – Incremental Process Models – Evolutionary Process Models – Concurrent Models.

UNIT–II: REQUIREMENTS ENGINEERING

Objective: Gets the idea of choosing the Requirements in Software Engineering.

Requirements Engineering: Establishing the Groundwork – Initiating the Requirements Engineering Process – Eliciting Requirements – Collaborative Requirements Gathering – Quality Function Deployment – Usage Scenarios – Elicitation work Products – Building the Requirements Model – Elements of Requirements Model – Analysis Pattern – Requirements Analysis – Data Modeling Concepts.

UNIT–III: DATA ENGINEERING

Objective: Gives an understanding the concept of Data Engineering.

Data Engineering: Design Process and Design Quality – Design Concepts – The Design Model– Creating an Architectural Design – Software Architecture – Data Design – Architectural style – Architectural Design – Architectural Mapping Using Data Flow – Performing User Interface Design – Golden Rules.

UNIT–IV: TESTING STRATEGIES
Objective: To impart knowledge on Testing and Debugging.
Testing Strategies: Strategic Approach to Software Testing – Strategic Issues – Test Strategies for Conventional and Object Oriented Software – Validation Testing – System Testing – Art of Debugging. Software Testing Fundamentals – White Box Testing – Basis Path Testing – Control Structure Testing – Black Box Testing – Model

Based Testing.

UNIT–V: PROJECT MANAGEMENT

Objective: To enable the students to learn the basic of Project Management & Scheduling.

Project Management: Management Spectrum – People – Product – Process – Project – Critical Practices – Estimation: Project Planning Process – Software Scope and Feasibility – Resources – Software Project Estimation – Project Scheduling – Quality Concepts – Software Quality Assurance – Elements of Software Quality Assurance – Formal Technical Reviews.

TEXT BOOKS:

1. "Software Engineering – A Practitioner's Approach", Roger S Pressman, McGraw Hill International Edition, New York: 2005, Seventh Edition

2. " Software Engineering", Mall Rajib, PHI Learning, 2009, 3 Third Edition.

REFERENCES:

1. "Software Engineering", Ian Somerville, Pearson Education, 2006, 7th Edition.

2. "Software Engineering Concepts" Richard Fairley, Tata McGraw–Hill Education, 2011.

3. "Software Engineering: Theory and Practice ", Pfleeger and Lawrence, Pearson Education, 2001, Second Edition.

SEMESTER VI

CORE PAPER - 8

OPEN SOURCE SOFTWARE

Objectives:

To study the concepts of open source techniques that can be effectively applied in practice about HTML5, JavaScript, PHP, and PERL.

UNIT I: INTRODUCTION TO HTML, CSS

Objective: To understand the concept of HTML, HTML5 and CSS.

Need of Open Source –Advantages of Open source –Application of Open Source – HTML – HTML tags –Dynamic Web content– HTTP Request and Response Procedure–Introduction to HTML5– HTML5 Canvas – HTML5 Audio and Video– Introduction to CSS – CSS Rules –Style Types – CSS Selectors– CSS Colors.

UNIT II: LINUX

Objective: To learn to inspect and detect errors by going through each and every code segment.

Introduction: Linux Essential Commands – Kernel Mode and user mode –File system Concept – Standard Files – The Linux Security Model – Vi Editor – Partitions Creation – Shell Introduction – String Processing – Investigation and Managing Processes – Network Clients – Installing Application.

UNIT III:JAVA SCRIPT AND MYSQL

Objective: To understand basic concept of Java Script and MySQL.

Java script :Advantages of JavaScript –JavaScript Syntax–Data type– Variable– Array – Operators and Expressions– Loops – functions – Dialog box– MySQL – The show Databases and Table – The USE command –Create Database and Tables – Describe Table – Select, Insert, Update, and Delete statement.

UNIT IV: PHP

Objective: To understand basic concept of PHP

PHP Introduction – General Syntactic Characteristics – PHP Scripting – Commenting your code – Primitives, Operations and Expressions – PHP

Variables – Operations and Expressions Control Statement – Array – Functions – Basic Form Processing – File and Folder Access – Cooking – Sessions – Database Access with PHO.

UNIT V: PERL

Objective: To understand basic concept of PERL

PERL : Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines, Packages, and Modules– Working with Files – Data Manipulation.

TEXT BOOKS:

1. "The Complete Reference Linux", Peterson, Tata McGraw HILL–2010

2. "Perl: The Complete Reference", Martin C. Brown, Tata McGraw Hill Publishing Company Limited, Indian Reprint 2009.
3. "MYSQL: The Complete Reference", VikramVaswani, 2nd Edition, Tata McGrawHill Publishing Company Limited, Indian Reprint 2009
4. "PHP: The Complete Reference", Steven Holzner, 2nd Edition, Tata McGrawHill Publishing Company Limited, Indian Reprint 2009.
5. "Complete Reference HTML", T. A. Powell, 3rd Edition, Tata McGrawHill Publishing Company Limited, Indian Reprint 2002.
6. "Mastering Java script" – J. Jaworski, BPB Publications, 1999

REFERENCES:

1. "Fundamentals of Open Source Software", by M.N. Rao, PHI publishers.
2. "MySQL Bible", Steve Suchring, John Wiley, 2002
3. "The Linux Kernel Book", Remy Card, Eric Dumas and Frank Mevel, Wiley Publications, 2003
4. Ivan Byross, HTML, DHTML, Javascript, Perl, BPB Publication

CORE PAPER - 9

PYTHON PROGRAMMING

UNIT I:

Identifiers – Keywords - Statements and Expressions – Variables – Operators – Arithmetic operators – Assignment operators – Comparison operators – Logical operators – Bitwise operators - Precedence and Associativity – Data types - Number – Booleans – Strings - Indentation – Comments – Single line comment – Multiline comments - Reading Input – Print Output – Type Conversions – int function – float function – str() function – chr() function – complex() function – ord() function – hex() function – oct() function - type() function and Is operator – Dynamic and Strongly typed language.

UNIT II:

Control Flow Statements – If statement – If else statement – If elif else statement – nested if statement - while loop – for loop – continue and break statements – catching exceptions using try and except statement – syntax errors – exceptions – exception handling – Strings – str() function - Basic string operations – String comparison – Built in functions using strings – Accessing characters in string – String slicing – String joining – split() method – string traversing.

UNIT III:

Functions – Built in functions – function definition and calling - return statement – void function – scope and lifetime of variables – args and kwargs – command line arguments - Tuples – creation – basic tuple operations – tuple() function – indexing – slicing – built-in functions used on tuples – tuple methods – packing – unpacking – traversing of tuples – populating tuples – zip() function - Sets – Traversing of sets – set methods – frozenset.

UNIT IV:

Lists: Using List- List Assignment and Equivalence – List Bounds- Slicing - Lists and Functions- Prime Generation with a List.List Processing: Sorting-Flexible Sorting- Search- List Permutations- Randomly Permuting a List- Reversing a List.

UNIT V:

Objects: Using Objects- String Objects- List Objects. Custom Types: Geometric Points- Methods- Custom Type Examples- Class Inheritance. Handling Exceptions: Motivation- Exception Examples- Using Exceptions - Custom Exceptions.

TEXT BOOKS:

1. Gowrishankar S, Veena A, "Introduction to Python programming", 1st Edition, CRC Press/Taylor & Francis, 2008. (Units 1-3)
2. Learn to Program with Python, 3th Edition, Richard L. Halterman, Southern Adventist University. (Units 4-5)

REFERENCE BOOKS:

1. Core Python Programming, 2thEdition, Wesley J. Chun, Prentice Hall.
2. Jake VanderPlas,"Python Data Science Handbook:Essential Tools for working with Data",1st edition, O'Reilly Media, 2016.

CORE PRACTICAL - 7

PYTHON PROGRAMMING LAB

Write a Python program to find the area and perimeter of a circle.

1. Write a Python program to generate Fibonacci series.
2. Write a Python program to compute the GCD of two numbers.
3. Write a Python program to generate first n prime numbers.
4. Write a Python program to find the sum of squares of n natural numbers.
5. Write a Python program to find the sum of the elements in an array.
6. Write a Python program to find the largest element in the array.
7. Write a Python program to check if the given string is a palindrome or not.
8. Write a Python program to store strings in a list and print them.
9. Write a Python program to find the length of a list, reverse it, copy it and then clear it.

CORE PRACTICAL - 8

OPEN SOURCE SOFTWARE LAB

1. Create a web page with Frames and Tables.

2. Create a web page incorporating CSS (Cascading Style Sheets).

3. Write a shell program to find the factorial of an integer positive number.

4. Write a shell program to find the details of a user session.

5. Create a simple calculator in JavaScript.

6. Write a JavaScript program to scroll your name in the scrollbar.

7. Develop a program and check message passing mechanism between pages.

8. Application for Email Registration and Login using PHP and MySQL.

9. Program to Create a File and write the Data into it using PHP.

10. Program to perform the String Operation using Perl.

INTERNAL ELECTIVE

PAPER -2

(to choose one out of 3)

A. BIG DATA ANALYTICS

Objectives:

- To explore the fundamental concepts of big data analytics.
- To learn to analyze the big data using intelligent techniques and mining data stream.
- To understand the applications using Map Reduce Concepts.

UNIT–I: INTRODUCTION TO BIG DATA

Objective: To explore the fundamental concepts of big data analytics.

Introduction to big data: Introduction to Big Data Platform – Challenges of Conventional Systems – Intelligent data analysis – Nature of Data –.Characteristics of Data – Evolution of Big Data – Definition of Big Data – Challenges with Big Data – Volume, Velocity, Variety – Other Characteristics of Data – Need for Big Data– Analytic Processes and Tools – Analysis vs. Reporting.

UNIT–II: MINING DATA STREAMS
Objective:To learn to use various techniques for mining data stream.

Mining data streams: Introduction To Streams Concepts – Stream Data Model and Architecture – Stream Computing – Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window – Real time Analytics Platform(RTAP) Applications – Case Studies – Real Time Sentiment Analysis– Stock Market Predictions.

UNIT III: BIG DATA FROM DIFFERENT PERSPECTIVES

Objective: To learn the Big data Business Perspective

Big data from business Perspective: Introduction of big data–Characteristics of big data–Data in the warehouse and data in Hadoop– Importance of Big data– Big data Use cases– Patterns for Big data deployment. Big data from Technology Perspective–Application Development in Hadoop–Getting your data in Hadoop.

UNIT –IV:HADOOP AND MAP REDUCE

Objective: To understand the applications using Map Reduce Concepts.

Hadoop: The Hadoop Distributed File System – Components of HadoopAnalysing the Data with Hadoop– Scaling Out–Hadoop Streaming– Design of HDFS–Java interfaces to HDFS Basics– Developing a Map Reduce Application–How Map Reduce Works– Anatomy of a Map Reduce Job run–Failures–Job Scheduling–Shuffle and Sort – Task execution – Map Reduce Types and Formats– Map Reduce Features–Hadoop environment.

UNIT – V: FRAMEWORKS

Objective:To introduce programming tools HIVE in Hadoop echo system.

Frameworks: Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive – fundamentals of HBase and ZooKeeper– IBM InfoSphereBigInsights and Streams.

TEXT BOOKS:

1. "Intelligent Data Analysis", Michael Berthold, David J. Hand, Springer, 2007.
2. "Hadoop: The Definitive Guide ", Tom White Third Edition, Oreilly Media, 2012.

REFERENCES:

1. "Big Data and Analytics" SeemaAcharya, SubhasiniChellappan, Wiley 2015.
2. "Mining of Massive Datasets",AnandRajaraman and Jeffrey David Ullman,CUP,2012.
3. "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data" .Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos,McGrawHill Publishing, 2012.
4. "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", Bill Franks, John Wiley& sons, 2012.
5. "Making Sense of Data", Glenn J. Myatt, John Wiley & Sons, 2007.

INTERNAL ELECTIVE

PAPER -2

B. CRYPTOGRAPHY

Objectives:

- Understand various Security practices and System security standards
- Understand different cryptographic operations
- Understand the various Authentication schemes to simulate different applications.

UNIT–I: COMPUTER AND NETWORK SECURITY

Objective: Understand OSI security architecture and classical encryption techniques.

Computer Security Concepts – OSI security architecture –Security trends – Security attacks – Security Services – Security Mechanisms – Fundamental Security Design Principles – Attack Surfaces and Attack Trees – Model for Network Security – Network Standards.

UNIT–II:SYMMETRIC CRYPTOGRAPHY

Objective: Understand the different cryptographic operations of symmetric cryptographic algorithm**s.**

Symmetric Cipher – Classical Encryption Technique – Symmetric Cipher Model – Substitution Techniques, Transposition Technique – Steganography – Block Cipher and the Data Encryption Standard – The Data Encryption Standard – Differential and Linear Cryptanalysis – Block Cipher Principles. Advanced Encryption Standard – AES Structure – AES Transformation Function.

UNIT–III: PUBLIC KEY CRYPTOGRAPHY

Objective: Understand the different cryptographic operations of Public key cryptographic algorithms.

Public Key Cryptography and RSA Principles– RSA Algorithm, Key Management and other Public Key Cryptosystems Key Management, Diffie–Hellman Key Exchange, Elliptic Curve Arithmetic – Elliptic Curve Cryptography – Psedorandom Number Generation**.**

UNIT –IV:HASH FUNCTIONS AND DIGITAL SIGNATURES

Objective: To make use of application protocols to design and manage a secure system.

Cryptographic Hash Functions – Application of Hash Functions – Two Simple Hash Functions – Secure Hash Algorithm(SHA) –Message Authentication Codes – Authentication requirement – Authentication function – MAC – HMAC – CMAC – Digital signature and authentication protocols – Digital Signature Standards –Digital Signatures Schemes– Digital Certificate – Key Management and Distribution.

UNIT – V: SECURITY APPLICATIONS

Objective: To learn the configuration and manage E–mail and WLAN Security.

Intrusion Detection System – Password Management – Introduction to Firewall – Firewall Generations– Web Security – Wireless network Security – Electronic Mail Security– Internet Mail Architecture–S/MIME – Pretty Good Privacy (PGP).
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TEXT BOOKS:

1. "Cryptography and Network security Principles and Practices",William Stallings,Pearson/PHI,Seventh Edition, 2017.
2. "CRYPTOGRAPHY & NETWORK SECURITY" – Principles and Practices, William Stallings, Pearson Education, Third Edition.

REFERENCES:

1. "Modern Cryptography Theory and Practice", Wenbo Mao, Pearson Education, 2004.
2. "Cryptography and Network Security ",BehourzForouzan, DebdeepMukhopadyay,Tata McGraw Hill Education Pvt. Ltd, New Delhi, 2010.
3. "Quantum Cryptography and Secret–Key Distillation", Gilles van Assche, CambridgeUniversity Press, 2010.

INTERNAL ELECTIVE

PAPER -2

C. DIGITAL IMAGE PROCESSING

Objectives:

This course enables the student knowledge about various image processing concepts like enhancement, restoration, segmentation, compression and recognition.

UNIT I: FUNDAMENTALS

Objective: To know the basics of Digital image and techniques.

Introduction – Origin – Steps in Digital Image Processing – Components – Applications of DIP – Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization – Images in Matlab– Pixels – Color models – Digital Image Processing in Multimedia.

UNIT II: IMAGE ENHANCEMENT

Objective: To understand various Image enhancement ideas.

Spatial Domain – Gray level transformations – Histogram Quantization – Histogram matching and processing – Basics of Spatial Filtering – Smoothing and Sharpening Spatial Filtering – Introduction to Fourier Series – Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal – Butterworth and Gaussian filters.

UNIT III: IMAGE RESTORATION AND SEGMENTATION

Objective: To understand Image restoration techniques.

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation– Active Contour Models – Snakes – Fuzzy Connectivity – Morphological processing– erosion and dilation.

UNIT IV: WAVELETS AND IMAGE COMPRESSION

Objective: To understand degrees of image resolution and compression methods.

Wavelets – Subband coding – Multi resolution expansions – Compression: Fundamentals – Image Compression models – Error Free Compression – Predictive Compression Methods – Vector Quantization – Variable Length Coding – Bit–Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards.

UNIT V: IMAGE REPRESENTATION AND RECOGNITION

Objective: To understand concepts of image representation and recognition.

Knowledge Representation – Statistical Pattern Recognition – Neural Nets – Fuzzy Systems – Chain Code – Polygonal approximation, signature, boundary segments – Shape number – Fourier Descriptor moments– Regional Descriptors – Topological feature, Texture – Patterns and Pattern classes – Recognition based on matching.

TEXT BOOKS

1. "Digital Image Processing," Rafael C. Gonzalez, Richard E.Woods, Prentice Hall, Third Edition, 2008.
2. "Digital Image Processing and Computer Vision," Sonka, Hlavac, Boyle, Cengage Learning, 2009
3. "Fundamentals of Digital Image Processing", Anil Jain K, PHI Learning Pvt. Ltd., 2011.

REFERENCES:

1. "Digital Image Processing", S. Sridhar, Oxford University Press; Second edition, 2016.
2. "Digital Image Processing", Gonzalez & woods, Pearson Education India, 2016.

INTERNAL ELECTIVE
PAPER -3
(to choose one out of 3)
A. ARTIFICIAL INTELLIGENCE

Objectives:

To induce the innovative ideas of students, related to Robotics, Artificial Intelligence and Machine Learning. This course enables the student's level to compete in the world of information and technology era.

UNIT I: INTRODUCTION TO ARTIFICIAL INTELLIGENCE:

Objective: To know the basics of Artificial Intelligence.

History of AI – Artificial Narrow Intelligence (ANI) – Artificial General Intelligence (AGI) – Artificial Super Intelligence (ASI) – Characteristics – Types of AI – Domains – Programming Languages of AI – Applications of AI – Future of AI.

UNIT II: AI – PROBLEM SOLVING METHODS:

Objective: To Understand the Methods and algorithms in AI.

Problem solving Methods – Search Strategies: Uninformed – Informed – Heuristics – Generate and test – hill climbing – Best first search – problem reduction – Local Search Algorithms and Optimization – Game Playing mini–max procedure – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games

UNIT III: AI – KNOWLEDGE REPRESENTATION:

Objective: To learn to represent knowledge in solving AI problems.

Procedural Versus declarative knowledge – logic programming – Forward Versus backward reasoning – Matching – Control knowledge – Ontological Engineering– Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories –Reasoning with Default Information.

UNIT IV: STATISTICAL REASONING AND AGENTS:

Objective: To Understand Statistical logics and know about Software agents.

Probability and Bayes Theorem – Certainty factors – Probabilistic Graphical Models – Bayesian Networks – Markov Networks – Fuzzy Logic. Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi–agent systems.

UNIT V: MACHINE LEARNING AND APPLICATIONS

Objective: To learn how Machine learning is related to AI.

Types of Machine Learning – Neural Networks – Deep Learning – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving.

TEXT BOOKS:

1. "Artificial Intelligence", Elaine Rich, Kevin Knight, Tata McGraw Hill, II Edition.
2. "Artificial Intelligence: A Modern Approach," Stuart Russell, Peter Norvig, Third Edition, Prentice Hall of India, New Delhi, 2010.
3. "Prolog: Programming for Artificial Intelligence", I. Bratko, Addison – Wesley Educational Publishers Inc., Fourth edition 2011.

REFERENCES:

1. "Machine Learning for Beginners 2019", Matt Henderson, This Is Charlotte, 2019
2. "Introduction to Artificial Intelligence and Expert Systems", Dan W. Patterson, Pearson, 2015

INTERNAL ELECTIVE
PAPER -3
B. SYSTEM SOFTWARE

Objectives:

To have an understanding the basic design of assemblers, loaders, linkers, macro processor.

UNIT I: INTRODUCTION TO SYSTEM SOFTWARE

Objective: To understand the basic concepts of system software

System software vs. Application software – Different types of system software – SIC& SIC/XE Architecture – traditional (CISC) machines – RISC machines.

UNIT II: ASSEMBLERS

Objective: Ability to trace the path of a source code to object code and to executable file

Basic assembler functions– Machine dependent and independent assembler features– Assembler design options–One pass assemblers–Multi pass assemblers– MASM assembler.

UNIT III: LOADERS AND LINKERS

Objective: To design and implementation of loaders and linkers

Basic loader functions–Simple bootstrap loaders – Machine dependent and independent loader features–Linkage editors– Dynamic linking.

UNIT IV: MACRO PROCESSOR

Objective: To understand the concepts of macro processor

Basic macro processor functions–Machine dependent and independent macro processor features–Macro processor design options.

UNIT V: COMPILERS

Objective: Ability to analyze the functions of compilers

Basic compiler functions–Machine dependent compiler features–Machine independent compiler features–Compiler design options the YACC compiler– Compiler.

TEXT BOOKS:

1. "System Software–An introduction to system programming", Leland L. Beck & D. Manjula, Pearson Education, 3rd edition, 2007.

2. "Compilers – Principles, techniques and tools", A.V. Aho, Ravi Sethi, J.D. Ullman, 2nd Edition, Pearson Education, 2011.

REFERENCES:

1. "Systems Programming and Operating Systems", D.M. Dhamdhere, Second Revised Edition, Tata McGraw Hill, 2000.

2. "Systems Programming", John J. Donovan, Tata McGraw Hill Edition, 2000.

3. "Systems Programming", Srimanta Pal, Oxford University Press, 2011.

INTERNAL ELECTIVE
PAPER -3
C. CLOUD COMPUTING

Objectives:

To enable the students to learn the basic functions, principles and concepts of cloud computing Systems.

UNIT I: UNDERSTANDING CLOUD COMPUTING

Objective: To understand the concepts in Cloud Computing.

Computing Paradigms – Cloud Computing Fundamentals – History of Cloud Computing – Cloud Computing Architecture & Management – Cloud Computing Deployment Models – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Cloud Services.

UNIT II: DEVELOPING CLOUD SERVICES

Objective: To understand the concepts of Cloud Computing Services.

Cloud Service Models – SOA & Cloud – Multicore Technology – Memory and Storage Technologies – Networking Technologies – Web 2.0 – 3.0 – Software Process Models for Cloud – Agile SDLC for Cloud Computing – Pervasive Computing – Application Environment – Virtualization.

UNIT III: PROGRAMMING MODELS FOR CLOUD COMPUTING

Objective: To enable the Students to learn Programming Models in Cloud Computing and its Environments.

Parallel and Distributed Programming Paradigms – Map Reduce, Twister and Iterative Map Reduce – CGL– Map Reduce – Programming models for Aneka – Hadoop Library from Apache – Mapping Applications – Programming Support – Google App Engine, Amazon AWS – Cloud Software Environments –Eucalyptus, Open Nebula, Open Stack, CloudSim – SAP Labs – EMC – Sales force – VMware.

UNIT IV: SOFTWARE DEVELOPMENT IN CLOUD

Objective: The student should be made to learn the basics of Software Development in Cloud.

Different Perspectives on SaaS Development – New Challenges in Cloud – Cloud Aware Software Development Using Paas Technology – Networking for Cloud

Computing – Networking Issues in Data Centers – Transport Layer Issues in DCNs – TCP Enhancements for DCNs – Open Source Support for Cloud – Open Source Tools for Iaas Open Source Tools for Iaas – Open Source Tools for Paas – Open Source Tools for Research.

UNIT V: SECURITY IN CLOUD COMPUTING

Objective: At the end of the course, the student should be able to learn Security Aspects of Cloud Computing.

Security Aspects – Platform Related Security – Audit and Compliance – Cloud Security Challenges and Risks – Software–as–a–Service Security– Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security – Identity Management and Access Control – Autonomic Security – Advance Concepts in Cloud Computing.

TEXT BOOKS:

1. "Essentials of Cloud Computing "– K.CHANDRASEKARAN – CRC Press Taylor and Francis Group an Informal Business – 2015.

2. Cloud Computing – A Practical Approach for Learning and Implementation, A.Srinivasan and J.Suresh, Pearson India Publications, 2014

REFERENCES:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.

3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.

4. Kumar Saurabh, "Cloud Computing – insights into New–Era Infrastructure", Wiley India, 2011.

5. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly.

SKILL BASED SUBJECT

PAPER-4

INTERNET OF THINGS

Objectives:

This course presents the Introduction to IoT, M2M,IoT Architecture, IoT Model And Views, IOT protocols and Real world design constraints enable the students to learn the concepts of IoT.

UNIT I: INTRODUCTION TO IoT

Objective: To understand the fundamentals of Internet of Things.

Introduction to Internet of Things –Definition and Characteristics of IoT– Physical Design– Logical Design–IoT Enabling Technologies –IoT Levels & Deployment Templates – Domain Specific IoTs – Home – City – Environment – Energy – Retail – Logistics – Agriculture – Industry – health and Lifestyle.

UNIT II: M2M and IoT ARCHITECTURE

Objective: To understand the M2M and IoT Architecture

IoT and M2M – Difference between IoT and M2M –SDN –IoT System Management with NETCONF–YANG–IoT Platforms Design Methodology – M2M high–level ETSI architecture – IETF architecture for IoT– OGC architecture –Service Oriented Architecture – IoT reference architecture

UNIT III: IoT MODEL AND VIEWS

Objective:To understand the IoT Model And Views

IoT reference model – Domain model – information model – functional model – communication model – Functional View – Information View – Deployment and operational View – other relevant architectural views – data representation and visualization.

UNIT IV: IoT PROTOCOLS

Objective: To learn about the basics of IOT protocols.

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus– Zigbee Architecture – Network layer – 6LowPAN –CoAP – Security

UNIT V: REAL–WORLD APPLICATIONS

Objectives: Analyze applications of IoT in real time scenario.

Real world design constraints – Applications – Asset management, Industrial automation, smart grid, Commercial building automation, Smart cities – participatory sensing – Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs – Cloud for IoT– Amazon Web Services for IoT.

TEXT BOOKS:

1. "Interconnecting Smart Objects with IP: The Next Internet", Jean–Philippe Vasseur, Adam Dunkels, Morgan Kuffmann, 2010.

2. Internet of Things – A Hands–on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015.

3. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014.

REFERENCES:

1. "Internet of Things – A hands–on approach‖", ArshdeepBahga, Vijay Madisetti, Universities Press, 2015

2. "Architecting the Internet of Things‖,"DieterUckelmann, Mark Harrison, Michahelles, Florian (Eds), Springer, 2011.

3. "The Internet of Things in the Cloud: A Middleware Perspective‖", Honbo Zhou, CRC Press, 2012.

4. "From Machine–to–Machine to the Internet of Things – Introduction to a New Age of Intelligence", Jan Höller, VlasiosTsiatsis, Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand, David Boyle, Elsevier, 2014.

5. "The Internet of Things – Key applications and Protocols", Olivier Hersent, David Boswarthick, Omar Elloumi ,Wiley, 2012.

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