Implementation of Data Structures

Programme Overview

Learn how to write correct and efficient data structures manipulation using the existing standard template library (STL) of C++. Get introduced to the power of STL and make your code more solid, reusable, and robust.

In this Computer Science course, you will learn about the implementation of all major abstract data structures using the object-oriented programming paradigm of C++ and map abstract data types to the Standard Template Library of C++.

Course content

The topics covered in this course:

- Review of OO programming, STL of C++
- Stacks
- Queues
- Lists
- Trees
- Graphs

The detailed description is given below:

Topic 1: Review of Object Oriented Programming

- Know about the member functions as interfaces of structures
- Learn to control access to members
- Get to know the use of scope resolution operator
- Learn about Template class

Topic 2: Stacks

- Learn more about Stack and a two-stack program
- Know the operations using Text Editor
- Know more about other applications of Stack
- Learn Infix to Postfix expression using Stack

Topic 3: Queues

- Learn the basics about Queue
- Look at an example called Bus Queue
- Explore the Program for a Bus Queue
- Get the concepts clear with Mumbai Vada Pav Seller Program

Topic 4: Lists

- Know more on List operations
- Learn the features of List class
- Know the cause and effect of redesigning Mumbai Vada Pav Seller Program
- Learn the Data Structure and Algorithms of a Media Player

Topic 5: Trees

- Learn more about Binary Tree and its Traversal
- Know how to gain efficiency of Binary Search Trees
- Learn about Trie
- Learn to write Binary Tree Program
- Learn the Huffman Coding

Topic 6: Graphs

- Get to know about the Graphs
- Know the types of Graphs
- Learn the basic operations of Graphs using a program
- Learn about Depth First Search and Breadth First Search

Teaching Faculty

Prof (Retired) Deepak B. Phatak, Dept. of CSE, IIT Bombay

Prof Ajit Diwan, Dept. of CSE, IIT Bombay

Prof Ganesh Ramakrishnan, Dept. of CSE, IIT Bombay

Nagesh Karmali, Sr. Manager (Research), Dept. of CSE, IIT Bombay

Duration and Venue

Registration Opens	July 1, 2020
Registration Ends	October 16, 2020
Course Starts	July 15, 2020
Course Ends	November 15, 2020
Total Duration	6 weeks

This course will be conducted in a self-paced mode, i.e. all the lecture videos, slides, reading materials, activities, and graded assignments will be released on when the course starts. This gives you the flexibility of progressing and completing the graded assignments at your own pace. However, but one would need to complete them before the course ends.

Who Should Attend

Concepts, as covered in the Object-Oriented Programming course and Foundations of Data Structures course, are prerequisites of this course.

Course Fee and Certification

The registration fee for the course is **Rs. 475/-**. However, register before **16 August 2020** for **Rs. 375/-** only to avail an early bird registration discount. Please note that the registration fee once paid is neither refundable nor adjustable under any circumstances.

Important payment instructions:

In case of a course fee transaction failure, the participant will get an auto generated mail with instructions for further process. Please go through the mail carefully. If the amount is already debited to your account, please do not make another payment. In case of a double payment (or more than once), please send a mail to dbpaccounts@cse.iitb.ac.in requesting for a refund. The participant will also have to check the following link for his/her vendor creation in order to get a refund. IIT Bombay will not be able to process

the refund (for any reason) if the vendor creation, as per IIT Bombay's requirement, is not completed by the participant. **Link**:- https://portal.iitb.ac.in/vrp/index.jsp

Honor Code Certificates will be issued on successful completion of the course based on the grading policy mentioned in the course. Please note that all certificates will be issued online. No hard copies will be given.

How to Apply

Enrollment will be strictly online, and no other mode of application will be entertained. The online registration for the course will start on **1 July 2020**. It will remain open till **16 October 2020**.

Registration process for the Program:

- Sign up using your valid email id on the website: https://www.it.iitb.ac.in/lakshya/signup.html
- After verification, your account will be created
- Login on the website with the verified account
- Go to Announcements, select the program and register
- After successful registration, you will receive an automated email. Your name will be listed in the "**List of Participants page"**
- Thereafter register on IITBombayX site (https://courses.iitbombayx.in/register) using the same email id to access the course content

Note

The course content is released under Open Source License. All participants must agree that the content contributed by them in any form, (assignments, questions, etc.) would be released under Open Source Licence, by accepting the terms mentioned under 'No Objection Certificate'. All contributors will be acknowledged.