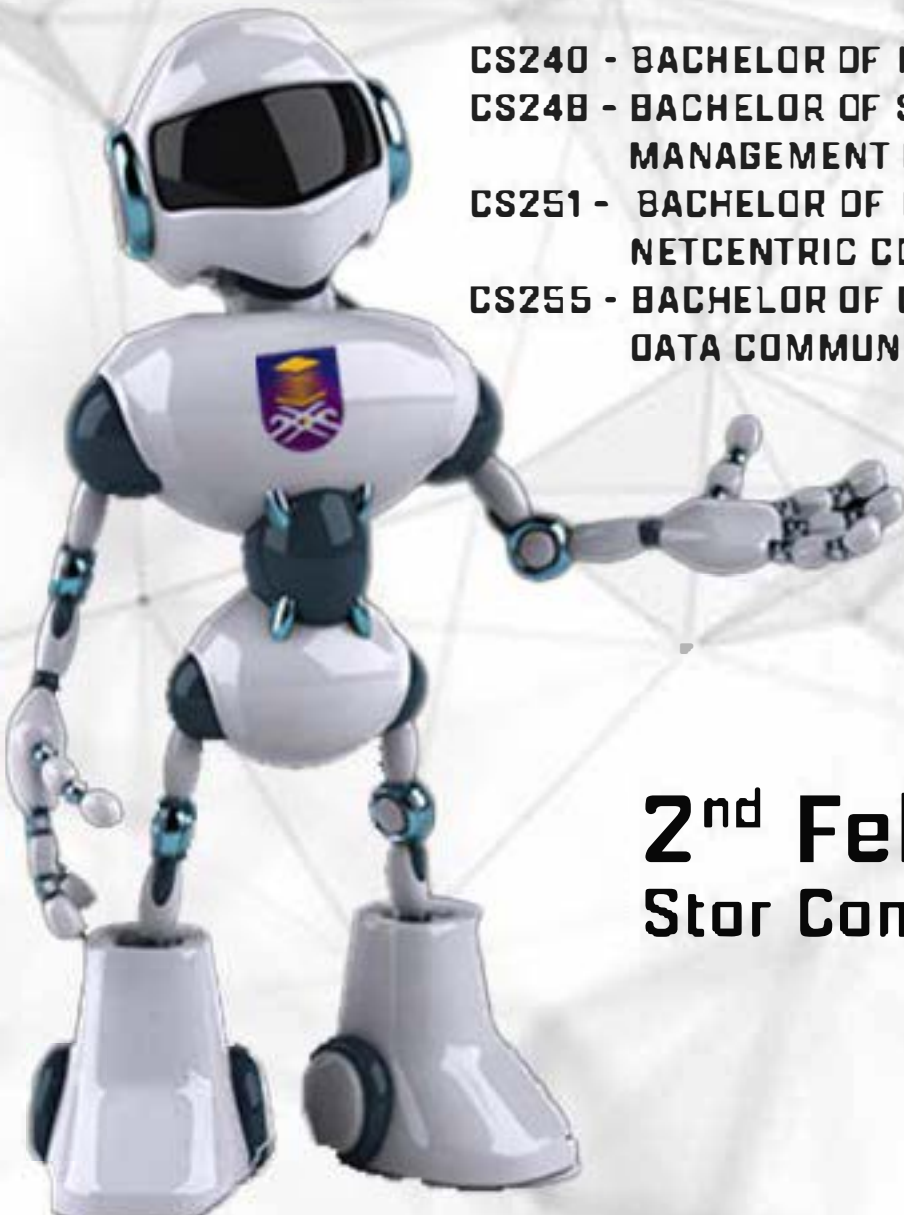


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RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

# REMACS 5.0

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- 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

**2<sup>nd</sup> February 2023**  
**Stor Complex, UiTM Perlis**

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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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*Editors*

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# Preface

It is with great pleasure that we present this extended abstract book, titled "The 5<sup>th</sup> 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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# EXTENDED ABSTRACTS

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RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES  
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# IOT-BASED FLOWER GARDEN CARE SYSTEM USING ESP8266 WI-FI MODULE AND TELEGRAM APPLICATION

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## Abstract

Proper care is very important to keep a flower garden in good condition, whether it is getting enough water or ensuring the safety of the flower garden area. Using technology can have advantages for people who have a small flower garden at home. The IoT-based Flower Garden Care System using the ESP8266 Wi-Fi Module and Telegram Application is developed to solve the problems of people always forgetting to water it and for the safety of the flower garden area from animal harm. This research uses an ESP8266 Wi-Fi module, a Telegram application, and two sensors, which are a PIR motion sensor and a soil moisture sensor. The development process for this research follows six stages, which are initiation, planning, design and development, implementation and testing, data analysis, and documentation. The aims of this research are to develop a prototype on an IoT system for a flower garden to monitor using sensors, a Wi-Fi module, and a Telegram application and evaluate the prototype performance using functionality testing.

*Keywords:* Flower garden, Telegram application, PIR sensor, soil moisture sensor, Wi-Fi module

## 1. Introduction

Flowers are living things in our environment that help to make our planet more productive and beautiful. In order to grow healthy, plants need water, light, and nutrition from the soil in order to clean the air naturally and produce oxygen for the world. The aims of this research are to develop a prototype on an IoT system for a flower garden to monitor using sensors, a Wi-Fi module, and a Telegram application and evaluate the prototype performance using functionality testing, and user acceptance's test. The area covered during this research is the small flower garden in Kuarters Ladang Risda Kepis, Kuala Pilah. The users involved in this research are people who have a small garden at home. The sensors that were used in this research are a soil moisture sensor and a PIR motion sensor.

## 2. Methodology

This research used functionality testing to determine whether it worked well or not. In functionality testing, the PIR sensor and the buzzer were tested three times by changing the distance of an animal from the sensor to check whether they could send an alert by telegram. Meanwhile, the soil moisture sensor and water pump were tested based on the functionality of the auto water pump and a command through telegram to read data and get the status of the soil moisture. Moreover, the system performance has been tested by using different types of telecommunications services.

## 3. Results and Discussion

In the analysis, users will no longer have to wait to check on their small flower garden because they will be notified right away through the Telegram app if motion is detected there, and the system will automatically water the garden if the soil moisture is below 33.3%. The average time it took for users to get alert notifications was measured from 0.5 to 1.5 m to figure out the best distance to detect motion. The distance from animal movement to the PIR sensor that has been used in this research is 0.5 to 1.5 meters. The buzzer will ring if motion is detected. The average response time to read the moisture value

and the status of the soil moisture is approximately 10.2 seconds. However, it depends on the type of telco services we used.

#### **4. Novelty of Research / Product**

There has been some related research that is used to develop systems on how to monitor gardens, with a greater focus on agriculture. In previous research about smart agriculture monitoring systems using the Internet of Things, they used the ARM processor and the ThingSpeak application as their platform to retrieve data (Jain & Kumar, 2020). There have also been several researches about using a telegram application to control lights to turn on and off (Candra et al., 2019). Furthermore, there has been research that uses the Atmega328p and ESP8266-01 as processors to connect with the sensor (Sarode et al., 2020). However, there has not been any research on using the Telegram application as a platform to retrieve and send data to its users. Therefore, the main focus of this research is on how the Telegram application and auto watering system can be used to monitor the small flower garden.

#### **5. Conclusion**

The objectives of this research were successfully achieved. Based on the result, the notification was sent immediately to the user when motion is detected, and the user can request the data for soil moisture through telegram application. Moreover, the auto pump was functioning well.

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