Course Out

Data Structure

28 Mar 2024

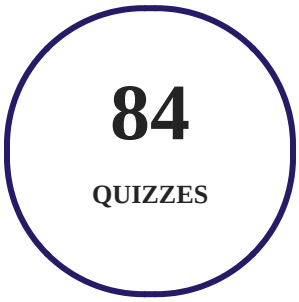
Contents

1. Exercises

There is no limit to the number of times learners can attempt these. Exercises come with detailed remediation, which ensures that learners are confident on the topic before proceeding.

2. Quizzes

Quizzes test your knowledge on the topics of the exam when you go through the course material. There is no limit to the number of times you can attempt it.



3. Expert Instructor-Led Training

uCertify uses the content from the finest publishers and only the IT industry's finest instructors. They have a minimum of 15 years real-world experience and are subject matter experts in their fields. Unlike a live class, you can study at your own pace. This creates a personal learning experience and gives you all the benefit of hands-on training with the flexibility of doing it around your schedule 24/7.

4. ADA Compliant & JAWS Compatible Platform

uCertify course and labs are ADA (Americans with Disability Act) compliant. It is now more accessible to students with features such as:

- Change the font, size, and color of the content of the course
- Text-to-speech, reads the text into spoken words
- Interactive videos, how-tos videos come with transcripts and voice-over
- Interactive transcripts, each word is clickable. Students can clip a specific part of the video by clicking on a word or a portion of the text.

JAWS (Job Access with Speech) is a computer screen reader program for Microsoft Windows that reads the screen either with a text-to-speech output or by a Refreshable Braille display. Student can easily navigate uCertify course using JAWS shortcut keys.

5. State of the Art Educator Tools

uCertify knows the importance of instructors and provide tools to help them do their job effectively. Instructors are able to clone and customize course. Do ability grouping. Create sections. Design grade scale and grade formula. Create and schedule assessments. Educators can also move a student from self-paced to mentor-guided to instructor-led mode in three clicks.

6. Award Winning Learning Platform (LMS)

uCertify has developed an award winning, highly interactive yet simple to use platform. The SIIA CODiE Awards is the only peer-reviewed program to showcase business and education technology's finest products and services. Since 1986, thousands of products, services and solutions have been

recognized for achieving excellence. uCertify has won CODiE awards consecutively for last 7 years:

- **2014**
    1. Best Postsecondary Learning Solution

- **2015**
    1. Best Education Solution
    2. Best Virtual Learning Solution
    3. Best Student Assessment Solution
    4. Best Postsecondary Learning Solution
    5. Best Career and Workforce Readiness Solution
    6. Best Instructional Solution in Other Curriculum Areas
    7. Best Corporate Learning/Workforce Development Solution

- **2016**
    1. Best Virtual Learning Solution
    2. Best Education Cloud-based Solution
    3. Best College and Career Readiness Solution
    4. Best Corporate / Workforce Learning Solution
    5. Best Postsecondary Learning Content Solution
    6. Best Postsecondary LMS or Learning Platform
    7. Best Learning Relationship Management Solution

- **2017**
    1. Best Overall Education Solution
    2. Best Student Assessment Solution
    3. Best Corporate/Workforce Learning Solution
    4. Best Higher Education LMS or Learning Platform

- **2018**
    1. Best Higher Education LMS or Learning Platform

2. Best Instructional Solution in Other Curriculum Areas
3. Best Learning Relationship Management Solution

- **2019**
  1. Best Virtual Learning Solution
  2. Best Content Authoring Development or Curation Solution
  3. Best Higher Education Learning Management Solution (LMS)

- **2020**
  1. Best College and Career Readiness Solution
  2. Best Cross-Curricular Solution
  3. Best Virtual Learning Solution

7. Chapter & Lessons

uCertify brings these textbooks to life. It is full of interactive activities that keeps the learner engaged. uCertify brings all available learning resources for a topic in one place so that the learner can efficiently learn without going to multiple places. Challenge questions are also embedded in the chapters so learners can attempt those while they are learning about that particular topic. This helps them grasp the concepts better because they can go over it again right away which improves learning.

Learners can do Flashcards, Exercises, Quizzes and Labs related to each chapter. At the end of every lesson, uCertify courses guide the learners on the path they should follow.

Syllabus

Chapter 1: Abstract Data Types and Sequentially Allocated Bags

- The Bag
- Specifying a Bag
- Using the ADT Bag

- Using an ADT Is Like Using a Vending Machine
- Bag Implementations That Use Arrays
- Using a Fixed-Size Array to Implement the ADT Bag
- The Pros and Cons of Using an Array to Implement the ADT Bag

Chapter 2: Implementing Bags with Linked Allocation

- A Bag Implementation That Links Data
- Linked Data
- A Linked Implementation of the ADT Bag
- Removing an Item from a Linked Chain
- A Class Node That Has Set and Get Methods
- The Pros and Cons of Using a Chain to Implement the ADT Bag

Chapter 3: Introduction to Analysis of Algorithms

- The Efficiency of Algorithms
- Motivation
- Measuring an Algorithm's Efficiency
- Picturing Efficiency
- The Efficiency of Implementations of the ADT Bag

Chapter 4: Stacks

- Stacks
- Specifications of the ADT Stack
- Using a Stack to Process Algebraic Expressions
- Stack Implementations
- A Linked Implementation
- An Array-Based Implementation

Chapter 5: Queues

- Queues, Deques, and Priority Queues
- The ADT Queue
- Queue, Deque, and Priority Queue Implementations
- A Linked Implementation of a Queue
- An Array-Based Implementation of a Queue

Chapter 6: Deques

- The ADT Deque
- A Doubly Linked Implementation of a Deque

Chapter 7: Lists

- Lists
- Specifications for the ADT List
- Using the ADT List
- List Implementations That Use Arrays
- Using an Array to Implement the ADT List
- Operations on a Chain of Linked Nodes
- Beginning the Implementation
- Continuing the Implementation
- A Refined Implementation
- The Efficiency of Using a Chain to Implement the ADT List

Chapter 8: Basic Sorting Algorithms

- An Introduction to Sorting
- Organizing Java Methods That Sort an Array
- Selection Sort
- Insertion Sort

Chapter 9: Faster Sorting Algorithms

- Faster Sorting Methods

- Merge Sort
- Quick Sort
- Radix Sort

Chapter 10: Sorted Lists

- Specifications for the ADT Sorted List
- A Linked Implementation

Chapter 11: Searching a List

- Searching
- The Problem
- Searching an Unsorted Array
- Searching a Sorted Array
- Searching an Unsorted Chain
- Searching a Sorted Chain
- Choosing a Search Method

Chapter 12: Dictionary as an Associative ADT

- Dictionaries

- Specifications for the ADT Dictionary
- Using the ADT Dictionary

Chapter 13: Sequential Hash Tables

- Introducing Hashing
- What Is Hashing?
- Hash Functions
- Resolving Collisions

Chapter 14: Bucket Hashing

Chapter 15: Introduction to Trees

- Tree Concepts
- Traversals of a Tree
- Examples of Binary Trees
- Examples of General Trees

Chapter 16: Implementation of Binary Trees

- An Implementation of the ADT Binary Tree

Chapter 17: Binary Search Trees

- Getting Started
- Searching and Retrieving
- Traversing
- Adding an Entry
- Removing an Entry
- The Efficiency of Operations
- An Implementation of the ADT Dictionary

Chapter 18: Appendix A Java Essentials

- Introduction
- Java Basics
- Simple Input and Output Using the Keyboard and Screen
- The if-else Statement
- The switch Statement
- Enumerations
- Scope
- Loops
- The Class String

- The Class StringBuilder
- Using Scanner to Extract Pieces of a String
- Arrays
- Wrapper Classes

Chapter 19: Appendix B Java Classes

- Objects and Classes
- Using the Methods in a Java Class
- Defining a Java Class
- Enumeration as a Class
- Packages
- Generic Data Types

Chapter 20: Appendix C Creating Classes from Other Classes

- Composition
- Inheritance
- Type Compatibility and Superclasses
- Polymorphism

Chapter 21: Appendix D Designing Classes

- Encapsulation
- Specifying Methods
- Java Interfaces
- Choosing Classes
- Reusing Classes

Chapter 22: Appendix E Handling Exceptions

- The Basics
- Handling an Exception
- Throwing an Exception
- Programmer-Defined Exception Classes
- Inheritance and Exceptions
- The finally Block

Chapter 23: Appendix F File Input and Output

- Preliminaries
- Text Files
- Binary Files

Chapter 24: Appendix G Documentation and Programming Style

- Naming Variables and Classes
- Indenting
- Comments

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