ECE 375: Assignment 3

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1.
```
.include m128def.inc
.def mpr = r16
.org $0000

rjmp INIT

reti
INIT:
;set DDRA to control engine
ldi mpr, (1<<EngEnL)|(1<<EngEnR)|(1<<EngDirR)|(1<<EngDirL)
out DDRA, mpr

;set DDRD to detect whiskers
ldi mpr, (0<<WskrL)|(0<<WskrR)
out DDRD, mpr

;Enable pull-up resistors for left/right whiskers
ldi mpr, (1<<WskrL)|(1<<WskrR)
out PORTD, mpr

; Initialize external interrupts (to trigger on falling edge)
ldi mpr, (1<<ISC01)|(0<<ISC00)|(1<<ISC11)|(0<<ISC10)
sts EICRA, mpr ; Use sts, EICRA is in extended I/O space
; Set EIMSK
ldi mpr, (1<<INT0)|(1<<INT1)
out EIMSK, mpr
; Turn on interrupts
sei
```

2.
```
.include "m128def.inc"
.DEF A = R16 ; General purpose register A
.DEF B = R17 ; General purpose register B

.ORG $0000
RJMP Initialize
```

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.ORG $0046 ; End of interrupt vectors
Initialize:
; Initialize stack
LDI A, high(RAMEND)
OUT SPH, A
LDI A, low(RAMEND)
OUT SPL, A
; Initialize TCNT0
SBI DDRB, PB4 ; Set bit 4 of port B (OC0) for output
LDI A, 0b00000111 ; Activate Normal mode, OC0 disconnected,
OUT TCCR0, A ; and set prescaler to 1024
WAIT:
  SBI PORTB, PB4 ; Turn on OC0
RCALL WAIT_0.5sec ; Call WAIT_0.5sec subroutine
CBI PORTB, PB4 ; Turn off OC0
LOOP:
RJMP LOOP ; Loop forever
; Subroutine to wait for 500 ms
WAIT_0.5sec:
LDI B, 50 ; Load loop count = 50
WAIT_10msec:
LDI A, 99 ; (Re)load value for delay
OUT TCNT0, A
; Wait for TCNT0 to roll over
CHECK:
IN A, TIFR ; Read in TIFR
ANDI A, 0b00000001 ; Check if TOV0 set
BREQ CKECK ; Loop if TOV0 not set
LDI A, 0b00000001 ; Otherwise, Reset TOV0
OUT TIFR, A ; Note - write 1 to reset
DEC B ; Decrement count
BRNE WAIT_10msec ; Loop if count not equal to 0
  RET
```