



**KENNETH J HAMER-HODGES**

## **ABOUT THE BOOK**

Significant changes are taking place. The advent of Intelligent Malware; and the Virtualization of Democracy.

Together they spell doom for today's monolithic software and general-purpose computer science. However, the science of the Church-Turing Thesis discovered in 1936, mathematically deconstructs these threats, preventing corruption and crime by replacing digital dictatorships and unfair privileges with democratic alternatives.

Kenneth J. Hamer-Hodges wrote the hardened security code for the first Capability Based Computer called PP250. He explores the hiatus and the solution to cyber security by comparing and contrasting the Church-Turing Thesis with several Capability Limited Computers including the Abacus, the Slide Rule, Charles Babbage's flawless engines, and the PP250 in the role of a Church-Turing Machine.

All these machines use the laws of  $\lambda$ -calculus to detect and prevent errors that cause cyber-crime, and they pass the test of time, allowing a 21<sup>st</sup> Century Digital Democracy to be ruled by the people and for the people, unthreatened by monopolies, dictatorships, false news, and undetected digital corruption.

# CIVILIZING CYBERSPACE

## **THE FIGHT FOR A DIGITAL DEMOCRACY**

Dedication, Acknowledgments, About The Author, Preface, Introduction

## **ON FLAWLESS COMPUTERS**

The Birth of Computers, The Need for Cybersecurity, The Age of Electronics

## **THE GOLDEN RULE**

The Perimeter of Computation, From Abstraction to Reality, The Hidden Springs

## **THE DELUSION PROBLEM**

The Integrity Problem, The Deep Fake Problem, The Trust Problem, The Privilege Problem, The Detection Problem, The Evolution Problem, The Privacy Problem, The Breakout Problem

## **THE INTEGRITY OF MACHINES**

Symbolic Instructions, Imperative Commands, Symbolic Instructions, Object-Oriented Machine Code, Clockwork Cybersecurity

## **THE ISHTAR GATE**

True-to-Form, Survival, Encapsulation, Mathematical Machines, A Thread of a Computation, Dynamic Binding, The DNA Hierarchy, Typed Machines, The Clockwork Meta-Machine

## **TRUSTED SOFTWARE**

Untrusted Software, Trusted Faithfull Software, Crime Pays, Dictators Rule, The Road to Cyber-Security

## **TRUSTED COMPUTERS**

A Universal Model of Computation, Computational Meta-Data, Functional Machine Types, The Fight for Control, Secure Machine Code, Fraud and Forgery Resistance, Namespace Security

## **THE CLOCKWORKS OF $\lambda$ -CALCULUS**

Undetected Corruption, The Foundation Technology, An Evolutionary Model, A Functional Class, The Surface of Cyberspace, Transparent Cybersecurity, The  $\lambda$ -Calculus Concepts, The Typed Access Rights, The Frames of Computation, A  $\lambda$ -calculus Variable, Computational Threads

## CAPERS JONES III

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*'This book is a must-read for anyone concerned with software quality, hacking, malware, and cyber-crime. It covers the waterfront on Industrial Strength Computer Science and faithful, trusted software.'*

- Capers Jones an author, and expert on software engineering, software quality, function point cost estimation and an advisor on software quality to the governments of South Korea and Malaysia.

## PETER VENTON

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*'In this provocative book, Ken argues that the monolithic general-purpose computer is outdated, unchanged architecturally since batch processing mainframes were locked in secure computer rooms. The tremendous advances in technology since the Cold War means that computer software permeates every facet of society, networked into complex global interactions, placed under relentless attack. Ken argues these systems are vulnerable to bad actors using intelligent malware. These global shortcomings will destroy cyber-society. Ken's book is a fascinating insight into the enormous cyber-security problems of 21<sup>st</sup> century democratic society.'*

- Peter Venton – OBE, BSc, CEng, MIET – former Major Program Review Chairman for HMG UK

## INFALLIBLE AUTOMATION

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The Analytical Engine, Alonzo Church, A Universal Model of Computation, Trusted Computers, Faithful Computer Science, Software Security, Innate Immunity, Unfair Privileges, Algebraic Computations, Industrial Progress

## THE MATHEMATICAL DNA

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The Art of Abstraction, Chained Abstractions, The DNA of Computers, Implementation Hiding, Extended Machine Language, Separating Concerns

## AN ENDLESS SOFTWARE MACHINE

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Object-Oriented Machine Code, The Hidden Spring, Inherited Fault-Tolerance, Capability Key Types, Evolutionary Stable Software, The Paradigm Shift, A Scientific Servant, Ada's Endless Vision

## THE CULTS OF CYBER SOCIETY

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Endless Convergence, Flawed Technology, Spooks and Spies, Malware D-Day, Digital Sarin Gas, Click Jack Attacks, Opaque Corruption

## ON DIGITAL ENLIGHTENMENT

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Atomic Responsibilities, Social Responsibilities, Monumental Computer Science, The Virtual Chalkboard, Infallible Automation, Symbolic Addressing, Software Modularity, The Church Instructions, The Magic of Variables, The Language of Abstraction

## COLONIZING CYBERSPACE

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The Natural Language, An Enchanted Formula, The Cyber Suit, Machine Conventions, Data Ownership, Software Reliability, Deterministic Garbage Collection, Policy Controlled Cybersecurity

## THE FUTURE OF CYBER-SOCIETY

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The Fight for Control, The Point of Singularity, The Wild Frontier, The Enemy Within, The Secure Electronic Village, The Loss of Control, The Level Playing Field, Trusted Government, Industrial Strength Software, Serving Society, The Monumental Machine, The Final Word

## BIBLIOGRAPHY

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