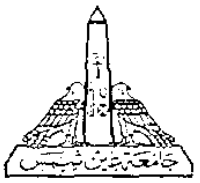


AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
Computer and Systems Engineering Department

HARDWARE/SOFTWARE CODESIGN METHODOLOGY FOR SOFTWARE ACCELERATION

A Thesis

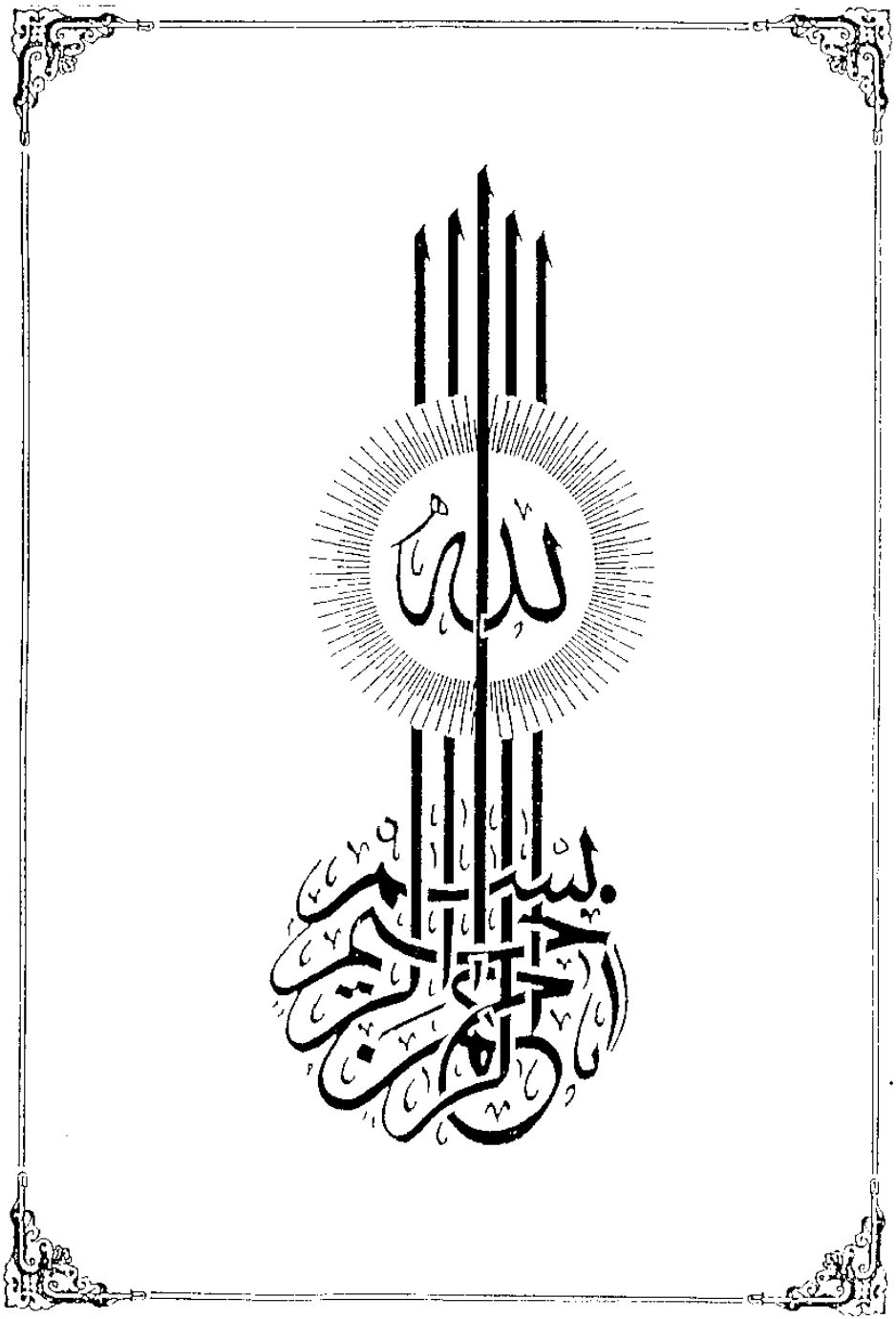
Submitted in Partial Fulfillment for the Requirements
of the Degree of the Master of Science in Electrical Engineering
(Computer and Systems Engineering)

Submitted By

Mohamed Ahmed Shalan
B.Sc. of Electrical Engineering
(Computer and Systems Engineering)
Ain Shams University, 1993

Supervised By
Prof. Dr. Osman Badr
Dr. Hassan Shehata

Cairo -1997



بسم الله الرحمن الرحيم

﴿ذلك فضل الله يؤتيه من يشاء و الله ذو الفضل العظيم﴾

(الجمعة ٤)

ABSTRACT

Codesign is the Integrated design of system implementation using both hardware and software components. It is applied to tightly coupled systems with hardware and software modules that interact to solve a certain task. HW/SW Codesign differs from conventional approaches of the design in that it continuously relates the hardware development cycle to the software one. Hence decisions made at the hardware design effect software design activities and vice versa. The HW/SW codesign techniques can be used for many applications. These applications include: speedup of software execution, design of cost-effective systems, embedded systems and controllers, etc.

In our work we review the concept of HW/SW codesign, its applications and its methodologies. Then we select the speedup of software algorithms as an application and we propose a codesign methodology for it. Some tools are built and others are modified to build a framework for our proposed methodology. Also a general purpose accelerator is built, to be used for the HW part. Finally, we select a case study and we apply our methodology for it.

Key Words : *Hardware, Software, Codesign, FPGA, Synthesis, Partitioning, CPLD, Accelerator.*

ACKNOLEDGMENT

I would like to thank Dr. Osman Badr and Dr. Hassan Shehata for their great efforts with me. Also I would like to thank my parents. Finally I would like to thank my fiancé and for her I dedicate this thesis.

Contents

2 Related Works

3 HW/SW Codesign Framework

B Bool 2

References