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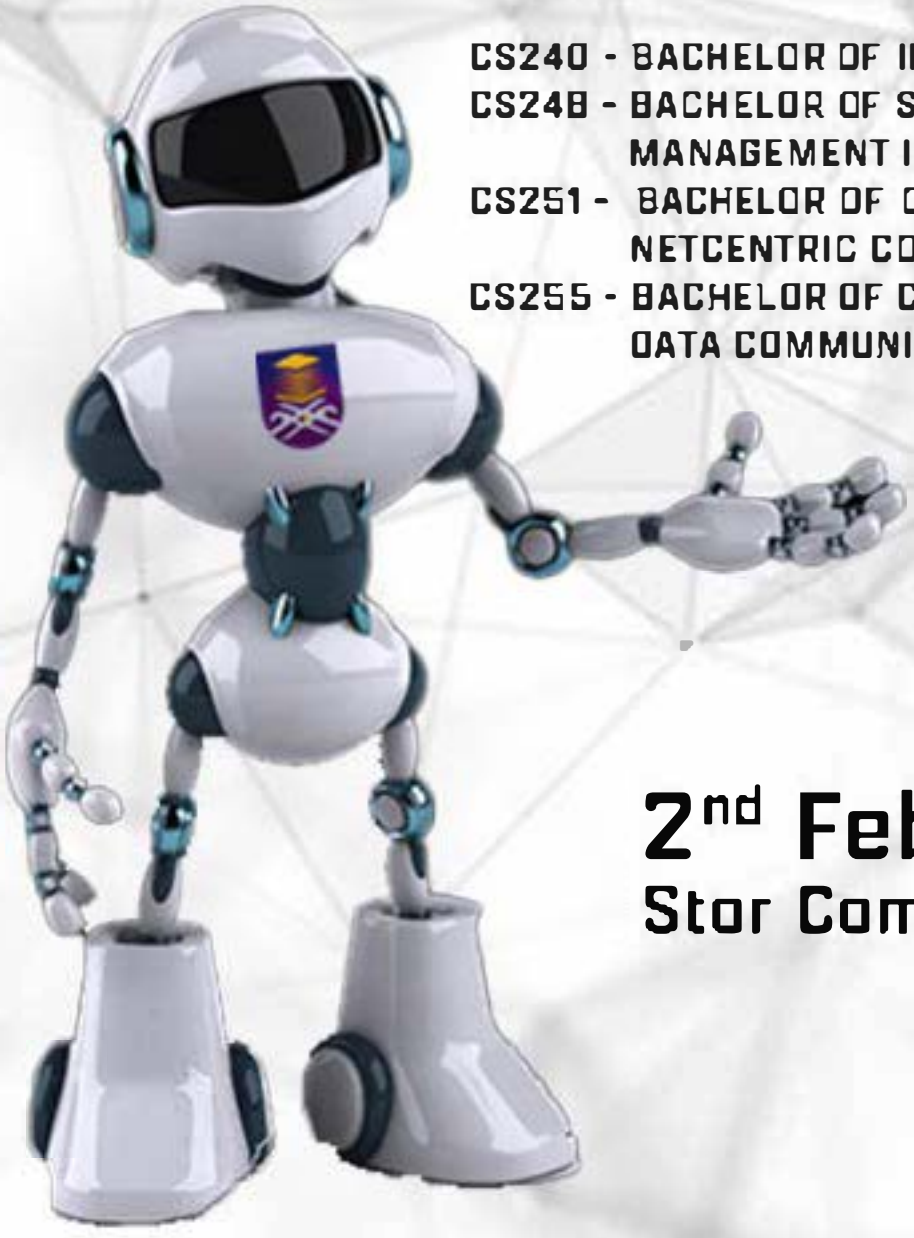
RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

REMACS 5.0



CS240 - BACHELOR OF INFORMATION TECHNOLOGY (HONS.)
CS248 - BACHELOR OF SCIENCES (HONS.)
MANAGEMENT IN MATHEMATICS
CS251 - BACHELOR OF COMPUTER SCIENCE (HONS)
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DATA COMMUNICATION & NETWORKING

2nd Februory 2023

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College of Computing, Informatics and Media
Universiti Teknologi MARA Perlis Branch

Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)

Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)
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Preface

It is with great pleasure that we present this extended abstract book, titled "The 5th Research Exhibition in Mathematics and Computer Sciences (REMACS 5.0)". This book is a collection of research work in the fields of Computer Science and Mathematics, contributed by the final year students from Universiti Teknologi MARA, Perlis Branch. The aim of this book is to showcase the diversity and depth of research in these two interrelated fields.

Mathematics and Computer Science are two fields that have seen tremendous growth and advancement in recent years. With the rise of new technologies and the increasing demand for data-driven solutions, researchers in these fields have been working hard to develop new theories, algorithms, and models that can help solve some of the most pressing problems of our time. This book is a testament to their hard work and dedication.

The abstracts in this book cover a wide range of topics, including algebra, analysis, logic, computer architecture, algorithms, artificial intelligence, machine learning, computer network, netcentric computing and many more. The work presented here is both theoretical and practical, and has the potential to impact many areas of society, from finance and healthcare to education and security.

We hope that this book will serve as a valuable resource for future students in the fields of Mathematics and Computer Science. We also hope that it will inspire more students to pursue innovative and groundbreaking research in these two fields. Finally, we would like to express our gratitude to all the contributors for their hard work and dedication, without which this book would not have been possible.

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EVENT SCHEDULE

8:00 – 8:30 am
•Registration

8:00 am – 12:00 pm
•FYP Project Presentation

12:00 - 2:00pm
•Lunch Break

2:15 – 2:35 pm
•National & Wawasan Setia Anthems
•Doa Recitation

2:35 – 2:45 pm
•Welcoming Address by Director of REMACS 5.0

2:45 – 2:55 pm
•Officiating & Closing Remarks from Rector of UiTM Perlis

2:55 – 3:00 pm
•REMACS 5.0 Montage

3:00 – 4:00 pm
•Awarding of Winners:
•Best Poster
•Best Project Award

•Photo Session

•End of Ceremony

Dress Code: Formal / Corporate

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RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

REMACS 5.0

EXTENDED ABSTRACTS

MATHEMATICAL MODELLING ANALYSIS OF DIET PLANNING FOR THALASSEMIA PATIENTS

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Abstract

The purpose of this study is to develop a mathematical model of meal preparation for thalassemia patients. This study aims to find the cost of the food combinations, the amount of nutrients thalassemia patients needed, and the optimal model between linear programming and integer programming. The diet problem describes its limitations and objectives functions. Planning good meals requires taking into consideration a variety of constraints, including the required nutrient composition, the amount of food to be taken, and food allergy with the smallest cost possible. The formulation of mathematical models that correspond to all requirements and limitations. This article clarifies how the linear and integer programming approach provides an optimal and feasible solutions to the diet problem for thalassemia patients.

Keywords*: Linear Programming, Integer Programming, Diet Planning, Optimisation, Mathematical Modelling, Thalassemia*

1. Introduction

Diet planning for thalassemia patients was chosen to find out how much of certain nutrients they need in their daily intake as requirement. The main objective of this study is to formulate a linear programming and integer programming model for the diet planning problem of thalassemia patients. The sub-objectives are to determine the amount of nutrients needed for thalassemia patients and to evaluate the cost of food combinations for thalassemia patients. This study focuses on the good nutrients for thalassemia patients such as calcium, vitamin D, folate, zinc, copper, ceruloplasmin, selenium, vitamin C and vitamin E. The data was collected from one thalassemia patient at a government hospital.

2. Methodology

The research is based on secondary data from Hospital Tuanku Fauziah (HTF), Kangar, Perlis, Standard Operating Procedure of Consulting Services for Individual with Thalassemia and book Nutrient of Composition of Malaysian foods is used to compile information on the recommended adult nutrient intakes. The information acquired includes the minimum and maximum amounts of nutrients that patients with thalassemia should consume. The data collected included the upper and lower limits nutrient content requirements for people with thalassemia (Vichinsky et al., 2021).

3. Results and Discussion

By using the linear programming approach and integer programming approach, the cost of the food menu can be minimised. A suitable method was also developed for thalassemia patients to design their meal menu in keeping with the mathematical model, in addition to ensuring a healthy diet that contains all the necessary nutrients. A more feasible strategy is provided by the integer programming, in which the food is served using integer value (Sufahani et al., 2021). When the integer programming method was used in place of linear programming, the cost increased significantly from RM7.95 to RM9.80. The study provided insight into the nutritional needs of thalassemia patients and the application of linear programming and integer programming to achieve a considered and optimal diet. The mathematical model constructed in this research known as linear programming and integer programming could be considered a useful tool to support decision making processes in healthcare and patients with thalassemia.

4. Novelty of Research / Product

There have been lots of research that have studied into applications of linear programming and integer programming such as (Varghese et al., 2022) previous research was done through optimisation of a linear objective function in circumstances with numerous decision factors has long been studied through linear programming. There has also been research about cost reduction, production quantity maximisation and capacity utilisation maximisation are the three goals of the linear programming model (Jyothi et al., 2019). In order to deal with the Nurse Rostering Problem in contemporary hospital environments (Rahimian E et al., 2017), used a novel hybrid Integer Programming was used. However, there has not been many research on how to use mathematical modelling for diet problem. Therefore, the main focus of this research is to construct a mathematical modelling for the diet problem by taking into consideration of food item and recommended nutrient needed. This research aims the optimisation of nutrients needs and cost of food combinations for thalassemia patients by using linear programming is flexible since it can include variables that are most suitable for the diet planning problem.

5. Conclusion

A suitable method was also developed for thalassemia patients to design their meal menu in keeping with the mathematical model. The study provided insight into the nutritional needs of thalassemia patients and the application of linear programming and integer programming to achieve a considered and optimal diet.

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