Problem #1

<u>Given</u>: Use VMLAB to write a register-level AVR program that makes R0 and R1 into a 16-bit Cylon eye. Start with a 1 in the LSB of R1. With each time interval the 1 will move to the left (aka 1-hot). The movement will continue into R0. When the 1 gets to the MSB of R0, it changes to moving to the right until it gets back to the starting position, at which point it repeats the pattern, as this animated gif shows.

<u>Find</u>: Design Cyclon Eye

<u>Solution</u>:

```
.include "C:\VMLAB\include\m168def.inc"

loop5:

ldi r16, 1     ; loads r16 with 00000001
mov r1, r16    ; moves r16 into r1
clr r16        ; clears r16

loop1: ; loop1 shifts left through r1, stops when all 0
lsl r1
brne loop1

ldi r17, 1  ; loads r17 with 00000001
mov r0, r17  ; moves r17 into r0
clr r17     ; clears r17

loop2: ; loop2 shifts left through r0, stops when all 0
lsl r0
brne loop2

ldi r18, 128 ; loads r18 with 10000000
mov r0, r18   ; moves r18 into r0
clr r18       ; clears r18

loop3: ; loop3 shifts right through r0, stops when all 0
lsr r0
```

```
        brne loop3

        ldi r19, 128  ;loads r19 with 10000000
        mov r1, r19   ; moves r19 into r1
        clr r19       ; clears r19

        loop4: ; loop4 shifts right through r1, stops when all 0
        lsr r1
        brne loop4

        breq loop5 ; loops back to start
```