



*Amrita Rathor*

# **Simulation of ATM using Elliptic Curve Cryptography in MatLab**

Elliptic Curve Cryptography



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# Simulation Using Elliptic Cryptography Matlab

**Amita Rathee**



## **Simulation Using Elliptic Cryptography Matlab:**

Simulation of ATM Using Elliptic Curve Cryptography in MatLab Amita Rathee,2012 This work is about implementing Elliptic Curve Cryptography to make ATM working secure and reliable ECC is advanced Cryptography scheme which is advanced and take less size of keys to implement security and also provide methods to implement customer authentication very well ATM is Automated Teller Machine with which ECC is combined to make it much secure and reliable ECDSA algorithm is used to generate signatures for authentication Elliptic Curves provide much secure keys which is the strongest part of this simulation work

**Applied Computing and Information Technology** Roger Lee,2019-08-21 This book gathers the outcomes of the 7th International Conference on Applied Computing and Information Technology ACIT 2019 which was held on May 29 31 2019 in Honolulu Hawaii The aim of the conference was to bring together researchers and scientists businesspeople and entrepreneurs teachers engineers computer users and students to discuss the various fields of computer science and to share their experiences and exchange new ideas and information in a meaningful way Further they presented research results on all aspects theory applications and tools of computer and information science and discussed the practical challenges encountered in their work and the solutions they adopted to overcome them The book highlights the best papers from those accepted for presentation at the conference They were chosen based on review scores submitted by members of the program committee and underwent further rigorous rounds of review From this second round 15 of the conference s most promising papers were selected for this Springer SCI book and not the conference proceedings We eagerly await the important contributions that we know these authors will make to the field of computer and information science

Cognitive Radio-based Internet of Vehicles Syed Hashim Raza Bukhari,Muhammad Maaz Rehan,Mubashir Husain Rehmani,2024-10-16 The incorporation of Cognitive Radio CR into the Internet of Vehicles IoV has emerged as the Intelligent Transportation System ITS Section 1 covers the aspects of cognitive radio when it provides support to IoV The challenges which limit the performance of ITS are highlighted in this chapter These issues include unreliable delivery the dynamic topology of IoV routing overhead scalability and energy to name a few The issues can be considered as future research directions for a promising intelligent transportation system Machine learning ML is a promising discipline of Artificial Intelligence AI to train the CR based IoV system so that it can make decisions for improved spectrum utilization The ML enabled IoV systems can better adapt to the dynamically changing environment Section 2 covers the applications of ML techniques to the CR IoV systems and highlights their issues and challenges Section 3 covers the examination of ML in conjunction with Data Science applications which further widens the scope of the readership In CR IoV ML and Data Science can be collaboratively used to further enhance road safety through inter vehicle intra vehicle and beyond vehicle networks The channel switching and routing overhead is an important issue in CR based IoVs To minimize the channel switching and routing overheads an effective scheme has been presented in Section 4 to discuss the promising solutions and performance

analysis Meanwhile IoV communication is a highly time sensitive application that requires that the vehicles should be synchronized The time synchronization in IoVs has been highlighted in Section 5 to elaborate further on the critical metrics challenges and advancements in synchronization of IoVs As the vehicles exchange data using wireless channels they are at risk of being exposed to various security threats The eavesdropping identity exposure message tampering or sinkhole attack to name a few It needs time to discuss the security issues and their countermeasures to make the CR IoV attack resilient The last section of the book highlights the security issues and maintaining the quality of service QoS of the CR based IoVs which concludes the book Key features The architecture and applications of Intelligent Transportation System ITS in CR IoVs The overview of ML techniques and their applications in CR IoVs The ML applications in conjunction with Data Science in CR IoVs A minimized channel switching and routing MCSR technique to improve the performance of CR IoVs Data Science applications and approaches to improve the inter and intra vehicle communications in CR IoVs The classification of security threats and their countermeasures in CR IoVs The QoS parameters and their impact on the performance of the CR IoV ecosystem The targeted audience of this book can be undergraduate and graduate level students researchers scientists academicians and professionals in the industry This book will greatly help the readers to understand the application scenarios the issues and challenges and the possible solutions All the chapters highlight the future research directions that can be taken as research topics for future research

**Cyber Security and Digital Forensics** Nihar Ranjan Roy, Amit

Prakash Singh, Pradeep Kumar, Ajay Kaul, 2025-08-23 This book features peer reviewed papers from the International Conference on Recent Developments in Cyber Security organized by the Center for Cyber Security and Cryptology It focuses on key topics such as information privacy and secrecy cryptography cyber threat intelligence and mitigation cyber physical systems quantum cryptography and blockchain technologies and their applications This volume is a unique collection of chapters from various disciplines united by a common theme making it immensely valuable for both academic researchers and industry practitioners

**Advances in Computing and Information Technology** Natarajan

Meghanathan, Dhinaharan Nagamalai, Nabendu Chaki, 2012-06-30 The international conference on Advances in Computing and Information technology ACITY 2012 provides an excellent international forum for both academics and professionals for sharing knowledge and results in theory methodology and applications of Computer Science and Information Technology The Second International Conference on Advances in Computing and Information technology ACITY 2012 held in Chennai India during July 13 15 2012 covered a number of topics in all major fields of Computer Science and Information Technology including networking and communications network security and applications web and internet computing ubiquitous computing algorithms bioinformatics digital image processing and pattern recognition artificial intelligence soft computing and applications Upon a strength review process a number of high quality presenting not only innovative ideas but also a founded evaluation and a strong argumentation of the same were selected and collected in the present proceedings that is

composed of three different volumes      **Digital Technologies and Applications** Saad Motahhir, Badre Bossoufi, 2021-06-26 This book gathers selected research papers presented at the First International Conference on Digital Technologies and Applications ICDTA 21 held at Sidi Mohamed Ben Abdellah University Fez Morocco on 29-30 January 2021 highlighting the latest innovations in digital technologies as artificial intelligence Internet of things embedded systems network technology information processing and their applications in several areas such as hybrid vehicles renewable energy robotic and COVID 19 The respective papers encourage and inspire researchers industry professionals and policymakers to put these methods into practice      **Evolutionary Computing and Mobile Sustainable Networks** V. Suma, Xavier Fernando, Ke-Lin Du, Haoxiang Wang, 2022-03-21 This book mainly reflects the recent research works in evolutionary computation technologies and mobile sustainable networks with a specific focus on computational intelligence and communication technologies that widely ranges from theoretical foundations to practical applications in enhancing the sustainability of mobile networks Today network sustainability has become a significant research domain in both academia and industries present across the globe Also the network sustainability paradigm has generated a solution for existing optimization challenges in mobile communication networks Recently the research advances in evolutionary computing technologies including swarm intelligence algorithms and other evolutionary algorithm paradigms are considered as the widely accepted descriptors for mobile sustainable networks virtualization optimization and automation To deal with the emerging impacts on mobile communication networks this book discusses about the state of the research works on developing a sustainable design and their implementation in mobile networks With the advent of evolutionary computation algorithms this book contributes varied research chapters to develop a new perspective on mobile sustainable networks

**Smart Card Research and Advanced Applications** Josep Domingo-Ferrer, 2006-04-03 This volume constitutes the refereed proceedings of the 7th International Conference on Smart Card Research and Advanced Applications CARDIS 2006 held in Tarragona Spain in April 2006 The 25 revised full papers presented were carefully reviewed and updated for inclusion in this book The papers are organized in topical sections on smart card applications side channel attacks smart card networking cryptographic protocols RFID security and formal methods      **Mathematics Today**, 1998      Acta scientiarum naturalium, Universitatis Amoiensis, 2005      **Index to Theses with Abstracts Accepted for Higher Degrees by the Universities of Great Britain and Ireland and the Council for National Academic Awards**, 2003 Theses on any subject submitted by the academic libraries in the UK and Ireland      **Mathematical Reviews**, 2008      The British National Bibliography Arthur James Wells, 2005      Graduate Courses and Programs Iowa State University, 1997      An Enhancement of Elliptical Curve Cryptography for the Resource Constrained Wireless Sensor Network Pritam Gajkumar Shah, 2010 Abstract Analysis and mathematical modeling of Elliptical Curve Cryptography ECC is investigated in this thesis in regard to the Wireless Sensor Networks WSN Novel approaches combining use of mixed coordinate system recoding of integer with One

s Complement Subtraction OCS method OCS window method to avoid Special Power Analysis SPA attacks use of Dynamic Window method to avoid node failure and use of hidden generator point to avoid man in the middle attack and use of uni coordinate public key for WSN have been proposed These six innovative novel and industrially applicable algorithms are demonstrated which significantly improve performance of scalar multiplication processes on WSN and demonstrated to achieve node authenticity data integrity confidentiality on 8 bit microcontroller of sensor node These claims are validated using simulation results obtained on MIRACL crypto library and using MATLAB analysis appropriately provided wherever necessary

*ELLIPTIC CURVE CRYPTOGRAPHY (ECC) KEY GENERATION, ENCRYPTION, DECRYPTION, AND DIGITAL SIGNATURES: LEARN BY EXAMPLES WITH PYTHON AND TKINTER* Vivian Siahaan, Rismon Hasiholan Sianipar, 2024-08-30

This book is dedicated to the development of a sophisticated and feature rich Tkinter GUI that leverages Elliptic Curve Cryptography ECC for various cryptographic operations including key generation encryption decryption signing and verifying data The primary goal is to create an interactive application that allows users to perform these operations on synthetic financial data demonstrating the practical use of ECC in securing sensitive information The GUI is meticulously designed with multiple tabs each corresponding to a different cryptographic function enabling users to navigate through key generation data encryption decryption and digital signature processes seamlessly The GUI starts with the key generation tab where users can generate ECC key pairs These key pairs are essential for the subsequent encryption and signing operations The GUI provides feedback on the generated keys displaying the public and private keys in hexadecimal format This feature is crucial for understanding the foundational role of ECC in modern cryptography where small key sizes provide strong security The key generation process also highlights the advantages of ECC over traditional RSA particularly in terms of efficiency and security per bit length In the encryption and decryption tab the GUI enables users to encrypt synthetic financial data using the previously generated ECC keys The encryption process is performed using AES in Cipher Feedback CFB mode with the AES key derived from the ECC private key through key derivation functions This setup showcases the hybrid approach where ECC is used for key exchange or key derivation and AES is employed for the actual encryption of data The GUI displays the generated ciphertext in a hexadecimal format along with the Initialization Vector IV used in the encryption process providing a clear view of how the encrypted data is structured The signing and verifying tab demonstrates the use of ECC for digital signatures Here users can sign the synthetic financial data using the ECDSA Elliptic Curve Digital Signature Algorithm a widely recognized algorithm for ensuring data integrity and authenticity The GUI displays the generated digital signature in hexadecimal format offering insights into how ECC is applied in real world scenarios like secure messaging and digital certificates The verification process where the signature is checked against the original data using the ECC public key is also integrated into the GUI emphasizing the importance of digital signatures in verifying data authenticity The synthetic financial data used in these operations is generated within the GUI simulating

transaction records that include fields such as transaction ID account number amount currency timestamp and transaction type This dataset is crucial for demonstrating the encryption and signing processes in a context that mirrors real world financial systems By encrypting and signing this data users can understand how ECC can be applied to protect sensitive information in financial transactions ensuring both confidentiality and integrity Finally the GUI s design incorporates user friendly elements such as scrolled text widgets for displaying long hexadecimal outputs entry fields for user inputs and clear labels for guiding the user through each cryptographic operation The application provides a comprehensive and interactive learning experience allowing users to explore the intricacies of ECC in a controlled environment By integrating ECC with AES for encryption and ECDSA for signing the GUI offers a practical demonstration of how modern cryptographic techniques can be combined to secure data making it an invaluable tool for anyone looking to understand or teach the principles of ECC based cryptography

**Guide to Elliptic Curve Cryptography** Darrel Hankerson, Alfred J. Menezes, Scott

Vanstone, 2006-06-01 After two decades of research and development elliptic curve cryptography now has widespread exposure and acceptance Industry banking and government standards are in place to facilitate extensive deployment of this efficient public key mechanism Anchored by a comprehensive treatment of the practical aspects of elliptic curve cryptography ECC this guide explains the basic mathematics describes state of the art implementation methods and presents standardized protocols for public key encryption digital signatures and key establishment In addition the book addresses some issues that arise in software and hardware implementation as well as side channel attacks and countermeasures Readers receive the theoretical fundamentals as an underpinning for a wealth of practical and accessible knowledge about efficient application Features Benefits Breadth of coverage and unified integrated approach to elliptic curve cryptosystems Describes important industry and government protocols such as the FIPS 186 2 standard from the U S National Institute for Standards and Technology Provides full exposition on techniques for efficiently implementing finite field and elliptic curve arithmetic Distills complex mathematics and algorithms for easy understanding Includes useful literature references a list of algorithms and appendices on sample parameters ECC standards and software tools This comprehensive highly focused reference is a useful and indispensable resource for practitioners professionals or researchers in computer science computer engineering network design and network data security

**Advances in Elliptic Curve Cryptography** Ian F. Blake, Gadiel

Seroussi, Nigel P. Smart, 2005-04-25 This second volume addresses tremendous progress in elliptic curve cryptography since the first volume *Elliptic Curves and Their Applications to Cryptography* Andreas Enge, 1999-08-31 Since their invention in the late seventies public key cryptosystems have become an indispensable asset in establishing private and secure electronic communication and this need given the tremendous growth of the Internet is likely to continue growing Elliptic curve cryptosystems represent the state of the art for such systems *Elliptic Curves and Their Applications to Cryptography* An Introduction provides a comprehensive and self contained introduction to elliptic curves and how they are employed to

secure public key cryptosystems Even though the elegant mathematical theory underlying cryptosystems is considerably more involved than for other systems this text requires the reader to have only an elementary knowledge of basic algebra The text nevertheless leads to problems at the forefront of current research featuring chapters on point counting algorithms and security issues The Adopted unifying approach treats with equal care elliptic curves over fields of even characteristic which are especially suited for hardware implementations and curves over fields of odd characteristic which have traditionally received more attention Elliptic Curves and Their Applications An Introduction has been used successfully for teaching advanced undergraduate courses It will be of greatest interest to mathematicians computer scientists and engineers who are curious about elliptic curve cryptography in practice without losing the beauty of the underlying mathematics

**Handbook of Elliptic and Hyperelliptic Curve Cryptography** Henri Cohen, Gerhard Frey, Roberto Avanzi, Christophe Doche, Tanja Lange, Kim Nguyen, Frederik Vercauteren, 2005-07-19 The discrete logarithm problem based on elliptic and hyperelliptic curves has gained a lot of popularity as a cryptographic primitive The main reason is that no subexponential algorithm for computing discrete logarithms on small genus curves is currently available except in very special cases Therefore curve based cryptosystems require much smaller key sizes than RSA to attain the same security level This makes them particularly attractive for implementations on memory restricted devices like smart cards and in high security applications The Handbook of Elliptic and Hyperelliptic Curve Cryptography introduces the theory and algorithms involved in curve based cryptography After a very detailed exposition of the mathematical background it provides ready to implement algorithms for the group operations and computation of pairings It explores methods for point counting and constructing curves with the complex multiplication method and provides the algorithms in an explicit manner It also surveys generic methods to compute discrete logarithms and details index calculus methods for hyperelliptic curves For some special curves the discrete logarithm problem can be transferred to an easier one the consequences are explained and suggestions for good choices are given The authors present applications to protocols for discrete logarithm based systems including bilinear structures and explain the use of elliptic and hyperelliptic curves in factorization and primality proving Two chapters explore their design and efficient implementations in smart cards Practical and theoretical aspects of side channel attacks and countermeasures and a chapter devoted to pseudo random number generation round off the exposition The broad coverage of all important areas makes this book a complete handbook of elliptic and hyperelliptic curve cryptography and an invaluable reference to anyone interested in this exciting field

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