

ECE3613 Processor System Laboratory
LAB 1. Atmel Studio 7 Tutorial and AVR assembly Language

Lab 1 worksheet

Section: 002

Name: Robert Bara

Submit your report in word and pdf files (both) to Canvas <Lab 1 assignment submission>

Part 1. Fill out the OPCODE for each line of code (5 points each, total 30 points)

Find the OPCODES for each instruction using the OPCODE tutorial on Canvas or .lss file information.

Instruction	OPCODE
start:	
ldi r29, 0xf3	<u>efd3</u> (Example)
ldi r22, 99	<u> E979 </u>
add r17, r18	<u> 0F12 </u>
out ddrc,r29	<u> b9d7 </u>
in r17,pinb	<u> b113 </u>
lds r2,0x2345	<u> 9020, 2345 </u>
sts 0x0100,r17	<u> 9310, 0100 </u>
 nop	

Part 2. Fill out the number conversion table – Table 1

Table 1. (2 points each, total 20 points)

Task	Binary	Decimal	Hexadecimal
Example	00000011	3	03
1	10010110	150	96
2	00010111	23	17

3	01001001	73	49
4	00011111	31	1F
5	00111011	59	3B

Part 3. Load the numbers to the designated registers using Atmel Studio 7

Load the values to the designated registers. Take screenshots of the register values of each task. Write the code line and add the screenshots to the screenshot section of Table 2. Use the exact number format for the code line and the resulted screenshot. Follow the sample.

To change a number's format in the processor status view, take the right click on the value and select the number displaying format (as shown in the figure below) while the debugging is on.

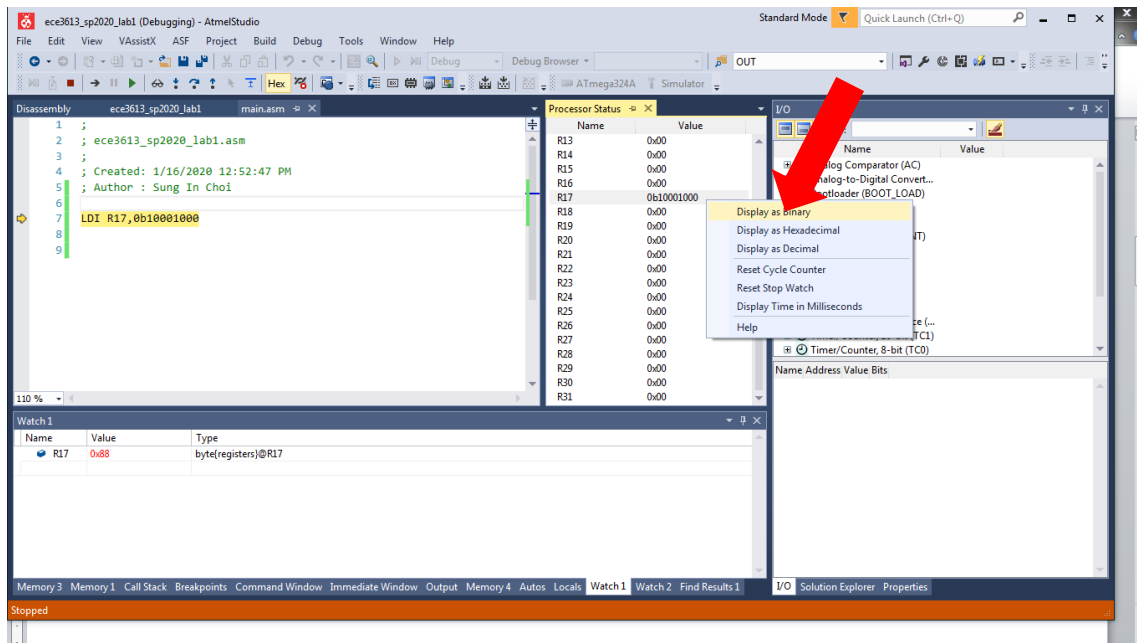


Table 2. (10 points each task (5 for code line, 5 for screenshot), total 50 points)

Show the binary/ hex/decimal formats of the value in code line and screenshot (the given value format for code and screenshot)

Example	10001000	R17
Code line	LDI R17, 0b10001000	

Screenshot	<div>R170b10001000</div>	
Task	Number	Register
1	0x67	R19
Code line	ldi R19, 0x67	
Screenshot	<div>R190x67</div>	
2	10000111	R26
Code line	ldi R26, 0b10000111	
Screenshot	<div>R260b10000111</div>	
3	180	R16
Code line	ldi R16, 180	
Screenshot	<div>R16180</div>	
4	\$5A	R20
Code line	ldi R20, \$5A	
Screenshot	<div>R200x5A</div>	
5	94	R29
Code line	ldi R29, 94	

Screenshot	R29	94
------------	-----	----

LAB 1 Grading Rubric

Part	Task	Full Points	Earned Points	Comment
1	Opcode 1	5		
	Opcode 2	5		
	Opcode 3	5		
	Opcode 4	5		
	Opcode 5	5		
	Opcode 6	5		
Subtotal		30		
2	Task 1	4		
	Task 2	4		
	Task 3	4		
	Task 4	4		
	Task 5	4		
Subtotal		20		
3	Task 1	10		
	Task 2	10		
	Task 3	10		
	Task 4	10		
	Task 5	10		
Subtotal		50		
Total		100		