

**Universiti Teknologi MARA**

**Investment Portfolio Optimization  
Using  
Genetic Algorithm**

**Mohd Fikri Hafifi B Yusof  
2005614204**

Thesis submitted in fulfillment of the requirements for  
**Bachelor of Computer Science (Hons)**  
**Faculty of Information Technology And  
Quantitative Science**

May 2007

## DECLARATION

I certify that this thesis and the research to which it refers are the product of my own work and that any ideas or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline

MAY 31, 2007

A handwritten signature in black ink, appearing to read 'fikri' with a stylized flourish at the end.

MOHD FIKRI HAFIFI B YUSOF

2005614204

## **Acknowledgements**

***“In the name of Allah, Most Gracious, Most Merciful”***

Praise to Allah: Alhamdulillah, with His bless and for my family to pray for me night and day I am able to complete this thesis titled “Investment Portfolio Optimization using Genetic Algorithm”. The thesis delivered in this paper could not have been accomplished without the help of many individuals.

First of all, I would like to express my gratitude toward my project supervisor, Pn Noor Latiffah bt. Adam, who has given me her most valuable advices, guidance, and supervision throughout this project proposal. I would also like to thank my project coordinator for her support and brilliant idea.

To my beloved family who are always there for me whenever I need them and million of thanks for all the supports, blessing, loves and financial support they had given me.

Finally, I am thankful to all people whose names are not been mentioned for their encouragement, criticism, and support for this thesis. I wouldn't have done it without all of you. Thank you.

## **Abstract**

Genetic Algorithm (GA) is adaptive methods which may be used to solve search and optimization problems. In investment, GA is helpful to find the best portfolio optimization. The five syariah securities are taken to optimize the portfolio and then find the best portfolio using the GA. All of the five securities are approved by Security Commission (SC) of Malaysia. The weekly return of each Syariah securities are taken from Stock Performance Guide Malaysia produced by Dynaquest Sdn. Bhd.. The outcome from this project is the best syariah securities for we invest and get highest profit.

**Keywords:** Genetic Algorithm, Portfolio Optimization, Investment

## **Table of Contents**

Acknowledgements.....	i
Abstract.....	ii
Table of Contents .....	iii

## **CHAPTER ONE: INTRODUCTION**

<b>1.0 Introduction .....</b>	<b>1</b>
1.1 Problem statement .....	1
1.2 Objectives .....	1
1.3 Significance of the research .....	1
1.4 Project scope .....	2
1.5 Research questions .....	2
1.6 Summary.....	2

## **CHAPTER TWO: LITERATURE REVIEW**

<b>2.0 What is Genetic Algorithms?.....</b>	<b>3</b>
2.1 History of Genetic Algorithms.....	3
2.2 Phases of the Genetic Algorithms.....	3
2.2.1 Population Creation.....	4
2.2.2 Fitness Function .....	4
2.2.3 Selection.....	4
2.2.4 Crossover .....	4
2.2.5 Mutation.....	4
2.3 Related Techniques in Genetic Algorithms .....	5
2.4 Why people using Genetic Algorithms? .....	6
2.5 Why Genetic Algorithms?.....	7
2.6 What is Portfolio? .....	7
2.7 What is Portfolio Optimization? .....	7
2.8 History of Portfolio Optimization.....	7
2.9 Related Studies.....	8
2.10 Summary.....	8