

UNIT – III

TREES AND GRAPHS

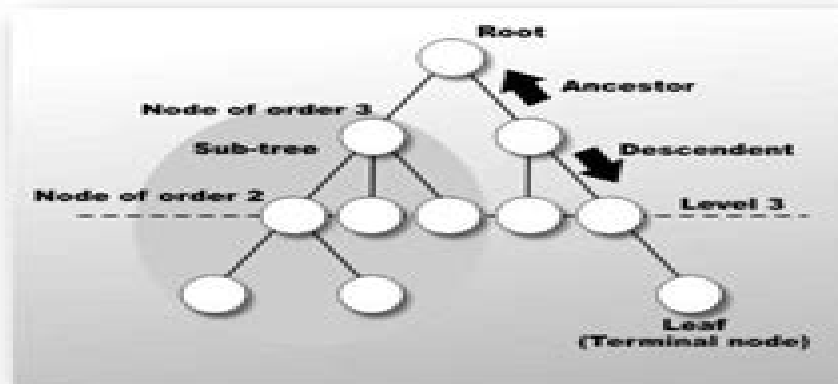
Basic Tree Concepts:

A **tree** is a non-empty set one element of which is designated the root of the tree while the remaining elements are partitioned into non-empty sets each of which is a sub-tree of the root.

A tree T is a set of nodes storing elements such that the nodes have a parent-child relationship that satisfies the following

- If T is not empty, T has a special tree called the root that has no parent.
- Each node v of T different than the root has a unique parent node w ; each node with parent w is a child of w .

Tree nodes have many useful properties. The **depth** of a node is the length of the path (or the number of edges) from the root to that node. The **height** of a node is the longest path from that node to its leaves. The height of a tree is the height of the root. A **leaf node** has no children – its only path is up to its parent.



Binary Tree:

In a binary tree, each node can have at most two children. A binary tree is either **empty** or consists of a node called the **root** together with two binary trees called the **left subtree** and the **right subtree**.

Data Structures Tannenbaum

**Elliott I. Organick, Alexandra I.
Forsythe, Robert P. Plummer**



Data Structures Tannenbaum:

Data Structures Using C Aaron M. Tenenbaum, 1990-09 **Encyclopedia of Software Engineering Three-Volume Set (Print)** Phillip A. Laplante, 2010-11-22 Software engineering requires specialized knowledge of a broad spectrum of topics including the construction of software and the platforms applications and environments in which the software operates as well as an understanding of the people who build and use the software Offering an authoritative perspective the two volumes of the Encyclopedia of Software Engineering cover the entire multidisciplinary scope of this important field More than 200 expert contributors and reviewers from industry and academia across 21 countries provide easy to read entries that cover software requirements design construction testing maintenance configuration management quality control and software engineering management tools and methods Editor Phillip A Laplante uses the most universally recognized definition of the areas of relevance to software engineering the Software Engineering Body of Knowledge SWEBOK as a template for organizing the material Also available in an electronic format this encyclopedia supplies software engineering students IT professionals researchers managers and scholars with unrivaled coverage of the topics that encompass this ever changing field Also Available Online This Taylor E mail e reference taylorandfrancis com International Tel 44 0 20 7017 6062 E mail online sales tandf co uk Data Model Patterns: A Metadata Map David C. Hay, 2010-07-20 Data Model Patterns A Metadata Map not only presents a conceptual model of a metadata repository but also demonstrates a true enterprise data model of the information technology industry itself It provides a step by step description of the model and is organized so that different readers can benefit from different parts It offers a view of the world being addressed by all the techniques methods and tools of the information processing industry for example object oriented design CASE business process re engineering etc and presents several concepts that need to be addressed by such tools This book is pertinent with companies and government agencies realizing that the data they use represent a significant corporate resource recognize the need to integrate data that has traditionally only been available from disparate sources An important component of this integration is management of the metadata that describe catalogue and provide access to the various forms of underlying business data The metadata repository is essential to keep track of the various physical components of these systems and their semantics The book is ideal for data management professionals data modeling and design professionals and data warehouse and database repository designers A comprehensive work based on the Zachman Framework for information architecture encompassing the Business Owner s Architect s and Designer s views for all columns data activities locations people timing and motivation Provides a step by step description of model and is organized so that different readers can benefit from different parts Provides a view of the world being addressed by all the techniques methods and tools of the information processing industry for example object oriented design CASE business process re engineering etc Presents many concepts that are not currently being addressed by such tools and should be *Transactions on Rough Sets VI* James F. Peters, Ivo

Düntsche, Jerzy Grzymala-Busse, Ewa Orlowska, Lech Polkowski, 2007-03-08 Annotation The LNCS journal Transactions on Rough Sets is devoted to the entire spectrum of rough sets related issues from logical and mathematical foundations through all aspects of rough set theory and its applications such as data mining knowledge discovery and intelligent information processing to relations between rough sets and other approaches to uncertainty vagueness and incompleteness such as fuzzy sets and theory of evidence Volume VI of the Transactions on Rough Sets TRS commemorates the life and work of Zdzislaw Pawlak 1926 2006 His legacy is rich and varied Prof Pawlak's research contributions have had far reaching implications inasmuch as his works are fundamental in establishing new perspectives for scientific research in a wide spectrum of fields This volume of the TRS presents papers that reflect the profound influence of a number of research initiatives by Professor Pawlak In particular this volume introduces a number of new advances in the foundations and applications of artificial intelligence engineering logic mathematics and science These advances have significant implications in a number of research areas such as the foundations of rough sets approximate reasoning bioinformatics computational intelligence cognitive science data mining information systems intelligent systems machine intelligence and security **C A Software**

Engineering Approach Peter A. Darnell, Philip E. Margolis, 2012-12-06 A highly readable text designed for beginning and intermediate C programmers While focusing on the programming language the book emphasises stylistic issues and software engineering principles so as to develop programs that are readable maintainable portable and efficient The software engineering techniques discussed throughout the text are illustrated in a C interpreter whose source listing is provided on diskette and highlighted bug alerts offer tips on the common errors made by novice programmers Can be used as the primary course textbook or as the main reference by programmers intent on learning C Official Gazette of the United States Patent and Trademark Office, 2001 Programming Language Structures Elliott I. Organick, Alexandra I. Forsythe, Robert P. Plummer, 2014-05-10 Programming Language Structures deals with the structures of programming languages and introduces the reader to five important programming languages Algol Fortran Lisp Snobol and Pascal The fundamental similarities and differences among these languages are discussed A unifying framework is constructed that can be used to study the structure of other languages such as Cobol PL I and APL Several of the tools and methodologies needed to construct large programs are also considered Comprised of 10 chapters this book begins with a summary of the relevant concepts and principles about algorithms flowcharts and computation that a student is expected to know from the first course The discussion then turns to the semantics of procedure and function call as well as argument parameter matching with various kinds of parameters recursion and its relation to tree traversal syntax formalism for context free languages and ALGOL 60 and block structuring Case study programs are presented to reinforce the reader's understanding of ALGOL 60 and Fortran semantics The remaining chapters deal with Lisp Snobol and Pascal This monograph is intended for working programmers and students in computer science who have an interest in the subject of programming Data Structures and Algorithms

Shi Kuo Chang,2003 This is an excellent up to date and easy to use text on data structures and algorithms that is intended for undergraduates in computer science and information science The thirteen chapters written by an international group of experienced teachers cover the fundamental concepts of algorithms and most of the important data structures as well as the concept of interface design The book contains many examples and diagrams Whenever appropriate program codes are included to facilitate learning This book is supported by an international group of authors who are experts on data structures and algorithms through its website at <http://www.cs.pitt.edu/jung/GrowingBook> so that both teachers and students can benefit from their expertise **poverty, inequality and class structure , Curvature Scale Space Representation: Theory,**

Applications, and MPEG-7 Standardization F. Mokhtarian,M. Bober,2013-11-11 MPEG 7 is the first international standard which contains a number of key techniques from Computer Vision and Image Processing The Curvature Scale Space technique was selected as a contour shape descriptor for MPEG 7 after substantial and comprehensive testing which demonstrated the superior performance of the CSS based descriptor Curvature Scale Space Representation Theory Applications and MPEG 7 Standardization is based on key publications on the CSS technique as well as its multiple applications and generalizations The goal was to ensure that the reader will have access to the most fundamental results concerning the CSS method in one volume These results have been categorized into a number of chapters to reflect their focus as well as content The book also includes a chapter on the development of the CSS technique within MPEG standardization including details of the MPEG 7 testing and evaluation processes which led to the selection of the CSS shape descriptor for the standard The book can be used as a supplementary textbook by any university or institution offering courses in computer and information science

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