



INSTITUTO POLITÉCNICO NACIONAL

ESCUELA SUPERIOR DE CÓMPUTO

ESCOM

Ejercicio 11
“Señales”

Alumno: Borís Rodríguez Arce

Grupo:3CM15

23/05/2021

Profesor: José Juan Pérez Pérez



Problema

Código

➤ A)

```
.include "m8535def.inc"
.def aux = r16
.def aux2 = r17
```

reset:

```
rjmp main
.org $009
rjmp onda
```

main:

```
ldi aux,low(RAMEND)
out spl,aux
ldi aux,high(RAMEND)
out sph,aux
rcall config_io
```

fin:

```
nop
nop
rjmp fin
```

config_io:

```
ser aux
out ddra,aux
ldi aux,1
out tccr0,aux
ldi aux,1
out timsk,aux
ldi aux2,214
sei
ret
```

onda:

```
nop
```

```
out tcnt0,aux2
in aux,pina
com aux
out porta,aux
reti
```

➤ B y C

```
.include "m8535def.inc"
```

```
.def aux0 = r16
```

```
.def aux1 = r17
```

```
.def aux2 = r18
```

```
.def aux3 = r19
```

reset:

```
rjmp main
```

```
.org $008
```

```
rjmp onda1
```

```
rjmp onda2
```

main:

```
ldi aux0,low(RAMEND)
```

```
out spl,aux0
```

```
ldi aux0,high(RAMEND)
```

```
out sph,aux0
```

```
rcall config_io
```

fin:

nop

nop

rjmp fin

config_io:

ser aux0

out ddra,aux0

out ddrc,aux0

ldi aux0,1

out tccr1b,aux0

ldi aux0,1

out tccr0,aux0

ldi aux0,\$65

out timsk,aux0

sei

ldi aux1,\$FE

ldi aux2,245

ldi aux3,135

ret

onda1:

nop

```
out tcnt1l,aux2
out tcnt1h,aux1
in aux0,pina
com aux0
out porta,aux0
reti
```

onda2:

```
nop
nop
out tcnt0,aux3
in aux0,pinc
com aux0
out portc,aux0
reti
```

Simulación en AVR Studio 4

➤ A)

AVR Studio - [C:\Users\Vreker\Documents\Tarea11.asm]

File Project Build Edit View Tools Debug Window Help

Trace Disabled

Processor

Register	Value
Program Counter	0x000000
Stack Pointer	0x0000
X pointer	0x0000
Y pointer	0x0000
Z pointer	0x0000
Cycle Counter	0
Frequency	4.0000 MHz
Stop Watch	0.00 us
SREG	00000000

```
.include "m8535def.inc"
.def aux = r16
.def aux2 = r17

reset:
    rjmp main
    .org $009
    rjmp onda

main:
    ldi aux, low(RAMEND)
    out spl, aux
    ldi aux, high(RAMEND)
    out sph, aux
    rcall config_io

fin:
    nop
    nop
    rjmp fin

config_io:
    ser aux
    out ddra, aux
    ldi aux, 1
    out tccr0, aux
    ldi aux, 1
    out tmsk, aux
    ldi aux2, 214
    sei
    ret

onda:
    nop
    out tcnt0, aux2
    in aux, pina
    com aux
    out porta, aux
    reti
```

I/O View

Name	Add...	Value	Bits
AD_CONVERTER			
ANALOG_COMPARATOR			
TWI			
USART			
PORTA			
PORTB			
PORTC			
PORTD			
SPI			
EEPROM			
TIMER_COUNTER_0			
TIMER_COUNTER_1			
TIMER_COUNTER_2			
EXTERNAL_INTERRUPT			
WATCHDOG			
CPU			

Message

gcc plug-in: No WinAVR installation found. The AVR GCC plug-in can still be used if you set up your own build tools.
Loaded plugin Atmel AVR Assembler
Loaded partfile: C:\Program Files (x86)\Atmel\AVR Tools\PartDescriptionFiles\ATmega8535.xml
AVR Simulator: Please wait while configuring simulator...
AVR Simulator: ATmega8535 Configured OK
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj

Build Message Find in Files Breakpoints and Tracepoints

ATmega8535 AVR Simulator Auto Stopped Ln 6, Col 1 CAP NUM SCRL

AVR Studio - [C:\Users\Vreker\Documents\Tarea11.asm]

File Project Build Edit View Tools Debug Window Help

Trace Disabled

Processor

Register	Value
Program Counter	0x00000F
Stack Pointer	0x025F
X pointer	0x0000
Y pointer	0x0000
Z pointer	0x0000
Cycle Counter	161
Frequency	4.0000 MHz
Stop Watch	40.25 us
SREG	00000000

```
.include "m8535def.inc"
.def aux = r16
.def aux2 = r17

reset:
    rjmp main
    .org $009
    rjmp onda

main:
    ldi aux, low(RAMEND)
    out spl, aux
    ldi aux, high(RAMEND)
    out sph, aux
    rcall config_io

fin:
    nop
    nop
    rjmp fin

config_io:
    ser aux
    out ddra, aux
    ldi aux, 1
    out tccr0, aux
    ldi aux, 1
    out tmsk, aux
    ldi aux2, 214
    sei
    ret

onda:
    nop
    out tcnt0, aux2
    in aux, pina
    com aux
    out porta, aux
    reti
```

I/O View

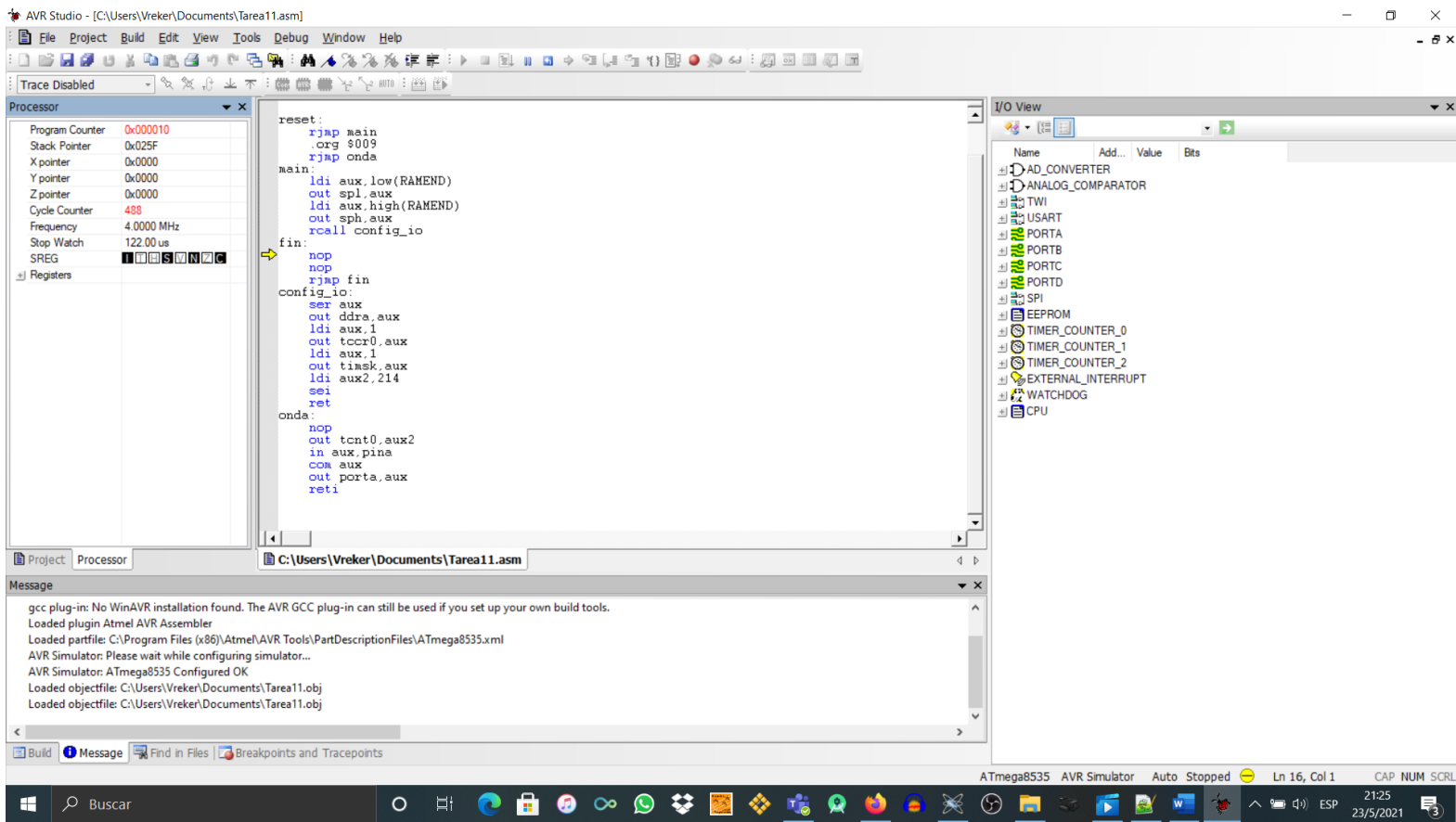
Name	Add...	Value	Bits
AD_CONVERTER			
ANALOG_COMPARATOR			
TWI			
USART			
PORTA			
PORTB			
PORTC			
PORTD			
SPI			
EEPROM			
TIMER_COUNTER_0			
TIMER_COUNTER_1			
TIMER_COUNTER_2			
EXTERNAL_INTERRUPT			
WATCHDOG			
CPU			

Message

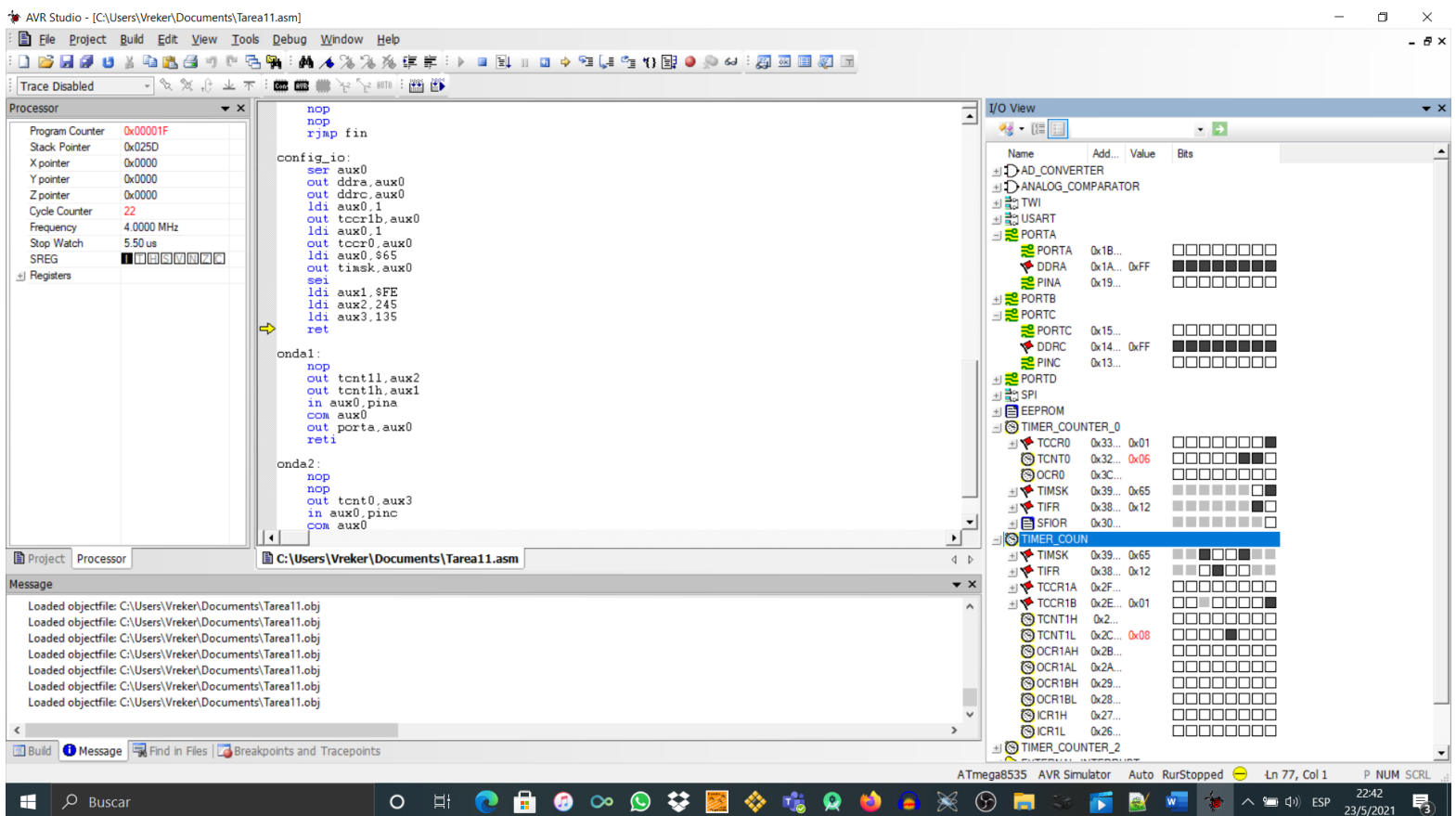
gcc plug-in: No WinAVR installation found. The AVR GCC plug-in can still be used if you set up your own build tools.
Loaded plugin Atmel AVR Assembler
Loaded partfile: C:\Program Files (x86)\Atmel\AVR Tools\PartDescriptionFiles\ATmega8535.xml
AVR Simulator: Please wait while configuring simulator...
AVR Simulator: ATmega8535 Configured OK
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj

Build Message Find in Files Breakpoints and Tracepoints

ATmega8535 AVR Simulator Auto Running Ln 16, Col 1 CAP NUM SCRL



➤ ByC



AVR Studio - [C:\Users\Vreker\Documents\Tarea11.asm]

File Project Build Edit View Tools Debug Window Help

Trace Disabled

Processor

Program Counter: 0x0000F
Stack Pointer: 0x025F
X pointer: 0x0000
Y pointer: 0x0000
Z pointer: 0x0000
Cycle Counter: 26
Frequency: 4.0000 MHz
Stop Watch: 6.50 us
SREG:

Registers

```

ldi aux0,high(RAMEND)
out sph,aux0
rcall config_io

fin:
nop
nop
rjmp fin

config_io:
ser aux0
out ddra,aux0
out ddr,aux0
ldi aux0,1
out tccr1b,aux0
ldi aux0,1
out tccr0,aux0
ldi aux0,$65
out tmsk,aux0
sei
ldi aux1,$FE
ldi aux2,245
ldi aux3,135
ret

onda1:
nop
out tcnt1l,aux2
out tcnt1h,aux1
in aux0,pina
com aux0
out porta,aux0
reti

onda2:

```

I/O View

Name	Add...	Value	Bits
AD_CONVERTER			
ANALOG_COMPARATOR			
TWI			
USART			
PORTA			
DDRA	0x1B...	0xFF	
PINA	0x19...		
PORTB			
PORTC			
PORTD			
DDRC	0x15...	0xFF	
PINC	0x13...		
SPI			
EEPROM			
TIMER_COUNTER_0			
TCCR0	0x33...	0x01	
TCNT0	0x32...	0x0A	
OCR0	0x3C...		
TIMSK	0x39...	0x65	
TIFR	0x38...	0x12	
SFIO	0x30...		
TIMER_COUN...			
TIMSK	0x39...	0x65	
TIFR	0x38...	0x12	
TCCR1A	0x2F...		
TCCR1B	0x2E...	0x01	
TCNT1H	0x2...		
TCNT1L	0x2C...	0x0C	
OCR1AH	0x2B...		
OCR1AL	0x2A...		
OCR1BH	0x29...		
OCR1BL	0x28...		
ICR1H	0x27...		
ICR1L	0x26...		
TIMER_COUNTER_2			

Message

Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj

Build Message Find in Files Breakpoints and Tracepoints

ATmega8535 AVR Simulator Auto RunStopped Ln 59, Col 1 P NUM SCRL

22:42
23/5/2021

AVR Studio - [C:\Users\Vreker\Documents\Tarea11.asm]

File Project Build Edit View Tools Debug Window Help

Trace Disabled

Processor

Program Counter: 0x000011
Stack Pointer: 0x025F
X pointer: 0x0000
Y pointer: 0x0000
Z pointer: 0x0000
Cycle Counter: 72
Frequency: 4.0000 MHz
Stop Watch: 18.00 us
SREG:

Registers

```

ldi aux0,high(RAMEND)
out sph,aux0
rcall config_io

fin:
nop
nop
rjmp fin

config_io:
ser aux0
out ddra,aux0
out ddr,aux0
ldi aux0,1
out tccr1b,aux0
ldi aux0,1
out tccr0,aux0
ldi aux0,$65
out tmsk,aux0
sei
ldi aux1,$FE
ldi aux2,245
ldi aux3,135
ret

onda1:
nop
out tcnt1l,aux2
out tcnt1h,aux1
in aux0,pina
com aux0
out porta,aux0
reti

onda2:

```

I/O View

Name	Add...	Value	Bits
AD_CONVERTER			
ANALOG_COMPARATOR			
TWI			
USART			
PORTA			
DDRA	0x1B...	0xFF	
PINA	0x19...		
PORTB			
PORTC			
PORTD			
DDRC	0x14...	0xFF	
PINC	0x13...		
SPI			
EEPROM			
TIMER_COUNTER_0			
TCCR0	0x33...	0x01	
TCNT0	0x32...	0x38	
OCR0	0x3C...		
TIMSK	0x39...	0x65	
TIFR	0x38...	0x12	
SFIO	0x30...		
TIMER_COUN...			
TIMSK	0x39...	0x65	
TIFR	0x38...	0x12	
TCCR1A	0x2F...		
TCCR1B	0x2E...	0x01	
TCNT1H	0x2...		
TCNT1L	0x2C...	0x3A	
OCR1AH	0x2B...		
OCR1AL	0x2A...		
OCR1BH	0x29...		
OCR1BL	0x28...		
ICR1H	0x27...		
ICR1L	0x26...		
TIMER_COUNTER_2			

Message

Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj
Loaded objectfile: C:\Users\Vreker\Documents\Tarea11.obj

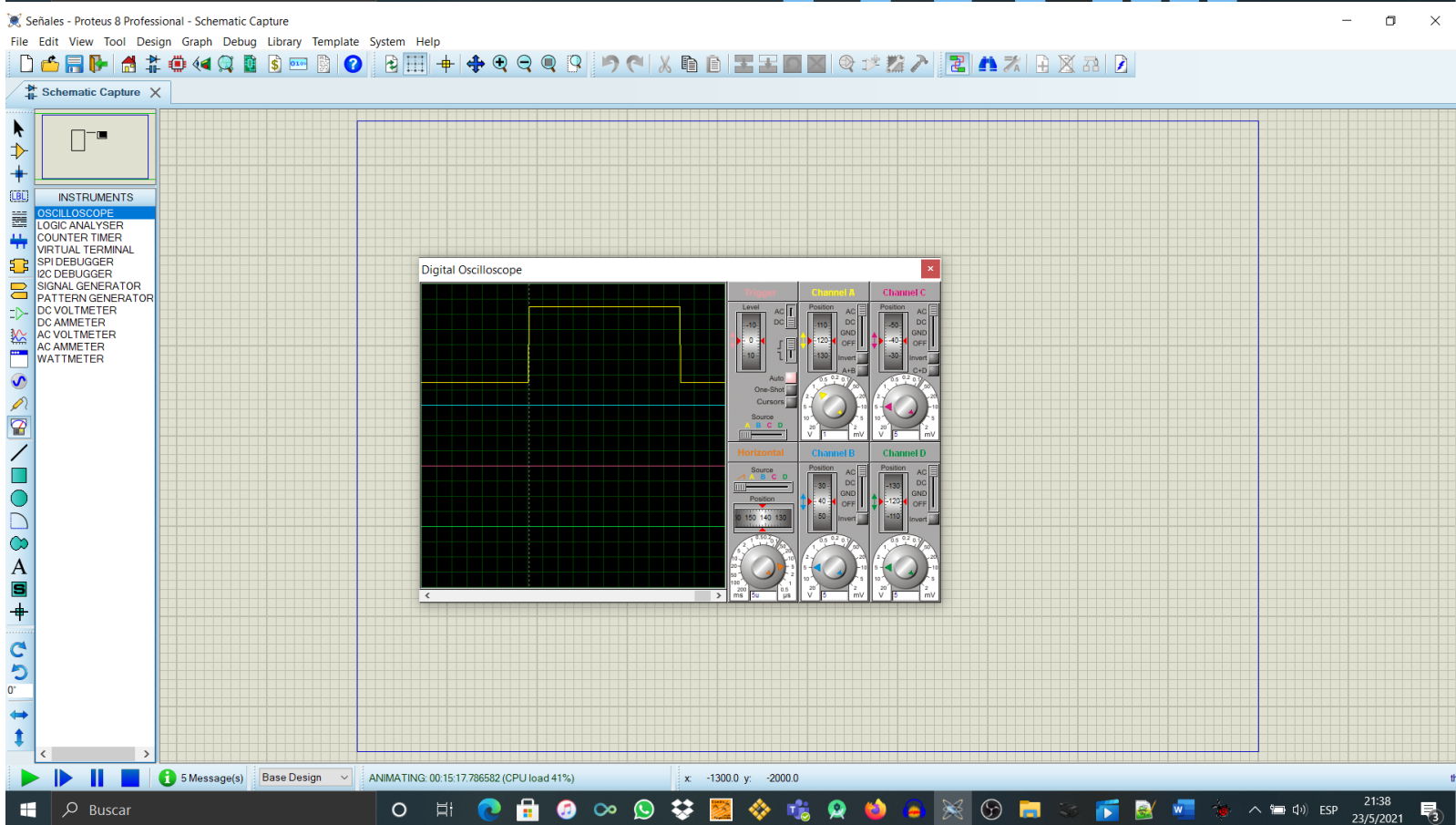
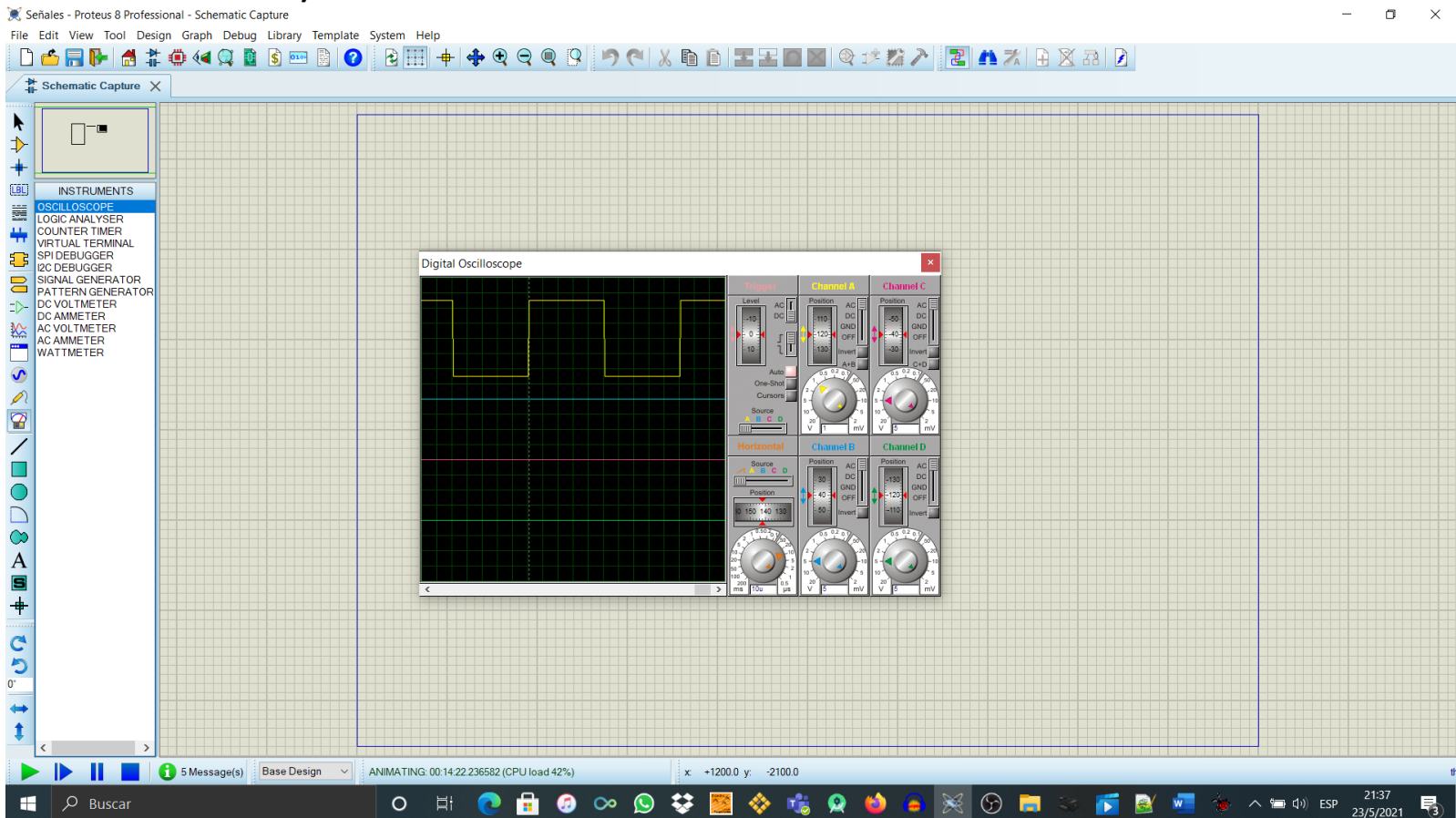
Build Message Find in Files Breakpoints and Tracepoints

ATmega8535 AVR Simulator Auto RunStopped Ln 61, Col 1 P NUM SCRL

22:42
23/5/2021

Simulación en Proteus

➤ A)



➤ ByC

