

LAB 3

SUBROUTINE and STACK OPERATIONS

1. INTRODUCTION

This lab gives information about stack usage of MC6802. Study relationship between calling subroutine and stack pointer. Learn STS, STX, TSX, TXS, PSHA, PSHB, PULA, PULB, INS, LDS instructions.

2. SUBROUTINES and ARGUMENT PASSING

Run following codes on the simulator. Draw simple table to write stack pointer and its values after each instruction is executed. You also convert following codes into machine code to run on ITU-Training Kit. Your results should be the same as the simulator results.

CALLING SUBROUTINES			ARGUMENT PASSING		
	LDS	#\$5F00		LDS	#\$5F00
	JSR	SUB1		LDAA	#\$23 //Argument
	SWI			PSHA	
SUB1	JSR	SUB2		JSR	SUB
	RTS			PULA	
SUB2	RTS			SWI	
			SUB	TSX	
				LDAB 2,x	//Now AccB is \$23
				RTS	

PC	STACK_POINTER	Memory[STACK_POINTER]

Fill above table for both *calling subroutine* and *argument passing* codes.

3. EXPERIMENT

Write the assembly code for the following algorithm. Then, convert the assembly into machine code and run on ITU-TRAINING Kit. The code calculates i th value of Fibonacci numbers. (Hint: You can easily modify *argument passing* code to return the variable from subroutine.)

```
int fibonacci(int n){
    if(n==1 || n==0)
        return n;
    else
        return (fibonacci(n-1)+fibonacci(n-2));
}
```

In your report, answers and simulator results of section 2 and 3 should be stated.