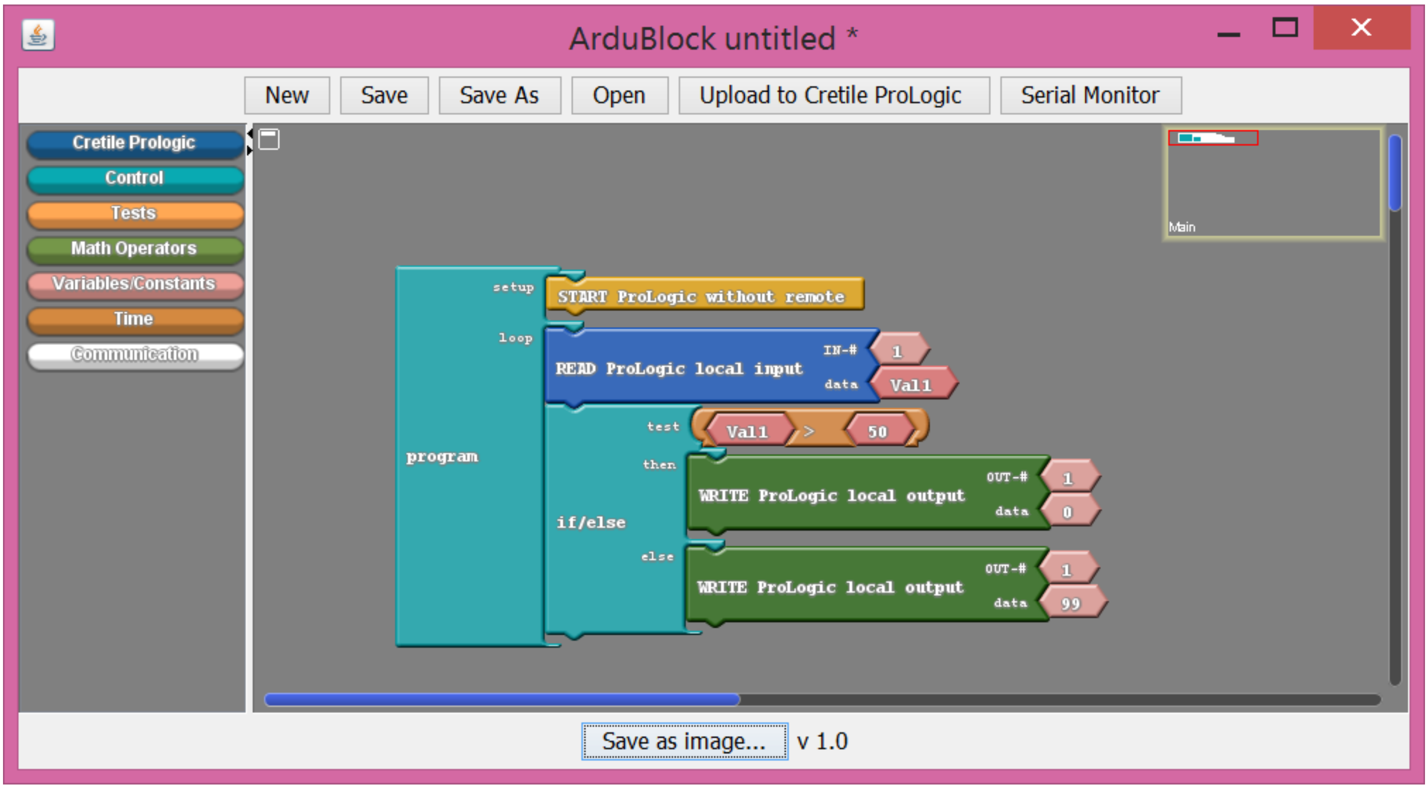
Cretile™ ProLogic is a programmable module. Cretile ProLogic can be programmed with the help of ArduBlocks* or by writing C/C++ code.

With ArduBlocks you can program Cretile ProLogic without having to write code in C or C++. ArduBlocks provides simple drag and drop blocks to build a programming Logic. The ArduBlocks environment looks like below:



```
program
  setup  START ProLogic without remote
  loop   READ ProLogic local input   IN-# 1
                                     data Val1
         if/else
           test  Val1 > 50
           then  WRITE ProLogic local output  OUT-# 1
                                              data 0
           else  WRITE ProLogic local output  OUT-# 1
                                              data 99
```

ArduBlock* is an open source OpenBlocks* based visual programming environment. It is extended to work with Cretile ProLogic and can be downloaded from here

If you know how to program in C/C++ language, you can choose to program using these programming languages instead of using ArduBlock.

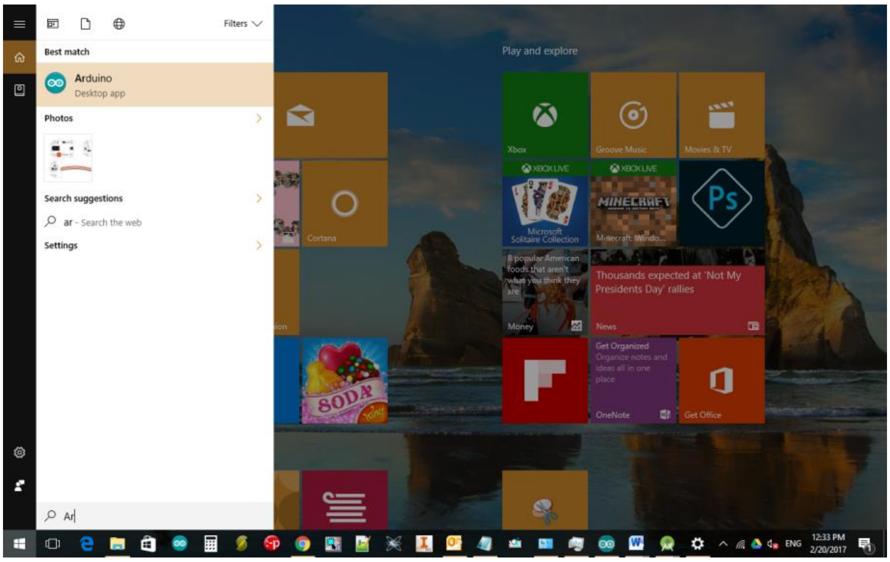
*Registered third party trademarks brand/product names

# Let’s get started

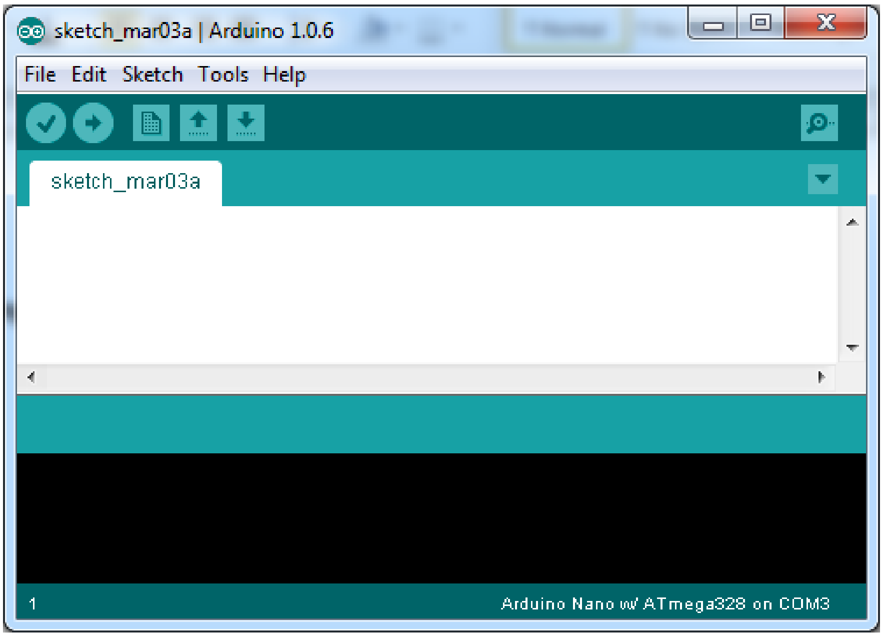
## 1 First step is to install the ArduBlock

Download ArduBlock from here and run ArduinoCretile.exe file on your Windows based computer/tablet. Current software is supported only for Microsoft Windows* 7 & above computer/tablets.

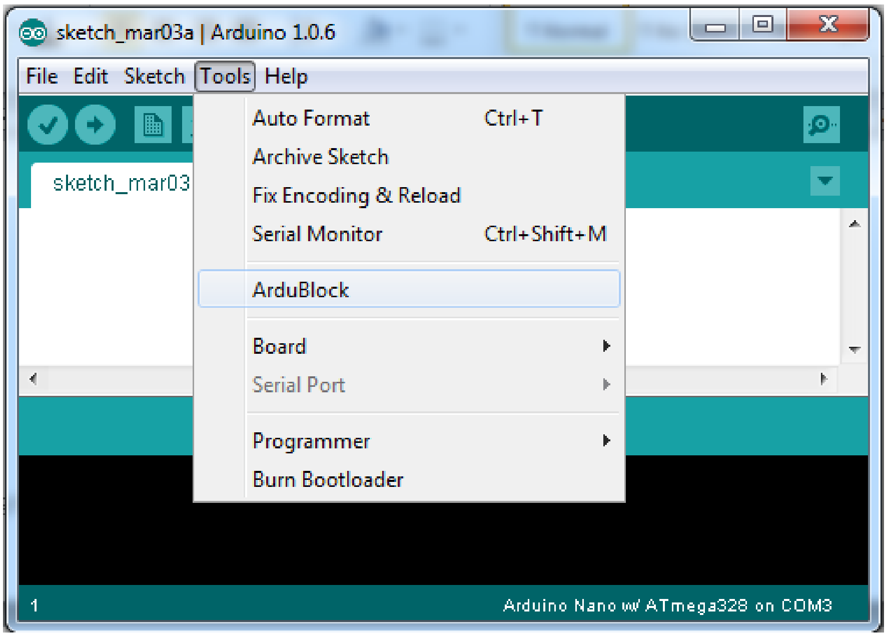
Once installed, Arduino* will appear in your program list of Windows “Start Menu”. On Windows 10, it should look similar to below.



Click on Arduino icon to open the application. Below is how it looks like

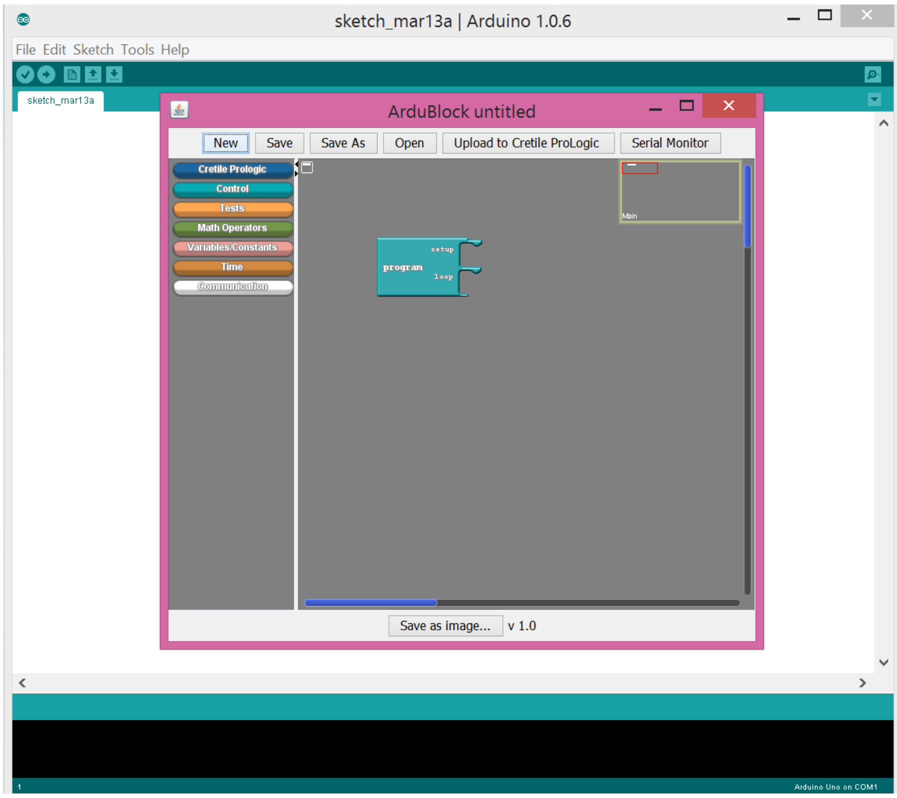

sketch_mar03a | Arduino 1.0.6
File Edit Sketch Tools Help
sketch_mar03a
1
Arduino Nano w/ ATmega328 on COM3

Click on ‘Tools’ menu item and Choose ‘ArduBlock’ option


sketch_mar03a | Arduino 1.0.6
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
ArduBlock
Board
Serial Port
Programmer
Burn Bootloader
sketch_mar03
1
Arduino Nano w/ ATmega328 on COM3

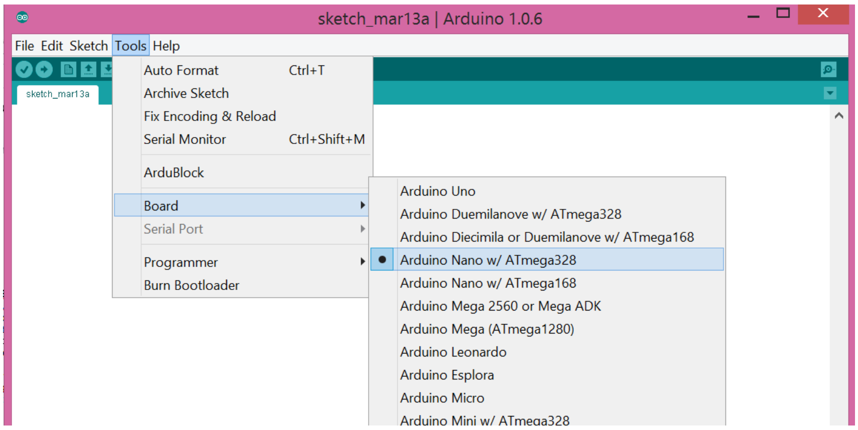
*Registered third party trademarks brand/product names

ArduBlock opens up and looks like below

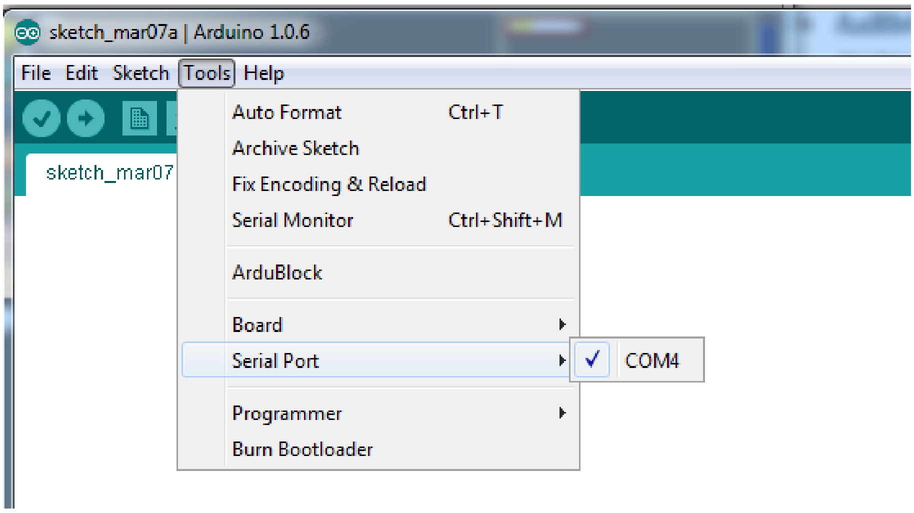


## 2 Now setup ArduBlock to work with Cretile ProLogic

- Choose the Board
  a. Open the Arduino
  b. Use 'Tools' menu
  c. Choose 'Board' menu item
  d. Select 'Arduino Nano w/ ATmega 328' board from the list


sketch_mar13a | Arduino 1.0.6
File Edit Sketch Tools Help
sketch_mar13a
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
ArduBlock
Board
Serial Port
Programmer
Burn Bootloader
Arduino Uno
Arduino Duemilanove w/ ATmega328
Arduino Diecimila or Duemilanove w/ ATmega168
● Arduino Nano w/ ATmega328
Arduino Nano w/ ATmega168
Arduino Mega 2560 or Mega ADK
Arduino Mega (ATmega1280)
Arduino Leonardo
Arduino Esplora
Arduino Micro
Arduino Mini w/ ATmega328

- Choose the how Cretile ProLogic will talk to your PC
  a. Connect Cretile ProLogic to your computer using a micro-USB cable
  b. Open the Arduino Editor
  c. Use 'Tools' menu
  d. Choose 'Serial Port menu item.
  e. Generally you should see one of COM port (Communication Port) selected here. In case, there are more than one ports mentioned in this list, you will have to try out each of the ports to check which port works for your setup.

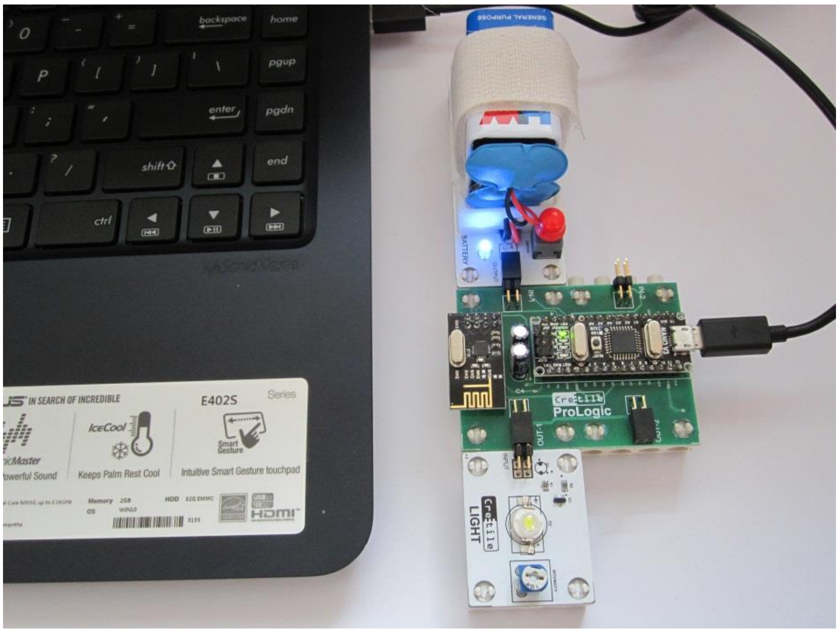


# Program #1: Let's now write the very first Blinking Light Program

## 1 What you need

1. Cretile Battery or Cretile Power
2. Cretile Light
3. Cretile ProLogic
4. A micro-USB Cable

## 2 Now make connections as shown



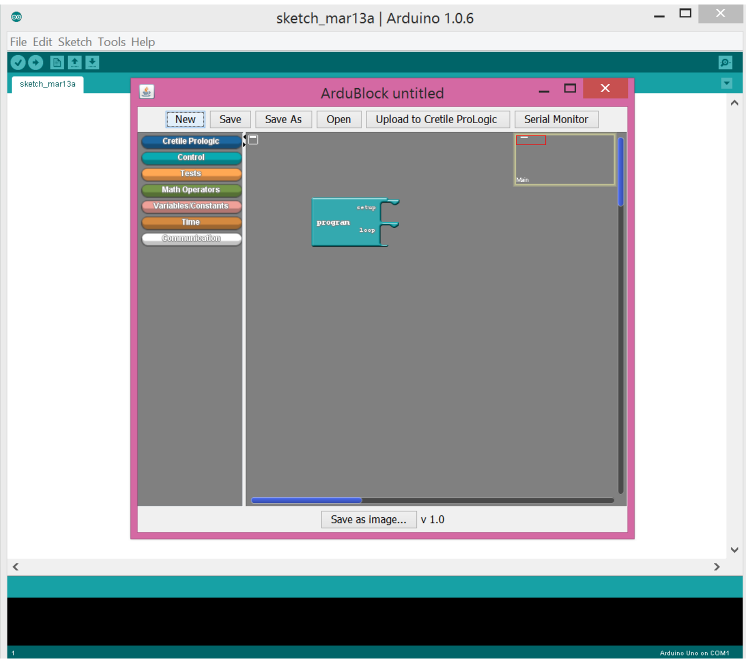
## 3 Logic that we need to implement

1. Switch ON the Cretile Light
2. Wait for 1 Sec
3. Switch OFF the Cretile Light
4. Wait for 1 Sec
5. Start from Step #1

So, if you carry our step 1, 2, 3 & 4 again and again, you will observe a Cretile Light starts to blink. Cretile light shall remain ON for one second and OFF for the next one second. This is happen indefinitely.

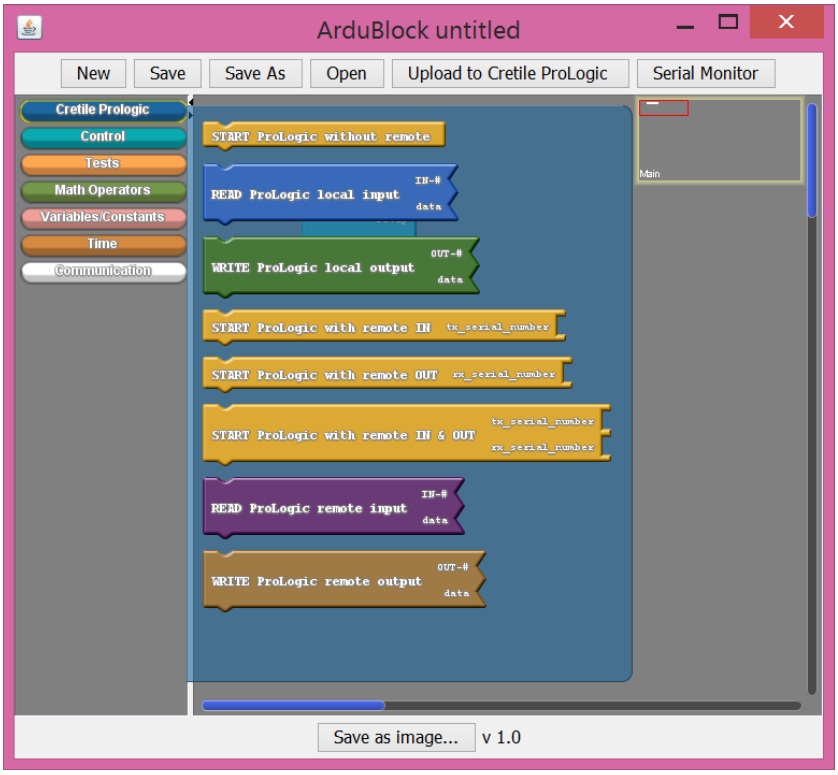
## 4 Writing ArduBlock Blinking Light Program

1. Open Arduino application.
2. Click  on 'Tools' menu option& choose 'ArduBlock' option
3. ArduBlock editor opens up as shown here



From the left side menu items, choose 'Cretile ProLogic' option. You will see all Cretile ProLogic function as shown here.

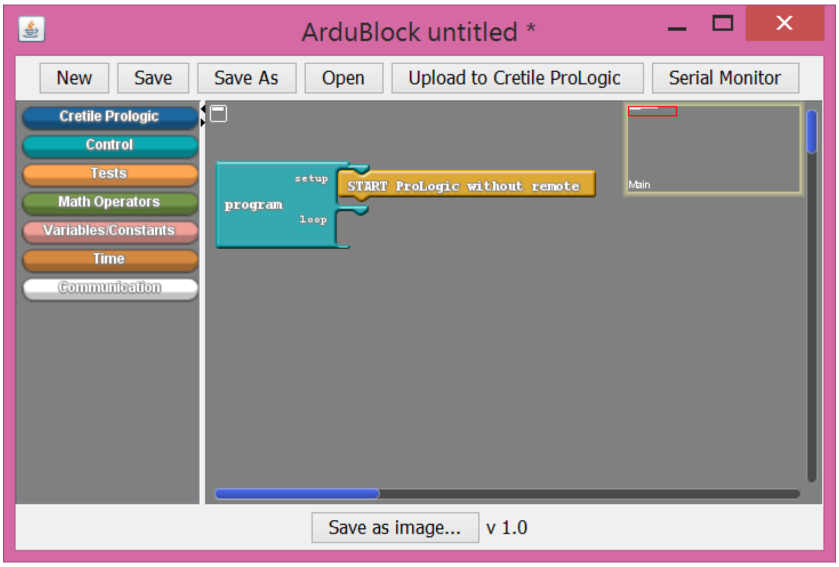
Similarly other functions are grouped under various categories of options. Explore each of those.


ArduBlock untitled
New
Save
Save As
Open
Upload to Cretile ProLogic
Serial Monitor
Cretile Prologic
Control
Tests
Math Operators
Variables/Constants
Time
Communication
START ProLogic without remote
READ ProLogic local input
IN-#
data
WRITE ProLogic local output
OUT-#
data
START ProLogic with remote IN
tx_serial_number
START ProLogic with remote OUT
rx_serial_number
START ProLogic with remote IN & OUT
tx_serial_number
rx_serial_number
READ ProLogic remote input
IN-#
data
WRITE ProLogic remote output
OUT-#
data
Main
Save as image...
v 1.0

Drag 'START ProLogic without remote' function and drop it in the 'setup' slot of the 'program' as shown.

This step makes Cretile ProLogic ready to perform further tasks.

It is like a doctor getting ready by wearing his uniform & gathering all the required equipment for the surgery that needs to be done.

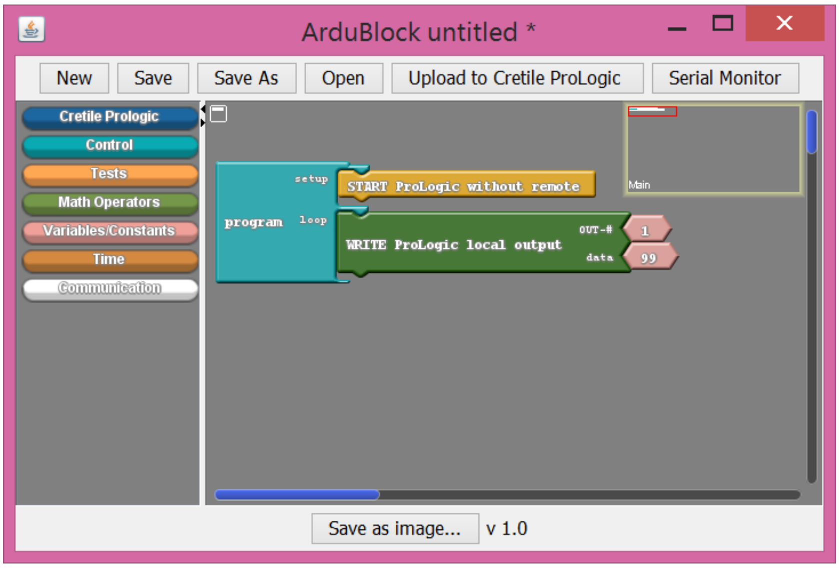


Now drag 'Write ProgLogic local output' and drop it in the loop section. This step will send '99' value to Cretile Light connected at Output-1.

You can send values from 0 to 99. Zero being lowest and 99 being the highest.

With '99' Cretile Light will be switch ON with full brightness. If value '50' used instead of '99', Cretile Light will be switched ON but with 50% brightness.

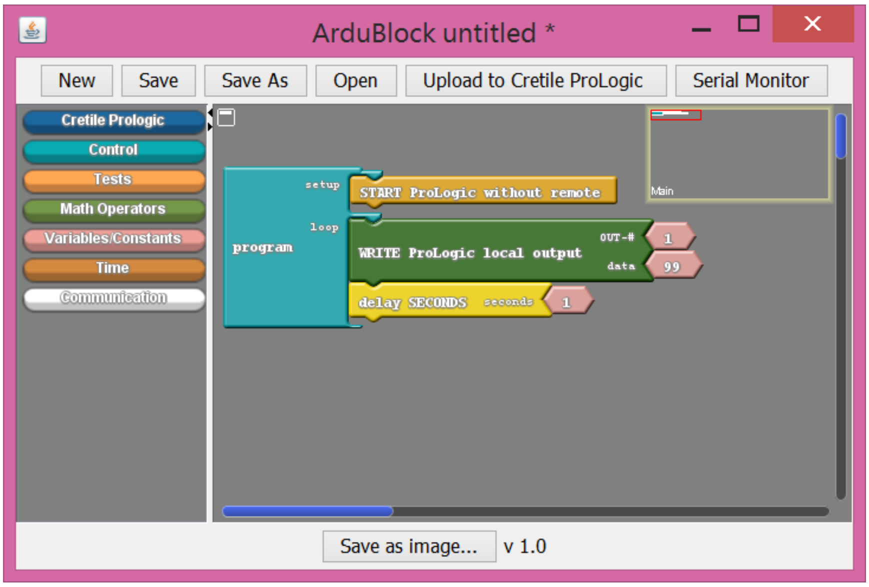
This will complete step #1 of our logic.



Now drag ‘delay SECONDS’ from ‘Time’ and drop it after ‘WRITE ProLogic’ block. This is the second step of our logic in which we wait for one second.

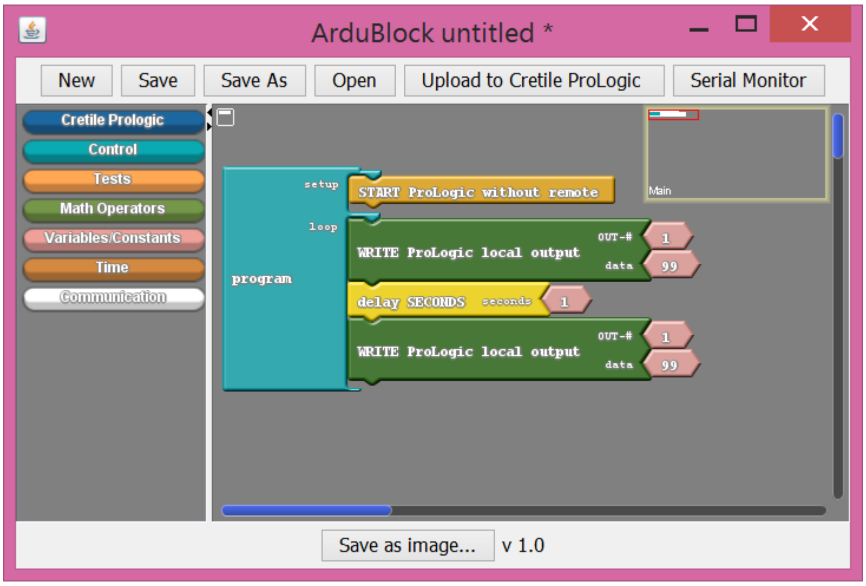
Note that you can also use delay MILLIS milliseconds’ from ‘Time’. In this case you will have to use value 1000 instead of 1. (One second = 1000 milliseconds)

This will complete step #2 of our logic



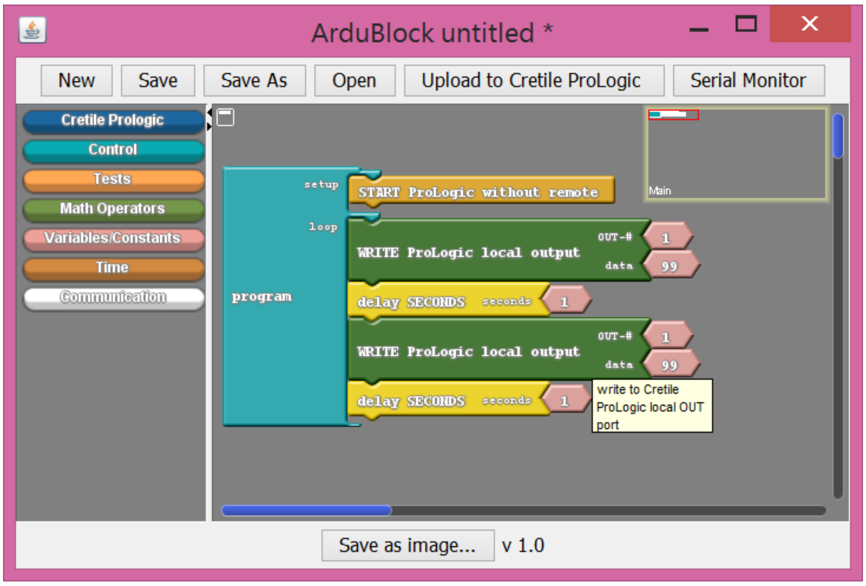
Next drag ‘Write ProgLogic local output’ and drop it after the ‘delay’. Click on the ‘99’ and change it to ‘0’. This will send ‘0’ value to Cretile Light connected at Output-1 making it switch OFF.

This will complete step #3 of our logic



Now drag ‘delay SECONDS’ from ‘Time’ and drop it after ‘WRITE ProLogic’ block.

This is fourth step of our logic in which we wait for one second after the Cretile Light is switched OFF



write to Cretile ProLogic local OUT port

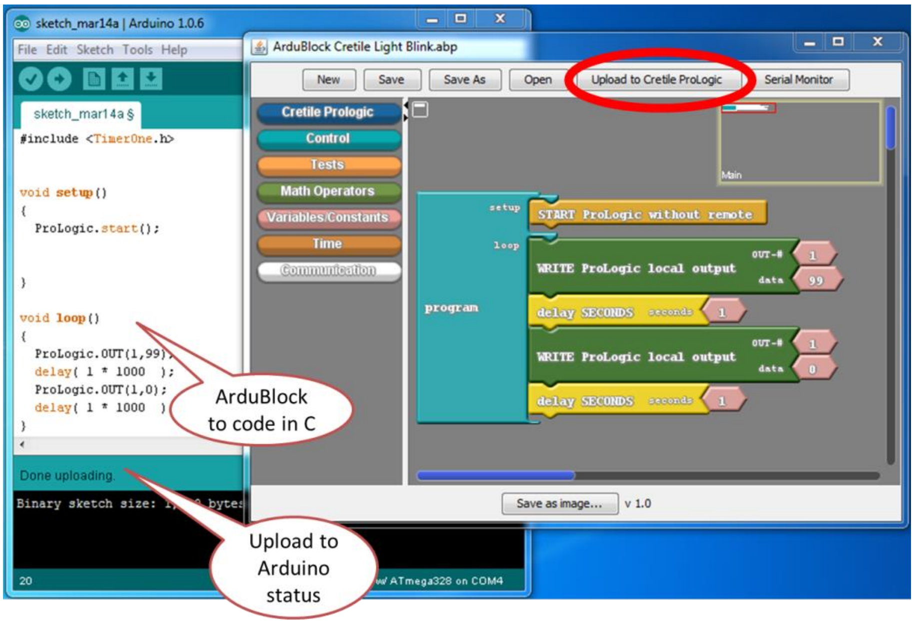
Note that all the four instructions are written inside ‘loop’ section of ‘program’. So, when the fourth instruction is completed the loop starts again from the first step. This is how the four step logic will get performed again and again until the circuit switched OFF.

For future use, save the program by using ‘Save’ or ‘Save As’ option from the menu bar and give a suitable name.

Program we just wrote is written on your computer and needs to be sent to Cretile ProLogic. Once sent to Cretile ProLogic the program will start working on Cretile ProLogic immediately.

To send the program to Cretile ProLogic click on ‘Upload to Cretile ProLogic.

As soon as the program is successfully sent to Cretile ProLogic the program start to execute and you will find that the Cretile Light connected at output-1 starts to blink



```
#include <TimerOne.h>


void setup()
{
  ProLogic.start();


}

void loop()
{
  ProLogic.OUT(1,99)
  delay( 1 * 1000  );
  ProLogic.OUT(1,0);
  delay( 1 * 1000  )
}
```

```
Done uploading.
Binary sketch size: 1,  0 bytes
```

ArduBlock to code in C

Upload to Arduino status

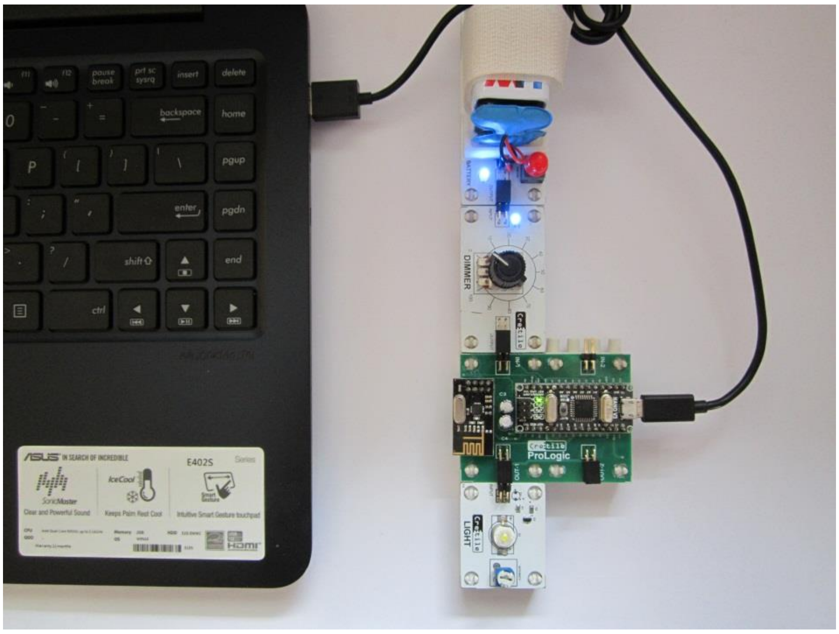
You may now remove the USB cable connected between your computer and Cretile ProLogic. The power will be taken from the Cretile Battery and your program will continue to run

# Program #2: Control Blinking Speed with Cretile Dimmer

## 1 What you need

1. Cretile Battery or Cretile Power
2. Cretile Light Cretile
3. Cretile Dimmer
4. Cretile ProLogic
5. A micro-USB Cable

## 2 Now make connection

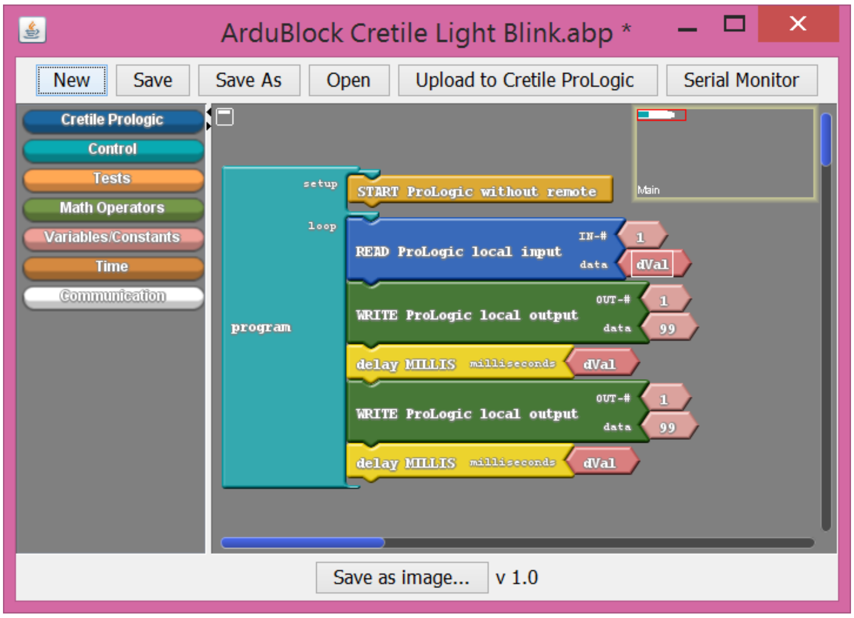


## 3 Logic that we need to implement

1. Read Cretile Dimmer Value; let's call it 'dVal'
2. Switch ON the Cretile Light
3. Wait for dVal milliseconds
4. Switch OFF the Cretile Light
5. Wait for dVal milliseconds
6. Start from Step #1

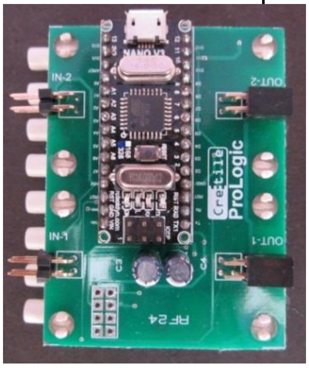
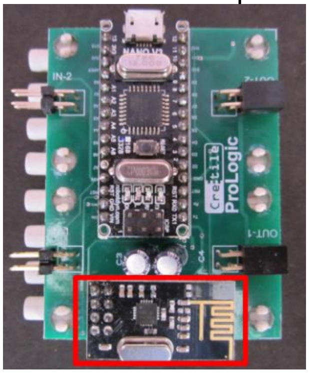
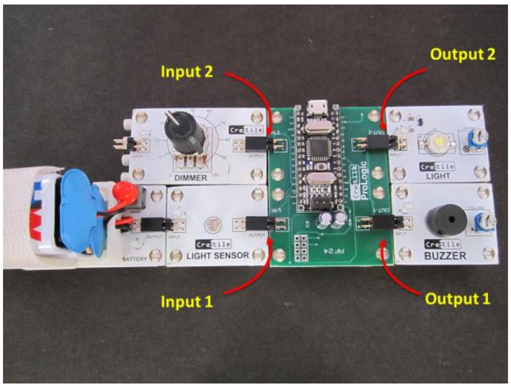
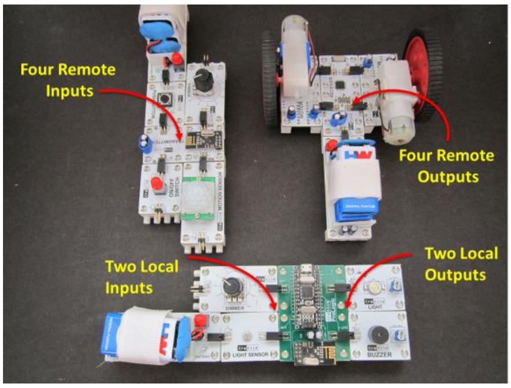
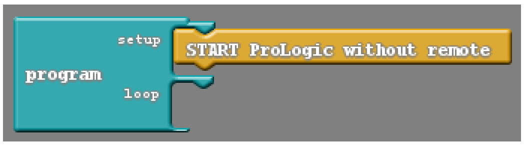
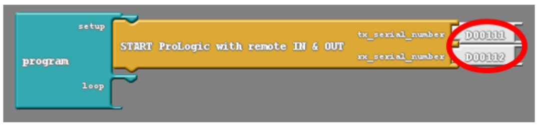
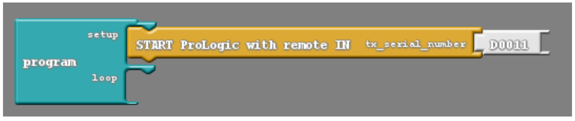
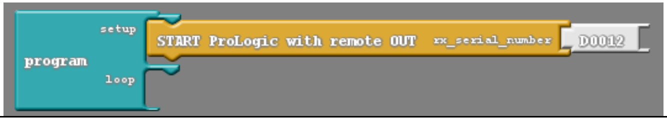
So, if you carry our step 1, 2, 3, 4 & 5 again and again, you will observe a Cretile Light blinking. As you increase the dimmer value the blinking speed reduces. When you decrease the dimmer value the speed of blinking increases.

## 4 Writing ArduBlock Program Dimmer Controlled Blinking of Light



```
program
  setup
    START ProLogic without remote
  loop
    READ ProLogic local input    IN-# 1    data dVal
    WRITE ProLogic local output  OUT-# 1   data 99
    delay MILLIS milliseconds dVal
    WRITE ProLogic local output  OUT-# 1   data 99
    delay MILLIS milliseconds dVal
```

Cretile ProLogic comes in two variants.

| 1) Without Remote Capability | 2) With Remote Capability |
|---|---|
|  |  |
|  |  Four Remote Inputs<br>Four Remote Outputs<br>Two Local Inputs<br>Two Local Outputs |
| It can read from two local inputs and write to two local outputs. | It can read from six inputs and write to six outputs.<br>Out of these six inputs/outputs, two need be connected locally to ProLogic directly.<br>Remaining four remote inputs/outputs need to be connected to Cretile Transmitter & Receiver respectively. |
| For reading/writing local inputs/outputs you need to use “START ProLogic without remote” in the setup section of the Program | For reading/writing remote inputs/outputs you need to use “START ProLogic with remote” in the setup section of the Program |
| <br>program setup START ProLogic without remote<br>loop | <br>program setup START ProLogic with remote IN & OUT tx_serial_number D00111 rx_serial_number D00112<br>loop<br>If using remote inputs only setup using ‘remote IN’<br><br>program setup START ProLogic with remote IN tx_serial_number D0011<br>loop<br>In using remote outputs only setupusing ‘remote OUT’<br><br>program setup START ProLogic with remote OUT rx_serial_number D0012<br>loop |

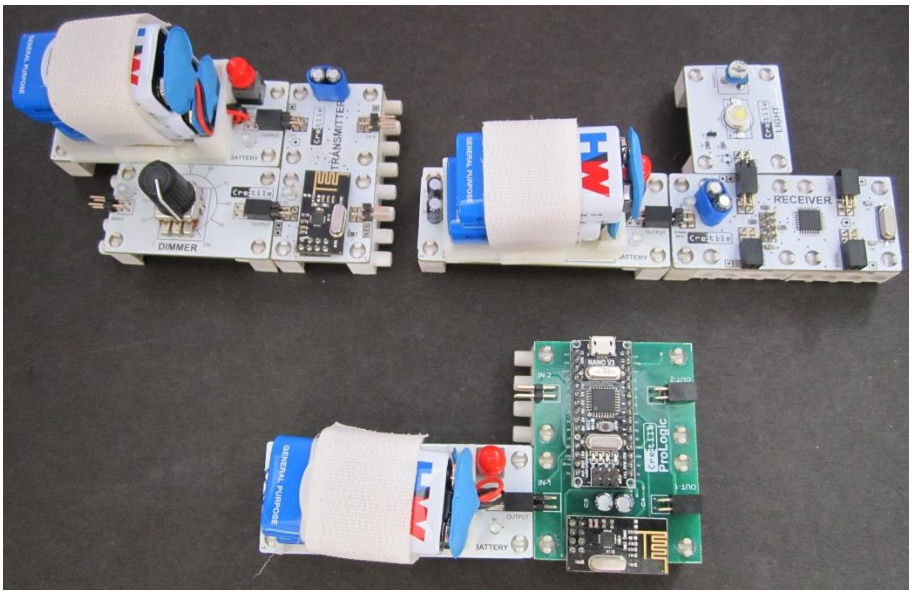
# Program #3: Remotely Control Speed of Blinking Light

**GOAL:** The goal is to Remotely change speed of Cretile Light blinking

1 **What you need**

1. Two Cretile Batteries
2. Cretile Receiver
3. Cretile Transmitter
4. Cretile ProLogic
5. Cretile Dimmer
6. Cretile Light
7. A micro-USB Cable

2 **Now make the connections**



3 **Logic that we need to implement**

The Logic of this program remains the same as that of blink program that we have already written. The Dimmer and Light however are not directly connected to ProLogic. They are remotely connected.

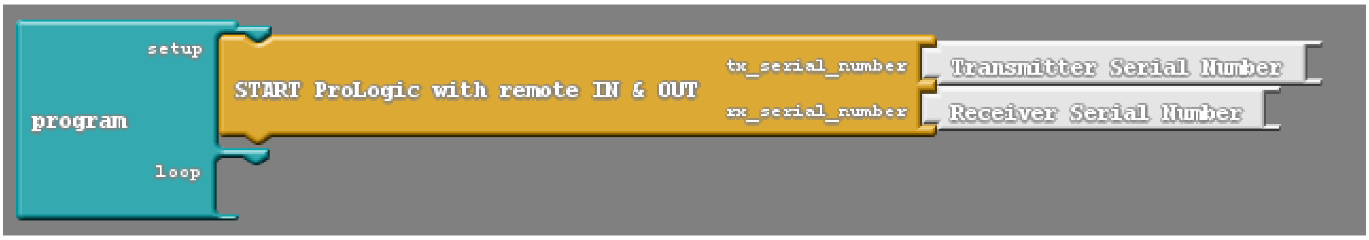
1. Read Cretile Dimmer Value; let's call it 'dVal'
2. Switch ON the Cretile Light
3. Wait for dVal milliseconds
4. Switch OFF the Cretile Light
5. Wait for dVal milliseconds
6. Start from Step #1

So, if you carry our step 1, 2, 3, 4 & 5 again and again, you will observe a Cretile Light blinking. As you increase the dimmer value the blinking speed reduces. When you decrease the dimmer value the speed of blinking increases.

**ArduBlock Program to control the vehicle remotely**

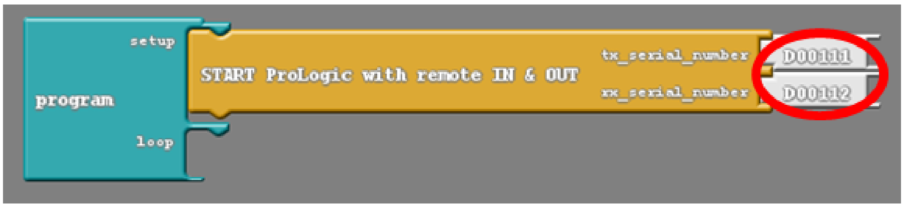
1 **First step is set-up Communication between ProLogic, Receiver & Transmitter**

Use 'START ProLogic with remote IN & OUT' block and put it in 'setup' section of 'Program'



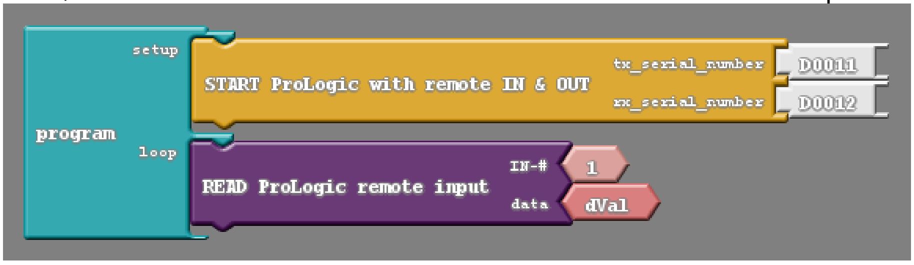
program
setup
START ProLogic with remote IN & OUT
tx_serial_number Transmitter Serial Number
rx_serial_number Receiver Serial Number
loop

Now insert the Cretile Receiver serial number mentioned at the bottom of Cretile Receiver & Transmitter like below. This step will enable ProLogic and Receiver talk to each other



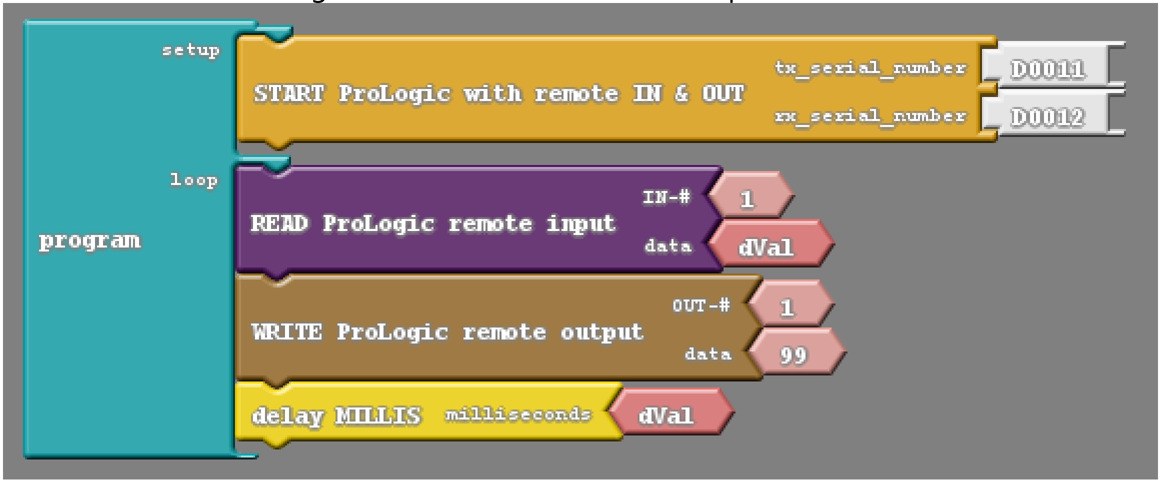
```
program
  setup
    START ProLogic with remote IN & OUT
      tx_serial_number  D00111
      rx_serial_number  D00112
  loop
```

Now, let's read the dimmer value connected to transmitter at input-1 and store that value in a variable 'dVal'



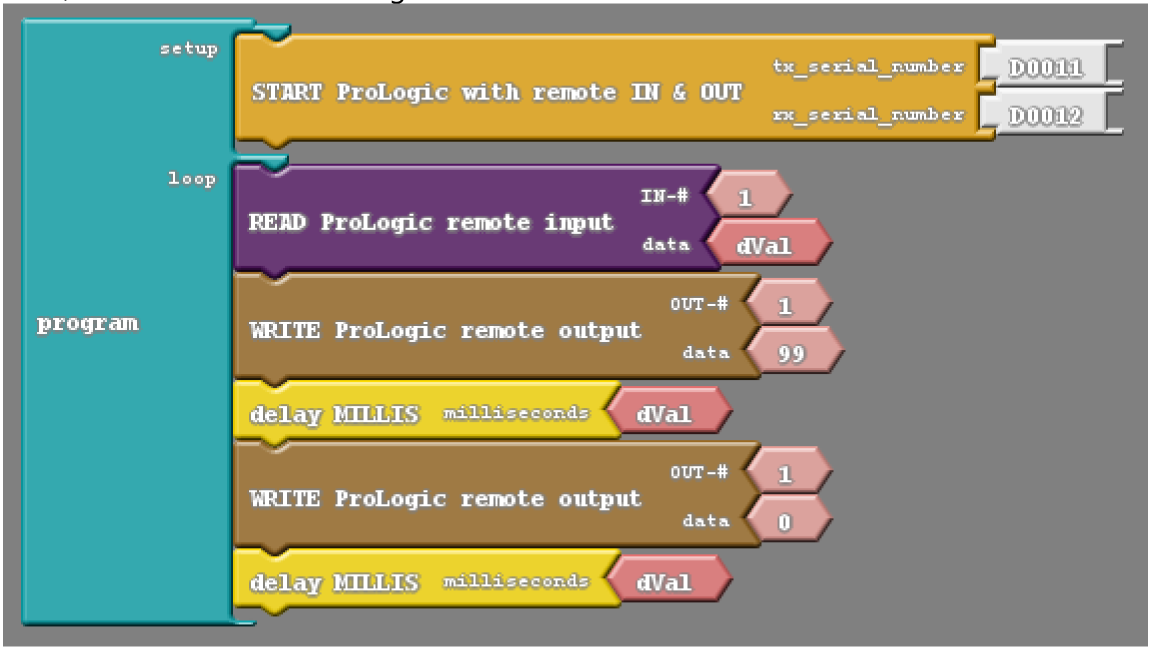
```
program
  setup
    START ProLogic with remote IN & OUT
      tx_serial_number  D0011
      rx_serial_number  D0012
  loop
    READ ProLogic remote input
      IN-#  1
      data  dVal
```

Switch ON the Cretile Light connected to receiver at output-1 and wait for 'dVal' milliseconds



```
program
  setup
    START ProLogic with remote IN & OUT
      tx_serial_number  D0011
      rx_serial_number  D0012
  loop
    READ ProLogic remote input
      IN-#  1
      data  dVal
    WRITE ProLogic remote output
      OUT-#  1
      data  99
    delay MILLIS  milliseconds  dVal
```

Now, switch OFF the Cretile Light connected to receiver and wait for 'dVal' milliseconds again



```
program
  setup
    START ProLogic with remote IN & OUT
      tx_serial_number  D0011
      rx_serial_number  D0012
  loop
    READ ProLogic remote input
      IN-#  1
      data  dVal
    WRITE ProLogic remote output
      OUT-#  1
      data  99
    delay MILLIS  milliseconds  dVal
    WRITE ProLogic remote output
      OUT-#  1
      data  0
    delay MILLIS  milliseconds  dVal
```

# Program #4: Remotely Control a Vehicle Remotely

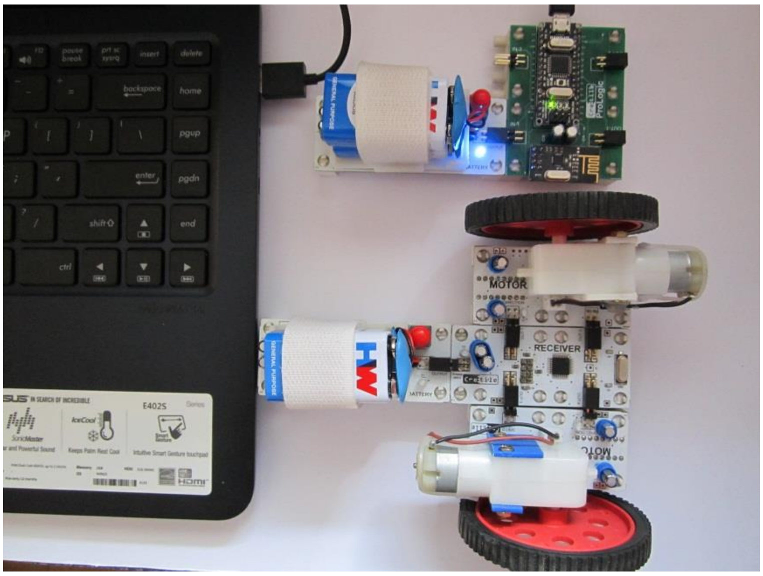
**GOAL:** The goal is to move a Vehicle on a rectangular path remotely from a program

### 1 What you need

8. Two Cretile Batteries
9. Two Cretile Motors
10. Cretile Receiver
11. Cretile ProLogic

A micro-USB Cable

### 2 Now make the connections



### 3 Logic that we need to implement

1. Start Motor 1 in forward direction
2. Start Motor 2 in reverse direction (Note that two motor when connected to Cretile Receiver is heading in opposite direction)
3. Wait for some time say three seconds. During these time period the vehicle will move in the forward direction as both motors are moving in one direction.
4. Now for vehicle to take turn, change the direction of one of the motors
5. Wait for some time say one second. During this time period the vehicle will take a turn as the two motors are moving in opposite direction.
6. Start over with step 1

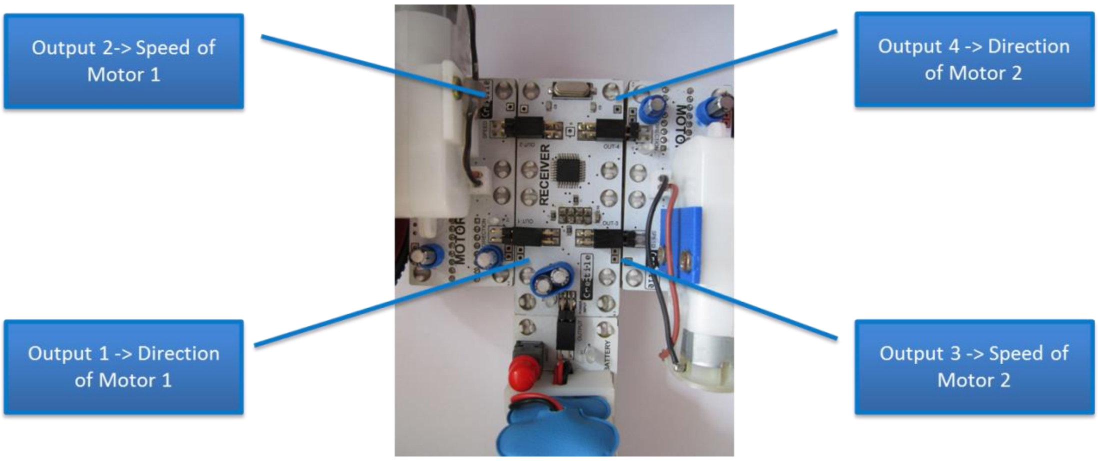
So, if you carry our step 1 to 5 again and again, you will observe that vehicle made with Cretiles will move forward for three second and take turn. This will continue indefinitely. By adjusting the time of turn you can make the car to move in a rectangular path.

**How to control Cretile Motor**

Cretile Motor has two inputs: Speed and Direction. If '99' is assigned to speed input, Cretile motor will move at full speed. To reduce the speed this number has to be reduced. Zero will stop the motor fully.

If '99' assigned to direction input, it will maintain one direction. Assigning '0' and it will reverse its direction.

**Connections**



Output 2-> Speed of Motor 1

Output 4 -> Direction of Motor 2

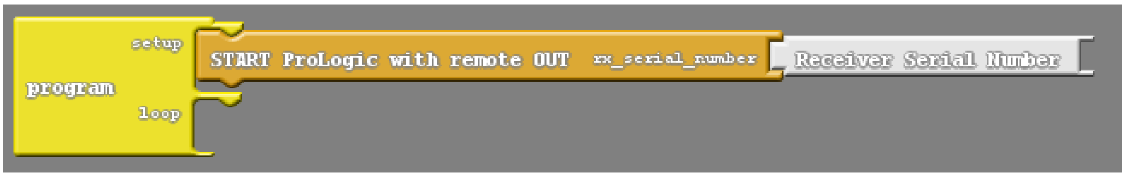
Output 1 -> Direction of Motor 1

Output 3 -> Speed of Motor 2

## ArduBlock Program to control the vehicle remotely

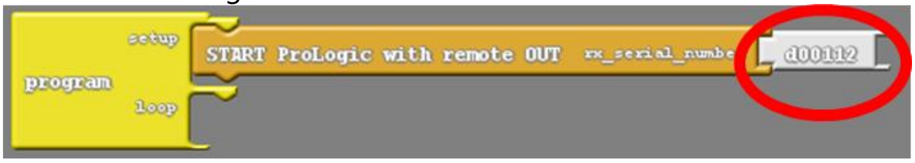
### 1 First step is set-up Communication between ProLogic & Receiver

Use ‘START ProLogic with remote OUT’ block and put it in ‘setup’ section of ‘Program’



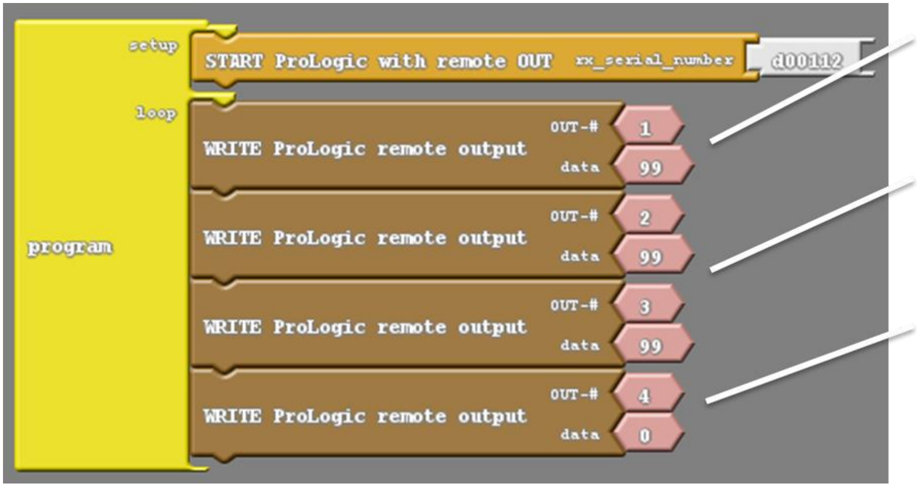
```
program
  setup  START ProLogic with remote OUT  rx_serial_number  Receiver Serial Number
  loop
```

Now insert the Cretile Receiver serial number mentioned at the bottom of Cretile Receiver like below. This step will enable ProLogic and Receiver talk to each other



```
program
  setup  START ProLogic with remote OUT  rx_serial_numbe  d00112
  loop
```

Now, let’s move the vehicle forward



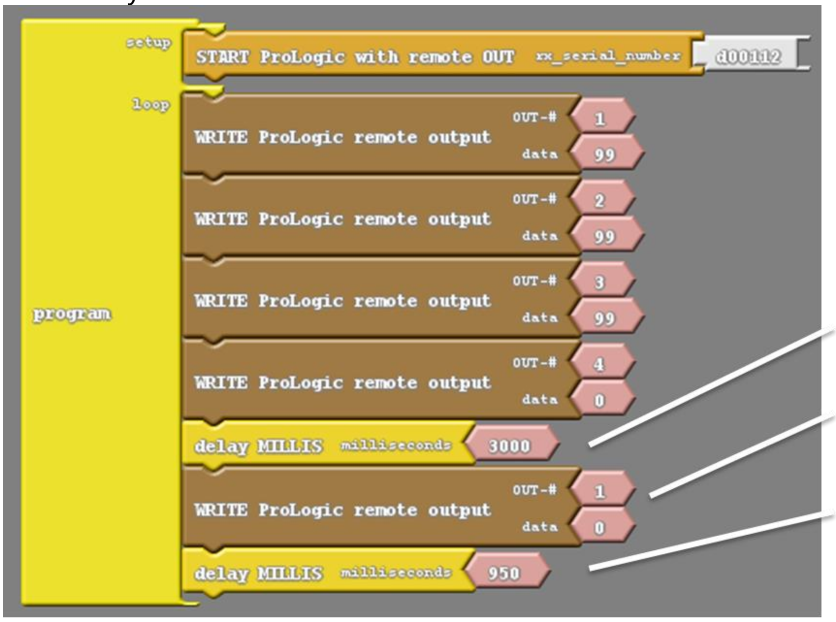
```
program
  setup  START ProLogic with remote OUT  rx_serial_number  d00112
  loop   WRITE ProLogic remote output  OUT-# 1  data 99
         WRITE ProLogic remote output  OUT-# 2  data 99
         WRITE ProLogic remote output  OUT-# 3  data 99
         WRITE ProLogic remote output  OUT-# 4  data 0
```

Set Direction of Motor 1 in one direction

Start both the motors at highest speed

Set Direction of Motor 2 in direction that is opposite of Motor 1

And finally make the vehicle to take a turn



```
program
  setup  START ProLogic with remote OUT  rx_serial_number  d00112
  loop   WRITE ProLogic remote output  OUT-# 1  data 99
         WRITE ProLogic remote output  OUT-# 2  data 99
         WRITE ProLogic remote output  OUT-# 3  data 99
         WRITE ProLogic remote output  OUT-# 4  data 0
         delay MILLIS  milliseconds  3000
         WRITE ProLogic remote output  OUT-# 1  data 0
         delay MILLIS  milliseconds  950
```

Let the Vehicle Move forward for 3 Seconds

Reverse the direction of Motor 1

This is time for which the vehicle will taking turn. Try changing this time to make the Vehicle move in rectangular path.

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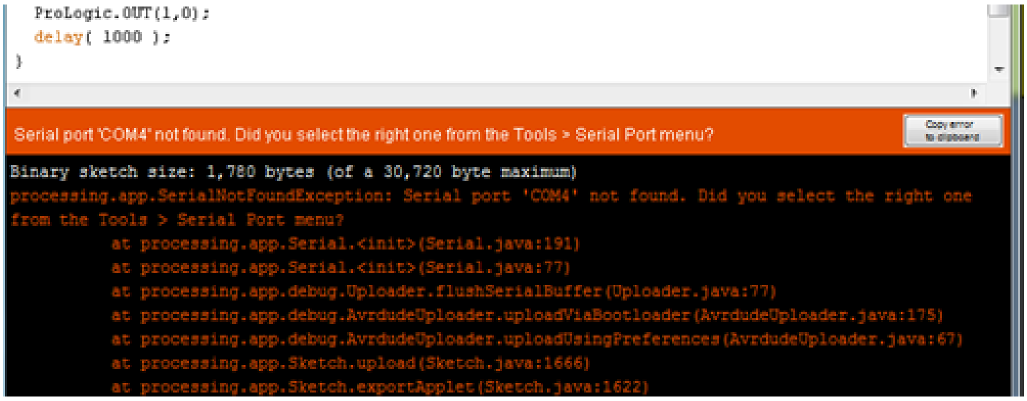
# Troubleshooting Guide

Below are some of the common problems that you may face and their solutions.

## 1 COM port not found error

**Reason**: This will happen if you have more than one instances of ArduBlock open on your computer.

**Solution**: Close the other instance and again use the option 'Upload to Cretile ProLogic' to proceed.



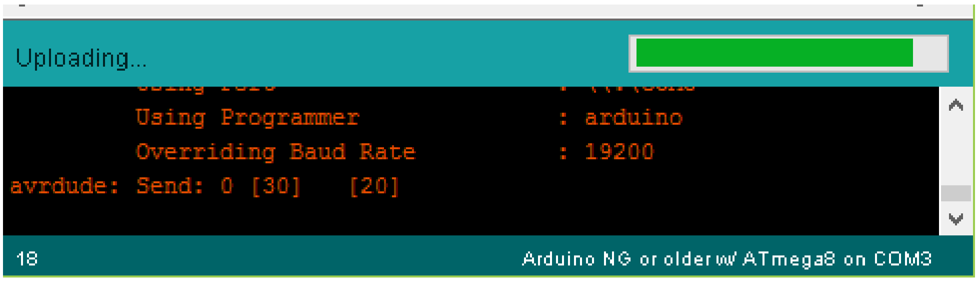
```
  ProLogic.OUT(1,0);
  delay( 1000 );
}
```

Serial port 'COM4' not found. Did you select the right one from the Tools > Serial Port menu?

```
Binary sketch size: 1,780 bytes (of a 30,720 byte maximum)
processing.app.SerialNotFoundException: Serial port 'COM4' not found. Did you select the right one
from the Tools > Serial Port menu?
        at processing.app.Serial.<init>(Serial.java:191)
        at processing.app.Serial.<init>(Serial.java:77)
        at processing.app.debug.Uploader.flushSerialBuffer(Uploader.java:77)
        at processing.app.debug.AvrdudeUploader.uploadViaBootloader(AvrdudeUploader.java:175)
        at processing.app.debug.AvrdudeUploader.uploadUsingPreferences(AvrdudeUploader.java:67)
        at processing.app.Sketch.upload(Sketch.java:1666)
        at processing.app.Sketch.exportApplet(Sketch.java:1622)
```

## 2 Upload to Cretile ProLogic just keeps waiting

**Reason**: This will happen if you have chosen wrong serial port

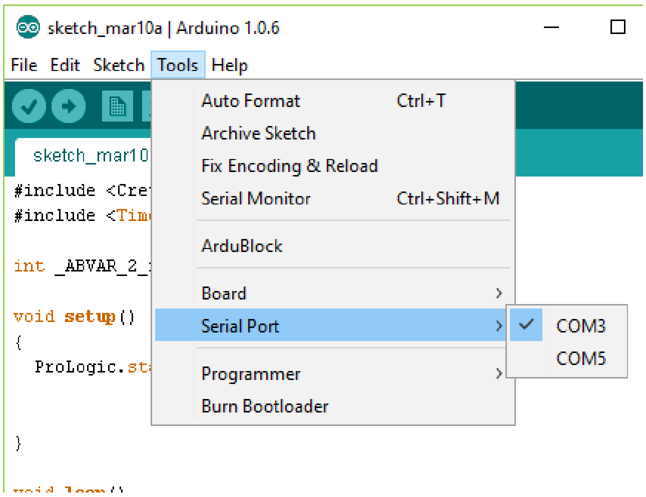


Uploading...

```
        Using Programmer              : arduino
        Overriding Baud Rate          : 19200
avrdude: Send: 0 [30]   [20]
```

18 Arduino NG or older w/ ATmega8 on COM3

**Solution**: Chose a different serial port from the Tools->Serial Port menu and again try to 'Upload to Cretile ProLogic'



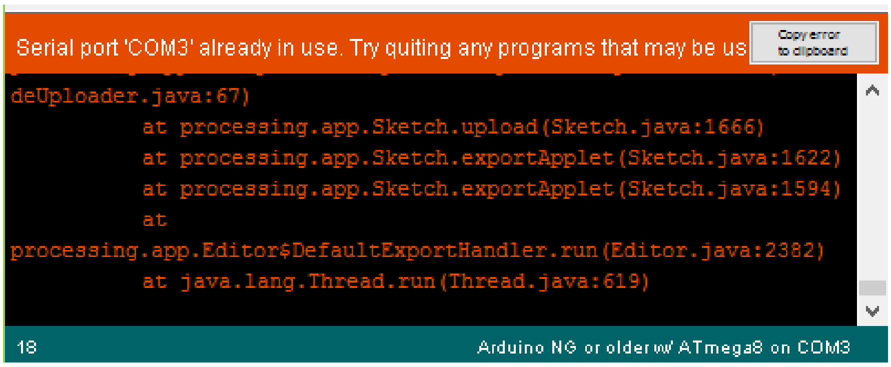
sketch_mar10a | Arduino 1.0.6

```
#include <Cre
#include <Tim

int _ABVAR_2_

void setup()
{
  ProLogic.st

}
```

## 3 COM port already in use error

**Reason**: This will happen if you have chosen wrong serial port

**Solution**: Chose a different serial port from the 'Tools->Serial Port' menu and again try to 'Upload to Cretile ProLogic'



Serial port 'COM3' already in use. Try quiting any programs that may be us

```
deUploader.java:67)
        at processing.app.Sketch.upload(Sketch.java:1666)
        at processing.app.Sketch.exportApplet(Sketch.java:1622)
        at processing.app.Sketch.exportApplet(Sketch.java:1594)
        at
processing.app.Editor$DefaultExportHandler.run(Editor.java:2382)
        at java.lang.Thread.run(Thread.java:619)
```

18 Arduino NG or older w/ ATmega8 on COM3

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Thank you for purchasing Cretile. Please read the instruction manual carefully before using the product. Please ensure that the product is used under adult supervision.

## BASIC INSTRUCTIONS

- Always assemble or de-assemble Cretiles in power-off mode
- Always ensure that the product is used under adult supervision and not left unattended.
- Always ensure that the circuit does not come in contact with any metal objects or liquids.
- Always ensure that the product is utilized along with a high quality ISI/ISO certified 9V 2A adapter with a compatible DC PIN for the power jack in Power module.
- Always ensure that the product is utilized with two 9V PP3 battery only when using Battery module.
- Always ensure that the battery is connected to the correct electrical polarity. Caution should be taken not to short-circuit battery terminals to each other which can damage the product and generate heat that may result in burns.
- Always take maximum precaution while plugging in batteries so that they are not connection to any wrong electrical polarity. Wrong electrical polarity can cause fire or burns.
- Always ensure that the product is used within 0 (zero) to 50 (fifty) degree temperature range only. Exposure to direct sunlight should be avoided.
- Never recharge a non-rechargeable battery.

## IMPORTANT: PLEASE READ CAREFULLY

*Please ensure that you have read and complied with all the details provided on the brochure/instruction manual placed. Please ensure safe and supervised usage of the entire product. In the event that any of the components of the product are dropped, the product may not function as desired. We do not make any express or implied warranties of any kind with respect to the product and we expressly disclaim any warranties of merchantability or fitness for a particular purpose. By using this product, you acknowledge and understand that the battery and the adapter provided separately have not been manufactured by us and we shall in no event be held liable for any loss or damage that may arise as a result of the use of such battery and the adapter. Kindly ensure that you have read and complied with all the instructions provided for the use of the battery and the adapter by the manufacturer. We shall not be held responsible for any incidental, indirect, consequential, or special damages that may arise as a result of the use of the product. Your use of the product implies your acceptance of these terms. If there are any defects or defaults in the product, kindly contact* ***support@cretile.com*** *within 10 (ten) days from the date of purchase of the product and the same would be replaced.*

*Any dispute which may arise as a result of the use of this product shall be subject to the jurisdiction of the Courts situated in Bangalore.*

Kindly keep the instruction manual and package for reference as they contain important information.

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