



COURSE TITLE	: Data Structures
COURSE PREREQUISITE	: Introduction to Programming 2
COURSE DURATION	:16 weeks (3 hours/week)
COURSE METHODOLOGY:	In-class lectures and take-home programming exercises

Course Description

Concepts, algorithms and applications of data structures: stacks, queues, trees, graphs, lists, tables and heaps, binary search trees and hash tables.

Course Outline	
Week	Topics
1*	Basic Concepts and Notations Problem Solving Process Properties of an Algorithm Addressing Methods Mathematical Functions Complexity of Algorithms
2*	Stacks Sequential Allocation Linked Representation Application: Infix to Postfix Form
3***	Advanced Topic on Stacks Multiple Stacks using One-Dimensional Array Memory Reallocation Strategy for Multiple Stacks using Garwick's Algorithm
4*	Queues Sequential Representation Linked Representation Circular Queues Application: Topological Sorting
5*	Binary Trees Definitions and Related Concepts Types of Binary Trees Binary Tree Traversals
6**	Binary Trees (cont.) Application of Binary Tree Traversals Heap and the Heapsort Algorithm
7*	Trees Definitions and Related Concepts Algorithms for Tree Operations Natural Correspondence: Binary Tree Representation of Trees

8**	Trees (cont.) Forest Traversal Sequential Representation of Forests
9***	Trees (cont.) Arithmetic Tree Representations Applications: Trees and the Equivalence Problem
10*	Graphs Definition and Related Concepts Representation of Graphs Graph Traversals: DFS and BFS
11**	Graphs (cont.) Minimum Cost Spanning Trees: Prim's and Kruskal's Algorithms Shortest Path Problems: Dijkstra's and Floyd's Algorithms
12**	Lists Definitions and Related Concepts Representation of Lists Singly Linked Lists Circular Lists Doubly-Linked Lists
13***	Advanced Topics on Lists Application: Polynomial Arithmetic Dynamic Storage Allocation(Sequential-Fit and Buddy System)
14*	Tables Definitions and Related Concepts Searching and Sequential Tables
15*	Binary Search Trees Binary Search Trees AVL Trees
16**	Hash Table and Hashing Techniques Definitions and Related Concepts Simple Hashing Technique: Prime Number Division Method Dynamic Hashing

- * Required
- ** Advanced
- *** Optional

Requirements

Supported Operating Systems

The NetBeans IDE 5.5 runs on operating systems that support the Java VM. Below is a list of platforms:

- Microsoft Windows XP Professional SP2 or newer
- Mac OS X 10.4.5 or newer
- Red Hat Fedora Core 3
- Solaris™ 10 Operating System Update 1 (SPARC® and x86/x64 Platform Edition)

NetBeans Enterprise Pack is also known to run on the following platforms:

- Microsoft Windows 2000 Professional SP4
- Solaris™ 8 OS (SPARC and x86/x64 Platform Edition) and Solaris 9 OS (SPARC and x86/x64 Platform Edition)
- Various other Linux distributions

Minimum Hardware Configuration

Note: The NetBeans IDE's minimum screen resolution is 1024x768 pixels.

- **Microsoft Windows operating systems:**
 - **Processor:** 500 MHz Intel Pentium III workstation or equivalent
 - **Memory:** 512 MB
 - **Disk space:** 850 MB of free disk space
- **Linux operating system:**
 - **Processor:** 500 MHz Intel Pentium III workstation or equivalent
 - **Memory:** 512 MB
 - **Disk space:** 450 MB of free disk space
- **Solaris OS (SPARC):**
 - **Processor:** UltraSPARC II 450 MHz
 - **Memory:** 512 MB
 - **Disk space:** 450 MB of free disk space
- **Solaris OS (x86/x64 Platform Edition):**
 - **Processor:** AMD Opteron 100 Series 1.8 GHz
 - **Memory:** 512 MB
 - **Disk space:** 450 MB of free disk space
- **Macintosh OS X operating system:**
 - **Processor:** PowerPC G4
 - **Memory:** 512 MB
 - **Disk space:** 450 MB of free disk space

Recommended Hardware Configuration

- **Microsoft Windows operating systems:**
 - **Processor:** 1.4 GHz Intel Pentium III workstation or equivalent
 - **Memory:** 1 GB
 - **Disk space:** 1 GB of free disk space
- **Linux operating system:**
 - **Processor:** 1.4 GHz Intel Pentium III or equivalent
 - **Memory:** 1 GB
 - **Disk space:** 850 MB of free disk space
- **Solaris™ OS (SPARC®):**
 - **Processor:** UltraSPARC IIIi 1 GHz
 - **Memory:** 1 GB
 - **Disk space:** 850 MB of free disk space
- **Solaris™ OS (x86/x64 platform edition):**
 - **Processor:** AMD Opteron 100 Series 1.8 GHz
 - **Memory:** 1 GB
 - **Disk space:** 850 MB of free disk space

Requirements

- **Macintosh OS X operating system:**
 - **Processor:** PowerPC G5
 - **Memory:** 1 GB
 - **Disk space:** 850 MB of free disk space

Required Software

NetBeans Enterprise Pack 5.5 Early Access runs on the Java 2 Platform Standard Edition Development Kit 5.0 Update 1 or higher (JDK 5.0, version 1.5.0_01 or higher), which consists of the Java Runtime Environment plus developer tools for compiling, debugging, and running applications written in the Java language. Sun Java System Application Server Platform Edition 9 has been tested with JDK 5.0 update 6.

- For **Solaris, Windows, and Linux**, you can download the JDK for your platform from <http://java.sun.com/j2se/1.5.0/download.html>
- For **Mac OS X**, Java 2 Platform Standard Edition (J2SE) 5.0 Release 4, is required. You can download the JDK from Apple's Developer Connection site. Start here: <http://developer.apple.com/java> (you must register to download the JDK).