

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**A GOAL PROGRAMMING APPROACH IN SOLVING SHIFT
SCHEDULING PROBLEM AT FAST-FOOD RESTAURANT**

**NURUL ATIKAH SYAHIDAH JASMANI - (2020835064)
RADIATUL MARDIAH BINTI ISMAIDI - (2020834354)
WAN IZYAN NADIRA BINTI MOHD KHARI - (2020846992)**

P62M23

**Report submitted in partial fulfillment of the requirement
for the degree of
Bachelor of Science (Hons.) (Management Mathematics)
College of Computing, Informatics and Mathematics**

AUGUST 2023

ACKNOWLEDGEMENTS

IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

Firstly, I am grateful to Allah S.W.T. for giving me the strength to complete this project successfully.

I would like to express my gratitude to our supervisors, Madam Syadatul Syaeda binti Mat Saleh and Madam Ezzah Suraya binti Sarudin along with our lecturer, Miss Nurlina binti Abdullah, for facilitating and providing our group with positive encouragement and warm spirit to complete the technical report. Their guidance and advice helped us to write the report well. It has been a great pleasure and honor to have them as lecturers and supervisors.

Our deepest gratitude goes to all of our family members who helped us directly and indirectly to complete the report. It would not be possible without their endless support. Last but not least, we would like to sincerely thank all our beloved classmates who were together through thick and thin for completing this report. May God showers each of us with success and honor in our lives.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	iv
LIST OF FIGURES	iv
ABSTRACT.....	v
CHAPTER 1: INTRODUCTION.....	1
1.1 Introduction.....	1
1.2 Problem Statement	3
1.3 Objectives	3
1.4 Significant and Benefits of Study	4
1.5 Scope and Limitation of Study.....	4
1.6 Summary	5
CHAPTER 2: BACKGROUND THEORY AND LITERATURE REVIEW	6
2.1 Introduction.....	6
2.2 Shift Scheduling.....	6
2.3 Previous Studies on Shift Scheduling Problems and Goal Programming	7
2.3.1 Shift Scheduling Problem.....	7
2.3.2 Goal Programming Method.....	8
2.3.3 Goal Programming Formulation.....	10
2.4 Summary.....	14
CHAPTER 3: METHODOLOGY AND IMPLEMENTATION.....	15
3.1 Introduction.....	15
3.2 Flowchart of Study.....	15
3.3 Phase 1: Data Collection.....	16
3.4 Phase 2: Implementation of Goal Programming Model	17
3.5 Phase 3: Run the Goal Programming Model	21
CHAPTER 4: RESULTS AND DISCUSSION	23
4.1 Introduction.....	23
4.2 Result and Discussion	23
4.3 Comparison between The Current Three-Shift Schedule and The Proposed Schedule.....	26
CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS.....	27
REFERENCES.....	29
APPENDIX A	31

LIST OF TABLES

Table 1. Summary of GP Method	9
Table 2. Objective Functions of Previous Studies	10
Table 3. Constraints from Previous Studies.....	11
Table 4. Parameters used in Previous Studies.....	122
Table 5. The Current Three-Shift Schedule	17
Table 6. Proposed Shift Scheduling.....	23

LIST OF FIGURES

Figure 1. Flowchart of Study	15
Figure 2. Output LINGO.....	23

ABSTRACT

Scheduling is important for all organizations and businesses as it helps manage and distribute workloads effectively. Currently, in fast-food restaurant located in Labuan, the manager using e-schedule to set up the worker's schedule. This e-schedule is a cloud-based worker scheduling software. This system is based on the manager's decision where the manager randomly pick a worker's name, department and shift. Due to the randomly pick, the selection of workers may cause to unbalanced schedule that unable to fulfill the staff's satisfaction such as the total shift assigned for each worker. The significance of this study is it can reduce the time consuming in making shift schedule and it also can be used in other organizations that apply three working shifts per day. The study consists of a few variables and constraints, including total workers, total shifts, maximum and minimum workers per shift, and operating hours. Hence, the objectives of this study are to propose a better schedule and minimize the unbalanced total working days and shift rotation among the workers by applying the Goal Programming (GP) method. As a result, a shift schedule pattern with balanced total working days and total shifts that fulfills the company's policies has been generated. In future study, the model can be modified by considering the other goals and other constraints such as to maximize the staff satisfaction and minimize total cost.