

Project/Thesis No.:

[12,Normal, Left]

Header 0.5"

1.2"

CSE 4000: Thesis/ Project

[14,Normal, Centered]

[Top Page]

[A4 Page]

# AN EFFICIENT IMPLEMENTATION SCHEME FOR MULTIDIMENSIONAL INDEX ARRAY

[Times Roman, Bold, Centered, Small Caps, 18 size, 1.5 line space everywhere] [ 2 blank line of 12 size with 1.5 line space between title and By]

[14,Normal, Centered]

By

[3 blank size of 12 size]

[14, bold, Centered]

**Dola Das**

[14, Normal, Centered]

Roll: 1407016

&

**Md. Shahidul Salim**

Roll: 1507034



[KUET Logo, 1.14"×1.0", centered ]

[2 blank line of 12 size]

**Department of Computer Science and Engineering**

**Khulna University of Engineering & Technology**

**Khulna 9203, Bangladesh**

**December, 2023**

[12,bold, Centered, 1.2 line space, at the bottom of page]

1.0"

1.2"

1.0"

[Title Page]

# An Efficient Implementation Scheme for Multidimensional Index Array

[Times Roman, Bold, Centered, 18 size, 1.5 line space]

[ 3 blank line of size 12 between Title and By]

By

[12, Normal,  
Centered]

[2 blank line of size 12]

**Md. Razib Khan**

Roll: 0707001

[12, bold, centered]

[12, Normal, centered]

&

**Md. Galib Khan**

Roll: 0707005

A thesis submitted in partial fulfillment of the requirements for the degree of  
“Bachelor of Science in Computer Science & Engineering”

[12, Normal,  
Centered]

[2 blank line of size 12]

**Supervisor:**

[12, bold, left aligned]

**Mr. Xyz**

[12, bold, 0.8" left]

Professor

Department of ...

Khulna Univer...

[ 12, Normal,  
0.8" left  
indentation]

\_\_\_\_\_  
Signature

Department of Computer Science and Engineering  
Khulna University of Engineering & Technology

12, Normal, Centered

Khulna 9203, Bangladesh

December, 2023

[Times Roman, Bold,  
Centered, 16 size, 1.5  
line space]

## Acknowledgment

[2 blank line of size 12]

All the praise to the almighty Allah, whose blessing and mercy succeeded me to complete this thesis works fairly. I gratefully acknowledge the valuable suggestions, advice and sincere co-operation of ...

[Times Roman, Normal, justified, 12 size, 1.5 line space]

**Authors**

[12, bold, right]

## **Abstract**

*[Times Roman, Bold, Centered, 16 size, 1.5 line space]*

*[2 blank line of size 12]*

Write an abstract of your Thesis within 500 words.

*[Times Roman, Normal, justified, 12 size, 1.5-line space]*

[Chapter Style: 12, bold, left,  
1.5 line space]

[Within Chapter style: Times  
New Roman, Normal, 12 size,  
1.5 line space]

## Contents

[2 blank line of size 12]

	PAGE
Title Page	i
Acknowledgment	ii
Abstract	iii
Contents	iv
List of Tables	vii
List of Figures	viii
<b>CHAPTER I    Introduction</b>	<b>1</b>
• Introduction	1
• Background / Problem statement	1
• Objectives	2
• Scope (Write about the modern tools used in your work)	3
• <i>Unfamiliarity of the Problem/ Topic/Solution (Ensure that the problem idea is not acquired directly from any existing source)</i>	3
• <i>Project planning and work distribution</i>	4
➤ <i>Write about the work plan using the Gantt Chart/RACI matrix</i>	
➤ <i>Write about work distribution of this project/thesis if it is done by two or more students</i>	
• Applications of the work	5
• Organization of the thesis	5
<b>CHAPTER II    Literature Review</b>	<b>6</b>
• Introduction	6
• Literature Review	7

• Discussion	8
➤ Research gap solution (Write a summary using table and proof that the problem idea is a new one and not acquired directly from any existing source)	8
<b>CHAPTER III Methodology</b>	<b>22</b>
• Introduction	22
• Detailed methodology	23
➤ Problem design and analysis	24
➤ Overall Framework/ Flowchart	24
➤ .....	25
• Conclusion	25
<b>CHAPTER IV Implementation, Results and Discussions</b>	<b>43</b>
• Introduction	43
• Experimental Setup	43
• Evaluation Metrics	44
• Dataset	44
• Implementation and Results	45
➤ Quantitative results[table/charts/confusion matrix/etc]	45
➤ Qualitative results [real example]	
➤ Analysis of the results	
• Objective Achieved(Write down how the objectives are achieved from the statement of Introduction section)	45
• <i>Financial Analyses and budget</i> (Overall budget planning or, Component / Software Budget planning. It can be written in Appendices also.)	47
• Conclusion	48

## **CHAPTER V Societal, Health, Environment, Safety, Ethical, Legal and Cultural Issues 49**

- Intellectual Property Considerations 49
- Ethical Considerations 50
- Safety Considerations 51
- Legal Considerations 52
- Impact of the Project on Societal, Health, and Cultural Issues 53
- Impact of Project on the Environment and Sustainability 54

## **CHAPTER VI Addressing Complex Engineering Problems and Activities 55**

- Complex engineering problems associated with the current project/thesis 55
- Complex engineering activities associated with the current project/thesis 56

## **CHAPTER VII Conclusions 57**

- Summary(*You should summarize your work in one paragraph*) 57
- Limitations 58
- Recommendations and Future Works 59  
(*How this work can be extended*)

Appendices (If any) 60

References (Provide only related references in *IEEE format*) 62

*[Times Roman, Bold,  
Centered, 16 size, 1.5 line  
space]*

## List of Tables

*[ 2 blank line of size 12]*

Table No.	Description	Page
2.1	Pentium Classic-Power dissipation	16
3.1	Experimental data for heat sink type A.	34
4.1	Efgq	49
5.1	Wxyz	53

*[Times Roman, 12 size, 1.5  
line space]*



## List of Figures

*[Times Roman, Bold,  
Centered, 16 size, 1.5 line  
space]*

*[ 2 blank line of size 12]*

Figure No.	Description	Page
2.1	Circuit diagram of experimental setup	19
3.1	Block diagram of process type A.	37
4.1	Cooling of microprocessor with heat sink	44
5.1	Wxyz	54



# CHAPTER I

[1 blank line of size 12, 1.5 line]

## Introduction

[2 blank line of size 12, 1.5 line]

[Times Roman, Bold, Centered, 14 size, 1.5 line space]

[Times Roman, Bold, Centered, 16 size, 1.5 line space]

[Times Roman, Bold, left, 14 size, 1.5 line space, space before 12 pt, after 6

### 1.1 Introduction

There are few classes of data structures which are as well understood or as extensively used as arrays. It is quite often for scientific, statistical and engineering applications to have computation on large multidimensional arrays [1,2]. The ...

The fast random accessing capability of multidimensional arrays is a fascinating characteristic [3,4] that enables various ...

[Each paragraph will be Times Roman, normal, justified, 12 size, 1.5 line space, space before 12pt, after 6pt space before 12 pt, after 6 pt]

### 1.2 Problem Statement

There are many existing array systems to represent multidimensional data such as Traditional ...

### 1.3 The Realization of Multidimensional Array

[Times Roman, Bold, left, 12 size, 1.5 line space, space before 12 pt, after 6 pt]

There are many data structures already exist to represent multidimensional data. Some of the well-known and prominent data structures are discussed next.

#### 1.3.1 Traditional Multidimensional Array (TMA) [5]

Traditional Multidimensional Array (TMA) is a representation scheme for multidimensional data which represent  $n$  dimensional data. An illustration of 3dimensional TMA of dimension length  $3 \times 4 \times 5$  is given in Figure 1.1. F

Each figure or table should be on top or bottom of the page.

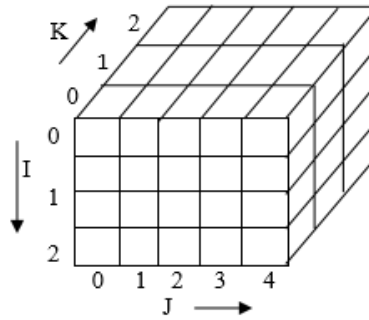


Figure 1.1: A three dimensional TMA with length of dimension  $3 \times 4 \times 5$ .

Table 1.1: Parameters for cost function for TMA

Parameter	Description
$n$	Number of dimension
$d_i$	Dimension $i$ , $1 \leq i \leq n$
$l_i$	Length of dimension $d_i$
$V$	Initial volume
$s$	Number of segments in a subarray

The cost functions are represented as the number of array cells required to access. The parameters that are assumed are described in Table 3.1. All the lengths are in bytes. Some parameters are provided as input while others are derived from input parameters.

[Figure and Table caption will be

*Times Roman, normal, centered, 11 size, 1.5 line space, space before 12 pt, after 6 pt*

*For Figure -> caption will be below the figure*

*For Table -> caption will be above the table]*

# Use IEEE formatting

## REFERENCES

[ 2 blank line of size 12, 1.5 line]

[ Font size 14, Bold, Times New Roman and Centered, 1.5 line]

**Please follow the link below for example**

Chrome-  
extension://efaidnbmnnnibpcajpcgglefindmkaj/https://ieeauthorcenter.i  
eee.org/wp-content/uploads/IEEE-Reference-Guide.pdf

[ For References

*Times Roman, normal, justified, 12 size, 1.2 line space,*

*Space before 6 pt, after 6 pt*

*Bullet is left aligned,*

*Paragraph-> left indentation=0, hanging =0.31"*]

**N.B.** This is the preferable format of progress report for Thesis writing. The sections written in italic forms are fixed. However, the Supervisor can extend the chapters/points of report for Thesis writing (If necessary).