

Computing for Human Services

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Electrical and Computer Engineering-IIUM University

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Book Contents

Chapter No	Chapter Title, Author(s)	Page No
	Book Contents	v
	Preface	ix

Part I

Computing to Serve Educational Aspects

Chapter 1	Status of Higher Education in Developing and Islamic World, <i>Shihab A. Hameed</i>	3
Chapter 2	Planning the Future of Higher Education in Developing and Islamic World, <i>Shihab A. Hameed</i>	13
Chapter 3	Internet Impact on Education, <i>Shihab A. Hameed</i>	21
Chapter 4	Eliminating Internet Weakness in Education, <i>Shihab A. Hameed</i>	29
Chapter 5	Computing Role in Educating Deaf Children, <i>Haidawati Mohamad Nasir, Othman Omran Khalifa, Shihab A. Hameed</i>	37
Chapter 6	Management of Research and Development in Educational Organizations, <i>Rashid A. Saeed, Othman O. Khalifa, Aisha Hassan, Shihab A. Hameed</i>	43
Chapter 7	Computer Implementable Quick Fourier Transform (QFT) for Engineering Educators <i>Abdulfattah A. Aboaba, Shihab A. Hameed, Othman O. Khalifa, Aisha H. Abdalla, Ado Dan-Isa, Jubril D. Jiya., James Katende, Abdulfattah B. Mustapha, & Abdullahi L. Amoo</i>	53
Chapter 8	Virtual-Learning Content Management System Using Problem-Based Learning (PBL), <i>Norul Ashikin Bt Abu Kasim, Teddy Surya Gunawan</i>	63
Chapter 9	Development of Final Year Project Portal for Engineering Program, <i>Teddy Surya Gunawan, Abdul Mutholib, Mira Kartiwi</i>	71

Part II
Computing to Serve Ethical, Social, and Environmental Aspects

Chapter 10	Software Engineering and Ethical Values, <i>Shihab A. Hameed</i>	83
Chapter 11	New Model for Software Engineering Ethical Principles <i>Shihab A. Hameed</i>	91
Chapter 12	Hajj and Information Technologies: Analytical Study, <i>Shihab A. Hameed</i>	101
Chapter 13	Framework for Comprehensive Hajj Model with ICT, <i>Shihab A. Hameed</i>	109
Chapter 14	RFID for Hajj Identification Guide Information and Personnel Announcement, <i>Dzul I'zzat Bin Julaihi, Ahmad F. Abdul Rahman, Othman O. Khalifa</i>	121
Chapter 15	Development of Online Application for Muslim Traveler with UML Diagram, <i>Teddy Surya Gunawan, Afif Abul Fattah Che Omar, Shihab A. Hameed, Mira Kartiwi</i>	133
Chapter 16	Computers and Electronic Devices Waste: Fundamental Facts <i>Shihab A. Hameed</i>	139
Chapter 17	Computers and Electronic Devices Waste: Analysis and Solution, <i>Shihab A. Hameed</i>	149
Chapter 18	ICT and Environmental Problem, <i>Shihab A. Hameed</i>	157
Chapter 19	Strategy for Green ICT: An Islamic View, <i>Shihab A. Hameed</i>	165

Part III
Computing to Serve Healthcare and Medical Aspects

Chapter 20	Fundamental to Medical Data Centre, <i>Shihab A. Hameed, Waleed A. Badurik</i>	175
Chapter 21	Network Based Telemedicine for Fetal ECG Monitoring, <i>M. I. Ibrahimy, S. M. A. Motakabber</i>	185
Chapter 22	Electronic Patient Medical Record to facilitate Patient Monitoring, <i>Shihab A. Hameed, Shazana Mustafa, Aina Mardhiyah, Vladimer Miho, Aisha Hassan</i>	195

Chapter 23	Developing EPMR to Serve Effective Patient Monitoring Database, <i>Shihab A. Hameed, Shazana Mustafa, Aina Mardhiyah, Vladimer Miho</i>	203
Chapter 24	Interactive Web-Based Model for Medical Emergency, <i>Shihab A. Hameed, Shahina shabnam, Nur hafizah Chek Nuh , Nur Huda Bt Salim</i>	209
Chapter 25	Mobile Web Model to Serve Healthcare, <i>Shihab A. Hameed, Vladimer Miho</i>	221
Chapter 26	SMS to Facilitate Healthcare and Emergency, <i>Shihab A. Hameed, Shahina Shabnam Bt Mohd Sharifudeen, Nur hafizah Chek Nuh , Nur Huda Bt Salim, Aisha Hassan, Othman Khalifa</i>	229

Part IV

Computing to Serve Security and Privacy Aspects

Chapter 27	Wireless Technology to Scure Emergency and Guidance, <i>Shihab A. Hameed, B. A. Aliyu</i>	237
Chapter 28	Authentication Enhancement for Medical Data Centers, <i>Shihab A. Hameed, Waleed A. Badurik</i>	245
Chapter 29	Integrated Authentication Model: Face Verification, <i>Shihab A. Hameed, Waleed A. Badurik</i>	255
Chapter 30	Confidentiality to Service Medical Emergency Model, <i>Shihab A. Hameed, Habib Yuchoh, Wajdi F. Al-Khateeb</i>	261
Chapter 31	Fundamental to Password based security <i>Shihab A. Hameed, Ahmed Fathi Zainazlan, Herman Sazwan nor rahim</i>	269
Chapter 32	Graphical Password Security Model, <i>Shihab A. Hameed, Ahmed Fathi Zainazlan, Herman Sazwan nor rahim</i>	277
Chapter 33	Automobile Monitoring and Tracking, <i>Shihab A. Hameed, Othman Khalifa, Aisha Hassan</i>	287

Part V
Computing to Serve Industrial and other Aspects

Chapter 34	Speech to Text to Sign Language, <i>Khalid Khalil Kamil, Othman O. Khalifa</i>	297
Chapter 35	Speech to Sign Language Interpreter System (SSLIS), <i>Khalid Khalil El-Darymli, Othman O. Khalifa and Hassan Enemosah</i>	313
Chapter 36	Speech Codec for a Voice over IP (VoIP) Systems, <i>Othman O. Khalifa, Shihab A. Hameed</i>	323
Chapter 37	Reconfigurable Platform in Embedded System, <i>Amelia Wong Azman</i>	329
Chapter 38	Smart Grid Communication Layer, <i>Norulhuda Lokeman, Norizan Mohd Hassan, Sigit PW Jarot</i>	337

Chapter 37

Reconfigurable Platform in Embedded System

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37.1. Introduction to Embedded Systems

In recent decades, advancements in the semiconductor industry have stimulated tremendous growth in embedded system designs. In particular, it has had a significant impact on the way designers select the target platform for their embedded system. Before reconfigurable platforms, ASICs have been the dominant processing platform solution. However, as the number of transistors on an integrated circuit increases, more complex features have been able to be incorporated on the reconfigurable platforms making way for reconfigurable platform. In this chapter we will discuss on FPGA platform as the targeted architecture for embedded system.

In general, an embedded system can be defined as a special purpose computer dedicated to perform specific and predefined tasks¹. In other words, a System-on-Chip (SoC) that is programmed for a dedicated task will result in an embedded system. For a system to be called an embedded system, it must satisfy most of the following requirements (Noegaard, 2005):

- a) **Specific task:** As opposed to a general purpose processor, an embedded system is always designed for a specific purpose.
- b) **Low cost:** Because an embedded system only performs dedicated tasks, it is only useful if the cost is lower than a general purpose device.
- c) **Performance and size:** In order to produce an embedded system at a lower cost, this has an inadvertent effect on the performance of an embedded system. At the same time, this performance restriction has made an embedded system typically small.
- d) **Software and operating system:** The software that runs in the embedded systems is known as the firmware. This firmware together with any requirement of an embedded operating system resides on ROM (read only memory) since its task never changes. Some commonly used real-time OS for embedded systems are the Symbian, RTLinux and Windows CE.

¹ <http://www.embedsystems.com/>