ECSE 324

Laboratory No. 2 Report

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Introduction

This is the report for Lab 2. The lab assignment given was to program some tasks in assembly and implement one of them in C.

Part 1: Subroutines

Part 1.1: The stack (stack.s)

**Description**

This part was about implementing a PUSH and POP instruction using an alternate way.

**Approach Taken**

We implemented the STMDB and LDMIA commands.

**Challenge Faced**

None.

Part 1.2: The subroutine calling convention (subroutine.s)

**Description**

This part was about converting the program for finding the max of an array into a program that uses subroutine.

**Approach Taken**

Implemented a stack to store the arguments and reset the registers after the task was performed. Branching using the subroutine calling convention was done from \_start. The instructions which compared and stored the maximum value was all within the subroutine.

**Challenge Faced**

None.

Part 1.3 Fibonacci calculation using recursive subroutine calls (fibonacci.s)

**Description**

This part was an assembly program which computes the nth Fibonacci number.

**Approach Taken**

A recursive subroutine was used as instructed. The nth Fibonacci number and the Load Register would always be preserved by storing them in stack. The value of the sub-result would also be stored in stack. This way, the recursion could reuse registers.

**Challenge Faced**

Finding the right way of storing and changing the value of the sub-result from recursion. It was very tricky to find out.

**Improvements made**

Multiple stack push and pull commands were present within the recursion to preserve the data.

Part 2: C Programming

Part 2.1: Pure C (max\_pureC.c)

**Description**

This part was about creating a C program and filling in the missing iteration.

**Approach Taken**

A simple count controlled iteration was used.

**Challenge Faced**

Variables had to be declared separately. Did not know that.

Part 2.2: Calling an assembly subroutine from C (max\_2\_subroutine\_test.c, max\_2\_subroutine.s, max\_2\_task.c)

**Description**

This part was about creating a C program and calling an assemble subroutine.

**Approach Taken**

The assembly file to compare two numbers was created. The C program to call that subroutine was also created. Then an updated version was created to find the maximum value in an array by calling the assembly subroutine.

**Challenge Faced**

None.

Conclusion

The lab requirements were very straight forward. The interesting part was using stack to preserve the initial arguments and calling assembly subroutine using a C program.