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An 8-Bit Scientific Calculator Based Intel 8086 Virtual Machine Emulator

Qasem Abu Al-Haija*, Saleh Al-Abdulatif and Mohaned Al-Ghofaily

King Faisal University, Department of Electrical Engineering, Al-Ahsa 31982, P.O. Box 380

Abstract

Microprocessors and their applications course is considered as a significant core course for electrical engineering students due to its potential impact into several real life applications such as complex calculations, interfacing, control and automation technology. In this paper, we propose an eight bit scientific calculator based Intel 8086 assembly language programming. The calculator were designed over the virtual machine for Intel 8086 microprocessor using EMU8086 emulator software. Several arithmetic and logic operations as well as trigonometric functions were implemented in this paper. Also, a plot function and integration of function tools are to be implemented and added as a separate modules for this design. This work was very beneficial in enhancing the student' skills in mathematics, engineering and computer programming which can be employed in designing a useful applications for users as well as the ability to apply numerical techniques and programming algorithms to design a small microprocessor-based system.

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Keywords: Intel 8086; EMU8086; Virtual Machine; Assembly Language; Scientific Calculator.

1. Introduction

In the late of 1978, Intel introduced the 8086 microprocessor as an enhanced product version of previous 8085 microprocessor. The product implementation depended on semiconductor process innovation, improved architecture, better circuit design, and more sophisticated software, yet upward compatibility not envisioned by the first designers was maintained [5].

Intel 8086 Microprocessor was designed to provide an order of magnitude increase in processing throughput over the older 808x. The processor was to be assembly-language-level-compatible with the 8080 so that existing 8080 software could be reassembled and correctly executed on the 8086 [1]. The 8086 processor architecture is described in terms of its memory structure, register structure, instruction

* Corresponding author, Lecturer, ECE Department, KFU. Tel.: +966-3-5895400; fax: +966-3-5871068.
E-mail address: qalhaija@kfu.edu.sa.

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Christian G. Meyer

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