

Teaching Dossier

Faria Nishat Khan

Lecturer

Department of Computer Science and Engineering

Faculty of Science and Information Technology

Daffodil International University

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Curriculum Vitae

Personal Information

Faria Nishat Khan

Lecturer, Department of Computer Science and Engineering &
Daffodil International University
Daffodil Smart City, DSC.
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Cell No: 01723444424

Education

Degree/Certificate	Institution	Result	Passing Year
B.Sc in CSE	Daffodil International University	3.74 out of 4.00	2021
HSC	Abdul Kadir Mollah City College	5.00 out of 5.00	2016
SSC	Motijheel Government Girls' High School	5.00 out of 5.00	2014

Professional Experiences

1. Lecturer, Department of Computer Science and Engineering at Daffodil International University, Jan, 2022-Present.
2. Teaching Assistant and Teaching Apprentice Fellow, Department of Computer Science and Engineering at Daffodil International University, Feb, 2021- Dec, 2021.

Awards and Honors

1. Certification in recognition of Scholarly Publication in Reputed Indexed Conferences & Journals by Daffodil International University (2022).

TEACHING

Teaching Experiences

Lecturer, Department of Computer Science and Engineering at Daffodil International University.

Teaching Responsibility at DIU

- | | |
|------------|---|
| 1. CSE 123 | Data Structure. |
| 2. CSE 124 | Data Structure Lab. |
| 3. CSE 321 | Data Mining and Machine Learning |
| 4. CSE 115 | Introduction to Biology and Chemistry for Computation |

TEACHING WORKSHOP AND TRAININGS

2024

1. Unlocking AI Potential Tools for Effective Teaching & Research
2. Capacity Development Training- How to Make a Perfect Online Course for students
3. Workshop on “Process of Final Year Defense Project (FYDP)”
4. Workshop on “Hands-on Introduction to Quantum Computing”
5. Workshop on Complex Engineering Problem in FYDP
6. Training session on 'Towards Excellence in Educational Leadership’

7. Workshop on “Generative AI”
8. Seminar on "How Effectively You Can Write a Q1 Journal Paper"
9. Workshop on “Spirit of Computing”
10. Workshop “Transformation of Real–World Problems to Graph–Theoretic Problems”

2023

1. Research Talk: Enhancing Research Ideas & Gap Findings
2. Workshop on "Patent Filing and Application”
3. AI-Enhanced Teacher Training Program by HRDI
4. Seminar on “Recent Research Trends for Academics & Students”
5. Conversational Sharing on Teaching and Research Excellence at Daffodil International University
6. Seminar on Brain-Computer Interaction (BCI)
7. Workshop on “Writing Effective Course Outcome (CO)
8. Workshop on “Effective CO/PO Mapping
9. OBE Implementation Workshops - CSE
10. Effective Mapping of PO/PEO

2022

1. Teacher Training :MI Theory and Lesson Plan
Human Resource Development Institute (HRDI)
2. Alternative assessments for Inclusive Learners
Human Resource Development Institute (HRDI)
3. Research Methodology
Human Resource Development Institute (HRDI)
4. How to Make Teaching Visible
Human Resource Development Institute (HRDI)
5. Teacher's Training: Learner Centric Classroom
Human Resource Development Institute (HRDI)
6. Faculty Development Program of OBE Practices
Department of Computer Science and Engineering
Daffodil International University
7. Teacher Training for DIU Newly recruited teachers organized by Human Resource Development Institute (HRDI)
Making Interactive Video Lessons and Creating an Online Course
Doers Bootcamp
Learner Centric Classroom

2020-2021

1. Personal & Professional Development – Ownership
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
2. Leadership Development Training Program – Dec, 2020 - Jan, 2021
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
3. Personal & Professional Development – Ownership
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
4. Personal & Professional Development – Growth Mindset
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
5. Personal & Professional Development – Different Teaching Learning Approach
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
6. Personal & Professional Development – Alternative Assessments
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
7. Personal & Professional Development – Classroom engagements and interactivity in the virtual medium
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
8. Personal & Professional Development – Preparing Winning Pitch
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
9. Personal & Professional Development – Social Innovation Projects and Design Thinking
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
10. Personal & Professional Development – Action Research and Advocacy on SIP
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
11. Personal & Professional Development – Classroom Managements Skill
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
12. Personal & Professional Development – Low-Cost Classroom Material Design
Teaching Apprentice Fellowship (TAF)
Human Resource Development Institute (HRDI)
13. Workshop on "Digital Citizenship"
Dnet
Human Resource Development Institute (HRDI)

RESEARCH

Research interest

1. Data Mining
2. Machine Learning
3. Deep Learning
4. Health Informatics

Research Publication

Peer Reviewed Research Publication

1. **Faria Nishat Khan, S. Rakesh Uddin, Y. Arafat Shampod and A. Sattar, "The Impact of Corona Pandemic on the E-Commerce Industry Using Data Mining,"** 2021 5th International Conference on Computing Methodologies and Communication (ICCMC), 2021, pp. 1755-1761, doi: 10.1109/ICCMC51019.2021.9418369. (Scopus Indexed Publication).

SKILLS AND QUALIFICATIONS

Major Academic Courses	Programming and Software Proficiencies	Linguistic Proficiencies
Computer Fundamentals Programming and Problem Solving Data Structures Object Oriented Programming Algorithms	<i>Programming Language:</i> C, JAVA, XML, HTML,CSS, PHP.	English (Listening, Speaking, Reading, Writing) IELTS: 8 2024-2026

Microprocessor and Assembly Language	<i>Microsoft Office:</i>	
Database Management System	Word, PowerPoint, Excel	
Computer Organization and Architecture		Bangla
Computer Networks	<i>Development Tools:</i>	(Listening, Speaking, Reading, Writing)
Computer Graphics	Visual studio,	
Software Engineering	Android Studio	
System Analysis and Design	Hadoop	
Artificial Intelligence		
Software Engineering		
Simulation Modeling		
Data Communication		
Statistics and Probability		
Embedded System		

ACADEMIC PROJECTS

1. Project title: Restaurant Management System
Project Type: Desktop Application
Role: Designer, developer and programmer.
Tools and Technology used: Java
2. Project title: 0/1 Knapsack
Project Type: Web Application
Role: Designer, developer and programmer.
Tools and Technology used: PHP, html and CSS
3. Project title: Root Level Online Newspaper
Project Type: Web Application
Role: Designer, developer and programmer.
Tools and Technology used: PHP, html and CSS, mysql

4. Project title: District Based live Corona Update
Project Type: Web Application
Role: Designer, developer and programmer.
Tools and Technology used: Php, javascript, mysql
5. Project title: Android Application “First to Aid”
Project Type: Android Application
Role: Designer, developer and programmer.
Tools and Technology used: Android Studio
6. Project title: Android Application on Cat breed
Project Type: Android Application
Role: Designer, developer and programmer.
Tools and Technology used: Android Studio

SERVICES

Current Services at DIU

1. Convener, DIU Girls Computer Programming Club - GCPC
2. Member, DIU 4IR Research Cell
3. Member, DIU NLP & ML Research Lab

Teaching Philosophy

2. TEACHING PHILOSOPHY

Education is the most powerful weapon which you can use to change the world.

- Nelson Mandela

When I first read this quotation, I couldn't stop thinking about the greatness of being a teacher. In this world of fakery and trickery the only thing that can bring peace and creativity is education. And the man with the torch here is a teacher. Only a teacher knows how to mend the minds of young minds that will change the world.

I am a very passionate person with a dream to learn forever. I learn because I love to learn. The motivation behind my interest to be a teacher is to plant the seed of love towards study into young minds and also learn more. My teaching philosophy is "Learn together".

Nobody can know everything. Teachers are not any different than this. Then the question arises, "If teachers don't know it all then why are they there for?" Teachers are there to show the right path to learn more if not all. They are there to guide through the path of betterment.

I believe teaching is an art, where teachers get to shape the young minds of their students into great art pieces that will amaze the whole world.

Professional Knowledge

- Knowing the students and how they learn
- Knowing the content and how to teach it

Professional Practice

- Planning for and implementing effective teaching and learning
- Creating and maintaining supportive and safe learning environments
- Assessing, providing feedback and reporting on student learning

Professional Engagement

- Engaging in Professional learning
- Engaging professionally with colleagues, parents/carers and the community

Teaching Approach

Constructive view: I believe every student is different and their learning process is different. According to MI theory, People have 8 types of intelligence. They may learn in 8 different ways. I try to bring it all on the table as an option so they feel comfortable to learn. Learning in their own way might increase their interest in the content. This is something I count on. Language is not a barrier in my class. I encourage my students to speak English as our curriculum supports but I also appreciate speaking Bangla as long as it confirms their learning.

Problem based learning:

I like to present a visual in front of my students. Sometimes it's a physical form or sometimes as a real life example. I believe it helps them to be familiar with the scenario, identify the problem, analyze it, set requirements and finally go ahead to the path to solve it. Visual representation of references and real life examples help the students to connect with the lecture on a personal level and that ensures their attentiveness towards the lecture on a great level.

I extensively use real life personalized examples in my lectures, because, I believe, posing real-life example problems and gradually guiding the students towards a complete solution provides a very useful tool for learning the underlying rules as well as creating high motivation for learning. In any case, I accept that the well-understood concepts have to be displayed to the understudies somehow, other than letting them build their possessive information through problem tackling. This helped students to think of the underlying rules present in the example and create a mental picture of the technique. Then I presented the technique formally, which allows the students to reinforce or rectify the mental picture they have already built. At this point, to further evaluate their own understanding, I usually ask the students to solve more problems using the new programming structure.

Action Based Learning:

I believe Traditional simplex learning system where the teacher just gives a lecture from the front and students just sit and take notes is not fitted for 21st century students any more. The world is advanced, the lecture material is advanced, why be caged in the traditional teaching learning methods? I encourage my students to move around and enjoy the process of learning with me. I design activities that connect to my lecture topic and let my students play around the class. They play, take action, enjoy the class and I ensure their proper learning in the process. This method allows me to banish monotony and boredom from the class and make learning a happy and fun process for students.

Errors as an integral part of learning:

I like when Students make mistakes, because if a student makes a mistake that means that student is learning and I use the opportunity to make sure the learning is complete and flawless. Students in my class are not afraid to make mistakes as I celebrate mistakes as well as perfections so the concept of mistake counts as an opportunity to be perfect only.

Course Description

3. Course Description

The course is designed to provide students with a solid foundation in the principles, implementation, and applications of data structures in computer science. The course will cover both theoretical concepts and practical techniques for organizing and managing data efficiently. Students will explore a variety of data structures, understand their underlying algorithms, and evaluate their performance in terms of time and space complexity.

Throughout the course, students will develop problem-solving skills by implementing and applying data structures in different programming scenarios. This course will emphasize both abstract thinking and concrete programming skills, preparing students for advanced topics in computer science and software engineering.

Course Syllabus

4. Course Syllabus

Course Code	: CSE123	
Course Title	: Data Structure	
Program	: B.Sc. in CSE	
Faculty	: Faculty of Science and Information Technology(FSIT)	
Semester	: Spring	Year: 2024
Credit	: 2.0	Contact Hour: 2.5
Course Level	: Level 1 Term 3	Prerequisite: CSE112
Course Category	: Core Engineering	
Instructor Name	: Faria Nishat Khan	
Designation	: Lecturer	
Email	: farianishat.cse@diu.edu.bd	
Office Time	: Saturday to Wednesday (Time: 08:00 am to 06:00 pm BDT)	
Office Address	: Room 505, Knowledge Tower, Daffodil Smart City, Ashulia, Dhaka.	

Class Schedule

1st Class :

Day : Monday
Time : 12:15 pm to 01:30 pm
Room : 208 KT

2nd Class:

Day : Tuesday
Time: : 2:45 pm to 04:00 pm
Room : 304 KT

4.1 Course Rationale

The main goal of this course is to provide students with a solid background in information data structures through a combination of theory and practice. It introduces the vital logical and design considerations addressed during system and application software development.

4.2 Course Objective

Upon completion of the course, students are expected to be able to:

1. To introduce the fundamental concept of data structures including link-list
2. To emphasize the importance of data structures in implementing the algorithms
3. To develop effective skills in the implementation of data structure

4.3 Course Learning Outcomes (CO's)

CO1	Able to explain implementation and operations of basic data structures: Linked list, stack, queue, tree and graph
CO2	Able to apply programming techniques using pointers, dynamic memory allocation and structures to implement data structures: stack, queue, tree and graph
CO3	Able to design and implement new abstract data using linked list, stack, queue, tree and graph with the help of programming implementations

4.4 Program Outcomes (PO's): Program Outcomes are reported in Appendix-I.

CO-PO Mapping

	CO1	CO2	CO3	CO4	CO5
PO1: Engineering knowledge	✓				
PO2: Problem analysis					
PO3: Design/development of solutions			✓		
PO4: Investigation					
PO5: Modern tool usage		✓			
PO6: The engineer and society					
PO7: Environment and sustainability					
PO8: Ethics					
PO9: Individual work and teamwork					
PO10: Communication					
PO11: Project management and finance					
PO12: Life-long learning					

4.5 CO Assessment Scheme

Assessment Task	CO's			Mark (Total=100)
	CO1	CO2	CO3	
Attendance	--	--	--	7
Class Test (CT1, CT2, CT3)	--	--	--	15
Assignment	--	--	--	5
Presentation	--	--	--	8
Midterm Examination	2	23	0	25
Semester Final Examination	17	18	5	40
Total Mark	19	41	5	100

4.6 Methods of Assessment:

Direct:

1. Written exams
2. Written Assignment problem sets/Quizzes
3. Written reviews of scholarly articles
4. Viva

Indirect:

1. Class participations
2. Peer-reviewed presentations

4.7 Strategies and approaches to learning

Teaching and Learning Activities (TLA)

TLA1	Lectures twice a week using multimedia of different topics.
TLA2	Active discussion in class regarding efficient solving of the logical and mathematical problems.
TLA3	Group discussion and presentation regarding diverse problems and corresponding lectures.
TLA4	Evaluation of class performances to reach each student in a class for every topic.

4.8 Course Schedule and Structure

4.8.1. Textbook

- a. Data Structures and Algorithm Analysis in C by Mark Allen Weiss
- b. Principles of Data Structures by Pande

4.8.2. Reference Books

1. Google drive repository
2. Other online resources

4.8 Course Plan/Lesson Plan

Week	Lesson.	Topic	Teaching and Learning Activities (TLAi)	Textbook & Video Reference	Related CO's
1	Les. 1	Introduction and importance of Data Structure in computing; Applications	TLA1	Mark Allen Weiss	CO1
	Les. 2	Review discussion on recursion, pointer, structure, self-referential structure; dynamic memory allocation	TLA1, TLA2	Mark Allen Weiss	CO1
2	Les. 3	a. Computational Complexity and exercises b. Self-referential structure application for	TLA1, TLA2	Mark Allen Weiss	CO2
	Les. 4	Exercise on visualization of data node Course Project Team creation		Mark Allen Weiss	CO3
3		(Class Test – 1, Assignment – 1)			
	Les. 5	Link-List and operations on link list	TLA3	Mark Allen Weiss	CO1, CO2
	Les. 6	Project Discussion and execution plan	TLA2, TLA3	Mark Allen Weiss	CO3
4	Les. 7	Review operations on Link list and applications	TLA1, TLA2	Mark Allen Weiss	CO2
	Les. 8	Discussion on Stack data	TLA2,	Mark Allen	CO3

		structure	TLA3	Weiss	
5		(Class Test – 2)			
	Les. 9	a. Application of stack in processing expressions	TLA2, TLA3	Mark Allen Weiss	CO2, CO3
	Les. 10	b. Discussion on Queue data structure	TLA3	Mark Allen Weiss	CO2, CO3
6	Les. 11	a. Discussion on Queue and applications	TLA1, TLA3	Mark Allen Weiss	CO2, CO3
	Les. 12	c. Exercise for expression processing d. Review discussion	TLA3	Mark Allen Weiss	CO2, CO3
(MID-TERM EXAM)					
7	Les. 13	a. Discussion on Tree data structure	TLA1, TLA3	Mark Allen Weiss	CO1, CO3
	Les. 14	b. Tree traversals and applications	TLA3	Mark Allen Weiss	CO3
8	Les. 15	BST and operations on BST and AVL	TLA1, TLA4	Mark Allen Weiss	CO1, CO3
	Les. 16	b. Applications of BST and AVL	TLA1, TLA4	Mark Allen Weiss	CO1, CO3
9	Les. 17	a. HEAP data structure and applications of Heap.	TLA1, TLA3	Mark Allen Weiss	CO1, CO3
	Les. 18	b. Exercise on BST and Heap	TLA3	Mark Allen Weiss	CO3
10		(Class Test-3, Assignment – 2)			
	Les. 19	a. Graph data structure and applications of graph	TLA1, TLA4	Mark Allen Weiss	CO
	Les. 20	b. Traversal of Graph	TLA1, TLA4	Mark Allen Weiss	CO3

11	Les. 21	Review exercises on Tree, BST, Heap and Graph	TLA1, TLA4	Mark Allen Weiss	CO2, CO3
	Les. 22	Review exercises on Tree, BST, Heap and Graph	TLA1, TLA4	Mark Allen Weiss	CO2, CO3
(FINAL EXAM)					

4.9 Grading System

Numerical Grade	Letter Grade	Grade Point
80-100	A+	4.00
75-79	A	3.75
70-74	A-	3.50
65-69	B+	3.25
60-64	B	3.00
55-59	B-	2.75
50-54	C+	2.50
45-49	C	2.25
40-44	D	2.00
Less than 40	F	0.00

4.10 Additional Support for Students

- Student Portal:
<http://studentportal.diu.edu.bd/>
- Academic Guidelines
<https://daffodilvarsity.edu.bd/article/academic-guidelines>
- Rules and Regulations of DIU
<https://daffodilvarsity.edu.bd/article/rules-and-regulation>
- Career Development Center:
<https://cdc.daffodilvarsity.edu.bd/>

- For general queries:

<http://daffodilvarsity.edu.bd/>

4.11 Program Outcomes and Assessment

Program Outcomes (POs) are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills and attitudes that students acquire while progressing through the program. The BAETE specifically requires that students acquire the following graduate attributes.

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

(PO2: Problem analysis: Identify, formulate, research the literature and analyze complex engineering problems and reach substantiated conclusions using first principles of mathematics, the natural sciences and the engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety as well as cultural, societal and environmental concerns.

PO4: Investigation: Conduct investigations of complex problems, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

PO5: Modern tool usage: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

PO7: Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics, responsibilities and the norms of the engineering practice.

PO9: Individual work and teamwork: Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings.

PO10: Communication: Communicate effectively about complex engineering activities with the engineering community and with society at large. Be able to comprehend and write effective

reports, design documentation, make effective presentations and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member or a leader of a team to manage projects in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.

Sample Powerpoint Lecture

5.Sample Powerpoint Lecture

Course : Data Structure

Chapter 4 : Introduction to Trees

Textbook & Video Reference : Data Structures and Algorithm Analysis in C by Mark Allen Weiss

Learning Goal :

1. What is a Tree?
2. Tree terminology
3. Why trees?
4. General Trees and their implementation
5. N-ary Trees
6. N-ary Trees implementation
7. Implementing trees
8. Binary trees
9. Binary trees implementation
10. Application of Binary trees

Sample Slide Link [L7-IntroductionToTreesBLC.ppt](#)

Sample Quiz

11. Sample Quiz

This sample quiz was conducted on the H5P online platform.

Time: 15 Minutes

Marks: 15

Quiz Instructions:

- Each right answer carries 1 mark(s) & wrong answer carries - 0 mark(s).
- No mark will be deducted for unanswered questions.
- Though immense care has been taken while publishing this test, still if you face any subject/language/format/technical error, you are requested to notify me. Your small gesture will help us give more value to other students.

Question 1.

What is the process of visiting all the nodes of a binary tree in a specific order called?

- A. node exploration
- B. tree traversal
- C. tree navigation
- D. binary search

Question 2. Which traversal visits the left subtree, then the root, and finally the right subtree?

- A. Breadth-first traversal
- B. Preorder traversal
- C. Postorder traversal

D. Inorder traversal

Question 3. What is the property of a min heap where the value of each node is greater than or equal to the value of its parent?

- A. Binary tree property
- B. Heap property
- C. Priority queue property
- D. Max heap property

Question 4. What is the property of a min heap where the value of each node is greater than or equal to the value of its parent?

- A. Binary tree property
- B. Heap property
- C. Priority queue property
- D. Max heap property

Question 5. What is a data structure that stores items in a way that searching, insertion, and deletion can be performed efficiently?

- A. Random assortment
- B. Chaotic organization
- C. Alphabet
- D. Data structure

Question 6. Please mark the words of a good feasibility study.

What is the process of visiting all the nodes of a binary tree in a specific order called?

- A. tree traversal
- B. node exploration
- C. binary search
- D. tree navigation

Question 7. Which traversal visits the left subtree, then the root, and finally the right subtree?

- A. Preorder traversal
- B. Postorder traversal
- C. Breadth-first traversal
- D. Inorder traversal

Question 8. What is the property of a min heap where the value of each node is greater than or equal to the value of its parent?

- A. Max Heap Property
- B. Descending Heap Property
- C. Min Heap Property
- D. Ascending Heap Property

Question 9. What is the height-balanced binary search tree called?

- A. AVL tree
- B. B-tree
- C. Red-black tree
- D. Binary heap

Question 10. What is the process of visiting all the nodes of a binary tree in a specific order called?

- A. tree traversal
- B. node exploration
- C. binary search
- D. tree navigation

Question 11. What is the property of a tree where the value of each node is less than or equal to the value of its parent?

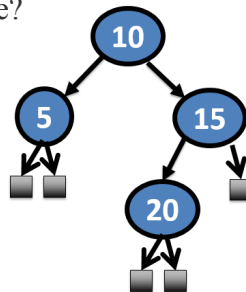
- A. Ascending Heap Property
- B. Max Heap Property
- C. Descending Heap Property
- D. Min Heap Property

Question 12. What is the process of inserting a new element into a heap called?

- A. Heap expansion
- B. Heap addition
- C. Heap insertion
- D. Heap growth

Question 13. Is the following tree an AVL tree?

- A. No
- B. Yes



Question 14. What is the worst-case height of an AVL tree?

- A. $O(\log n)$
- B. $O(1)$
- C. $O(n \log n)$
- D. $O(n)$

Question 15. Which of the following is a double rotation

- A. RL rotation
- B. LL rotation
- C. RR rotation
- D. None

Sample Examination

7. Sample Examination

Here attached some images of the scripts of one of the students of the sample quiz.

QUIZIZZ

Quiz : Quiz 3 - 61_P

Date : Mon Nov 27 2023 6:01 PM

Student : 221-15-5829 (221-15-5829)

Accuracy
73%

Total Questions

✓ Correct

✗ Incorrect

15

11

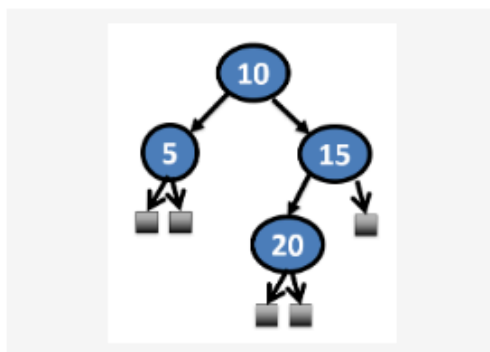
4

No.	Question	Time	Points	Response
1	What is the process of visiting all the nodes of a binary tree in a specific order called?	23	1	✓ tree traversal
2	Which traversal visits the left subtree, then the root, and finally the right subtree?	27	0	✗ Breadth-first traversal
3	What is the property of a min heap where the value of each node is greater than or equal to the value of its parent?	28	1	✓ Heap property
4	What is the height-balanced binary search tree called?	16	1	✓ AVL tree
5	What is a data structure that stores items in a way that searching, insertion, and deletion can be performed efficiently?	12	1	✓ data structure
6	What is the process of visiting all the nodes of a binary tree in a specific order called?	17	1	✓ tree traversal

7	Which traversal visits the left subtree, then the root, and finally the right subtree?	27	0	✗ Breadth-first traversal
8	What is the property of a min heap where the value of each node is greater than or equal to the value of its parent?	24	1	✓ Min Heap Property
9	What is the height-balanced binary search tree called?	13	1	✓ AVL tree
10	What is a data structure that stores items in a way that searching, insertion, and deletion can be performed efficiently?	29	1	✓ data structure
11	What is the property of a tree where the value of each node is less than or equal to the value of its parent?	28	0	✗ Min Heap Property
12	What is the process of inserting a new element into a heap called?	8	1	✓ Heap insertion
13	Is the following tree an AVL tree?	11	0	✗ yes
14	What is the worst-case height of an AVL tree?	9	1	✓ $O(\log n)$
15	Which of the following is a double rotation	17	1	✓ RL rotation

Appendix - Images

13.



Is the following tree an AVL tree?

Sample Pre-test Question and Analysis

8. Sample Pre Test

Pretest Exam.

Systems Data Structure

Time: 15 Minutes

Marks: 15

Exam Instructions:

1. Each right answer carries 1 mark(s) & wrong answer carries - 0 mark(s).
2. No mark will be deducted for unanswered questions.
3. Though immense care has been taken while publishing this test, still if you face any subject/language/format/technical error, you are requested to notify me. Your small gesture will help us give more value to other students.

Note: This test is strictly designed for pretest purposes only.

It is not indicative of the level of difficulty nor coverage for your in-class exam.

Make up Quiz - 61_P

Total questions: 15

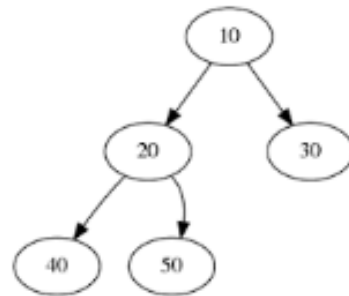
Worksheet time: 13mins

Instructor name: Faria Khan

Name

Class

Date



1.

In Order traversal

- | | |
|-------------------|-------------------|
| a) 40 20 50 10 30 | b) 50 40 20 30 10 |
| c) 10 20 30 40 50 | d) 40 50 20 30 10 |

2. What is the worst-case runtime of lookUp/get in a binary search tree?

- | | |
|----------------|-------------|
| a) $O(n)$ | b) $O(1)$ |
| c) $O(\log n)$ | d) $O(n^2)$ |

3. In a ____, for any node 'n' every descendant node's value in the left subtree is less than n and in the right subtree is greater than n.

- | | |
|-----------------------|----------------|
| a) Binary Heap Tree | b) Binary Tree |
| c) Binary Search Tree | d) AVL Tree |

4. The ____ of a Binary Search Tree starts by visiting the current node, then its left child node and then its right child node.

- | | |
|-------------------------|---------------------------|
| a) In-Order Traversal | b) Linear Order Traversal |
| c) Post-Order Traversal | d) Pre-Order Traversal |

5. For an AVL Tree, the ____ is the additional piece of information which indicates if the difference in height between the left and the right subtree is the same or not; which of the two subtrees has one unit larger height.

- | | |
|----------------------|-------------------|
| a) Additional Factor | b) Unit Factor |
| c) Tree Factor | d) Balance Factor |

6. A Binary Tree can have

- a) 0 child
- b) 2 children
- c) 1 child
- d) all of the above

7. Given a sequence of number below:

50,60,40,70,45,55,30,80,65,35,25,75,85

When creating a binary search tree, what is the height of the tree?

- a) 3
- b) 4
- c) 5
- d) 6

8. Root has more left descendants than the right descendants or vice versa.

- a) Balanced Tree
- b) Perfect Tree
- c) Right Tree
- d) Unbalanced Tree

9. What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0.

- a) 3
- b) 4
- c) 2
- d) 5

10. The sequence of insertion 10,12,14 will lead to imbalance by using which rotation can be used to balance the tree

- a) RL rotation
- b) LR rotation
- c) LL rotation
- d) RR rotation

11. Possible Operations on AVL tree

- a) insertion
- b) traversal
- c) deletion
- d) all the above

12. A graph is a collection of nodes, called _____ And line segments called arcs or _____ that connect pair of nodes.

- a) vertices, paths
- b) vertices, edges
- c) graph node, edges
- d) edges, vertices

13. The elements 32, 15, 20, 30, 12, 25, 16 are inserted one by one in the given order into a Max Heap. The resultant Max Heap is.



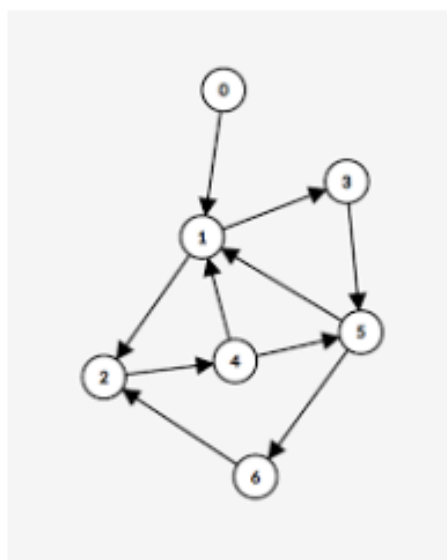
14. Consider a max heap, represented by the array: 40, 30, 20, 10, 15, 16, 17, 8, 4. Now consider that a value 35 is inserted into this heap. After insertion, the new heap is

a) 40, 35, 20, 10, 30, 16, 17, 8, 4, 15

b) 40, 35, 20, 10, 15, 16, 17, 8, 4, 30

c) 40, 30, 20, 10, 35, 16, 17, 8, 4, 15

d) 40, 30, 20, 10, 15, 16, 17, 8, 4, 35



15.

How many in and out degree does node 1 of the given graph has?

a) The in degree of node 1 is 2 and the out degree is 1.

b) The in degree of node 1 is 3 and the out degree is 2.

c) The in degree of node 1 is 0 and the out degree is 0.

d) The in degree of node 1 is 1 and the out degree is 3.

Table 2. Pretest and posttest grades obtained by participating students (50 students): Letter grades

Grade	Pre test Grade count
A+	0
A	0
A-	0
B+	0
B	1
B-	0
C+	1
C	0
C-	0
D	2
F	46

Obtained Mark(%) vs. Students

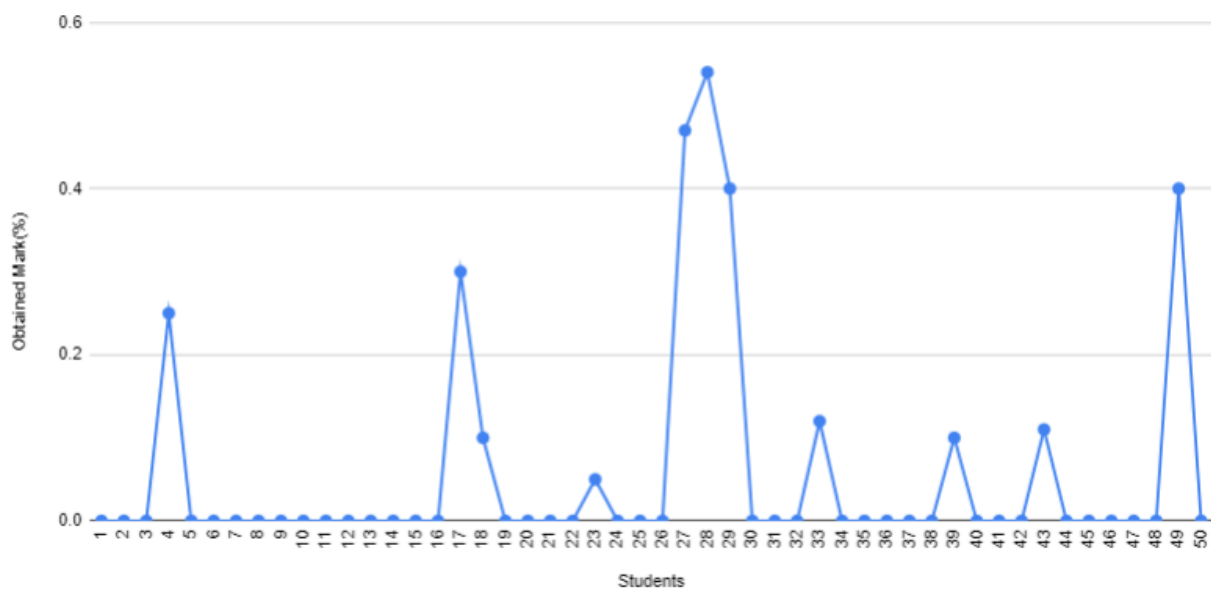


Figure 1: This graph shows the analysis of pre-test score percentage

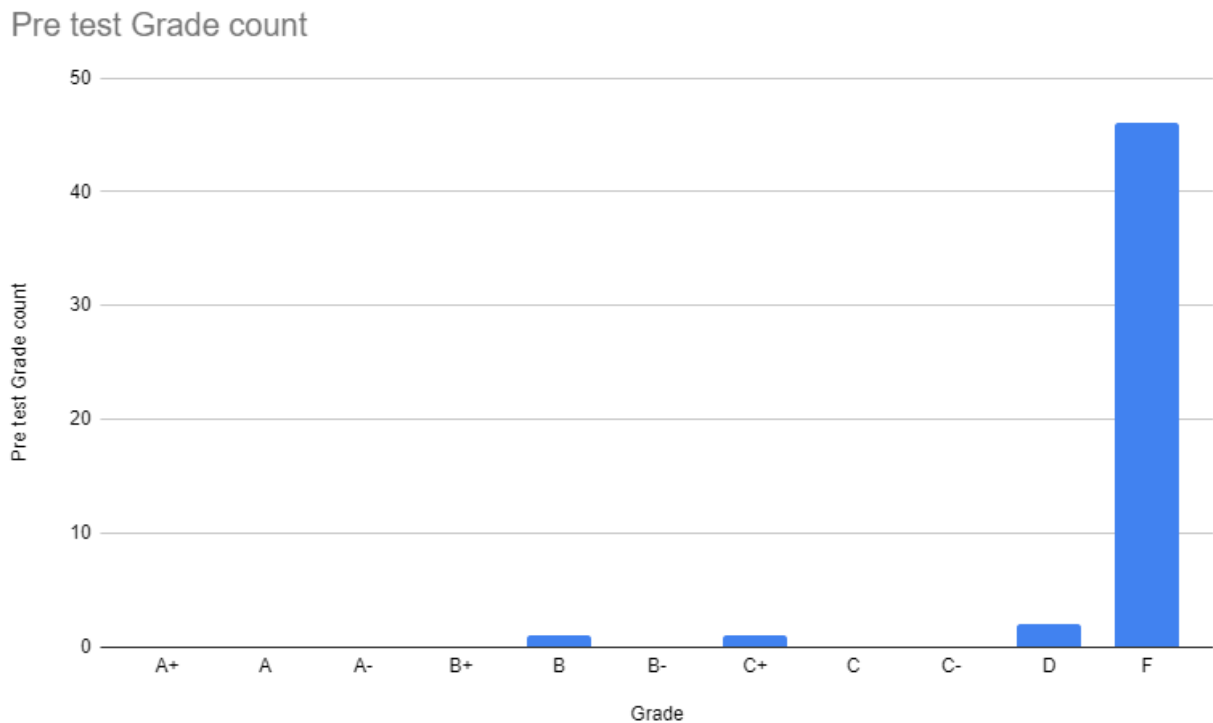


Figure 2: This graph shows the grade count analysis of the pretest score

Summary: Figure 1 and Figure 2 shows that a good number of students obtained very poor marks in pretest. This pretest scores provide evidence which students get lower grades and those graphs actually demonstrated increased or decreased knowledge when answering the pre-test questions. We can say that completing the course resulted in improved performance on the pre-test, and make the inference that completing the course resulted in the desired expected learning.

Sample Post-test Analysis

9. Sample Post-test Exam

Post Exam.

Systems Data Structure

Time: 15 Minutes

Marks: 15

Exam Instructions:

4. Each right answer carries 1 mark(s) & wrong answer carries - 0 mark(s).
5. No mark will be deducted for unanswered questions.
6. Though immense care has been taken while publishing this test, still if you face any subject/language/format/technical error, you are requested to notify me. Your small gesture will help us give more value to other students.

Note: This test is strictly designed for post test purposes only.

It is not indicative of the level of difficulty nor coverage for your in-class exam.

Make up Quiz - 61_P

Total questions: 15

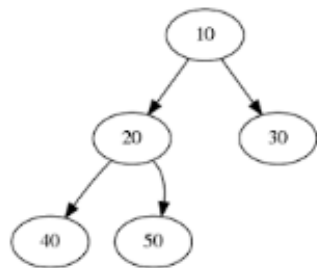
Worksheet time: 13mins

Instructor name: Faria Khan

Name

Class

Date



1.

In Order traversal

- | | |
|-------------------|-------------------|
| a) 40 20 50 10 30 | b) 50 40 20 30 10 |
| c) 10 20 30 40 50 | d) 40 50 20 30 10 |

2. What is the worst-case runtime of lookUp/get in a binary search tree?

- | | |
|----------------|-------------|
| a) $O(n)$ | b) $O(1)$ |
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- | | |
|-----------------------|----------------|
| a) Binary Heap Tree | b) Binary Tree |
| c) Binary Search Tree | d) AVL Tree |

4. The ____ of a Binary Search Tree starts by visiting the current node, then its left child node and then its right child node.

- | | |
|-------------------------|---------------------------|
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| c) Post-Order Traversal | d) Pre-Order Traversal |

5. For an AVL Tree, the ____ is the additional piece of information which indicates if the difference in height between the left and the right subtree is the same or not; which of the two subtrees has one unit larger height.

- | | |
|----------------------|-------------------|
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| c) Tree Factor | d) Balance Factor |

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- a) 0 child
 - b) 2 children
 - c) 1 child
 - d) all of the above
7. Given a sequence of number below:
50,60,40,70,45,55,30,80,65,35,25,75,85
- When creating a binary search tree, what is the height of the tree?
- a) 3
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 - c) 5
 - d) 6
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- a) Balanced Tree
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9. What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0.
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10. The sequence of insertion 10,12,14 will lead to imbalance by using which rotation can be used to balance the tree
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- a) insertion
 - b) traversal
 - c) deletion
 - d) all the above
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 - b) vertices, edges
 - c) graph node, edges
 - d) edges, vertices

13. The elements 32, 15, 20, 30, 12, 25, 16 are inserted one by one in the given order into a Max Heap. The resultant Max Heap is.



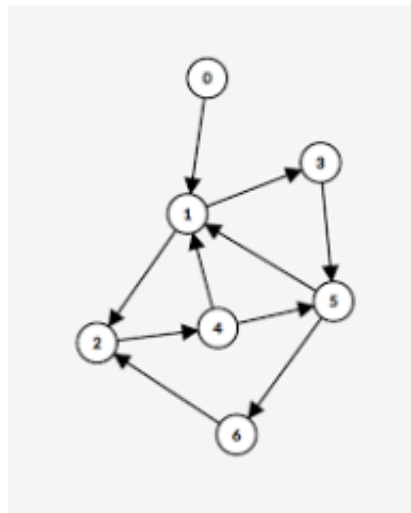
14. Consider a max heap, represented by the array: 40, 30, 20, 10, 15, 16, 17, 8, 4. Now consider that a value 35 is inserted into this heap. After insertion, the new heap is

a) 40, 35, 20, 10, 30, 16, 17, 8, 4, 15

b) 40, 35, 20, 10, 15, 16, 17, 8, 4, 30

c) 40, 30, 20, 10, 35, 16, 17, 8, 4, 15

d) 40, 30, 20, 10, 15, 16, 17, 8, 4, 35



15. How many in and out degree does node 1 of the given graph has?

a) The in degree of node 1 is 2 and the out degree is 1.

b) The in degree of node 1 is 3 and the out degree is 2.

c) The in degree of node 1 is 0 and the out degree is 0.

d) The in degree of node 1 is 1 and the out degree is 3.

Sample analysis of student learning:

Table1. Percentage and grades obtained by participating students (40 students): Question by question.

Name	Post test Score (% of correct answer)	Grade of post test
1	53.33333333	C+
2	60	B
3	46.66666667	C
4	73.33333333	A-
5	73.33333333	A-
6	66.66666667	B+
7	66.66666667	B+
8	46.66666667	C
9	73.33333333	A-
10	53.33333333	C+
11	40	D
12	66.66666667	B+
13	40	D
14	0	F
15	66.66666667	B+
16	93.33333333	A+
17	80	A+
18	66.66666667	B+
19	40	D
20	60	B
21	46.66666667	C
22	73.33333333	A-
23	86.66666667	A+
24	0	F
25	10	F
26	60	B
27	66.66666667	B+

28	100	A+
29	86.66666667	A+
30	66.66666667	B+
31	73.33333333	A-
32	66.66666667	B+
33	66.66666667	B+
34	73.33333333	A-
35	46.66666667	C
36	73.33333333	A-
37	40	D
38	40	D
39	73.33333333	A-
40	53.33333333	C+
41	53.33333333	C+
42	66.66666667	B+
43	80	A+
44	66.66666667	B+
45	80	A+
46	53.33333333	C+
47	66.66666667	B+
48	80	A+
49	86.66666667	A+
50	53.33333333	C+

Table 2. Post-test grades obtained by participating students (50 students): Letter grades

Grade	Post Test Grade Count
A+	9
A	0
A-	8
B+	12
B	3

B-	0
C+	6
C	4
C-	0
D	5
F	3

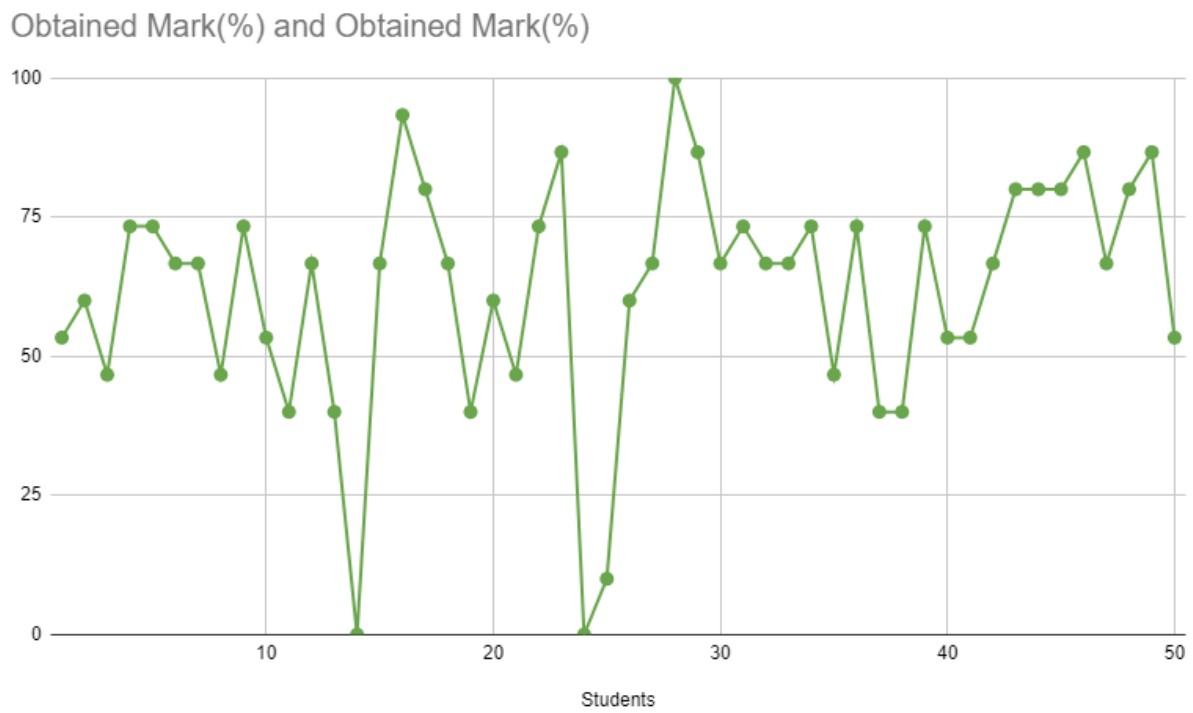


Figure 1: This graph shows the analysis of post-test score percentage

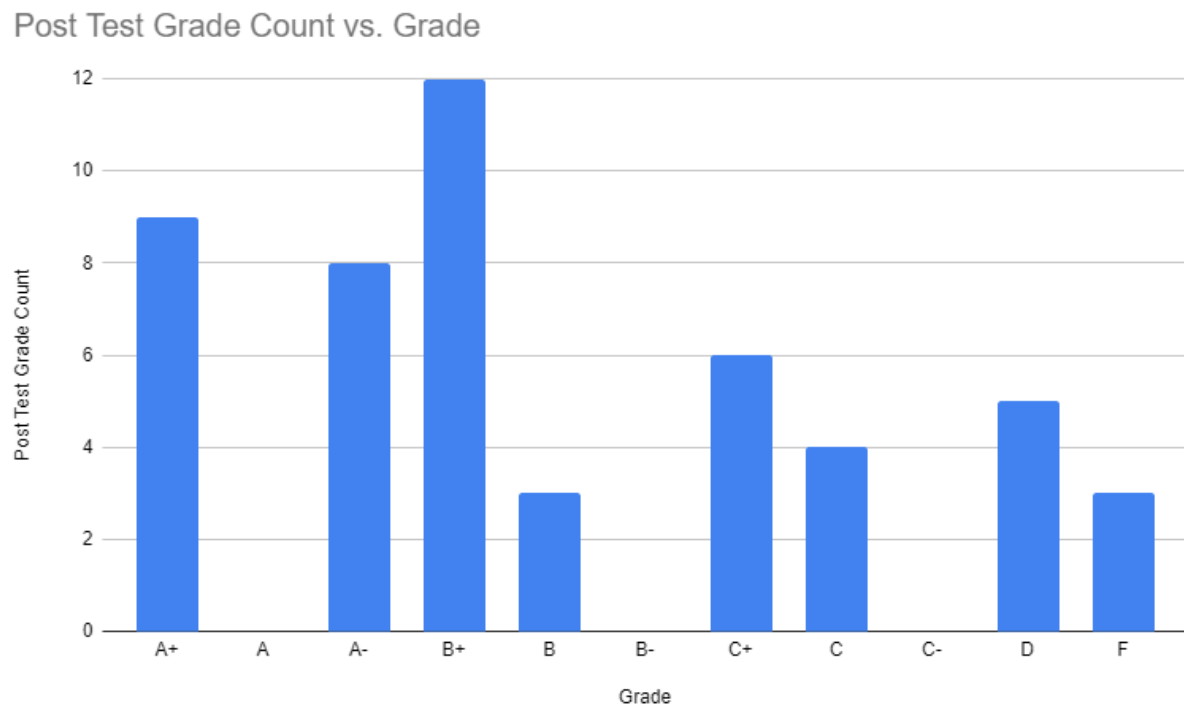


Figure 2: This graph shows the grade analysis of post-test score percentage

Pre-test and Post-Test Report Analysis

10. Analysis on Pre-test and Post-test

Course Name: Data Structure

Course Code: CSE123

Section: 65_R

Purpose of Pre-Test and Post-Test: Compare Pre-Test and Post-Test results to assess knowledge gained through taking the System Analysis and Design course

Pre-test and Post-Test information

- Pretest and post-test consisted of 15 questions.
- Each right answer carries 1 mark(s) & wrong answer carries - 0 mark(s).
- Test question format was multiple choice and true/false.
- No mark will be deducted for unanswered questions.
- Though immense care has been taken while publishing this test, still if you face any subject/language/format/technical error, you are requested to notify me. Your small gesture will help us give more value to other students.

Note: This test is strictly designed for post test purposes only.

Table1. Percentage and grades obtained by participating students (40 students): Question by question.

Name	Pretest Score (% of correct answer)	Post test Score (% of correct answer)	Change in Percentage	Grade of pretest	Grade of post test
1	0	53.33333333	53.33333333	F	C+
2	0	60	60	C+	B
3	0	46.66666667	46.66666667	C-	C

4	25%	73.33333333	7308%	F	A-
5	0	73.33333333	73.33333333	F	A-
6	0	66.66666667	66.66666667	F	B+
7	0	66.66666667	66.66666667	F	B+
8	0	46.66666667	46.66666667	F	C
9	0	73.33333333	73.33333333	F	A-
10	0	53.33333333	53.33333333	F	C+
11	0	40	40	F	D
12	0	66.66666667	66.66666667	F	B+
13	0	40	40	F	D
14	0	0	0	F	F
15	0	66.66666667	66.66666667	F	B+
16	0	93.33333333	93.33333333	F	A+
17	30%	80	7970%	F	A+
18	10%	66.66666667	6657%	F	B+
19	0	40	40	F	D
20	0	60	60	F	B
21	0	46.66666667	46.66666667	F	C
22	0	73.33333333	73.33333333	F	A-
23	5%	86.66666667	8662%	F	A+
24	0	0	0	F	F
25	0	10	10	F	F
26	0	60	60	F	B
27	47%	66.66666667	6620%	C	B+
28	54%	100	9946%	C+	A+
29	40%	86.66666667	8627%	D	A+
30	0	66.66666667	66.66666667	F	B+
31	0	73.33333333	73.33333333	F	A-
32	0	66.66666667	66.66666667	F	B+
33	12%	66.66666667	6655%	F	B+
34	0	73.33333333	73.33333333	F	A-
35	0	46.66666667	46.66666667	F	C

36	0	73.33333333	73.33333333	F	A-
37	0	40	40	F	D
38	0	40	40	F	D
39	10%	73.33333333	7323%	F	A-
40	0	53.33333333	53.33333333	F	C+
41	0	53.33333333	53.33333333	F	C+
42	0	66.66666667	66.66666667	F	B+
43	11%	53.33333333	5322%	F	A+
44	0	66.66666667	66.66666667	F	B+
45	0	80	80	F	A+
46	0	86.66666667	86.66666667	F	C+
47	0	66.66666667	66.66666667	F	B+
48	0	80	80	F	A+
49	40%	86.66666667	8627%	D	A+
50	0	53.33333333	53.33333333	F	C+

Table 2. Pretest and posttest grades obtained by participating students (50 students): Letter grades

Grade	Pre test Grade count	Post Test Grade Count
A+	0	9
A	0	0
A-	0	8
B+	0	12
B	1	3
B-	0	0
C+	1	6
C	0	4
C-	0	0
D	2	5
F	46	3

Pre test Grade count and Post Test Grade Count

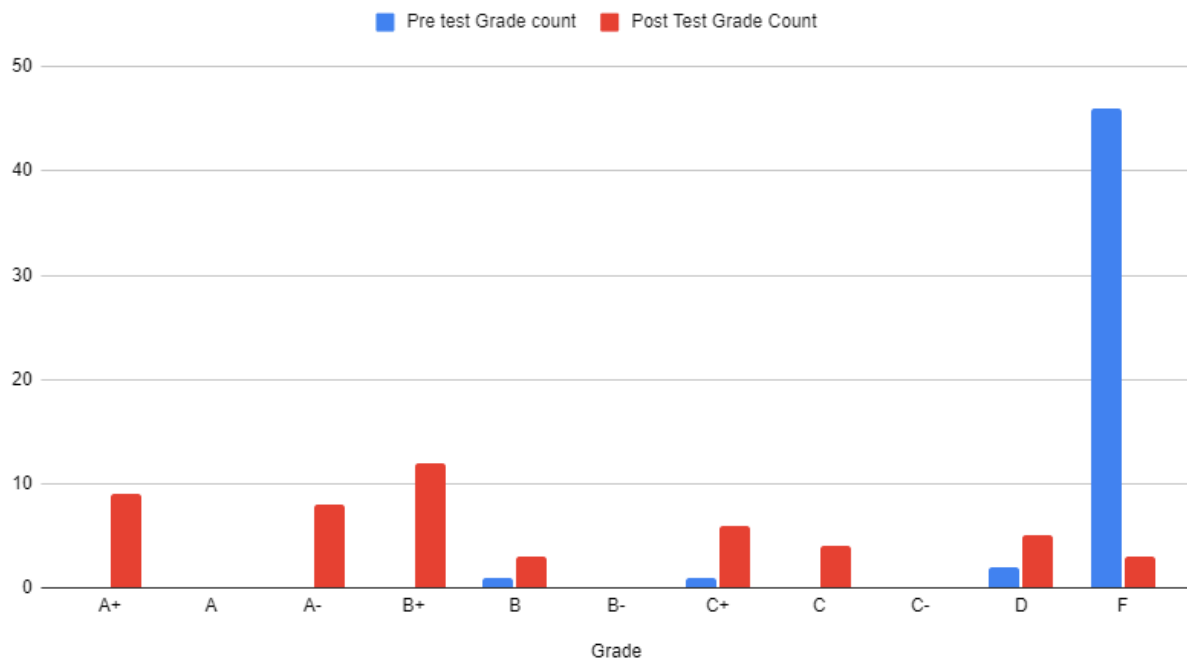


Figure 1: This graph shows the grade count of pre-test and post-test score.

Obtained Mark(%) vs. Students

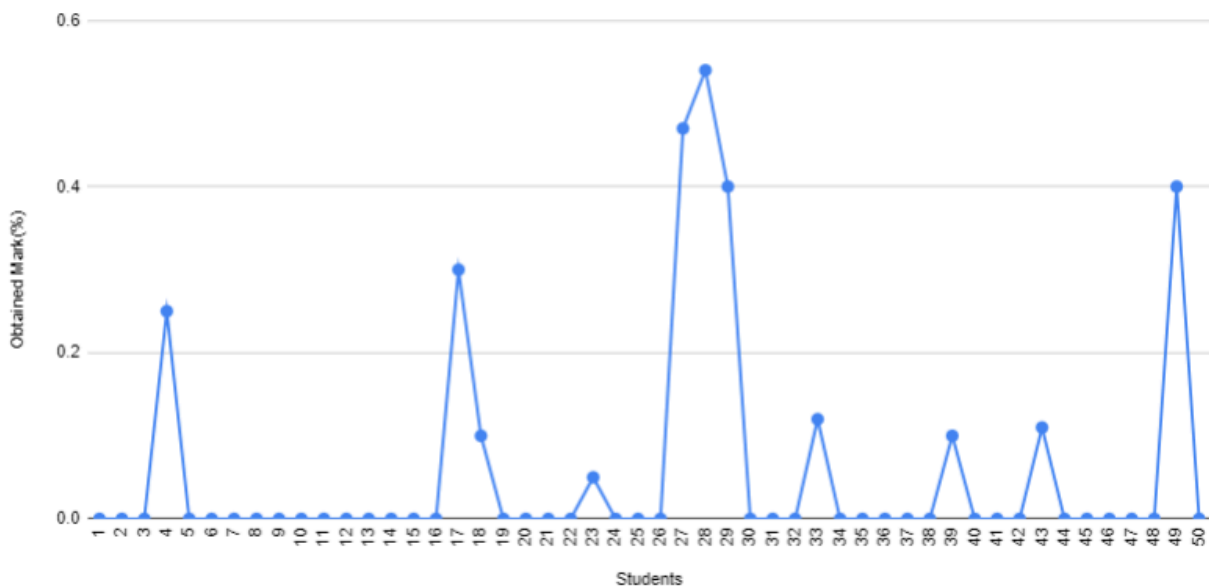


Figure 2: This graph shows the analysis of pre-test score percentage

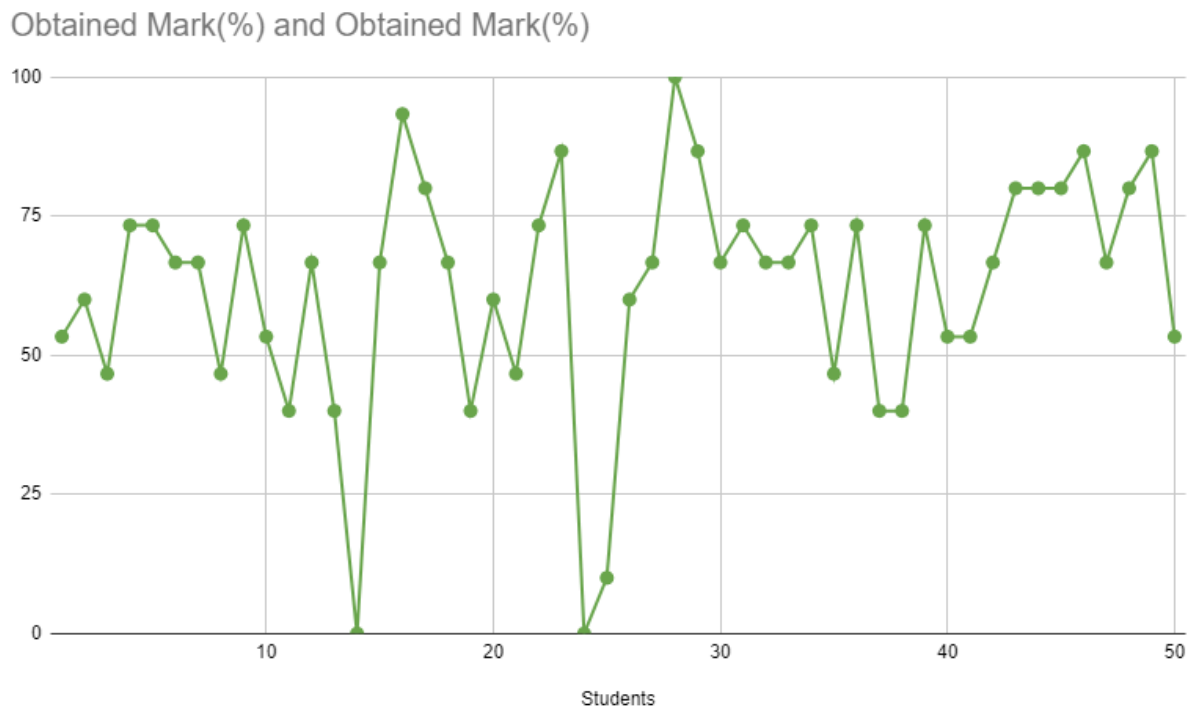


Figure 3: This graph shows the analysis of post-test score percentage

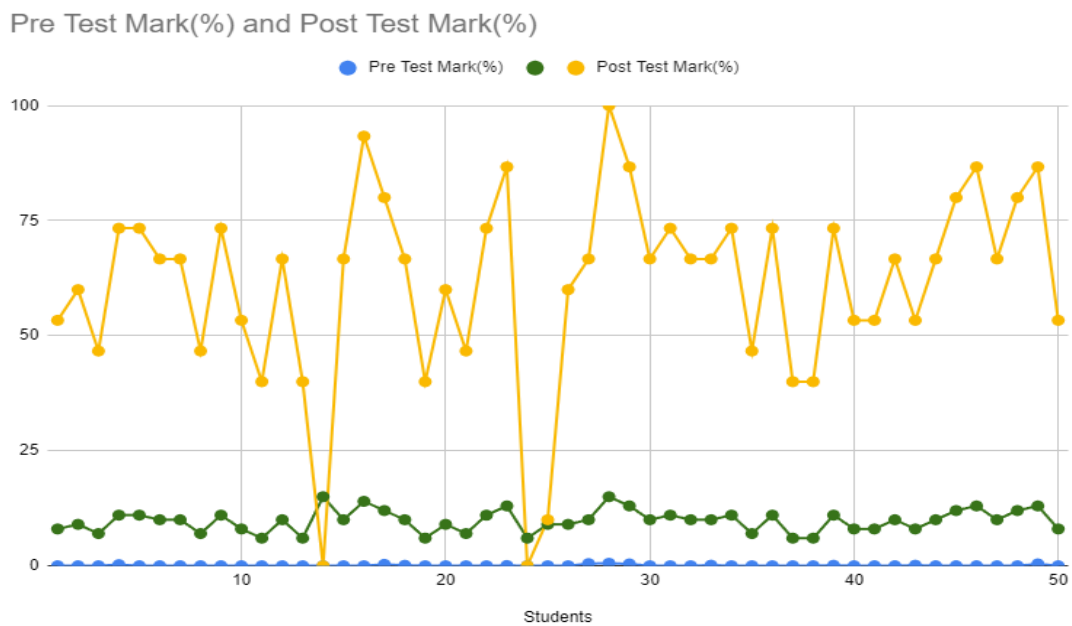


Figure 4: This graph shows the comparison between the pre-test and post-test score percentage.

Summery:

The pre-test and post-test scores provide evidence which students get lower grades and which students obtained lower grades after pre-test and those graphs actually demonstrated increased knowledge when answering the post-test questions. We can say that completing the course resulted in improved performance on the post-test, and make the inference that completing the course resulted in the desired expected learning.

Analysis of peer evaluation

Lecturer, Department of Computer Science and Engineering &
Daffodil International University
Daffodil Smart City, DSC.
E-mail: farianishat.cse@diu.edu.bd
Cell No: 01723444424

Peer Evaluation

Course Code: CSE123

Course Title: Data Structure

Section: 65_R

Semester: Spring 2024

Peer Evaluation done by: Tasnim Tabassum

Lecturer, Department of Computer Science and Engineering &
Daffodil International University
Daffodil Smart City, DSC.

Class Time: 2:45-04:00 (Tuesday: 304 KT)

Topic: Introduction to Tree

Peer Evaluation Report

Poor: 0.0-2.0

Below Average: 2.1-5.0

Average: 5.1-7.4

Good: 7.5-9.0

Excellent: 9.1-10

	Poor	Below Average	Average	Good	Excellent
Content Design				√	
Student Presence					√
Student Engagement					√
Presentation of Teacher					√
Student Teacher Interaction					√
Time Management					√

Summery

12. Summery

International standard methodologies being followed in respect of delivering lectures, class tests, presentations and lab classes. A simple exercise solving process is applied in classroom in respect of judging thought and understanding level of almost all the students in the class and thereby to create a norms of delivery ideas so as to enable students to reach to a satisfactory level to produce good result in acquiring the knowledge on the subjects being tough in order to make themselves educated. Teacher-student relationship criteria being followed for better understanding and close interactions in terms of exchange of views and ideas.

Conclusion

13. Conclusion

Reflecting on my role as an educator in computer science, my philosophy centers on cultivating an inclusive and hands-on learning environment where students engage deeply with complex concepts through collaborative projects and practical applications. I integrate innovative teaching methods like active learning and flipped classrooms to foster critical thinking and prepare students for the dynamic tech industry. Beyond technical skills, I emphasize a growth mindset and lifelong learning, staying current with emerging technologies to ensure relevance. My goal is to empower students as resilient problem solvers and ethical technologists who can thrive in the evolving landscape of computer science.