Concordia University

Lab 3: Addressing Modes and 2-D arrays

COEN 311

Lab Section: SN-X

Computer Organization and Software

Penoelo Thibeaud

40212017

Lab Instructor: T. Obuchowicz and Milad Khanchi

Performed on : November 8, 2023

Submitted on : November 22, 2023

I certify that this submission is my original work and meets the Faculty’s Expectations of Originality

# Objective:

This report explores the principles of flow control in assembly language. Key areas of study include conditional branches, looping mechanisms, and ASCII character manipulation. Through the use of ARM assembly language and debugging with GNU Debugger (gdb), we examine the efficiency and functionality of these low-level operations on ASCII character.

# Introduction:

Flow control dictates the execution sequence of a program and is crucial for task management and algorithm implementation. While high-level languages provide intuitive constructs for this purpose, in assembly language, flow control is managed more explicitly through branch instructions (e.g. b loop) and status flags (e.g. Cmp r0, r1). This lab's objective was to demystify these lower-level operations, providing insight into their high-level counterparts.

# Procedure (Methods):

The procedure followed in this lab involved several key activities before and during the lab.

## Steps Followed:

1. Translating C++ flow control statements into ARM assembly language.
2. Developing an assembly language program to convert ASCII characters from lowercase to uppercase.
3. Employing gdb to step through the assembly code, ensuring the logic matches the intended flow control.
4. Analyzing loop implementation variations and the impact of conditional branches on program control.

# Results and Discussion:

## Questions:

# Conclusion:

# Appendix: