DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
ECE-441
LAB 1

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Date Performed:	TBD
Partners:	TBD
Instructor:	Professor Saniie

1 Introduction

The main purpose of this lab is for the student to familiarize the equipment, which is the SANPER Educational Lab Unit and the TUTOR software (Courtesy of MOTOROLA®. This lab will help the student to understand the fundamentals about MC68000 instruction set, especially the functionality of the TRAP #14 instruction.

```
MOVE.B #<Function Number>, D7
TRAP #14
```

1.1 Background

The SANPER ELU: The SANPER ELU (Educational Lab Unit) is based on an MC68000 microprocessor made by MOTOROLA®. The SANPER ELU is developed by Dr. Saniie and Mr. Perich and the unit include multiple peripherals.

MC 68000: The MC 68000 is a 16/32-bit CISC microprocessor, which implements a 32-bit instruction set, with 32-bit registers and 32-bit internal data bus, but with a 16-bit main ALU and a 16-bit external data bus, designed and marketed by MOTOROLA®.

2 Lab Equipment and Procedure

2.1 Equipment

- SANPER ELU
- TUTOR software

2.2 Procedure

2.2.1 Part A

(a) Connect SANPER unit

(b) Command testing

- `HE <CR>`
  Help Command
- `DF <CR>`
  Display Formatted Registers Command
- `.SR 0000 <CR>`
  Modify the value of the Register (e.g: set to zero)
- `.A1 1234 <CR>`
  Changeing the contents of A1 register to 1234 ($00001234) or type
  in the command without the number to examine A1 register
- `.A <CR>`
  Display all address registers
- `.D <CR>`
  Display all data registers

2.2.2 Part B

(a) Assemble program provided (Table 1.1)

(b) Start the program from $1000

(c) Set the $900 to output

(d) Run the program

(e) Notice problem

(f) Use trace mode to check register changes

(g) Repeat for programs in Table 1.2 - 1.4

(h) Set SANPER-1 ELU to hardware single-step mode and reset it

(i) Depress the SINGLE STEP PULSE and observe

3 Result and Analysis

3.1 Discussion

4 Conclusions

5 Appendix

Figure 1: Figure caption.

6 Answers to Definitions

a. The *atomic weight of an element* is the relative weight of one of its atoms compared to C-12 with a weight of 12.0000000..., hydrogen with a weight of 1.008, to oxygen with a weight of 16.00. Atomic weight is also the average weight of all the atoms of that element as they occur in nature.

b. The *units of atomic weight* are two-fold, with an identical numerical value. They are g/mole of atoms (or just g/mol) or amu/atom.

c. *Percentage discrepancy* between an accepted (literature) value and an experimental value is

$$\frac{\text{experimental result} - \text{accepted result}}{\text{accepted result}}$$