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Ethical and Secure Computing

A Concise Module

Second Edition

Springer

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Preface

Following new technological developments is like climbing a mountain shrouded in early morning mist always expecting to crest at every forward step but never cresting. Yet we don't give up. We have gotten involved, to almost a point of enslavement, yet we keep on moving always expecting more and better as dire warnings of overuse fly just pass us. The overwhelming growth of technology and its ability to give us unlimited powers making us able to do things unthinkable just a few years past is equally creating as much excitement as it creates security scares and bewilderment. Tremendous technological advances have been registered across the board from telecommunication to computing with jaw-dropping developments. Along the way, these developments are creating an unprecedented convergence of communications and computing platform technologies that are reaching into all remote corners of the world, bringing the poor and less affluent on a par with the rest of the developed world. These new technological developments have created new communities and ecosystems that are themselves evolving, in flux and difficult to secure and with questionable, if not evolving ethical systems that will take time to learn, if it remains constant at all. Because of these rapid and unpredictable changes, I found my previous edition, *Ethics in Computing: A Concise Module*, in need of a review and an update. Without losing my focus and flavor of the previous edition, I have selectively updated the content of the chapters, adding new ones and clarifying the message that a time is coming, if not already here, when we, as individuals and as nations, will become totally dependent on computing technology. Evidence of this is embodied in the rapid convergence of telecommunication, broadcasting, computing and mobile devices, the miniaturization of these devices, the ever-growing ubiquity of computing, the speed of computation, and ease of use. These technology characteristics have been a big pulling force sucking in millions of new users every day, sometimes even those who are unwilling. Other appealing features of technology are ever-growing pervasiveness and applications both good and bad. Whether small or big, devices based on the growing ability of the changing technology have become the centerpiece of an individual's social and economic activities, the main access point for all information and the empowerment of the device owners. Individuals aside, computing technology has also become the engine that drives the nations' strategic and security infrastructures that control power grids, gas and oil storage facilities, transportation, and all forms of national communication, including emergency services. These developments have elevated the cyberspace ecosystem as the most crucial economic and security environment of nations requiring an *ethical and secure computing environment*.

As we look for ethical and secure computing strategies, the technological race is picking up speed with new technologies that make our efforts and existing protocols on which these strategies based obsolete in shorter and shorter periods. All these illustrate the speed at which the computing environment is changing and demonstrate a need for continuous review of our defensive strategies and more importantly a need for a strong *ethical and secure framework* in our computer, information, and engineering science education. This has been and will continue to be the focus of all my writings on this topic, and it is and remains so in this second edition.

Chapter Overview

This second edition is divided into twelve chapters as follows:

Chapter 1—**Morality and the Law** defines and examines the personal and public morality, identifying assumptions and values of the law, looking at both conventional and natural laws, and the intertwining of morality and the law. It, together with Chap. 3, gives the reader the philosophical framework needed for the remainder of the book.

Chapter 2—**Ethics and Ethical Analysis** sets up the philosophical framework and analysis tools for the book discussing moral theories and problems in ethical relativism. Based on these and in light of the rapid advances in technology, the chapter discusses the moral and ethical premises and their corresponding values in the changing technology arena.

Chapter 3—**Ethics and the Professions** examines the changing nature of the professions and how they cope with the impact of technology on their fields. An ethical framework to help in decision making is developed professional and ethical responsibilities based on community values and the law are also discussed. And social issues including harassment and discrimination are thoroughly covered.

Chapter 4—**Anonymity, Security, and Privacy and Civil Liberties** surveys the traditional ethical issues of privacy, security, anonymity and analyzes how these issues are affected by computer technology. Information gathering, databasing, and civil liberties are also discussed.

Chapter 5—**Intellectual Property Rights and Computer Technology** discusses the foundations of intellectual property rights and how computer technology has influenced and continues to influence and change the traditional issues of property rights, in particular intellectual property rights.

Chapter 6—**Social Context of Computing** considers the three main social issues in computing, namely the digital divide, workplace issues like employee monitoring, and health risks, and how these issues are changing with the changing computer technology.

Chapter 7—**Software Issues: Risks and Liabilities** revisits property rights, responsibility, and accountability with a focus on computer software. The risks and liabilities associated with software and risk assessment are also discussed.

Chapter 8—**Computer Crimes** surveys the history and examples of computer crimes, their types, costs on society, and strategies of detection and prevention.

Chapter 9—**Cyberbullying** discusses the growing threat and the effects of repeated deliberate harm or harassment of other people by using electronic technology that may include devices and equipment such as cell phones, computers, and tablets as well as communication tools including social media sites, text messages, chat, and Web sites.

Chapter 10—**Evolving Realities: Ethical and Secure Computing in the New Technological Spaces** discusses the new frontiers of ethical and secure computing in the new technological spaces that include intelligent and virtualization technologies, virtual spaces and realities, and their effects on the traditional ethical and social fabric of society.

Chapter 11—**Ethical, Privacy, and Security Issues in Online Social Network Ecosystem** discusses the new realities of global computer social network ecosystems, global linguistic, cultural, moral, and ethical dynamics, and their impact on our traditional and cherished moral and ethical systems.

Chapter 12—**Evolving Cyberspace: The Marriage of 5G and the Internet of Things (IoT) Technologies (New)** discusses the new frontiers of ethical and secure computing in the new and developing Internet–user interface whose protocols, policies, and standards are yet to be defined, discussed, and accepted by the scientific and user communities. We will explore how this new interface has created an ethical and security quagmire and how this is affecting our traditional ethical and social systems.

Audience

The book satisfies the following ACM/IEEE Curricula (i) CS-Computer Science Curriculum 2015 and (ii) CS-Information Technology Curriculum 2017 (https://www.acm.org/binaries/content/assets/education/curricula-recommendations/it2017.pdf). In summary, all these curricula emphasize the student's understanding of the basic cultural, social, legal, and ethical issues inherent in the discipline of computing. To achieve this, the student must:

- understand where the discipline has been, where it is, and where it is heading.
- understand the individual roles in this process, as well as appreciate the philosophical questions, technical problems, and aesthetic values that play an important part in the development of the discipline.
- develop the ability to ask serious questions about the social impact of computing and to evaluate the proposed answers to those questions.

- be aware of the basic legal rights of software and hardware vendors and users, and they also need to appreciate the ethical values that are the basis for those rights.

Students in related disciplines like computer information and information management systems, and library sciences will also find this book informative.

The book is also good for computer science practitioners who must practice the principles embedded in the curricula based on understanding:

- the responsibility that they bear and the possible consequences of failure.
- their own limitations as well as the limitations of their tools.

The book is also good for anyone interested in knowing how ethical and social issues like privacy, civil liberties, security, anonymity, and workplace issues like harassment and discrimination are affecting the new computerized environment.

In addition, anybody interested in reading about computer networking, mobile computing, social networking, information security, and privacy will also find the book very helpful.

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Chattanooga, TN, USA Joseph Migga Kizza
2018

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