Faculty of Information and Communication Technology									
Tshwane University of Technology *We empower people* I declare that I am familiar with, and will abide to the Assignment rules of Tshwane University of Technology _____ **Signature**	**COURSE NAME: DATA STRUCTURES AND ALGORITHMS V** **COURSE CODE: DSA417B/DTD117V**								
	Assignment 1 **Duration**: 7 Days **Due Date**: 13 March 2024 **Total Marks**: 40 **Total pages 2**				**Examiner**: Dr. T Chiyangwa **Moderator**: Dr. R Mushininga				
	Student number								
	Surname:				**Initials**:				%

QUESTION	1	2	3	4	5			MAX	Signatures
TOTAL MARK	5	5	10	10	10			40	
EXAMINER MARK									
STUDENT MARK									

Answer ALL questions.

Use the spaces provided to answer each question

Question 1

Explain the importance of understanding data structures and algorithms in software development. Provide examples where efficient data structures and algorithms significantly impact the performance of a program. [5 Marks]

Question 2

Differentiate between linear data structures and non-linear data structures. Provide examples of each and explain their applications in real-world scenarios. [5 Marks]

Question 3

Implement a stack data structure in Java, C++ or python and demonstrate its usage by performing push, pop, and peek operations. Provide a brief explanation of each operation. [10 Marks]

Question 4

Implement a linked list data structure in Python, C++ or Java and define methods to insert elements at the beginning and end of the list. Demonstrate the usage of these methods by adding elements to the list and printing its contents. [10 Marks]

Question 5

Implement a queue data structure in Java, C++ or Python using an array and demonstrate its usage by performing enqueue and dequeue operations. Provide a brief explanation of each operation. [10 Marks]