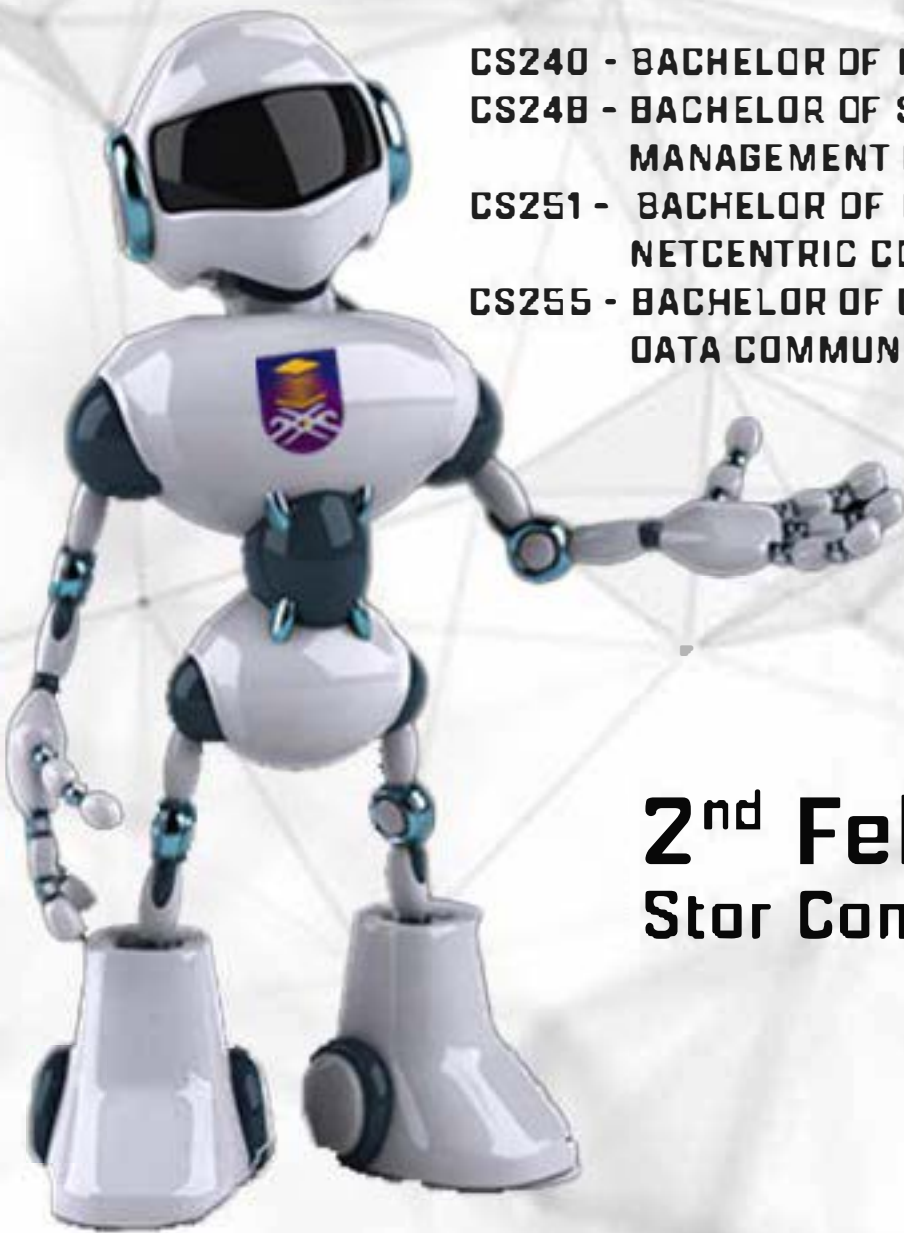

RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES

REMACS 5.0



CS240 - BACHELOR OF INFORMATION TECHNOLOGY [HONS.]
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2nd February 2023
Stor Complex, UiTM Perlis

Organized by:
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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e ISBN: 978-629-97934-0-3



Perpustakaan Negara Malaysia

Published by

MOHAMMAD HAFIZ BIN ISMAIL

Universiti Teknologi MARA

02600 Arau, Perlis

Tel: +604 988 2028

<https://fskmpерlis.uitm.edu.my/remacs50/>

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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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REMACS 5.0

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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

RESEARCH EXHIBITION IN MATHEMATICS & COMPUTER SCIENCES
REMACS 5.0

ANALYSIS ON RANSOMWARE CHARACTERISTICS USING STATIC ANALYSIS METHOD

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Abstract

Ransomware attacks pose a serious risk to the security of both personal and business systems. Using evasion techniques, payload distribution, and infection methods, these attacks infiltrate systems and encrypt valuable files, then demand money in exchange for the decryption key. Current ransomware analysis tools can provide general information about malicious binaries, but there are limitation in providing specific information about the behaviour of a specific ransomware sample, making it difficult to protect end-user machines from unknown attacks, particularly the most recent ransomware variants. This project intends to investigate the most recent ransomware attacks and study their characteristics using static analysis. A methodology for the static analysis of ransomware characteristics is proposed by utilising a secure lab environment, VMware Workstation and Windows operating system for host and guest, and various static analysis tools such as PeStudio, CFF Explorer, HxD, and HashMyFile to extract and analyse the functionalities of ransomware samples. The technology can detect unknown ransomware variants by recognising the variant's distinctive characteristics. Real-world ransomware samples were used to validate the methodology. This research provides significant information for security experts and researchers in the realm of cybersecurity and can aid in the protection of systems against ransomware attacks.

Keywords: ransomware, static analysis, characteristics

11. Introduction

At this point in time, ransomware offers a significant challenge that is also the one that is expanding at the fastest rate for all users, ranging from individual families to large enterprises and government agencies. The ransomware families of today use complex encryption and transmission strategies, which drastically reduces the possibilities of successfully recovering the data and brings them almost to zero. The objectives of this project are to study the main characteristics of the latest ransomware attacks and to analyse and differentiate the evolution of ransomware characteristics according to its generation. This project will use VMware Workstation as the secure lab environment during the implementation and analysis phase. Windows operating system will act as both host and guest machine.

12. Methodology

Ransomware samples were collected from trusted resources in the internet such as Virus Share and Malware Bazaar. The process of the analysis is held in the secure lab environment which is inside the VMware Workstation. Static analysis tools such as PeStudio, CFF Explorer, HxD editor and HashMyFile are used to analyse the ransomware characteristics. The process of understanding, assessing, or inspecting data or samples in order to discover the characteristics and properties of the specific ransomwares is the analysis that were done. All of the results were compiled and entered in a table. The obtained results determined the main characteristic of the ransomware according to its generation.

13. Results and Discussion

Every sample of ransomware has been analysed with a wide variety of reverse engineering and ransomware analysis tools. During the course of the investigation, it was found that vital information regarding the DLLs and the primary Windows functions utilised by each and every ransomware, in addition to information regarding the supplementary tools, such as the decryption components, was uncovered. In order to investigate the similarities and differences between the first generation, the second generation, and the third generation of ransomware, comparisons of their primary characteristics were made. The findings of this study could be put to use in the development of effective and efficient mitigation measures for ransomware according to its generation, which exhibits their own characteristics. These measures could be developed using the results of this research.

14. Novelty of Research / Product

There have been a number of studies and research projects that have investigated and studied the characteristics and properties of ransomware through the use of static and dynamic analysis; however, there is a gap in the analysis of ransomware with regard to the year in which it was first propagated and generated. Previous studies on the WannaCry ransomware utilised both dynamic and static analysis techniques to investigate the malware's primary characteristics (Vidyarathi, 2019). In addition, several pieces of research have been done on static malware analysis in order to identify ransomware characteristics (Akbanov, 2018). Moreover, there are also research on implementation on ransomware analysis using static and dynamic analysis (Riadi, 2015).

15. Conclusion

The purposed of this study is to study the characteristics of ransomware according through its generation through static analysis of the ransomware. So, all the objectives of this study were successfully achieved. Based on the analysis result, we can see the main characteristics of the ransomwares and the similarities on how they encrypt and decrypt files.

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Research Exhibition in Mathematics and Computer Sciences: REMACS 5.0
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e ISBN 978-629-97934-0-3

