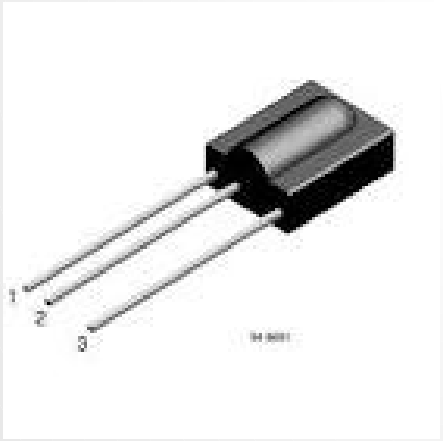
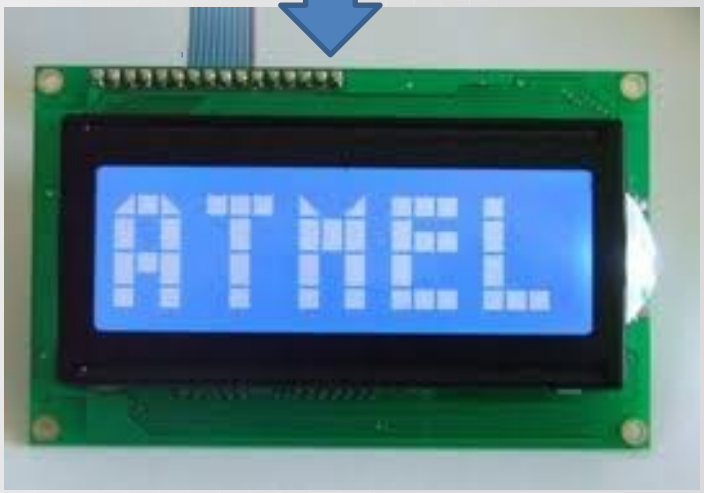
Tachometer

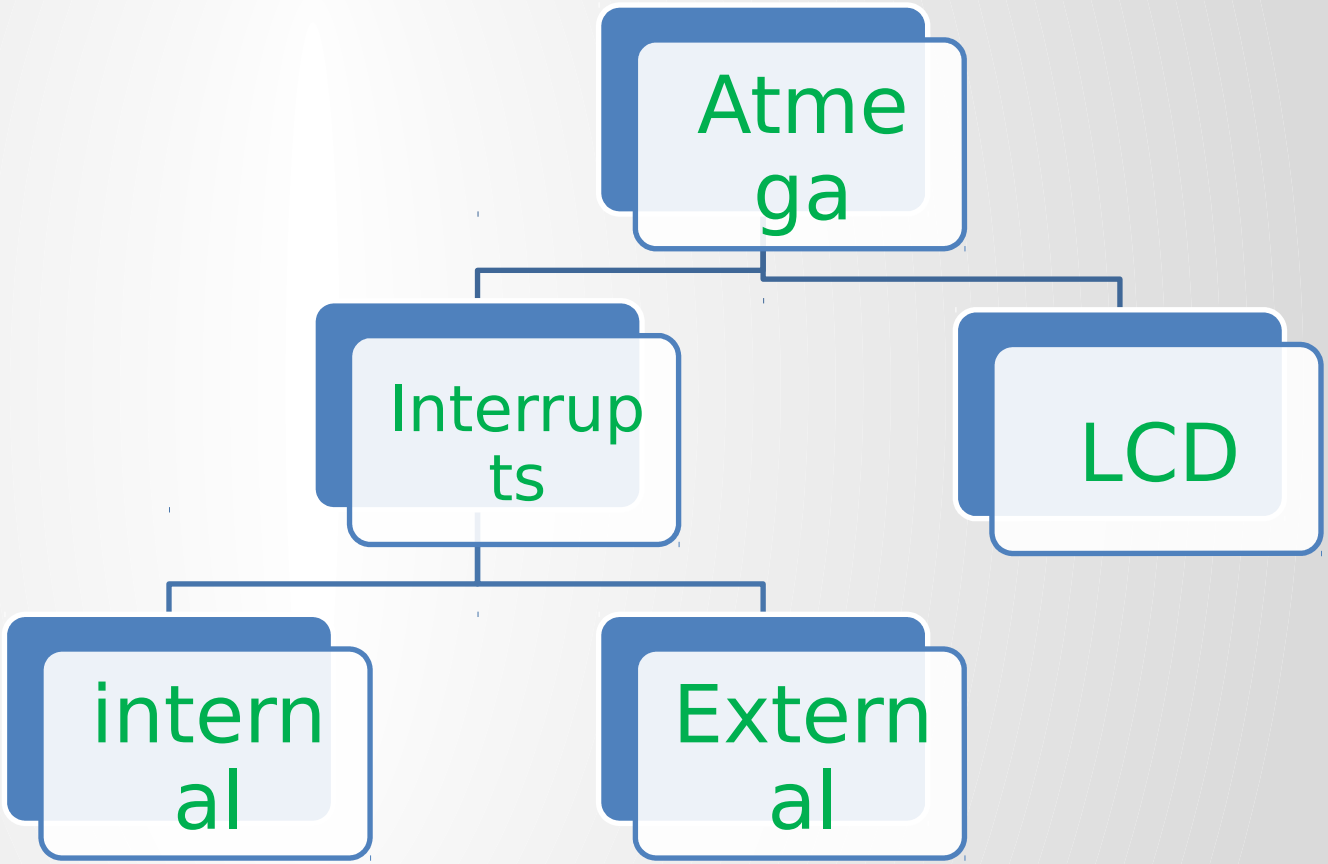
Hardware Design

-=





Recall



TSOP operates on 38 khz

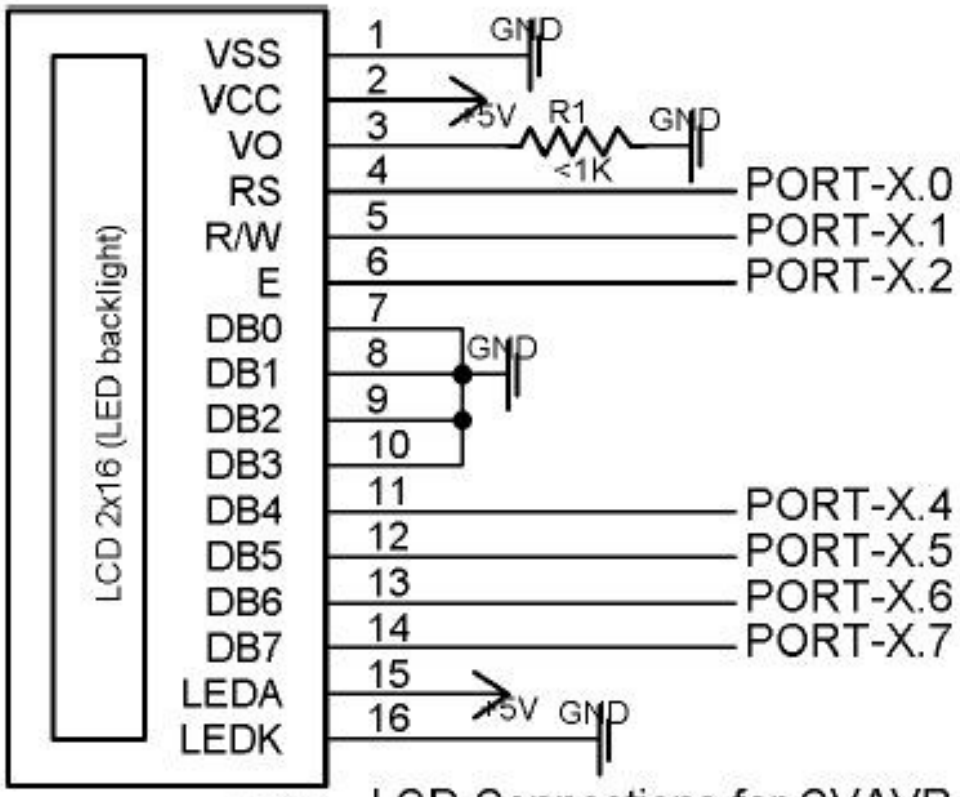
Internal interrupts

CTC MODE

38 Khz

LCD Circuit Diagram

There are 16 pins in an LCD; See reverse side of the LCD for the PIN configuration.
The connections have to be made as shown below:



LCD Connections for CVAVR

Circuit is ready . What next ?

Running Lcd through Code

4 Simple Commands

- Lcd_putsf(“Eclub welcomes u ”); // prints constant string
- Lc
- Lc

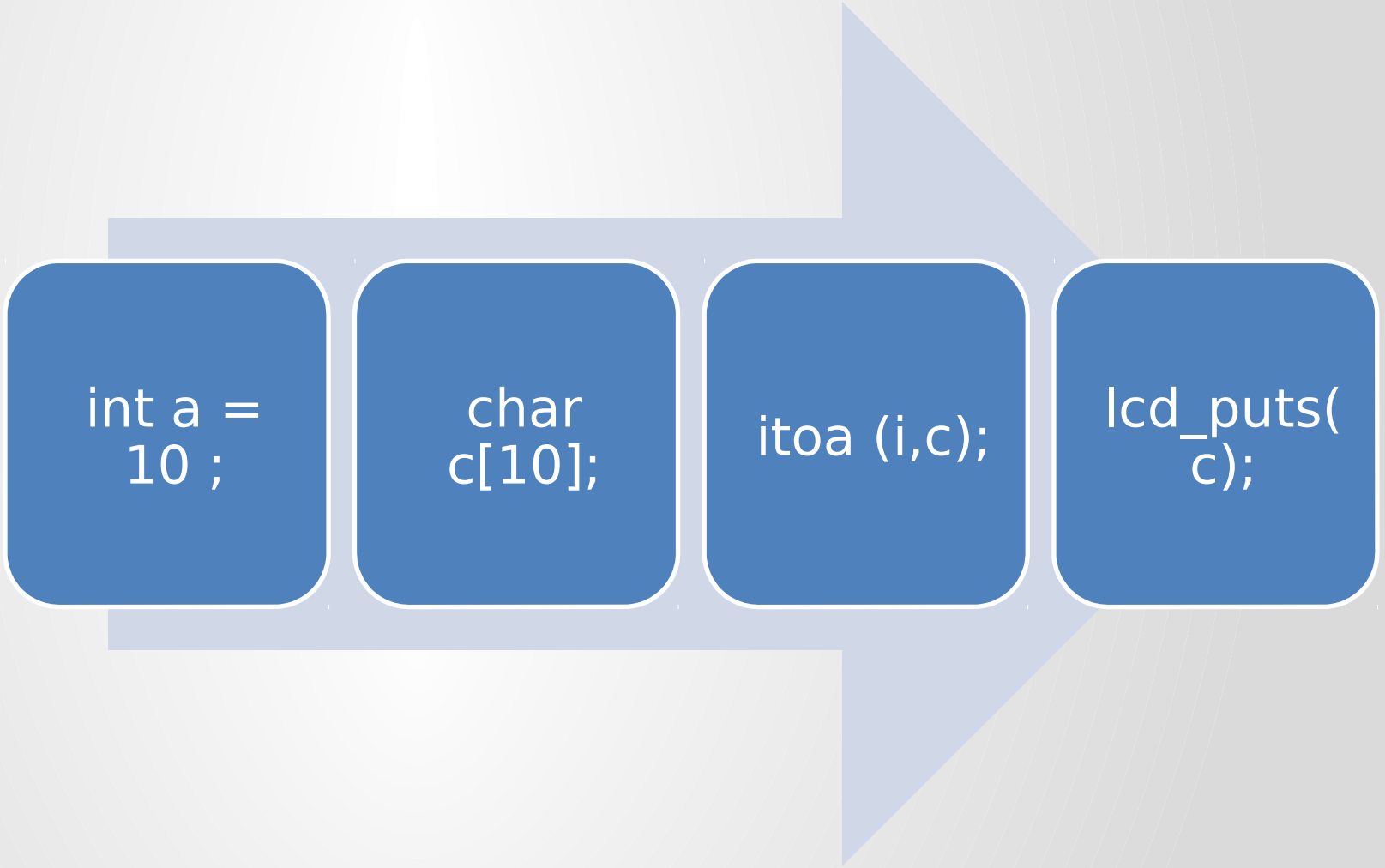
Problem

What about integers ?

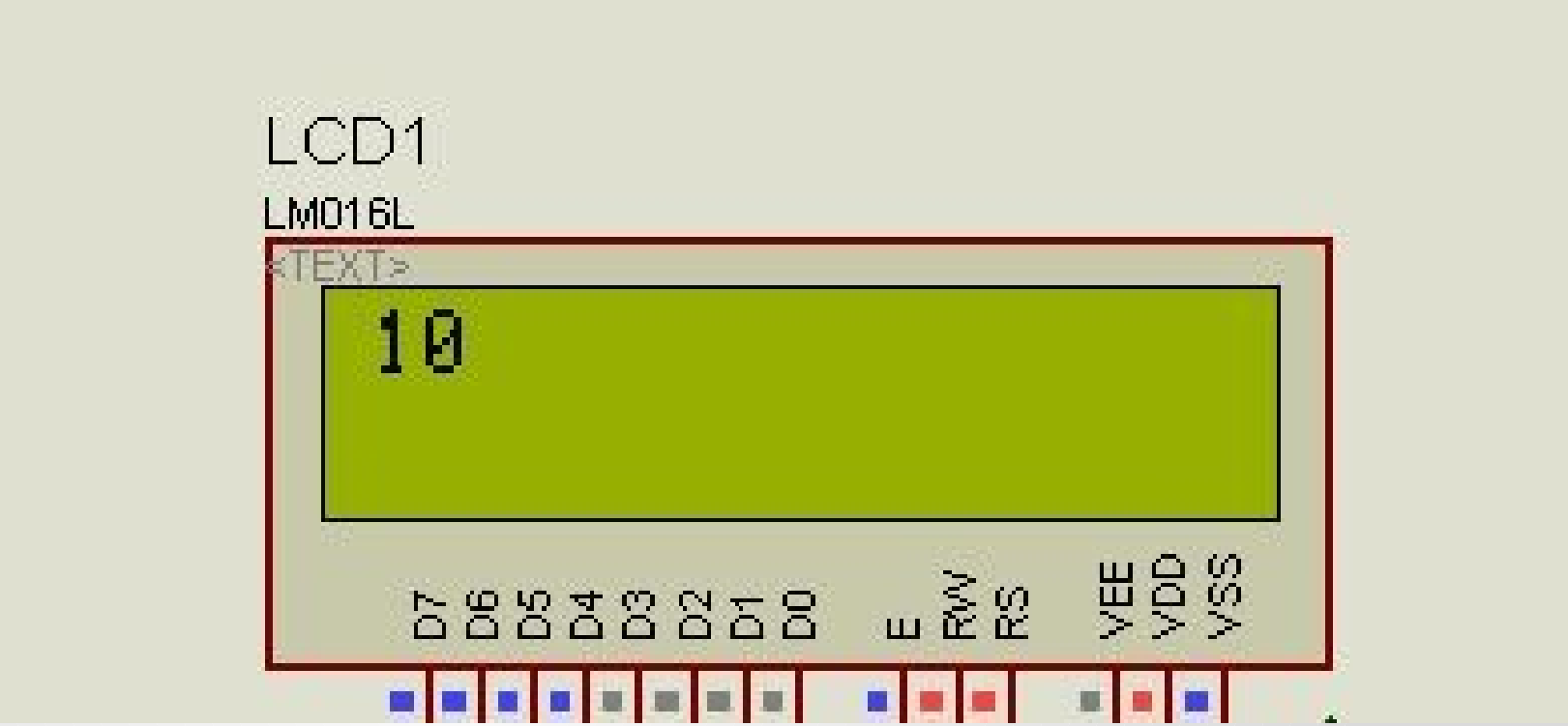
Solution

- Convert Integer to strings
- Use two simple Commands
- Itoa(i,c) & ftoa(f,3,c)

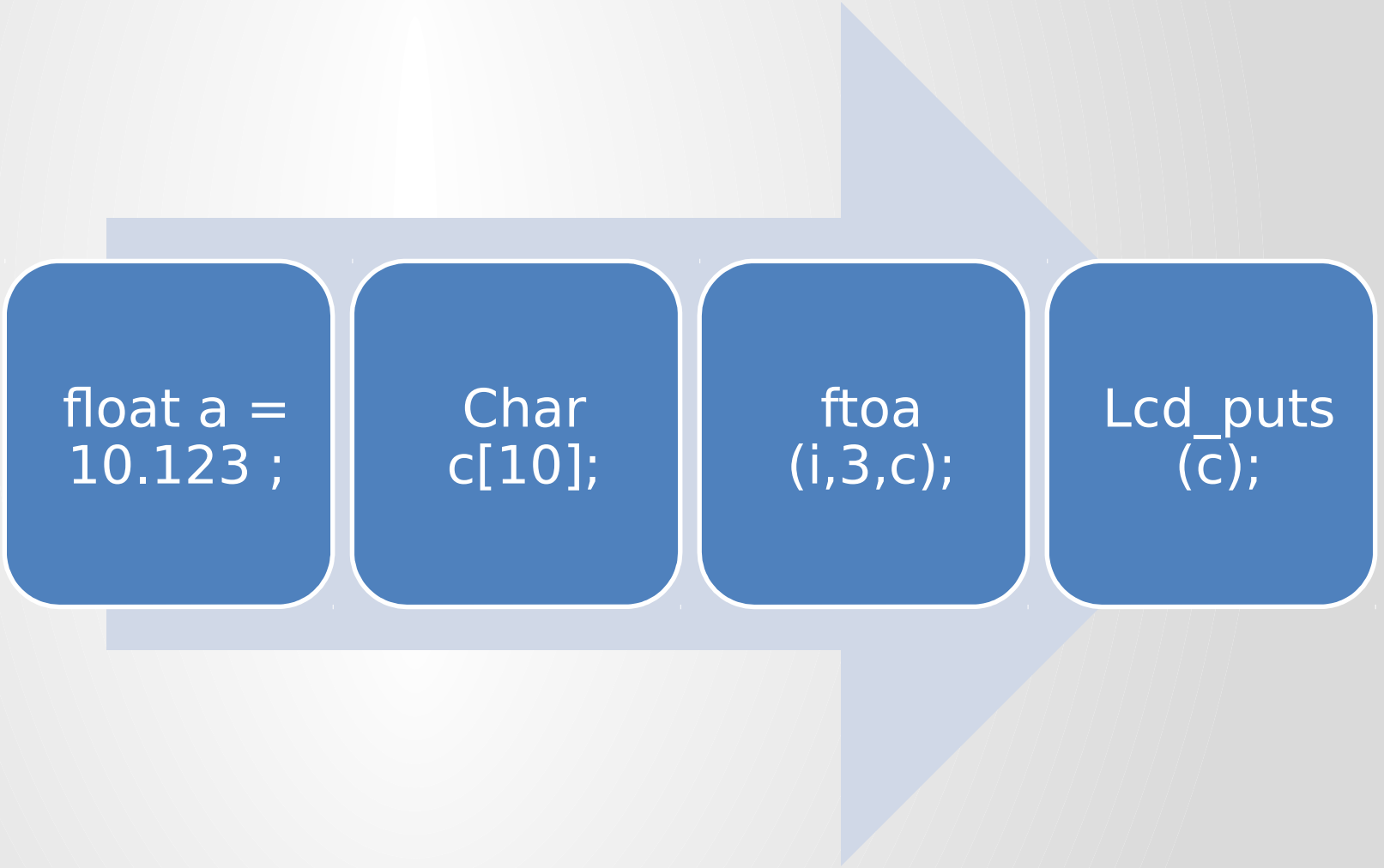
Using Itoa



Result

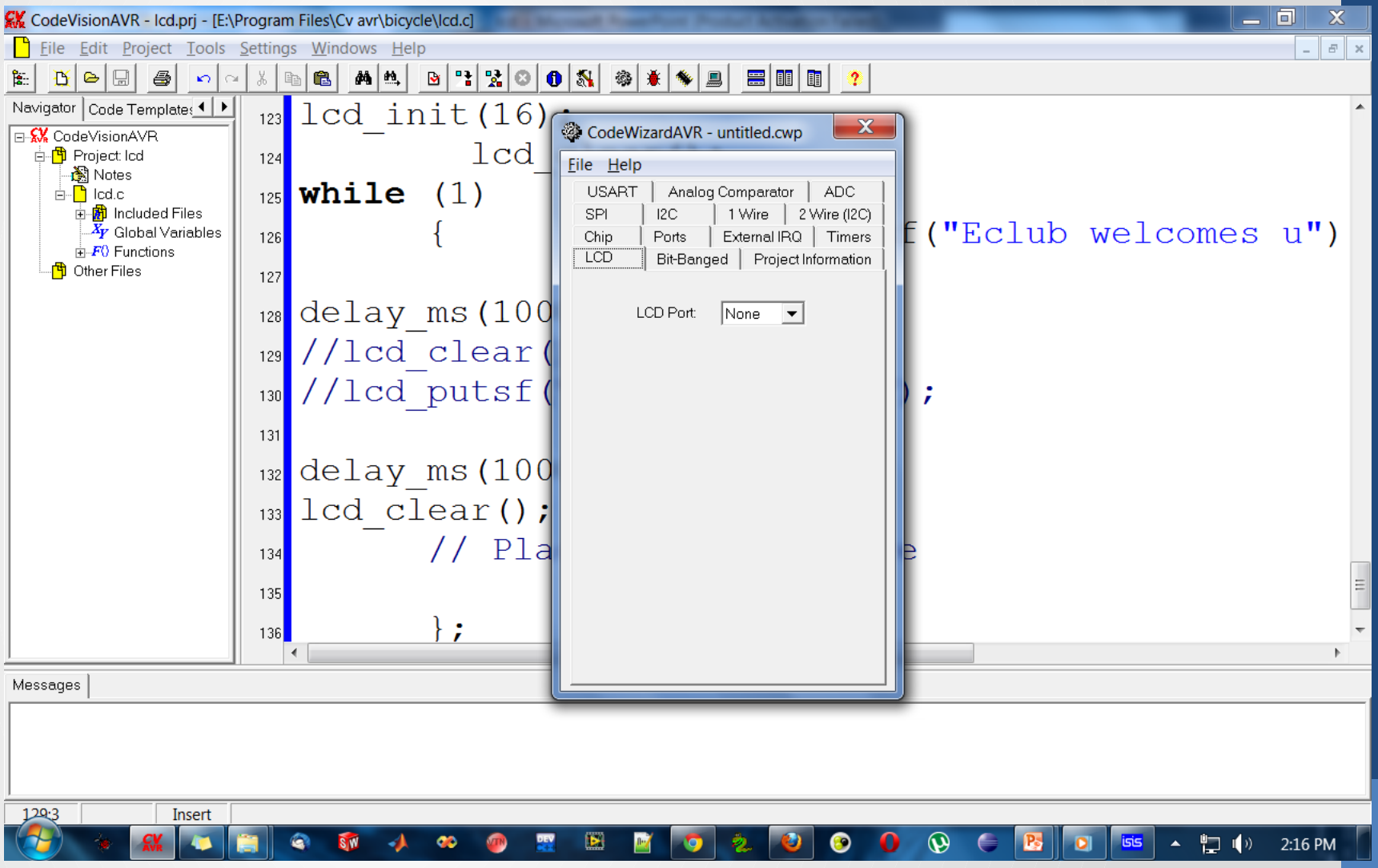


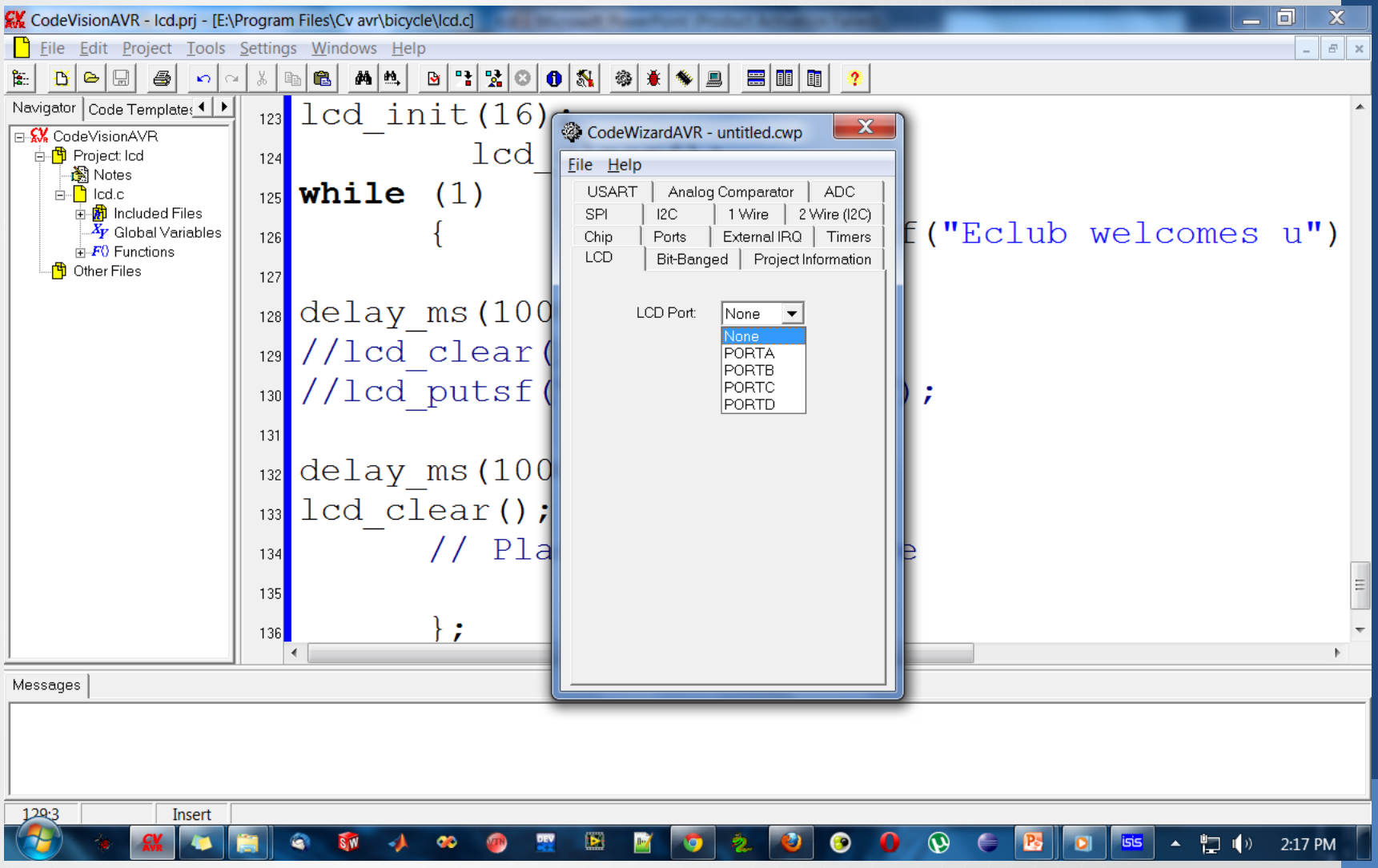
Using ftoa



Result

Using LCD in CVCAVR


CodeVisionAVR - lcd.prj - [E:\Program Files\Cv avr\bicycle\lcd.c]
File Edit Project Tools Settings Windows Help
Navigator
Code Templates
CodeVisionAVR
Project: lcd
Notes
lcd.c
Included Files
Global Variables
Functions
Other Files
lcd_init(16)
lcd_
while (1)
{
delay_ms(100
//lcd_clear(
//lcd_putsf(
delay_ms(100
lcd_clear();
// Pla
};
("Eclub welcomes u")
);
e
CodeWizardAVR - untitled.cwp
File Help
USART
Analog Comparator
ADC
SPI
I2C
1 Wire
2 Wire (I2C)
Chip
Ports
External IRQ
Timers
LCD
Bit-Banged
Project Information
LCD Port:
None
Messages
129:3
Insert
2:16 PM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Analog Comparator
ADC
SPI
I2C
1 Wire
2 Wire (I2C)
Chip
Ports
External IRQ
Timers
LCD
Bit-Banged
Project Information
LCD Port:
None
None
PORTA
PORTB
PORTC
PORTD
Messages
129:3
Insert
2:17 PM

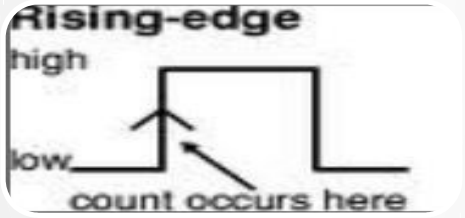
Select any Port

Use the 4 magical Functions

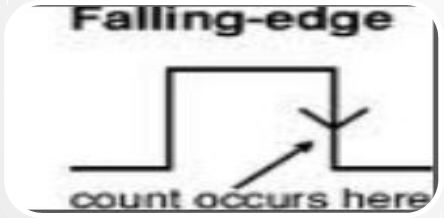
External Interrupt

- Triggered externally
- Not at regular intervals of time

Detects

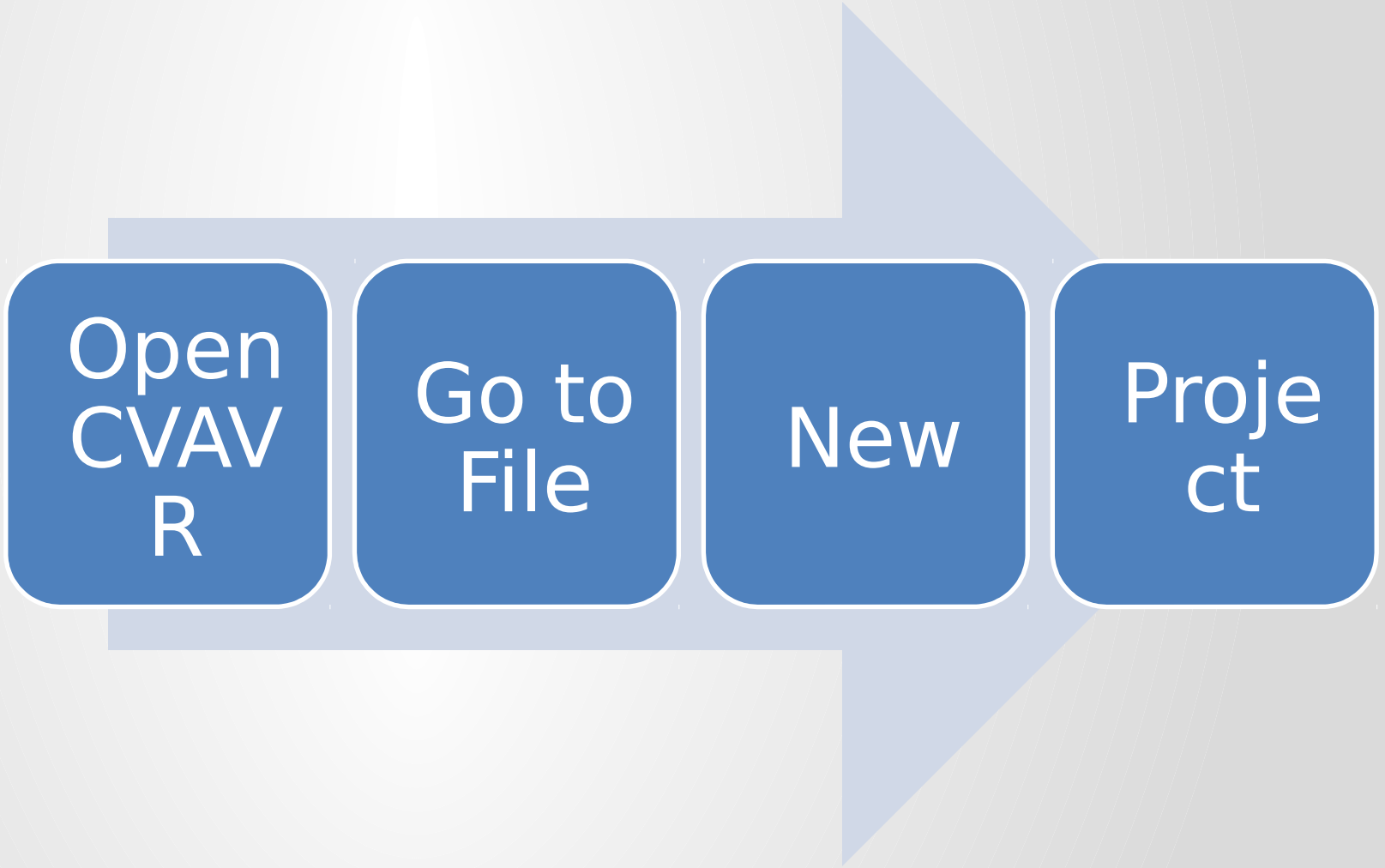


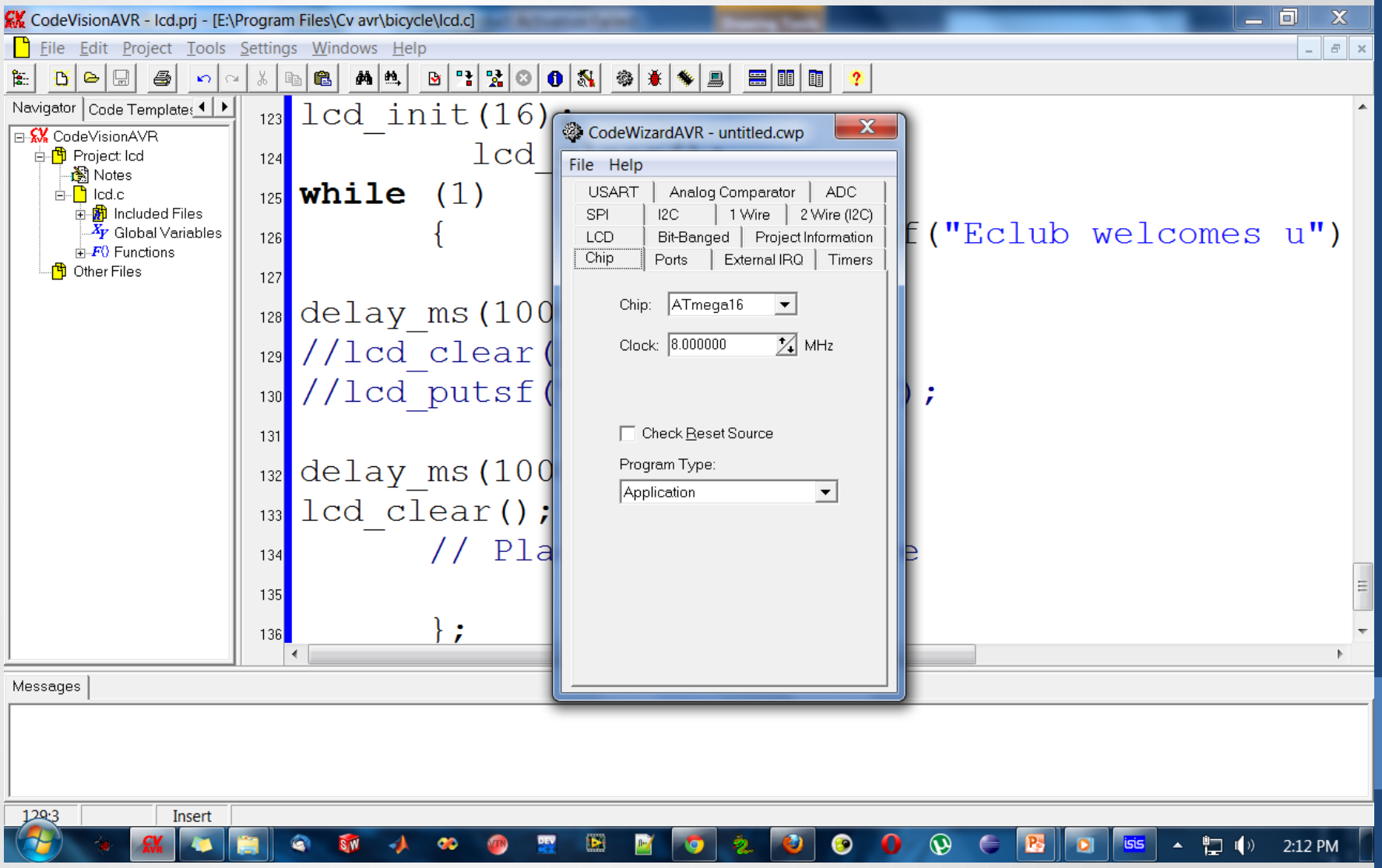
Rising Edge



Falling edge

Using Ext Interrupt in CVAVR


Open CVAV R
Go to File
New
Proje ct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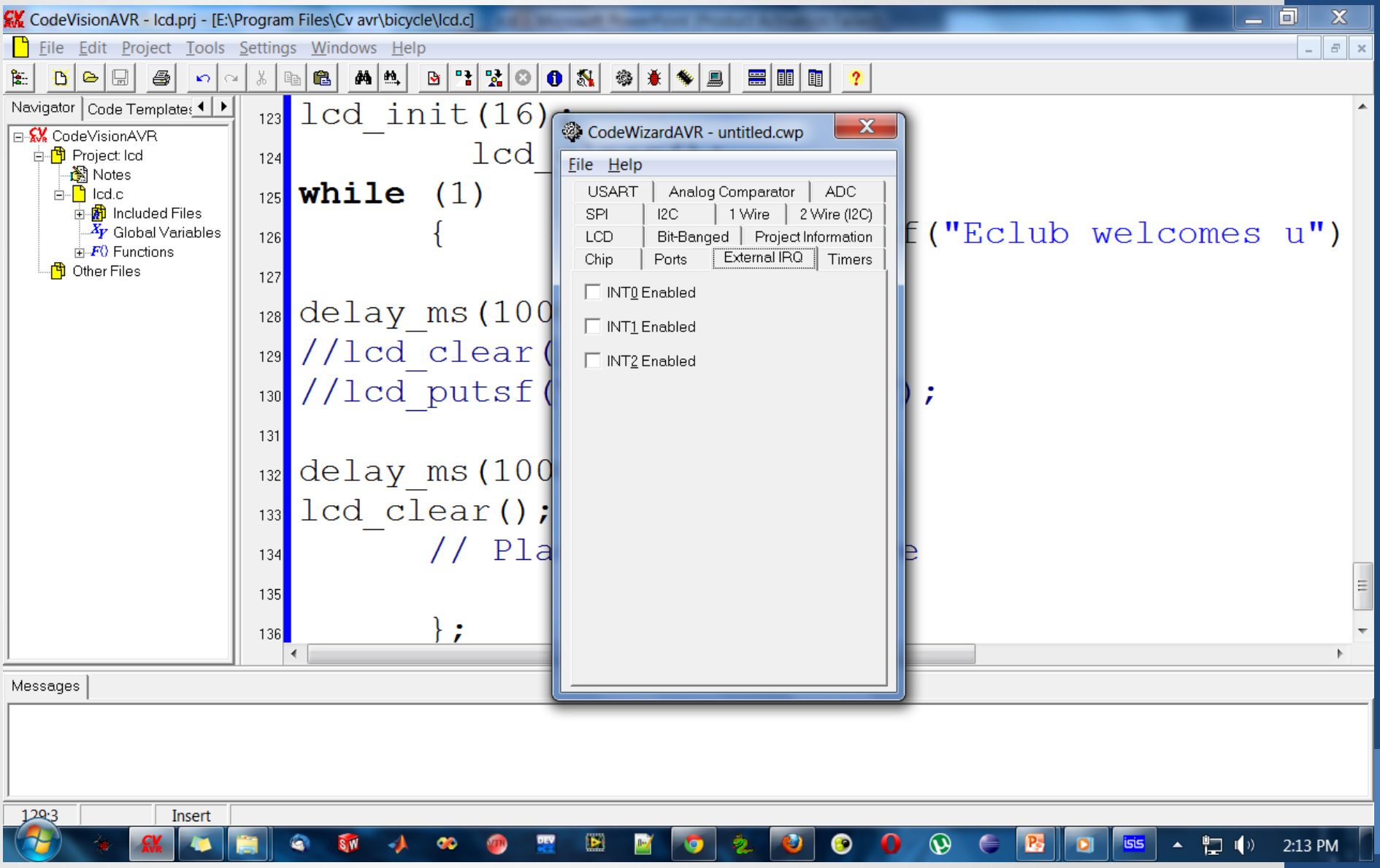
File Help
USART
Analog Comparator
ADC
SPI
I2C
1 Wire
2 Wire (I2C)
LCD
Bit-Banged
Project Information
Chip
Ports
External IRQ
Timers
Chip: ATmega16
Clock: 8.000000 MHz
Check Reset Source
Program Type:
Application
Messages
129:3
Insert
2:12 PM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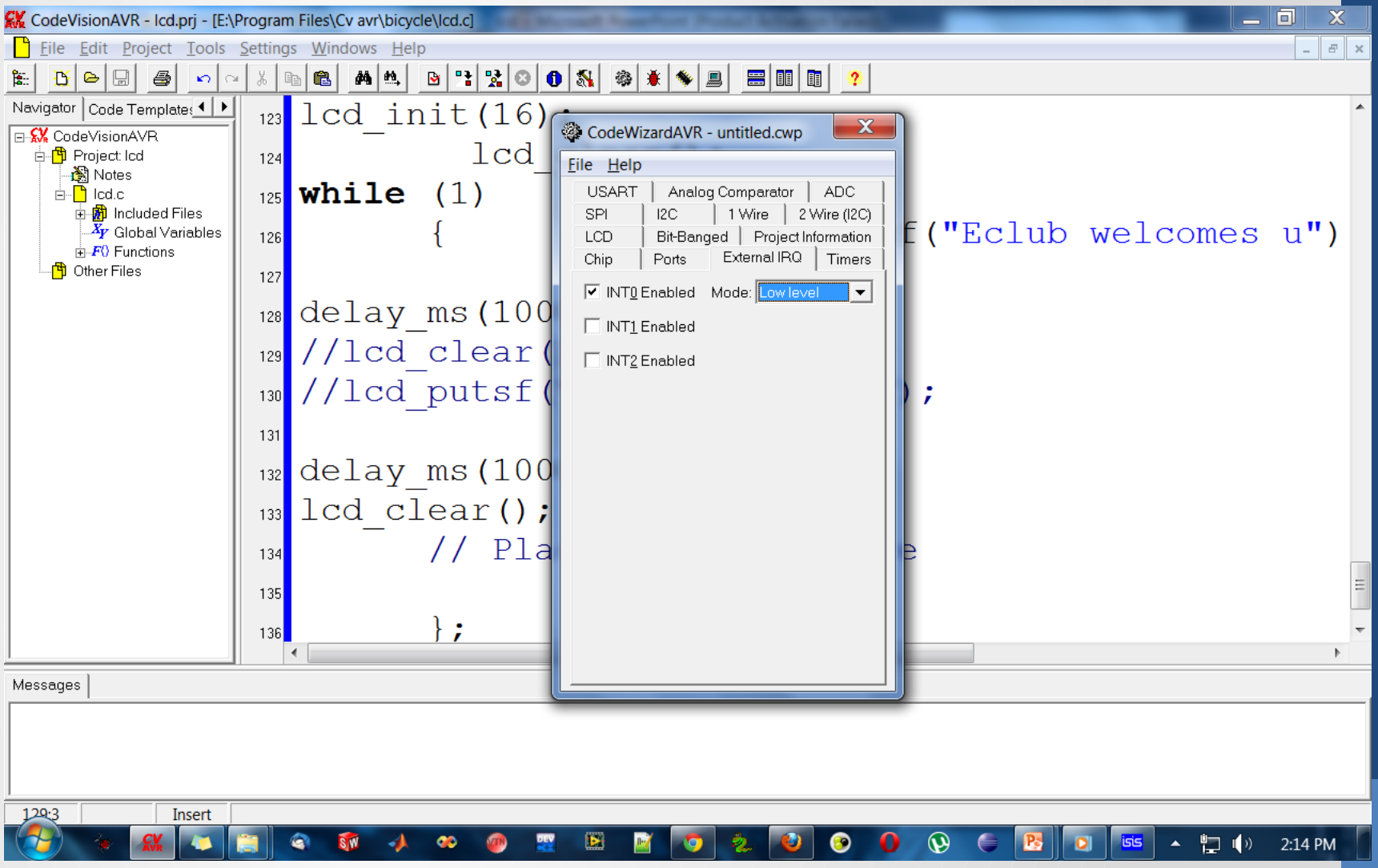
Analog Comparator
ADC
SPI
I2C
1 Wire
2 Wire (I2C)
LCD
Bit-Banged
Project Information
Chip
Ports
External IRQ
Timers
INT0 Enabled
INT1 Enabled
INT2 Enabled
Messages
129:3
Insert
2:13 PM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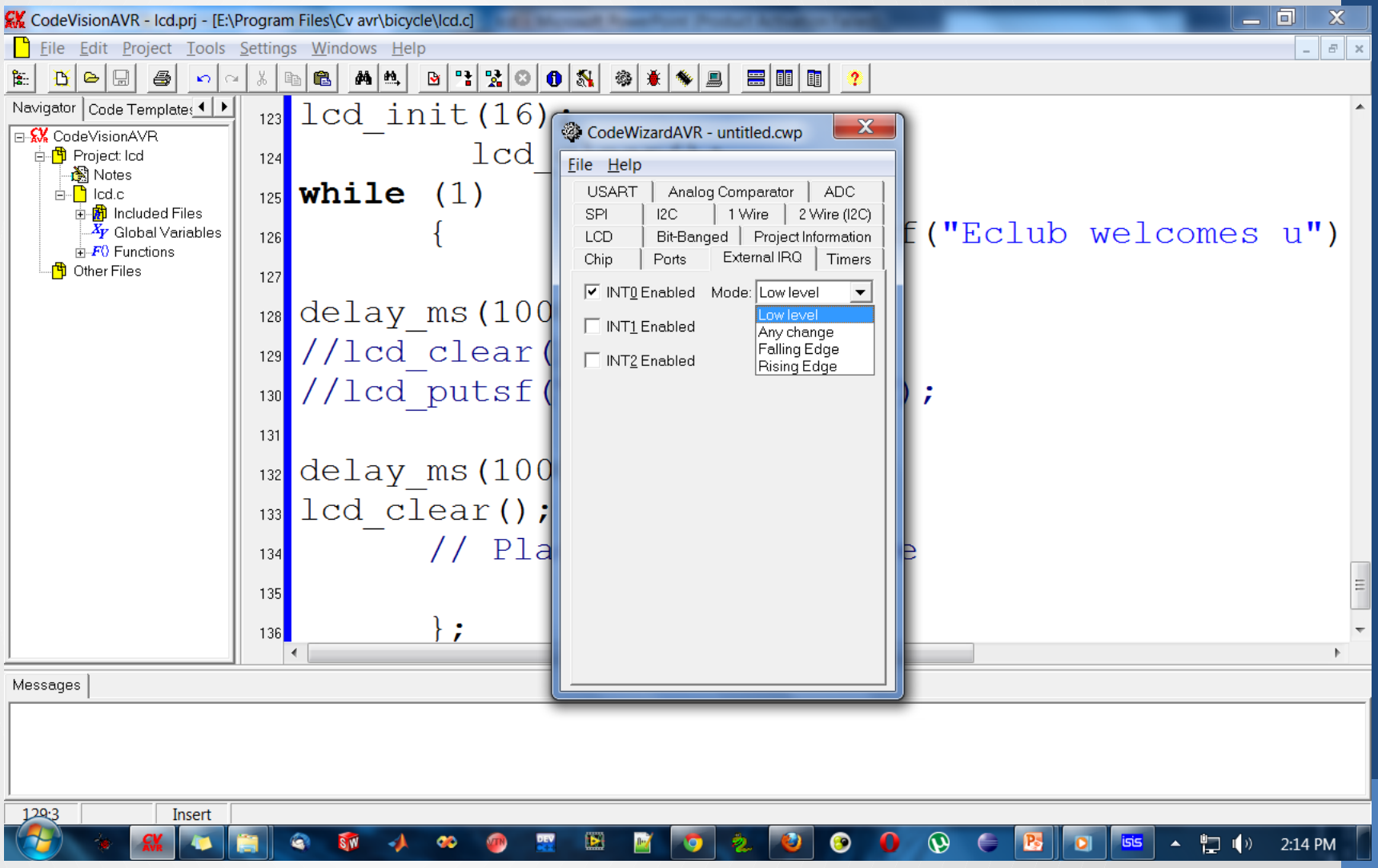
Analog Comparator
ADC
SPI
I2C
1 Wire
2 Wire (I2C)
LCD
Bit-Banged
Project Information
Chip
Ports
External IRQ
Timers
INT0 Enabled
Mode: Low level
INT1 Enabled
INT2 Enabled
Messages
129:3
Insert
2:14 PM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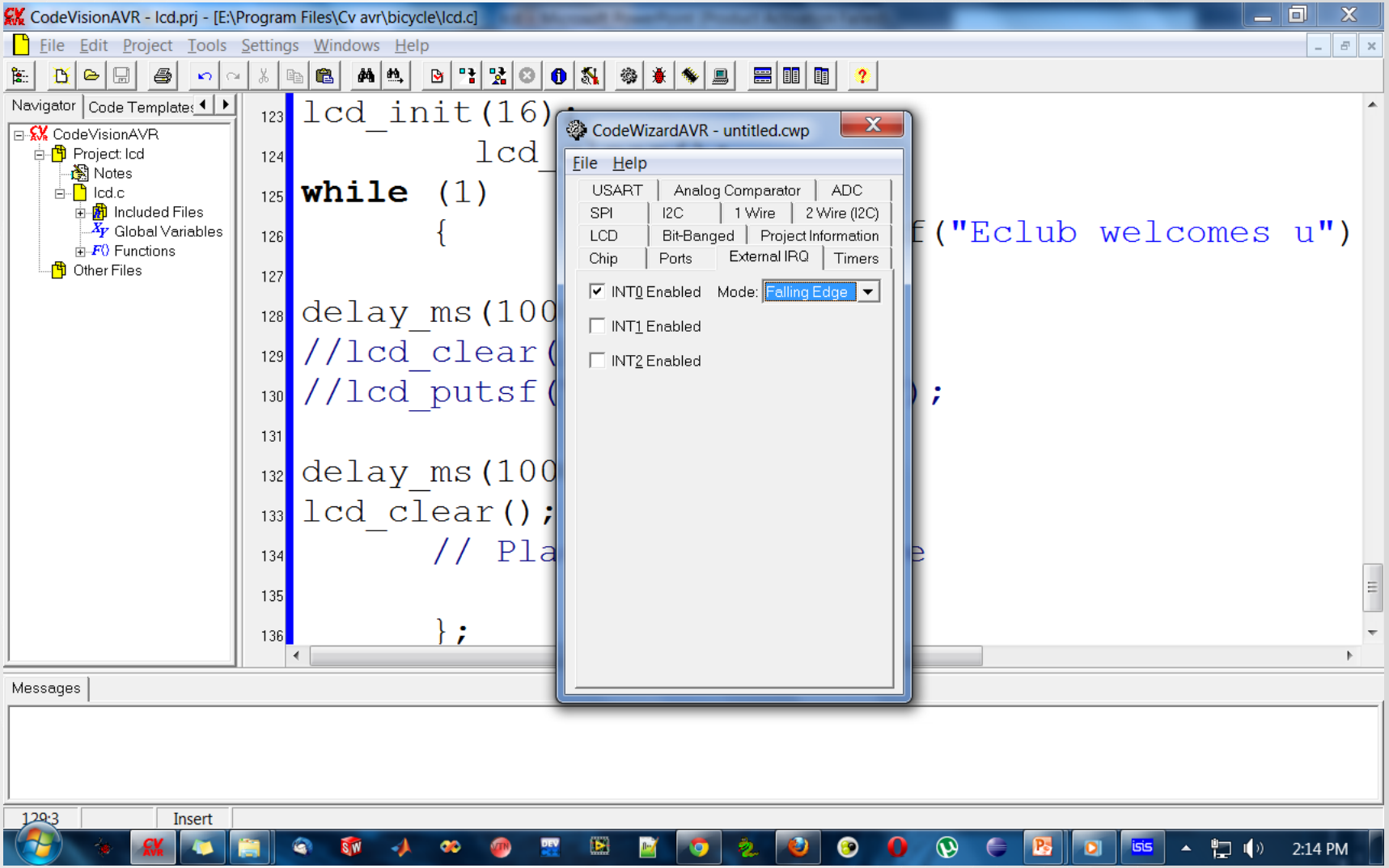
Analog Comparator
ADC
SPI
I2C
1 Wire
2 Wire (I2C)
LCD
Bit-Banged
Project Information
Chip
Ports
External IRQ
Timers
INT0 Enabled
Mode: Low level
INT1 Enabled
INT2 Enabled
Low level
Any change
Falling Edge
Rising Edge
Messages
129:3
Insert
2:14 PM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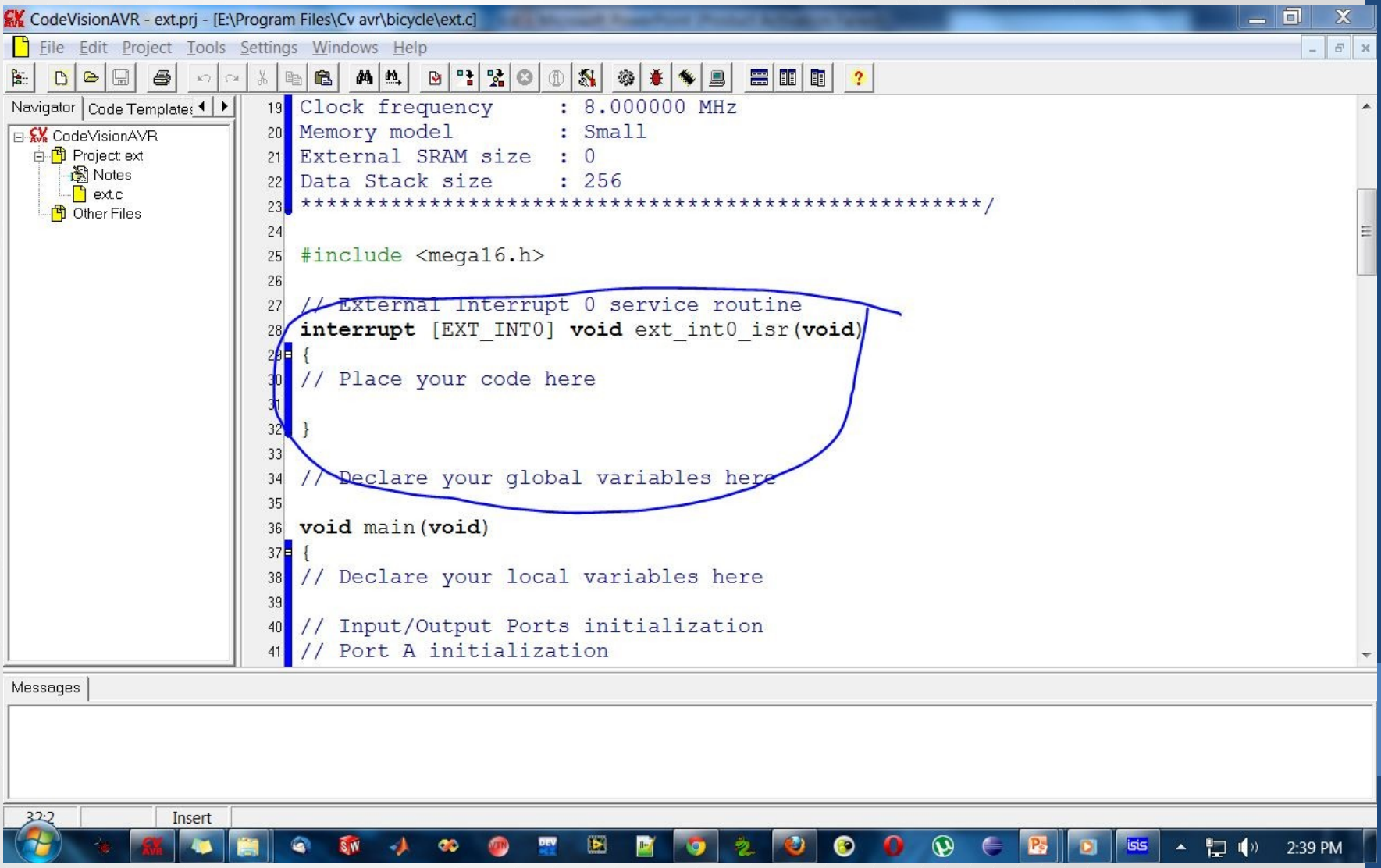
Analog Comparator
ADC
SPI
I2C
1 Wire
2 Wire (I2C)
LCD
Bit-Banged
Project Information
Chip
Ports
External IRQ
Timers
INT0 Enabled
Mode:
Falling Edge
INT1 Enabled
INT2 Enabled
Messages
129:3
Insert
2:14 PM

Place your code here



- So Now we are able to know when the obstacle attached to the shaft comes in way
- Able to display on LCD

What remains ?

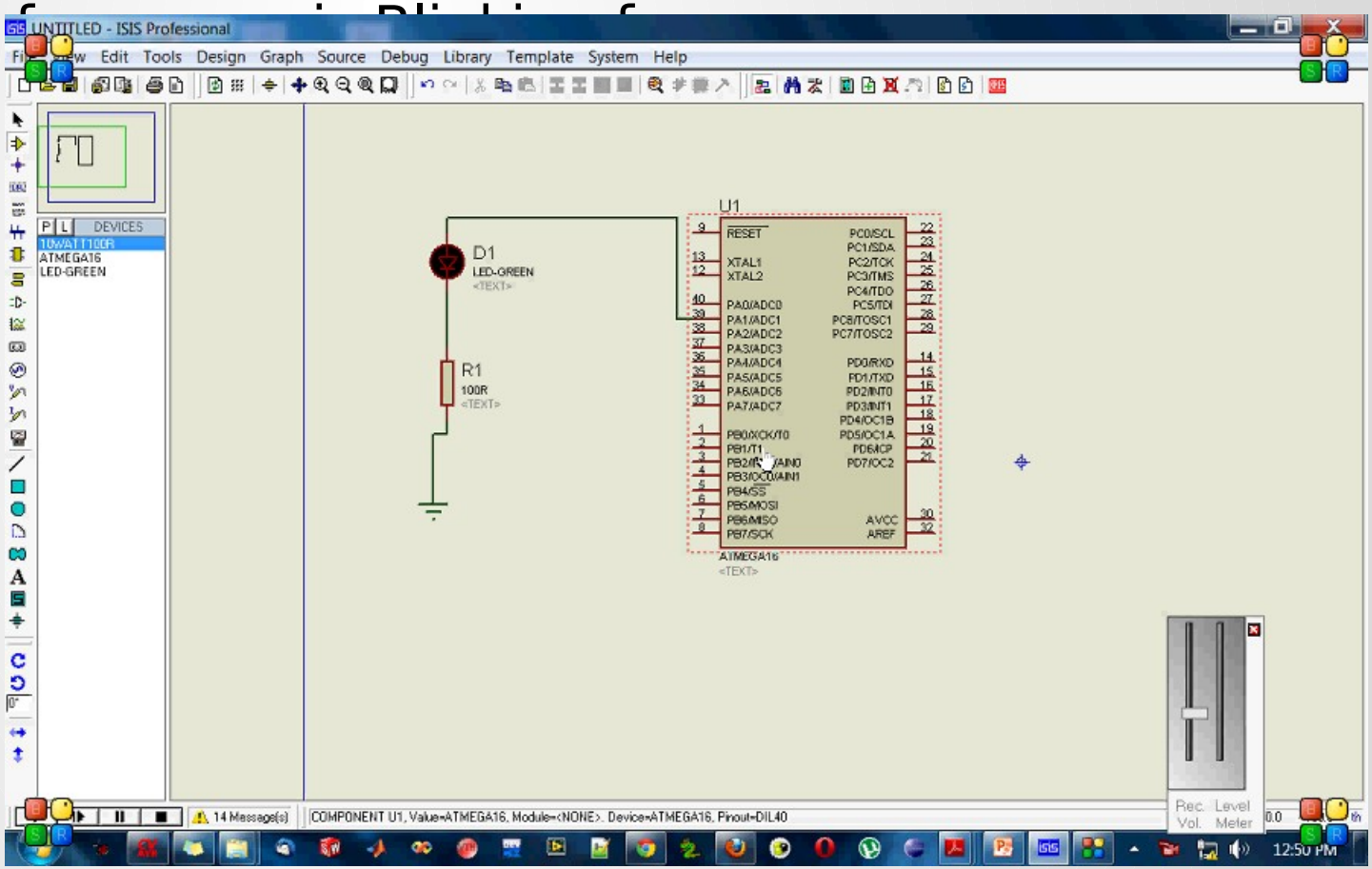
- Calculate time at which external interrupt occurs
- HOW ???

HINT

- Use one more Internal interrupt to get time

Pit Falls

- TSOP frequency 38 Khz and frequency of IR= 405 THz (10^12) - 300 GHz (10^9) . So 38 khz is



Pit Falls

- Internal Interrupts functions call themselves after specific intervals of time . Its not like C Programming that to use a function you need to call it in main program .
  But here time calls the function itself after time interval set by you . You need to mention anything inside main function to call interrupt after specific interval of time
- Declare variables global if declaring them inside main block results in error

- Downloading the Software
- Components distribution (When and where)
- Prelims (when , where & what to show)