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ECE 375

Lab#4 PreLab

1. What is the stack pointer? How is the stack pointer used, and how do you initialize it? Provide pseudocode (not actual assembly code) that illustrates how to initialize the stack pointer.

The stack pointer is mainly used for storing temporary data, local variables and return addresses after interrupts and subroutine calls. The stack pointer register always points to the top of the stack. As elements are added, or pushed, onto the stack, they are stored in lower memory locations which cause the stack pointer to decrease so it is always pointing at the most recently added element. As element are pushed onto the stack the pointer decreases, and it increases as elements are popped off the stack.

**Initialize Stack Pointer**

Low byte of end SRAM address is loaded into a register

The byte is then written to the stack pointer low byte

High byte of end SRAM address is loaded into a register

The byte is then written to the stack pointer high byte

2. What does the AVR instruction LPM do, and how do you use it? Provide pseudocode (not actual assembly code) that shows how to setup and use the LPM instruction.

LPM, or load program memory, loads one byte pointed to by the Z register into the destination register Rd.

Load high part of byte address into ZH

Load low part of byte address into ZL

Load byte from program memory into register 0

3. Take a look at the definition file m128def.inc (This file can be found in the Solution Explorer → Dependencies folder in Atmel Studio, assuming you have an Assembler project open and you have already built an assembly program that includes this definition file. Two good examples of such a project would be your Lab 1 and Lab 3 projects.) What is contained within this definition file? What are some of the benefits of using a definition file like this? Please be specific, and give a couple examples if possible.

Definition file for ATmega128; device and register definitions.

All I/O register names and I/O register bit names appearing in the data book can be used after including this file in the program. Also, the six registers forming the three data pointers X, Y, and Z have been assigned names XL, XH, YL, YH, ZL & ZH. The highest RAM address for internal SRAM is also defined with this.

REFERENCES

http://read.pudn.com/downloads171/sourcecode/asm/791985/avr/m128def.inc\_\_.htm