Prac 5 42094353 Justin Mancinelli

Prep

Prep: 4/4

Programming Task

```
ldi r29, 0x41
ldi r24, 0x54
sub r24, r29
```

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Prediction: ① r29 = 0x41
② r24 = 0x54
③ r24 = 0x54 - 0x41 = 0x13

Simulation: Same as prediction

Procedure

Task 1

① create project called "prac5"
② read comments in "prac5.asm"

Note: "8515def.inc" contains definitions for AT90S8515
".def temp = r16" assigns an alias to a register
"rjmp RESET" jumps to instruction immediately after label
"DDRB" is the direction register for port B
"out A, Rr" must be used to write to an I/O register
"0xFF" output, "0x00" input
"in Rd, A" load I/O to gpr

③ Complete code
④ Build and Simulate — Working correctly
⑤ Complete PonyProg Tutorial
i) Callibration Successful? Yes
ii) Probe Successful? Yes (Test OK)
iii) Complete AVR Studio Tutorial (get led.hex)
iv) open led.hex
v) Erase, Write, Run (automatic) [Erase Success, Write Successful]
vi) Reload Files

1 Func mm
1 wksh mm

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Tutor Lab

Procedure Cont.

Task 1 Cont.

⑥ Load "prac5.hex" onto the board

⑦ Test — Working

Task 2

① Simply add "neg temp" before setting PORTB

② Simulation — working

③ Load "prac5.hex" onto the board

④ Test — Working.

Tutor Task — AND prop numbers with 0xFC

①

```
ldi r29, 0x41
ldi r24, 0x54
and r24, r29
andi r24, 0xFC
```

```
ldi r29, 0x41
ldi r24, 0x54
andi r29, 0xFC
andi r24, 0xFC
```

② Prediction

r29 ← 0x41 (01000001)

r24 ← 0x54 (01010100)

r24 ← 0x40 (01000000)

r24 ← 0x40 (11111100 / 01000000)

r29 ← 0x41 01000001

r24 ← 0x54 01010100

r29 ← 0x40 01000000

r24 ← 0x54 01010100

③ Simulation — Working

④ Observation — 0xFC is acting like a bit mask but keeps r24 the same and sets the low byte of r29 to 0.

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Challenge Task 1

```
.def  a  =r00
.def  b  =r01
.def  temp  =r16
...
mainloop
   ldi  a, 0x0F
   ldi  b, 0xF0

   in  temp, PINC
   and  a, temp
   and  b, temp
   swap  b
   add  a, b
   out  PORTB, a

   rjmp  mainloop
```

Simulation — Working