

# FUNDAMENTALS OF COMPUTING

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THE IDENTITY OF COMPUTING HAS BEEN FIERCELY DEBATED THROUGHOUT ITS SHORT HISTORY WHY IS IT STILL SO HARD TO DEFINE COMPUTING  
AS AN ACADEMIC DISCIPLINE IS COMPUTING A SCIENTIFIC MATHEMATICAL OR ENGINEERING DISCIPLINE BY DESCRIBING THE MATHEMATICAL ENGINEERING  
AND SCIENTIFIC TRADITIONS OF COMPUTING THE SCIENCE OF COMPUTING SHAPING A DISCIPLINE PRESENTS A RICH PICTURE OF COMPUTING FROM  
THE VIEWPOINTS OF THE FIELD S CHAMPIONS THE BOOK HELPS READERS UNDERSTAND THE DEBATES ABOUT COMPUTING AS A DISCIPLINE IT  
EXPLAINS THE CONTEXT OF COMPUTING S CENTRAL DEBATES AND PORTRAYS A BROAD PERSPECTIVE OF THE DISCIPLINE THE BOOK FIRST LOOKS  
AT COMPUTING AS A FORMAL THEORETICAL DISCIPLINE THAT IS IN MANY WAYS SIMILAR TO MATHEMATICS YET DIFFERENT IN CRUCIAL WAYS IT  
TRACES A NUMBER OF DISCUSSIONS ABOUT THE THEORETICAL NATURE OF COMPUTING FROM THE FIELD S INTELLECTUAL ORIGINS IN  
MATHEMATICAL LOGIC TO MODERN VIEWS OF THE ROLE OF THEORY IN COMPUTING THE BOOK THEN EXPLORES THE DEBATES ABOUT COMPUTING  
AS AN ENGINEERING DISCIPLINE FROM THE CENTRAL TECHNICAL INNOVATIONS TO THE BIRTH OF THE MODERN TECHNICAL PARADIGM OF COMPUTING  
TO COMPUTING S ARRIVAL AS A NEW TECHNICAL PROFESSION TO SOFTWARE ENGINEERING GRADUALLY BECOMING AN ACADEMIC DISCIPLINE IT  
PRESENTS ARGUMENTS FOR AND AGAINST THE VIEW OF COMPUTING AS ENGINEERING WITHIN THE CONTEXT OF SOFTWARE PRODUCTION AND  
ANALYZES THE CLASH BETWEEN THE THEORETICAL AND PRACTICAL MINDSETS THE BOOK CONCLUDES WITH THE VIEW OF COMPUTING AS A  
SCIENCE IN ITS OWN RIGHT NOT JUST AS A TOOL FOR OTHER SCIENCES IT COVERS THE EARLY IDENTITY DEBATES OF COMPUTING VARIOUS

VIEWS OF COMPUTING AS A SCIENCE AND SOME FAMOUS CHARACTERIZATIONS OF THE DISCIPLINE IT ALSO ADDRESSES THE EXPERIMENTAL COMPUTER SCIENCE DEBATE THE VIEW OF COMPUTING AS A NATURAL SCIENCE AND THE ALGORITHMIZATION OF SCIENCES

OVERVIEW THE OBJECTIVE OF THIS BOOK IS TO PROVIDE AN INTRODUCTION INTO SOME OF THE KEY TOPICS IN THE HISTORY OF COMPUTING THE COMPUTING ELDER IS A VAST AREA AND A TRULY COMPREHENSIVE ACCOUNT OF ITS HISTORY WOULD REQUIRE SEVERAL VOLUMES THE AIMS OF THIS BOOK ARE MORE MODEST AND ITS GOALS ARE TO GIVE THE READER A TASTE OF SOME OF THE KEY TOPICS AND EVENTS IN THE HISTORY OF COMPUTING IT IS HOPED THAT THIS WILL STIMULATE THE INTERESTED READER TO STUDY THE MORE ADVANCED BOOKS AND ARTICLES AVAILABLE THE HISTORY OF COMPUTING HAS ITS ORIGINS IN THE DAWN OF CIVILIZATION EARLY HUNTER GATHERER SOCIETIES NEEDED TO BE ABLE TO PERFORM ELEMENTARY CALCULATIONS SUCH AS COUNTING AND ARITHMETIC AS SOCIETIES EVOLVED INTO TOWNS AND COMMUNITIES THERE WAS A NEED FOR MORE SOPHISTICATED CALCULATIONS THIS INCLUDED PRIMITIVE ACCOUNTING TO DETERMINE THE APPROPRIATE TAXATION TO BE LEVIED AS WELL AS THE DEVELOPMENT OF GEOMETRY TO ENABLE BUILDINGS TEMPLES AND BRIDGES TO BE CONSTRUCTED OUR ACCOUNT COMMENCES WITH THE CONTRIBUTIONS OF THE EGYPTIANS AND BABYLONIANS IT MOVES ON TO THE FOUNDATIONAL WORK DONE BY BOOLE AND BABBAGE IN THE NINETEENTH CENTURY AND TO THE IMPORTANT WORK ON BOOLEAN LOGIC AND CIRCUIT DESIGN DONE BY CLAUDE SHANNON IN THE 1930S THE THEORETICAL WORK DONE BY TURING ON COMPUTABILITY IS CONSIDERED AS WELL AS WORK DONE BY VON NEUMANN AND OTHERS ON THE FUNDAMENTAL ARCHITECTURE FOR COMPUTERS

DISCOVER THE HISTORY OF COMPUTING THROUGH 4 MAJOR THREADS OF DEVELOPMENT IN THIS COMPACT ACCESSIBLE HISTORY COVERING PUNCH CARDS SILICON VALLEY SMARTPHONES AND MUCH MORE IN AN ACCESSIBLE STYLE COMPUTER HISTORIAN PAUL CERUZZI OFFERS A BROAD THOUGH DETAILED HISTORY OF COMPUTING FROM THE FIRST USE OF THE WORD DIGITAL IN 1942 TO THE DEVELOPMENT OF PUNCH CARDS AND THE

FIRST GENERAL PURPOSE COMPUTER TO THE INTERNET SILICON VALLEY AND SMARTPHONES AND SOCIAL NETWORKING CERUZZI IDENTIFIES 4 MAJOR THREADS THAT RUN THROUGHOUT ALL OF COMPUTING S TECHNOLOGICAL DEVELOPMENT DIGITIZATION THE CODING OF INFORMATION COMPUTATION AND CONTROL IN BINARY FORM THE CONVERGENCE OF MULTIPLE STREAMS OF TECHNIQUES DEVICES AND MACHINES THE STEADY ADVANCE OF ELECTRONIC TECHNOLOGY AS CHARACTERIZED FAMOUSLY BY MOORE S LAW HUMAN MACHINE INTERFACE THE HISTORY OF COMPUTING COULD BE TOLD AS THE STORY OF HARDWARE AND SOFTWARE OR THE STORY OF THE INTERNET OR THE STORY OF SMART HAND HELD DEVICES IN THIS CONCISE AND ACCESSIBLE ACCOUNT OF THE INVENTION AND DEVELOPMENT OF DIGITAL TECHNOLOGY CERUZZI OFFERS A GENERAL AND MORE USEFUL PERSPECTIVE FOR STUDENTS OF COMPUTER SCIENCE AND HISTORY

GIVES STUDENTS A FIRM ROOTING IN THE FUNDAMENTAL PRINCIPLES OF COMPUTER SCIENCE AND AN APPRECIATION OF THE CORRELATION BETWEEN THOSE PRINCIPLES AND AN INTRODUCTION TO PROGRAMMING MAINTAINS STRONG COVERAGE OF THE TOPICS TAUGHT IN THE TRADITIONAL INTRODUCTORY COURSES INCLUDING ALGORITHMS AND BASIC ELEMENTS OF PROGRAMMING LANGUAGES AND THEN GOES FURTHER TO INTRODUCE HIGHER LEVEL TOPICS SUCH AS THE STRUCTURES OF OPERATING SYSTEMS DATABASES AND PRODUCTIVITY TOOLS

A NEW FRAMEWORK FOR UNDERSTANDING COMPUTING A COHERENT SET OF PRINCIPLES SPANNING TECHNOLOGIES DOMAINS ALGORITHMS ARCHITECTURES AND DESIGNS COMPUTING IS USUALLY VIEWED AS A TECHNOLOGY FIELD THAT ADVANCES AT THE BREAKNECK SPEED OF MOORE S LAW IF WE TURN AWAY EVEN FOR A MOMENT WE MIGHT MISS A GAME CHANGING TECHNOLOGICAL BREAKTHROUGH OR AN EARTHSHAKING THEORETICAL DEVELOPMENT THIS BOOK TAKES A DIFFERENT PERSPECTIVE PRESENTING COMPUTING AS A SCIENCE GOVERNED BY FUNDAMENTAL PRINCIPLES THAT SPAN ALL TECHNOLOGIES COMPUTER SCIENCE IS A SCIENCE OF INFORMATION PROCESSES WE NEED A NEW LANGUAGE TO DESCRIBE THE SCIENCE AND IN THIS BOOK PETER DENNING AND CRAIG MARTELL OFFER THE GREAT PRINCIPLES FRAMEWORK AS JUST SUCH A

LANGUAGE THIS IS A BOOK ABOUT THE WHOLE OF COMPUTING ITS ALGORITHMS ARCHITECTURES AND DESIGNS DENNING AND MARTELL DIVIDE THE GREAT PRINCIPLES OF COMPUTING INTO SIX CATEGORIES COMMUNICATION COMPUTATION COORDINATION RECOLLECTION EVALUATION AND DESIGN THEY BEGIN WITH AN INTRODUCTION TO COMPUTING ITS HISTORY ITS MANY INTERACTIONS WITH OTHER FIELDS ITS DOMAINS OF PRACTICE AND THE STRUCTURE OF THE GREAT PRINCIPLES FRAMEWORK THEY GO ON TO EXAMINE THE GREAT PRINCIPLES IN DIFFERENT AREAS INFORMATION MACHINES PROGRAMMING COMPUTATION MEMORY PARALLELISM QUEUEING AND DESIGN FINALLY THEY APPLY THE GREAT PRINCIPLES TO NETWORKING THE INTERNET IN PARTICULAR GREAT PRINCIPLES OF COMPUTING WILL BE ESSENTIAL READING FOR PROFESSIONALS IN SCIENCE AND ENGINEERING FIELDS WITH A COMPUTATIONAL BRANCH FOR PRACTITIONERS IN COMPUTING WHO WANT OVERVIEWS OF LESS FAMILIAR AREAS OF COMPUTER SCIENCE AND FOR NON COMPUTER SCIENCE MAJORS WHO WANT AN ACCESSIBLE ENTRY WAY TO THE FIELD

THIS WORK DERIVES FROM A CONFERENCE DISCUSSING THE HISTORY OF COMPUTING IN EDUCATION THIS CONFERENCE IS THE FIRST OF HOPEFULLY A SERIES OF CONFERENCES THAT WILL TAKE PLACE WITHIN THE INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING IFIP AND HENCE WE DESCRIBE IT AS THE FIRST CONFERENCE ON THE HISTORY OF COMPUTING IN EDUCATION HCE<sup>1</sup> THESE PROCEEDINGS REPRESENT A COLLECTION OF WORKS PRESENTED AT THE HCE<sup>1</sup> CONFERENCE HELD IN ASSOCIATION WITH THE IFIP 2004 WORLD COMPUTER CONGRESS HELD IN TOULOUSE FRANCE CONTRIBUTIONS TO THIS VOLUME RANGE FROM A WIDE VARIETY OF EDUCATIONAL PERSPECTIVES AND REPRESENT ACTIVITIES FROM FOUR CONTINENTS THE HCE<sup>1</sup> CONFERENCE REPRESENTS A JOINT EFFORT OF THE IFIP WORKING GROUP 9.7 ON THE HISTORY OF COMPUTING AND THE IFIP TECHNICAL COMMITTEE 3 ON EDUCATION THE HCE<sup>1</sup> CONFERENCE BRINGS TO LIGHT A BROAD SPECTRUM OF ISSUES AND SPANS FOURCONTINENTS IT ILLUSTRATES TOPICS IN COMPUTING EDUCATION AS THEY OCCURRED IN THE EARLY DAYS OF COMPUTING WHOSE RAMIFICATIONS OR OVERTONES REMAIN WITH US TODAY INDEED MANY OF THE EARLY CHALLENGES REMAIN PART OF OUR EDUCATIONAL TAPESTRY MOST LIKELY MANY WILL EVOLVE INTO FUTURE CHALLENGES THEREFORE THIS WORK PROVIDES ADDITIONAL VALUE TO THE READER AS

IT WILL REFLECT IN PART THE FUTURE DEVELOPMENT OF COMPUTING IN EDUCATION TO STIMULATE NEW IDEAS AND MODELS IN EDUCATIONAL DEVELOPMENT

TODAY COMPUTERS SHAPE EVERY ASPECT OF OUR LIVES IN OUR POCKETS WE CARRY MOBILE PHONES WITH COMPUTING POWER THAT WAS UNIMAGINABLE JUST 50 YEARS AGO MANY INDUSTRIES ARE EMBRACING THE PROMISES AND THE RISKS OF ARTIFICIAL INTELLIGENCE THE WORLD IS CHANGING FASTER THAN EVER AND COMPUTING IS AT THE HEART OF TECHNOLOGICAL DEVELOPMENT DERMOT TURING EXPLORES THE HISTORY OF THIS RAPIDLY EVOLVING TECHNOLOGY FROM THE CHARLES BABBAGE AND HIS EXPERIMENTS WITH STEAM POWERED CALCULATORS TO THE COMPUTERISED GO CHAMPION ALPHAGO FEATURING WONDERFUL FULL COLOUR IMAGES WHICH ILLUSTRATE THIS HISTORY THE STORY OF COMPUTING IS THE ESSENTIAL GUIDE TO A SUBJECT THAT NONE OF US CAN IGNORE TOPICS INCLUDE THE BIRTH OF THE COMPUTER CODEBREAKING IN WORLD WAR II INNOVATIONS IN HARDWARE AND SOFTWARE ARTIFICIAL INTELLIGENCE THE INTERNET THE CHALLENGES OF CYBERSECURITY

THIS BOOK PRESENTS A COLLECTION OF META STUDIES REVIEWS AND SCIENTOMETRIC ANALYSES THAT TOGETHER REVEAL A FRESH PICTURE ABOUT THE PAST PRESENT AND FUTURE OF COMPUTING EDUCATION RESEARCH CER AS A FIELD OF SCIENCE THE BOOK BEGINS WITH THREE CHAPTERS THAT DISCUSS AND SUMMARISE META RESEARCH ABOUT THE FOUNDATIONS OF CER ITS DISCIPLINARY IDENTITY AND USE OF RESEARCH METHODOLOGIES AND THEORIES BASED ON THIS THE BOOK PROCEEDS WITH SEVERAL SCIENTOMETRIC ANALYSES WHICH EXPLORE AUTHORS AND THEIR COLLABORATION NETWORKS DISSEMINATION PRACTICES INTERNATIONAL COLLABORATION AND SHIFTS IN RESEARCH FOCUS OVER THE YEARS ANALYSES OF DISSEMINATION ARE DEEPENED IN TWO CHAPTERS THAT FOCUS ON SOME OF THE MOST INFLUENTIAL PUBLICATION VENUES OF CER THE BOOK ALSO CONTAINS A SERIES OF COUNTRY OR REGION LEVEL ANALYSES INCLUDING CHAPTERS THAT FOCUS ON THE EVOLUTION OF CER

IN THE BALTIC REGION FINLAND AUSTRALASIA ISRAEL AND IN THE UK IRELAND TWO CHAPTERS PRESENT CASE STUDIES OF INFLUENTIAL CER INITIATIVES IN SWEDEN AND NAMIBIA THIS BOOK ALSO INCLUDES CHAPTERS THAT FOCUS ON CER CONDUCTED AT SCHOOL LEVEL AND COVER CRUCIALLY IMPORTANT ISSUES SUCH AS TECHNOLOGY ETHICS ALGORITHMIC BIAS AND THEIR IMPLICATIONS FOR CER IN ALL THIS BOOK CONTRIBUTES TO BUILDING AN UNDERSTANDING OF THE PAST PRESENT AND FUTURE OF CER THIS BOOK ALSO CONTRIBUTES NEW PRACTICAL GUIDELINES HIGHLIGHTS TOPICAL AREAS OF RESEARCH SHOWS WHO TO CONNECT WITH WHERE TO PUBLISH AND GIVES IDEAS OF INNOVATIVE RESEARCH NICHES THE BOOK TAKES A UNIQUE METHODOLOGICAL APPROACH BY PRESENTING A COMBINATION OF META STUDIES SCIENTOMETRIC ANALYSES OF PUBLICATION METADATA AND LARGE SCALE STUDIES ABOUT THE EVOLUTION OF CER IN DIFFERENT GEOGRAPHICAL REGIONS THIS BOOK IS INTENDED FOR EDUCATIONAL PRACTITIONERS RESEARCHERS STUDENTS AND ANYONE INTERESTED IN CER THIS BOOK WAS WRITTEN IN COLLABORATION WITH SOME OF THE LEADING EXPERTS OF THE FIELD

THIS ENGAGING WORK PROVIDES A CONCISE INTRODUCTION TO THE EXCITING WORLD OF COMPUTING ENCOMPASSING THE THEORY TECHNOLOGY HISTORY AND SOCIETAL IMPACT OF COMPUTER SOFTWARE AND COMPUTING DEVICES SPANNING TOPICS FROM GLOBAL CONFLICT TO HOME GAMING INTERNATIONAL BUSINESS AND HUMAN COMMUNICATION THIS TEXT REVIEWS THE KEY CONCEPTS UNPINNING THE TECHNOLOGY WHICH HAS SHAPED THE MODERN WORLD TOPICS AND FEATURES INTRODUCES THE FOUNDATIONS OF COMPUTING THE FUNDAMENTALS OF ALGORITHMS AND THE ESSENTIAL CONCEPTS FROM MATHEMATICS AND LOGIC USED IN COMPUTER SCIENCE PRESENTS A CONCISE HISTORY OF COMPUTING DISCUSSING THE HISTORICAL FIGURES WHO MADE IMPORTANT CONTRIBUTIONS AND THE MACHINES WHICH FORMED MAJOR MILESTONES EXAMINES THE FIELDS OF HUMAN COMPUTER INTERACTION AND SOFTWARE ENGINEERING PROVIDES ACCESSIBLE INTRODUCTIONS TO THE CORE ASPECTS OF PROGRAMMING LANGUAGES OPERATING SYSTEMS AND DATABASES DESCRIBES THE INTERNET REVOLUTION THE INVENTION OF THE SMARTPHONE AND THE RISE OF SOCIAL MEDIA AS WELL AS THE INTERNET OF THINGS AND CRYPTOCURRENCIES EXPLORES LEGAL AND ETHICAL ASPECTS OF COMPUTING INCLUDING

ISSUES OF HACKING AND CYBERCRIME AND THE NATURE OF ONLINE PRIVACY FREE SPEECH AND CENSORSHIP DISCUSSES SUCH INNOVATIONS AS DISTRIBUTED SYSTEMS SERVICE ORIENTED ARCHITECTURE SOFTWARE AS A SERVICE CLOUD COMPUTING AND EMBEDDED SYSTEMS INCLUDES KEY LEARNING TOPICS AND REVIEW QUESTIONS IN EVERY CHAPTER AND A HELPFUL GLOSSARY OFFERING AN ENJOYABLE OVERVIEW OF THE FASCINATING AND BROAD RANGING FIELD OF COMPUTING THIS EASY TO UNDERSTAND PRIMER INTRODUCES THE GENERAL READER TO THE IDEAS ON WHICH THE DIGITAL WORLD WAS BUILT AND THE HISTORICAL DEVELOPMENTS THAT HELPED TO FORM THE MODERN AGE

TRACING THE STORY OF COMPUTING FROM BABYLONIAN COUNTING BOARDS TO SMARTPHONES THIS INSPIRING TEXTBOOK PROVIDES A CONCISE OVERVIEW OF THE KEY EVENTS IN THE HISTORY OF COMPUTING TOGETHER WITH DISCUSSION EXERCISES TO STIMULATE DEEPER INVESTIGATION INTO THIS FASCINATING AREA FEATURES PROVIDES CHAPTER INTRODUCTIONS SUMMARIES KEY TOPICS AND REVIEW QUESTIONS INCLUDES AN INTRODUCTION TO ANALOGUE AND DIGITAL COMPUTERS AND TO THE FOUNDATIONS OF COMPUTING EXAMINES THE CONTRIBUTIONS OF ANCIENT CIVILISATIONS TO THE FIELD OF COMPUTING COVERS THE FIRST DIGITAL COMPUTERS AND THE EARLIEST COMMERCIAL COMPUTERS MAINFRAMES AND MINICOMPUTERS DESCRIBES THE EARLY DEVELOPMENT OF THE INTEGRATED CIRCUIT AND THE MICROPROCESSOR REVIEWS THE EMERGENCE OF HOME COMPUTERS DISCUSSES THE CREATION OF THE INTERNET THE INVENTION OF THE SMARTPHONE AND THE RISE OF SOCIAL MEDIA PRESENTS A SHORT HISTORY OF TELECOMMUNICATIONS PROGRAMMING LANGUAGES OPERATING SYSTEMS SOFTWARE ENGINEERING ARTIFICIAL INTELLIGENCE AND DATABASES

THIS TITLE GIVES STUDENTS AN INTEGRATED AND RIGOROUS PICTURE OF APPLIED COMPUTER SCIENCE AS IT COMES TO PLAY IN THE CONSTRUCTION OF A SIMPLE YET POWERFUL COMPUTER SYSTEM



THIS SECOND EDITION HAS BEEN REVISED AND UPDATED THROUGHOUT TO REFLECT CHANGES IN TECHNOLOGY PARTICULARLY THE MOVE TOWARDS DESKTOP PERSONAL COMPUTERS THE BOOK COVERS BOTH HARDWARE AND SOFTWARE ISSUES AND INCLUDES AN UP TO DATE BUYER S GUIDE WINDOWS EXPANDED COVERAGE OF BUSINESS TOPICS INCLUDING SYSTEMS ANALYSIS AND DESIGN AND COLOUR PHOTO GALLERIES AND ART PART OPENING INTERVIEWS FEATURE BOXES AND MARGIN NOTES

THE HISTORY OF COMPUTING COULD BE TOLD AS THE STORY OF HARDWARE AND SOFTWARE OR THE STORY OF THE INTERNET OR THE STORY OF SMART HAND HELD DEVICES WITH SUBPLOTS INVOLVING IBM MICROSOFT APPLE FACEBOOK AND TWITTER IN THIS CONCISE AND ACCESSIBLE ACCOUNT OF THE INVENTION AND DEVELOPMENT OF DIGITAL TECHNOLOGY COMPUTER HISTORIAN PAUL CERUZZI OFFERS A BROADER AND MORE USEFUL PERSPECTIVE HE IDENTIFIES FOUR MAJOR THREADS THAT RUN THROUGHOUT ALL OF COMPUTING S TECHNOLOGICAL DEVELOPMENT DIGITIZATION THE CODING OF INFORMATION COMPUTATION AND CONTROL IN BINARY FORM ONES AND ZEROS THE CONVERGENCE OF MULTIPLE STREAMS OF TECHNIQUES DEVICES AND MACHINES YIELDING MORE THAN THE SUM OF THEIR PARTS THE STEADY ADVANCE OF ELECTRONIC TECHNOLOGY AS CHARACTERIZED FAMOUSLY BY MOORE S LAW AND THE HUMAN MACHINE INTERFACE CERUZZI GUIDES US THROUGH COMPUTING HISTORY TELLING HOW A BELL LABS MATHEMATICIAN COINED THE WORD DIGITAL IN 1942 TO DESCRIBE A HIGH SPEED METHOD OF CALCULATING USED IN ANTI AIRCRAFT DEVICES AND RECOUNTING THE DEVELOPMENT OF THE PUNCH CARD FOR USE IN THE 1890 U S CENSUS HE DESCRIBES THE ENIAC BUILT FOR SCIENTIFIC AND MILITARY APPLICATIONS THE UNIVAC THE FIRST GENERAL PURPOSE COMPUTER AND ARPANET THE INTERNET S PRECURSOR CERUZZI S ACCOUNT TRACES THE WORLD CHANGING EVOLUTION OF THE COMPUTER FROM A ROOM SIZE ENSEMBLE OF MACHINERY TO A MINICOMPUTER TO A DESKTOP COMPUTER TO A POCKET SIZED SMART PHONE HE DESCRIBES THE DEVELOPMENT OF THE SILICON CHIP WHICH COULD STORE EVER INCREASING AMOUNTS OF DATA AND ENABLED EVER DECREASING DEVICE SIZE HE VISITS THAT HOTBED OF INNOVATION SILICON VALLEY AND BRINGS THE STORY UP TO THE PRESENT WITH THE INTERNET THE WORLD WIDE AND SOCIAL NETWORKING

THIS ENGAGING HISTORY COVERS MODERN COMPUTING FROM THE DEVELOPMENT OF THE FIRST ELECTRONIC DIGITAL COMPUTER THROUGH THE DOT COM CRASH THE AUTHOR CONCENTRATES ON FIVE KEY MOMENTS OF TRANSITION THE TRANSFORMATION OF THE COMPUTER IN THE LATE 1940S FROM A SPECIALIZED SCIENTIFIC INSTRUMENT TO A COMMERCIAL PRODUCT THE EMERGENCE OF SMALL SYSTEMS IN THE LATE 1960S THE BEGINNING OF PERSONAL COMPUTING IN THE 1970S THE SPREAD OF NETWORKING AFTER 1985 AND IN A CHAPTER WRITTEN FOR THIS EDITION THE PERIOD 1995 2001 THE NEW MATERIAL FOCUSES ON THE MICROSOFT ANTITRUST SUIT THE RISE AND FALL OF THE DOT COMS AND THE ADVENT OF OPEN SOURCE SOFTWARE PARTICULARLY LINUX WITHIN THE CHRONOLOGICAL NARRATIVE THE BOOK TRACES SEVERAL OVERLAPPING THREADS THE EVOLUTION OF THE COMPUTER S INTERNAL DESIGN THE EFFECT OF ECONOMIC TRENDS AND THE COLD WAR THE LONG TERM ROLE OF IBM AS A PLAYER AND AS A TARGET FOR UPSTART ENTREPRENEURS THE GROWTH OF SOFTWARE FROM A HIDDEN ELEMENT TO A MAJOR CHARACTER IN THE STORY OF COMPUTING AND THE RECURRING ISSUE OF THE PLACE OF INFORMATION AND COMPUTING IN A DEMOCRATIC SOCIETY THE FOCUS IS ON THE UNITED STATES THOUGH EUROPE AND JAPAN ENTER THE STORY AT CRUCIAL POINTS ON COMPUTING PER SE RATHER THAN ON APPLICATIONS SUCH AS ARTIFICIAL INTELLIGENCE AND ON SYSTEMS THAT WERE SOLD COMMERCIALLY AND INSTALLED IN QUANTITIES

THE HUMAN SIDE THE LANGUAGES THE MACHINES THE PLACES

FROM THE FIRST DIGITAL COMPUTER TO THE DOT COM CRASH A STORY OF INDIVIDUALS INSTITUTIONS AND THE FORCES THAT LED TO A SERIES OF DRAMATIC TRANSFORMATIONS THIS ENGAGING HISTORY COVERS MODERN COMPUTING FROM THE DEVELOPMENT OF THE FIRST ELECTRONIC DIGITAL COMPUTER THROUGH THE DOT COM CRASH THE AUTHOR CONCENTRATES ON FIVE KEY MOMENTS OF TRANSITION THE TRANSFORMATION OF THE COMPUTER IN THE LATE 1940S FROM A SPECIALIZED SCIENTIFIC INSTRUMENT TO A COMMERCIAL PRODUCT THE EMERGENCE OF SMALL

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COMPUTING TODAY MORE THAN EVER BEFORE IS A MULTI FACETED DISCIPLINE WHICH COLLATES SEVERAL METHODOLOGIES AREAS OF INTEREST AND APPROACHES MATHEMATICS ENGINEERING PROGRAMMING AND APPLICATIONS GIVEN ITS ENORMOUS IMPACT ON EVERYDAY LIFE IT IS ESSENTIAL THAT ITS DEBATED ORIGINS ARE UNDERSTOOD AND THAT ITS DIFFERENT FOUNDATIONS ARE EXPLAINED ON THE FOUNDATIONS OF COMPUTING OFFERS A COMPREHENSIVE AND CRITICAL OVERVIEW OF THE BIRTH AND EVOLUTION OF COMPUTING AND IT PRESENTS SOME OF THE MOST IMPORTANT TECHNICAL RESULTS AND PHILOSOPHICAL PROBLEMS OF THE DISCIPLINE COMBINING BOTH HISTORICAL AND SYSTEMATIC ANALYSES THE DEBATES THIS TEXT SURVEYS ARE AMONG THE LATEST AND MOST URGENT ONES THE CRISIS OF FOUNDATIONS IN MATHEMATICS AND THE BIRTH OF THE DECISION PROBLEM THE NATURE OF ALGORITHMS THE DEBATES ON COMPUTATIONAL ARTEFACTS AND MALFUNCTIONING AND THE ANALYSIS OF COMPUTATIONAL EXPERIMENTS BY COVERING THESE TOPICS ON THE FOUNDATIONS OF COMPUTING PROVIDES A MUCH NEEDED RESOURCE TO CONTEXTUALIZE THESE FOUNDATIONAL ISSUES FOR PRACTITIONERS RESEARCHERS AND STUDENTS ALIKE A HISTORICAL AND PHILOSOPHICAL

APPROACH SUCH AS WHAT THIS VOLUME OFFERS BECOMES ESSENTIAL TO UNDERSTAND THE PAST OF THE DISCIPLINE AND TO FIGURE OUT THE CHALLENGES OF ITS FUTURE

YEAH, REVIEWING A EBOOK **FUNDAMENTALS OF COMPUTING** COULD INCREASE YOUR NEAR FRIENDS LISTINGS. THIS IS JUST ONE OF THE SOLUTIONS FOR YOU TO BE SUCCESSFUL. AS UNDERSTOOD, EXPERTISE DOES NOT RECOMMEND THAT YOU HAVE EXTRAORDINARY POINTS. COMPREHENDING AS WITHOUT DIFFICULTY AS UNION EVEN MORE THAN EXTRA WILL COME UP WITH THE MONEY FOR EACH SUCCESS. ADJACENT TO, THE PROCLAMATION AS WITHOUT DIFFICULTY AS INSIGHT OF THIS FUNDAMENTALS OF COMPUTING CAN BE TAKEN AS CAPABLY AS PICKED TO ACT.

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