Programming Courses From Computer Science Tutoring Dec 4, 2023

We have over 24 Programming Courses taught interactively live on Skype or Zoom. Using share screen feature students start programming right away it is like having your own personnel instructor right beside you. Each course consists of a series of lessons you take one by one. In each lesson we present programming concepts, do in-class exercises, and give homework to do, that we take up next class. Each lesson costs $15, each lesson about 1 hour. Each Course contains a Project to do. A Certificate is awarded at the completion of a Course. These Courses are extremely successful. Start anytime. For ages 12+.

Computer Science Tutoring 416-785-5115 students@cstutoring.com
No text messages please.

PROGRAMMING COURSES BY CATEGORY

Programming Languages

Python Programming 15 Lessons
Java Programming 16 Lesson
C Programming 13 Lessons
C++ Programming 15 Lesson
Advanced C++ Programming
C# Programming 18 Lessons

AI Machine Learning

AI Machine Learning Core 18 Lessons
AI Machine Learning Advanced 19 Lessons

Mathematics using Python

Chapter 1 Basic Mathematics 19 Lessons
Chapter 2 Matrices, Lines, Angles and Circles 19 Lessons
Chapter 3 Derivatives, Tangents, Vectors and Gradients 20 Lessons
Chapter 4 Digital Signal Processing

Programming Projects

Build your own Operating System with Desktop 13 Lessons
C# GUI Database Takeout Restaurant App
Sales and Inventory Management using Nodejs, React and MongoDB

Web Programming

JavaScript Core 14 Lessons
JavaScript Bookstore with Firebase Database 9 Lessons
Nodejs Bookstore with MomgoDB Database 9 Lessons
React Bookstore with Firebase Database 9 Lessons
Mern Stack Bookstore with MongoDB Database 9 Lessons
Flask Python Bookstore 12 Lessons

Game Programming

Python Game Programming 8 Lessons
Java Game Programming 8 Lessons
JavaScript Game Programming 9 Lessons

Data Structures

Python Data Structures 21 Lessons
Java Data Structures 21 Lessons
C Data Structures 20 Lessons
C++ Data Structures 21 Lessons
C# Data Structures 21 Lessons

PROGRAMMING COURSE DETAILS:

PROGRAMMING LANGUAGES:

<table>
<tr>
<td> 
</td>
<td>

Python Programming

Ages 12+ Prepares for University, Grade 11 and 12

15 Lessons including a Project:

Lesson 1 Input and Output
Lesson 2 Functions
Lesson 3 Classes
Lesson 4 Operators
Lesson 5 Lists, Sets, Tuples and Dictionaries
Lesson 6 Programming Statements
Lesson 7 File I/O
Lesson 8 List Comprehension, Iterators, Generators and Higher Order Functions
Lesson 9 Overriding, Abstract classes and Polymorphism
Lesson 10 Annotations, Typing and Generics
Lesson 11 Recursion
Lesson 12 Regular Expressions
Lesson 13 SQL and SQLite Database
Lesson 14 Python GUI
Lesson 15 Python Project

</td>
</tr>
</table>

Java Programming

16 Lessons including a Project:

Ages 12+ Prepares for University, Grade 11 and 12

Lesson 1 **Input and Output**
Lesson 2 **Methods**
Lesson 3 **Classes and Inheritance**
Lesson 4 **Operators**
Lesson 5 **Programming Statements**
Lesson 6 **Arrays, ArrayList, Lists, Sets and Maps**
Lesson 7 **Overloading, Interfaces and Generics**
Lesson 8 **Enhanced Loops, Iterators, Comparators, Anonymous Functions and Inner Classes**
Lesson 9 **File Access**
Lesson10 **Abstract Classes, Polymorphism and Java Objects, Enums and Lambda Expressions**
Lesson 11 **Recursion**
Lesson 12 **Regular Expressions**
Lesson 13 **XML and JSON**
Lesson 14 **Graphical User Interfaces**
Lesson 15 **Using JavaFX**
Lesson 16 **Java Project**

C Programming

13 Lessons Ages 12 + Prepares for University

Lesson 1 **Input, Output and Variables**
Lesson 2 **Functions**
Lesson 3 **Structures**
Lesson 4 **Operators**
Lesson 5 **Programming Statements**
Lesson 6 **Arrays**
Lesson 7 **Pointers**
Lesson 8 **Allocating Memory for Arrays and Structures**
Lesson 9 **Passing Values, Arrays and Structures to Functions**
Lesson 10 **Function Pointers**
Lesson 11 **File Access**
Lesson 12 **Recursion**
Lesson 13 **Project**

C++ Programming

15 Lessons Prepares for University, Grade 11 and 12

Lesson 1 **Input and Output**
Lesson 2 **Functions**
Lesson 3 **Classes and Inheritance**
Lesson 4 **Operators**
Lesson 5 **Branch Control Statements**
Lesson 6 **Arrays**
Lesson 7 **Copy Constructors and Assignment Operators**
Lesson 8 **Move Constructors and Move Assignment Operators**
Lesson 9 **STL Vectors, Lists, Sets and Maps**
Lesson 10 **IO File Access**
Lesson 11 **Virtual Methods, Abstract Classes and Polymorphism**
Lesson 12 **Interfaces and Templates**
Lesson 13 **Recursion**
Lesson 14 **New Features in C++ Advanced Material**
Lesson 15 **C++ Project**

	**Advanced C++ Programming** **Compiling Advanced C++** **Constant Expressions** **Initialization of variables** **Data Type Inference** **Type Alignment** **Static Assertions** **Accessing enum values** **Structures and Unions** **Null Address Constant for pointers** **noexcept() Operator** **String conversions** **External Linkage** **Namespaces** **Function Pointers** **Overloading operators** **Functors (Function objects)** **Lambda Expressions** **Exception Handling** **Exiting Programs** **String View class** **Std Algorithms** **Algorithm Function Templates** **Smart Pointers** **Processes And Threads** **Multiple inheritance**

C# Programming

18 Lessons Prepares for University, Grade 11 and 12

Lesson 1 Input and Output
Lesson 2 Methods
Lesson 3 Classes and Inheritance
Lesson 4 Operators
Lesson 5 Programming Statements
Lesson 6 Arrays, Lists, HashSets and Dictionaries
Lesson 7 Overloading, Overriding and Interfaces
Lesson 8 Generic Interfaces and Classes
Lesson 9 Overloaded Operator, Indexers and BuiltIn Classes
Lesson 10 File Access
Lesson 11 Abstract Classes and Polymorphism
Lesson 12 Recursion
Lesson 13 Delegates and Lambda Expressions
Lesson 14 LINQ
Lesson 15 Expressions and Expression Trees
Lesson 16 Events, Asynchronous methods and Threading
Lesson 17 Regular Expressions
Lesson 18 Project

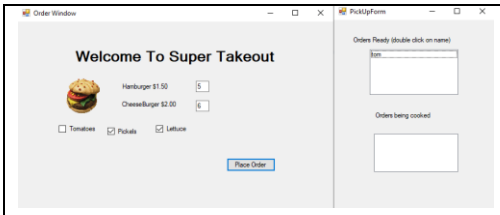
PROGRAMMING PROJECTS

Build your own Operating System in C

with a real GUI and Desktop

13 Lessons Prerequisites C Programming

Lesson1 Setup and Bootloaders
Lesson2 Bios Input Output Functions
Lesson3 Bios Reading Disk
Lesson4 Running in 32 bit Protected mode
Lesson5 Using C language
Lesson6 Screen and Strings functions
Lesson7 Interrupts, Keyboard and Timer
Lesson8 File System
Lesson9 Scheduling
Lesson10 Mouse and Graphical Interface
Lesson11 Working with Graphical Shapes and Objects
Lesson12 Graphics Desktop
Lesson13 Graphics App Project

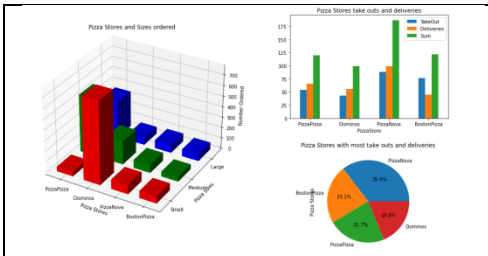


C# GUI PROJECT

Prerequisites C# Programming

Build a Takeout Restaurant App
Introduction to Databases
Using SQL Server
Connection Strings
DataReaders, Datasets and DataAdapters
C# Database Access Classes
Using DataReaders
Using Datasets and DataAdapters
Using C# GUI Controls and Events

AI MACHINE LEARNING

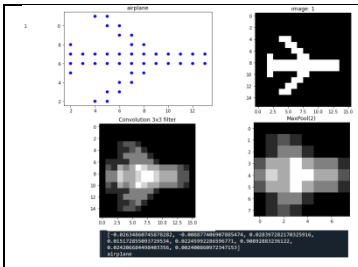


AI Machine Learning Core

18 Lessons Prepares for University and College

Prerequisites Python Programming

Lesson1 Introduction to Machine Learning and AI
Lesson2 Using Numpy
Lesson3 Plotting with Matplot
Lesson4 Using Pandas Series
Lesson5 Pandas Data Frames
Lesson6 Plotting with Pandas
Lesson7 Plotting with Seaborn
Lesson8 Advanced Pandas Data Frames
Lesson9 Advanced Pandas Data Frames 2
Lesson10 Advanced Pandas Data Frames 3
Lesson11 Advanced Pandas Data Frames 4
Lesson12 Linear Regression
Lesson13 Confusion Matrix and ROC
Lesson14 Logistic Regression
Lesson15 Classification
Lesson16 Correlation and Covariance
Lesson17 Curve Fitting
Lesson18 Machine Learning Project



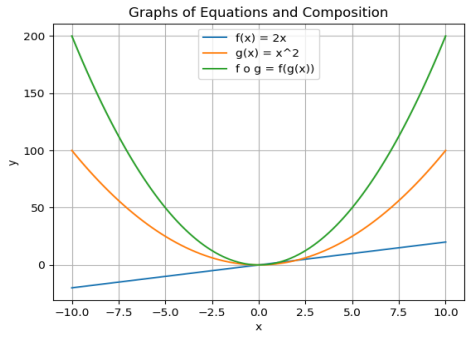
AI Machine Learning Advanced

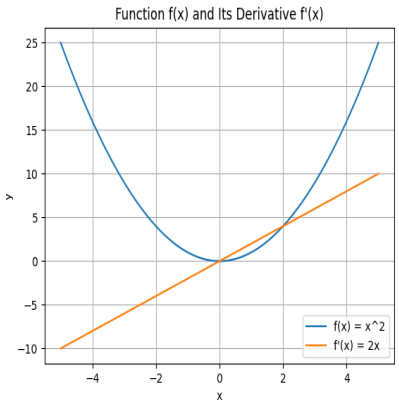
19 Lessons Prepares for University and College

Prerequisites Python Programming

Lesson19 Cross Validation
Lesson20 Time Series
Lesson21 Scaling and Encoding
Lesson22 Pipelining
Lesson23 Clustering
Lesson24 Segmentation
Lesson25 Feature Engineering
Lesson26 Introduction to Neural Networks
Lesson27 Neural Network Applications
Lesson28 Keras and TensorFlow
Lesson29 Image Classification
Lesson30 Image Classification2
Lesson31 AI Applications
Lesson32 Deep Learning Applications
Lesson33 Reinforcement Learning
Lesson34 Natural Language Processing
Lesson35 Adversary Attacks
Lesson36 Transformers
Lesson37 Advanced Machine Learning AI Project

MATHEMATICS USING PYTHON COURSE

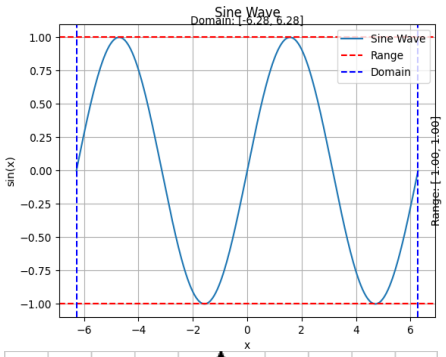


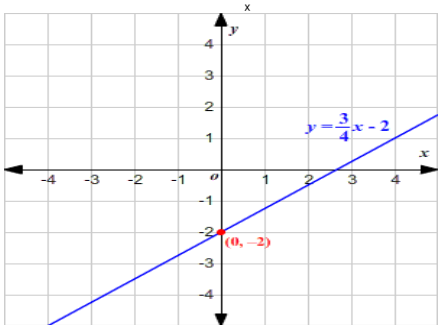


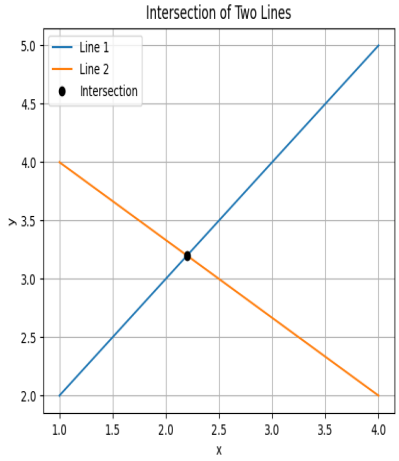
Chapter 1 Basic Mathematics

Learn Mathematics through Visualization

Ages 12 + Knowledge of Python







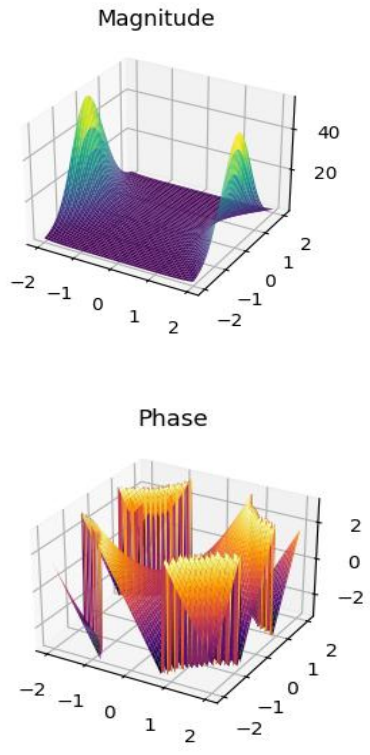
Chapter 2

Advanced Mathematics

Matrices, Lines, Angles and Circles

Learn Mathematics through Visualization

Ages 12 + Knowledge of Python



Chapter 3

Digital Signal Processing

Learn Mathematics through Visualization

Ages 12 + Knowledge of Python

3.1 Fourier Series and Transforms

3.2 Digital Filters

3.3 Convolution

3.4 Convolution Filters Using Sinc Taps

3.5 Convolution Filters Using Kernel Coefficients

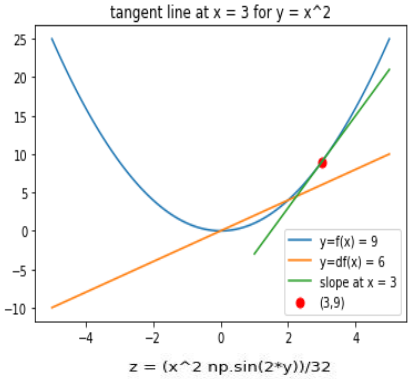
3.6 Digital Filters Using Fourier Transform

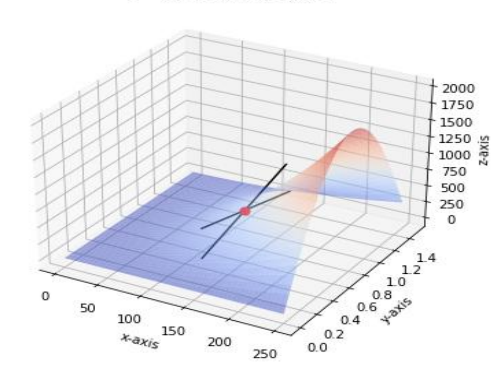
3.7 Comparing Fir and IIR Filters

3.8 Butterworth IIR Filter example

3.9 Laplace transform, s-plane and z-plane

3.10 Chebyshev IIR High Pass Filter example





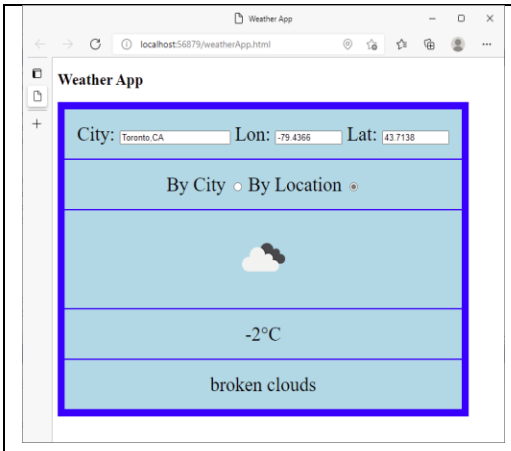
Chapter 4

Derivatives Tangents Partial Derivatives and Gradients

Learn Mathematics through Visualization

Ages 12 + Knowledge of Python

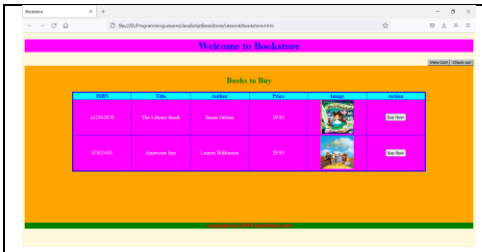
WEB PROGRAMMING COURSES



JavaScript Core

14 Lessons Prepares for University and College 12+

Lesson 1 Variables and Operators
Lesson 2 Programming Statements
Lesson 3 Arrays
Lesson 4 Functions
Lesson 5 Objects
Lesson 6 Classes
Lesson 7 Events
Lesson 8 Forms
Lesson 9 Reading and Storing JSON Data
Lesson 10 Reading a JSON file from a Web Server
Lesson 11 Using JQuery
Lesson 12 JavaScript Graphics
Lesson 13 Regular Expressions
Lesson 14 Weather App Project

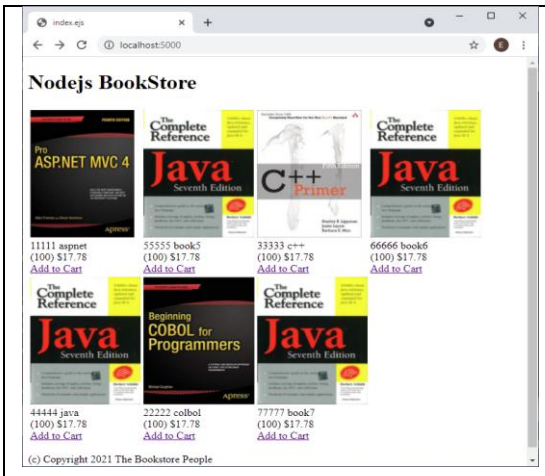


JavaScript Bookstore

9 lessons Prepares for University and College

Prerequisites JavaScript Programming

Lesson 1 Make a basic Web Page.
Lesson 2 Display Books for Sale
Lesson 3 Add Shopping Cart, Checkout and Thank you WebPages
Lesson 4 Ordering Books
Lesson 5 Displaying the Shopping Cart
Lesson 6 Customer Checkout and Saving Orders
Lesson 7 Displaying Customer Orders
Lesson 8 Using JQuery
Lesson 9 Using a Firebase Cloud Database

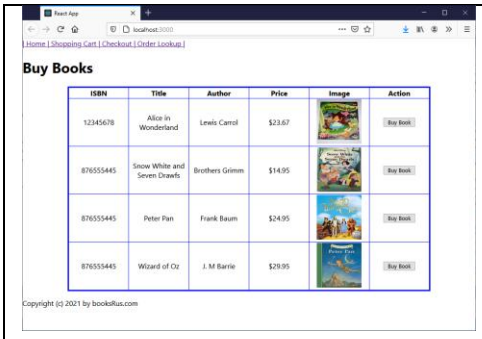


NodeJS Bookstore

9 Lessons Prepares for University and College

Prerequisites JavaScript Programming

Lesson 1 Bookstore Overview
Lesson 2 MongoDB Schema Models
Lesson 3 Populating the MongoDB Database
Lesson 4 Promises, Callbacks, Async and Await
Lesson 5 DataBase Manager
Lesson 6 Views
Lesson 7 Shopping Cart
Lesson 8 Routes and Actions
Lesson 9 Customer Order Lookup Project

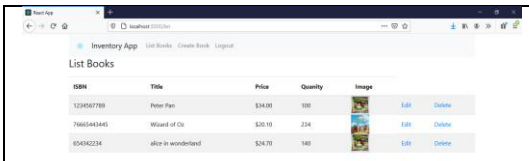


React Bookstore

9 Lessons Prepares for University and College

Prerequisites JavaScript Programming

Lesson 1 Introduction to React
Lesson 2 React Components
Lesson 3 Hooks
Lesson 4 Bookstore App Components
Lesson 5 Displaying Books for Sale
Lesson 6 Ordering Books and Shopping Cart
Lesson 7 Checkout Order
Lesson 8 Thank you Page and Storing Orders in a Firebase Database
Lesson 9 Lookup Orders in Firebase Database



Mern Stack Bookstore

Using MongoDB, Express, React and Nodejs

14 Lessons Prepares for University and College

Prerequisites JavaScript Programming

Lesson1 **Introduction to Mern,NodeJS, MongoDB**

Lesson2 **Installing MongoDB Database**

Lesson3 **Adding MongoDB to our Node.js Server**

Lesson4 **Routing and Setting up NodeJS Router**

Lesson5 **Setting up Book Controller**

Lesson6 **Setting up User Controller**

Lesson7 **React Client and Installing React**

Lesson8 **Introduction to React Components**

Lesson9 **React Hooks**

Lesson10 **Login and Registration Page**

Lesson11 **Preventing Unauthorized Users and Logging Out**

Lesson12 **Create Books Component**

Lesson13 **List, Edit and Delete Book Components**

Lesson14 **Mern Mini Project**

Flask Python Bookstore

Lesson 1 Python Web Server

Lesson 2 Making Login Page

Lesson 3 Adding a Registration page

Lesson 4 Making Headers and Footers

Lesson 5 Navigation

Lesson 6 Displaying Books for Sale

Lesson 7 Buying Books

Lesson 8 Displaying Shopping Cart

Lesson 9 Storing Customer Orders in DataBase

Lesson 10 Checkout

Lesson 11 Lookup Order Page

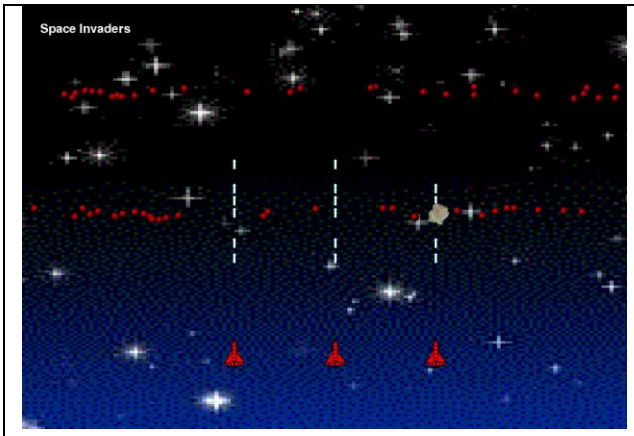
Lesson 12 Add Session Tracking

GAME PROGRAMMING COURSES

Python Game Programming

8 Lessons Prerequisites Python Programming

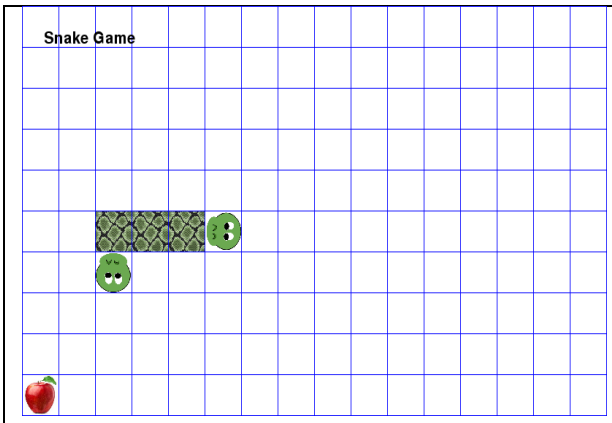
Lesson 1 SpaceInvaders
Lesson 2 Mario Game 1
Lesson 3 Mario Game 2
Lesson 4 Snake Game
Lesson 5 Snake Game 2
Lesson 6 Battle Ship
Lesson 7 Smart TicTacToe
Lesson 8 AI TicTacToe
Lesson 9 MineSweeper
Lesson 10 Connect 4
Lesson 11 Python Game Project



Java Game Programming

8 Lessons Prerequisites Java Programming

Lesson 1 SpaceInvaders
Lesson 2 Mario Game 1
Lesson 3 Mario Game 2
Lesson 4 Snake Game
Lesson 5 Snake Game 2
Lesson 6 Battle Ship
Lesson 7 Smart TicTacToe
Lesson 8 AI TicTacToe
Lesson 9 Java Game Programming
Lesson 10 Project

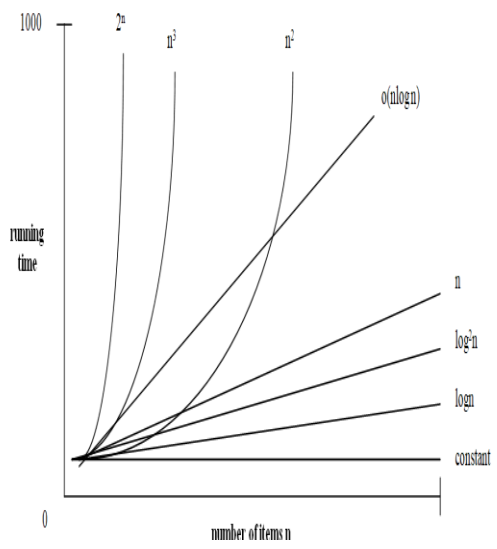


JavaScript Game Programming

9 Lessons Prerequisites JavaScript Programming

Lesson 1 SpaceInvaders
Lesson 2 Mario Game 1
Lesson 3 Mario Game 2
Lesson 4 Snake Game
Lesson 5 Snake Game 2
Lesson 6 Battle Ship
Lesson 7 Smart TicTacToe
Lesson 8 AI TicTacToe
Lesson 9 JavaScript Game Programming Project

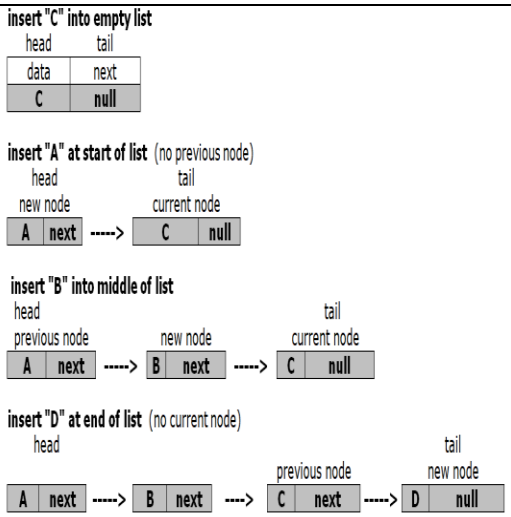
Data Structure Programming Courses



Python Data Structures Programming

21 Lessons Prerequisites Python Programming

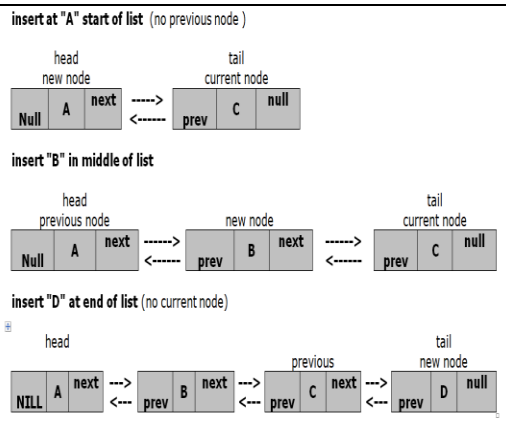
lesson 1 Induction, timing and loop invariants
lesson 2 Abstract data types using arrays
lesson 3 Recursion
lesson 4 Sorting arrays
lesson 5 Single link lists
lesson 6 Double link lists
lesson 7 Abstract data types using link lists
lesson 8 Sorting link lists
lesson 9 Binary search , hash tables and heaps
lesson 10 Binary search trees
lesson 11 Java data stucture course project 1
lesson 12 101 binary search tree recursion routines
lesson 13 AVL trees
lesson 14 B-trees
lesson 15 Constructing graph's
lesson 16 Graph class
lesson 17 Graph algorithms i
lesson 18 Graph algorithms ii
lesson 19 Simulation techniques i
lesson 20 Simulation techniques ii
lesson 21 Java data stucture course project 2



Java Data Structure Programming

21 lessons Prerequisites Java Programming

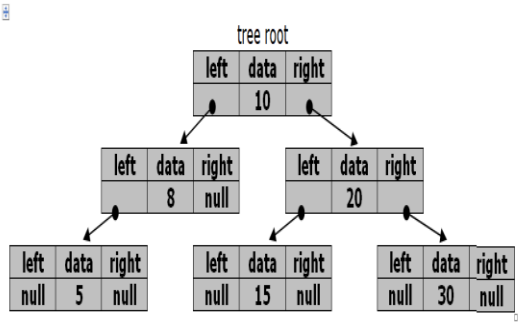
Lesson 1	**Induction, timing and loop invariants**
Lesson 2	**Abstract data types using arrays**
Lesson 3	**Recursion**
Lesson 4	**Sorting arrays**
Lesson 5	**Single link lists**
Lesson 6	**Double link lists**
Lesson 7	**Abstract data types using link lists**
Lesson 8	**Sorting link lists**
Lesson 9	**Binary search , hash tables and heaps**
Lesson 10	**Binary search trees**
Lesson 11	**Java data stucture course project 1**
Lesson 12	**101 binary search tree recursion routines**
Lesson 13	**AVL trees**
Lesson 14	**B-trees**
Lesson 15	**Constructing graph's**
Lesson 16	**Graph class**
Lesson 17	**Graph algorithms i**
Lesson 18	**Graph algorithms ii**
Lesson 19	**Simulation techniques i**
Lesson 20	**Simulation techniques ii**
Lesson 21	**Java data stucture course project 2**



C Data Structures Programming

20 Lessons Prerequisites C Programming

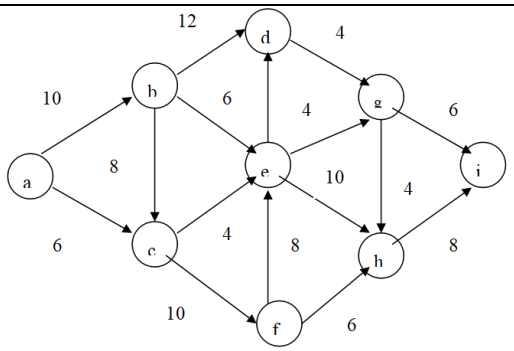
lesson 1	**Induction, timing and loop invariants**
Lesson 2	**Abstract data types using arrays**
Lesson 3	**Recursion**
Lesson 4	**Sorting arrays**
Lesson 5	**Single link lists**
Lesson 6	**Double link lists**
Lesson 7	**Abstract data types using link lists**
Lesson 8	**Sorting link lists**
Lesson 9	**Binary search , hash tables and heaps**
Lesson 10	**Binary search trees**
Lesson 11	**C data stucture course project 1**
Lesson 12	**101 Binary Search Tree recursion**
Lesson 13	**AVL trees**
Lesson 14	**B-trees**
Lesson 15	**Constructing graph's**
Lesson 16	**Graph algorithms i**
Lesson 17	**Graph algorithms ii**
Lesson 18	**Simulation techniques i**
Lesson 19	**Simulation techniques ii**
Lesson 20	**C data stucture course project 2**



C++ Data Structures Programming

21 lessons Prerequisites C++ Programming

lesson 1	**Induction, timing and loop invariants**
Lesson 2	**Abstract data types using arrays**
Lesson 3	**Recursion**
Lesson 4	**Sorting arrays**
Lesson 5	**Single link lists**
Lesson 6	**Double link lists**
Lesson 7	**Abstract data types using link lists**
Lesson 8	**Sorting link lists**
Lesson 9	**Binary search , hash tables and heaps**
Lesson 10	**Binary search trees**
Lesson 11	**C++ data stucture course project 1**
Lesson 12	**101 binary search tree recursion**
Lesson 13	**AVL trees**
Lesson 14	**B-trees**
Lesson 15	**Constructing graph's**
Lesson 16	**Graph class**
Lesson 17	**Graph algorithms i**
Lesson 18	**Graph algorithms ii**
Lesson 19	**Simulation techniques i**
Lesson 20	**Simulation techniques ii**
Lesson 21	**C++ data structure course project 2**



C# Data Structures Programming

21 lessons Prerequisites C# Programming

lesson 1	**Induction, timing and loop invariants**
Lesson 2	**Abstract data types using arrays**
Lesson 3	**Recursion**
Lesson 4	**Sorting arrays**
Lesson 5	**Single link lists**
Lesson 6	**Double link lists**
Lesson 7	**Abstract data types using link lists**
Lesson 8	**Sorting link lists**
Lesson 9	**Binary search , hash tables and heaps**
Lesson 10	**Binary search trees**
Lesson 11	**C++ data stucture course project 1**
Lesson 12	**101 binary search tree recursion**
Lesson 13	**AVL trees**
Lesson 14	**B-trees**
Lesson 15	**Constructing graph's**
Lesson 16	**Graph class**
Lesson 17	**Graph algorithms i**
Lesson 18	**Graph algorithms ii**
Lesson 19	**Simulation techniques i**
Lesson 20	**Simulation techniques ii**
Lesson 21	**C++ data structure course project 2**

END