

# basics of programming

super fast course



Patryk Król

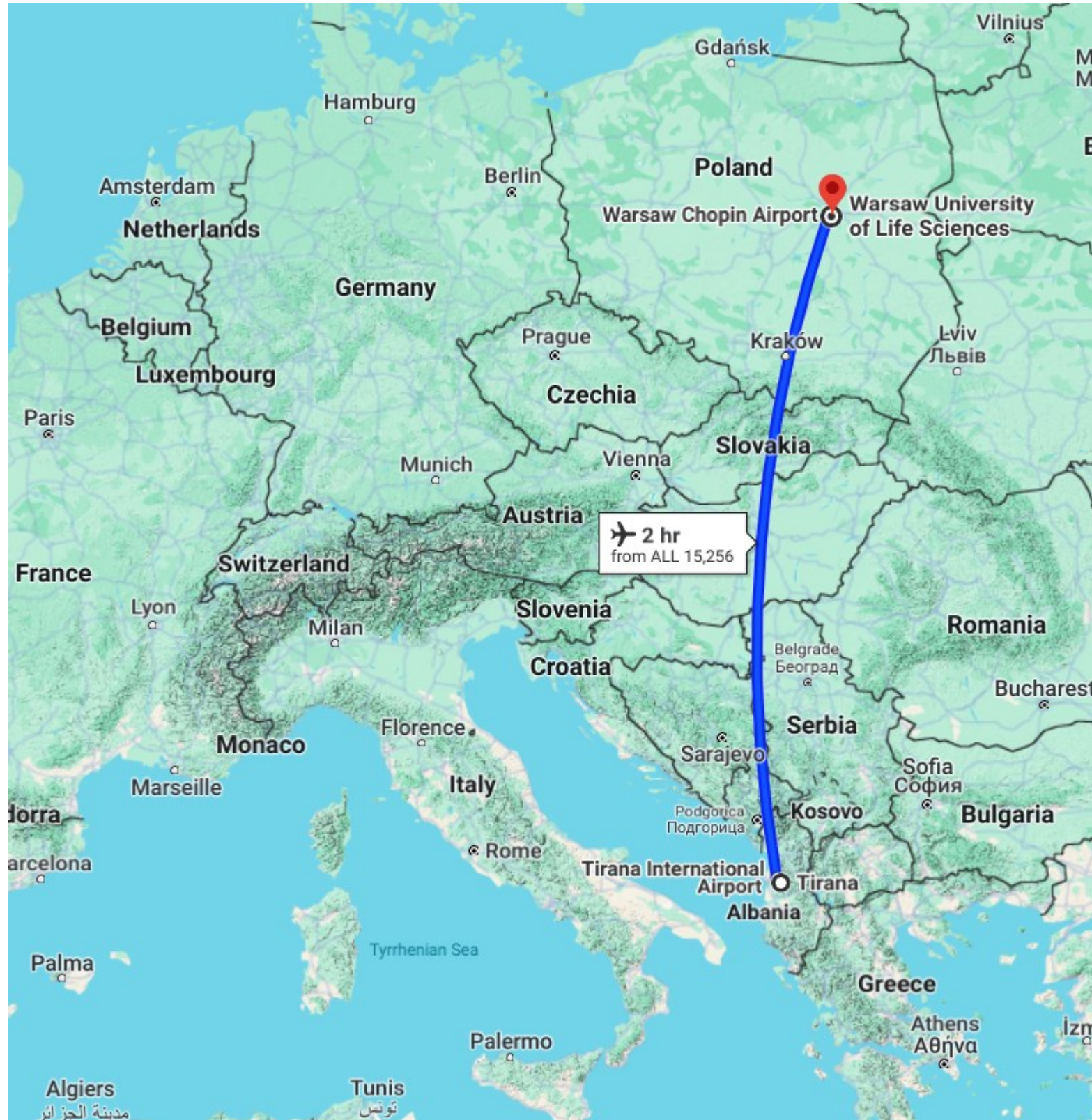
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Faculty of Wood Technology

Warsaw University of Life Sciences

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OF LIFE SCIENCES

# Made in Poland



## Faculty of Wood Technology

The Faculty of Wood Technology of the Warsaw University of Life Sciences is the oldest European academic faculty dealing with the entirety of wood industry, established nearly 70 years ago.



# About me



## Interests:

- Electronics and programming
- Mountain hiking

## Subjects I teach:

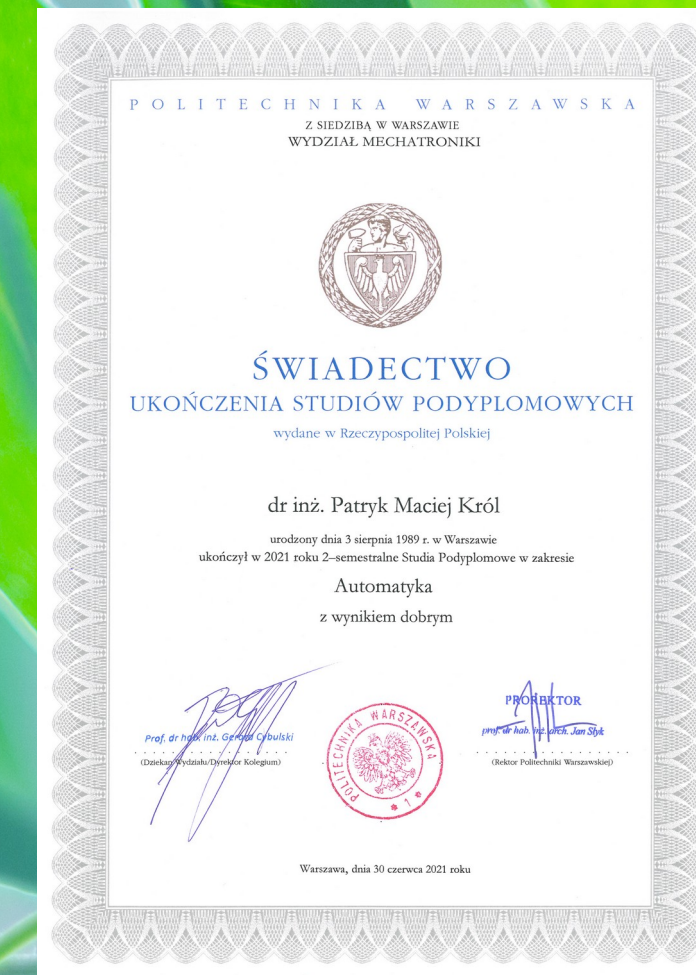
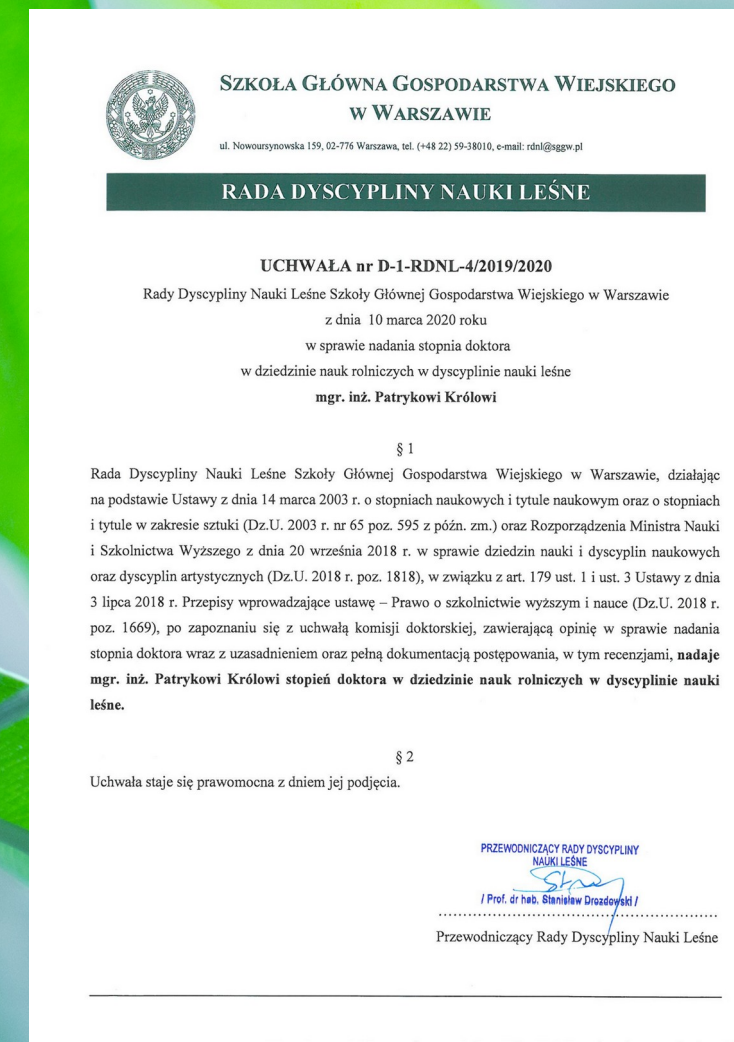
- Basics of electronics with elements of electrical engineeringi
- Automatics
  - Logic, pneumatics, PLC
  - Programming



# About me

## My diplomas:

- Ph. D. at Faculty of Wood Technology (2020)
- Bachelor of computer science and econometrics (2014)
- Automatics - postgraduate studies (2021)
- Pedagogical Preparation - postgraduate studies (2021)



# Programming - why do You need it?



# The Course



What will we do together:

- Electronic basics
- Microcomputers basics
- Programming
- Our first program

What You will do at Your own:

- Learn basic instructions
- Make the microcomputer perform simple operations
- Make microcomputer communicate with computer
- Make computer communicate with other devices





# Let's start!



[wtd.xn--zabaaganionemiejsce-8fd.pl/Erasums/](http://wtd.xn--zabaaganionemiejsce-8fd.pl/Erasums/)

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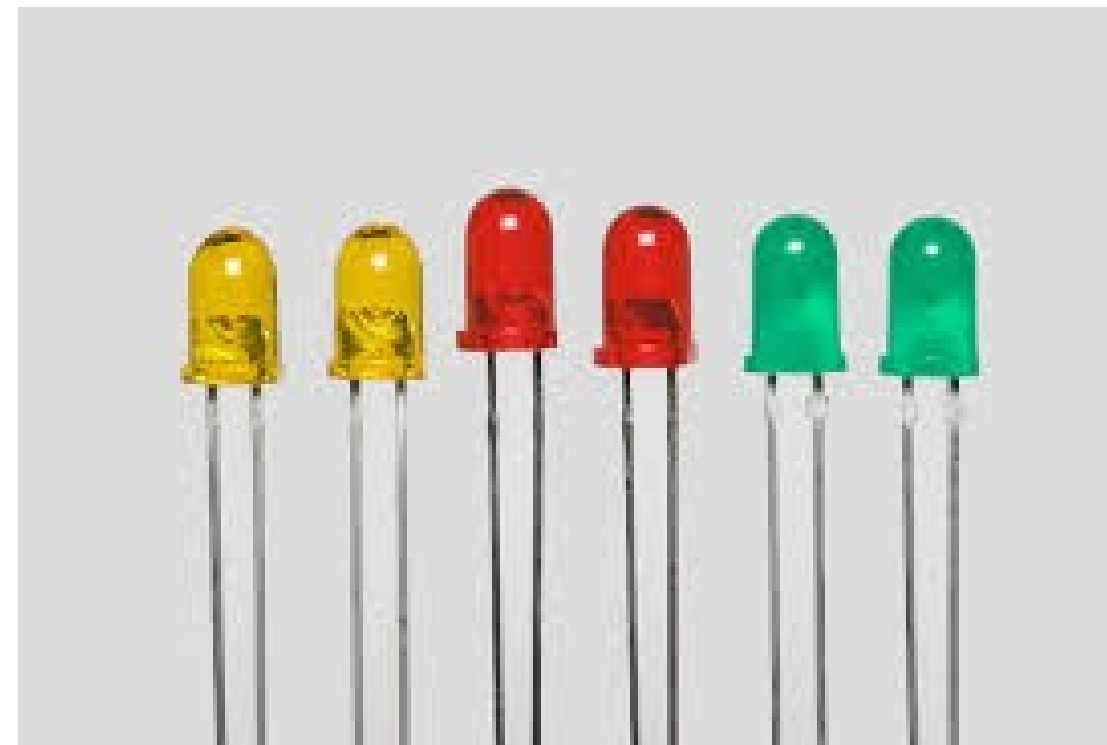
# Buttons and diodes

Aka binary informations



Tactical switch:

- 1 – means on (pushed down)
- 0 – means off

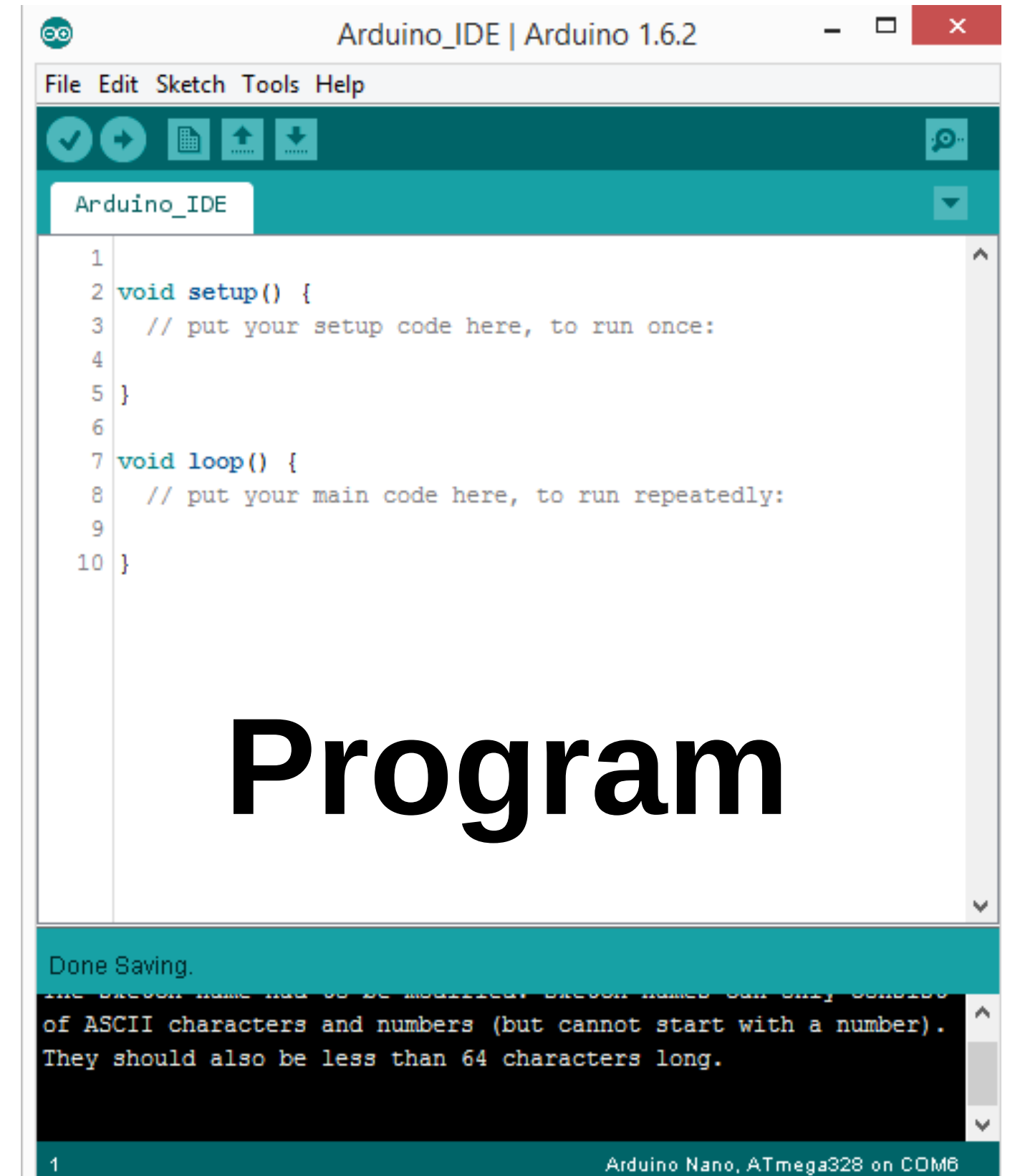
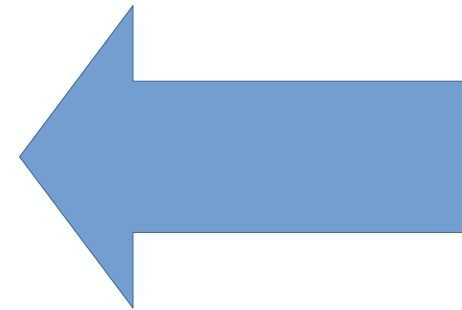
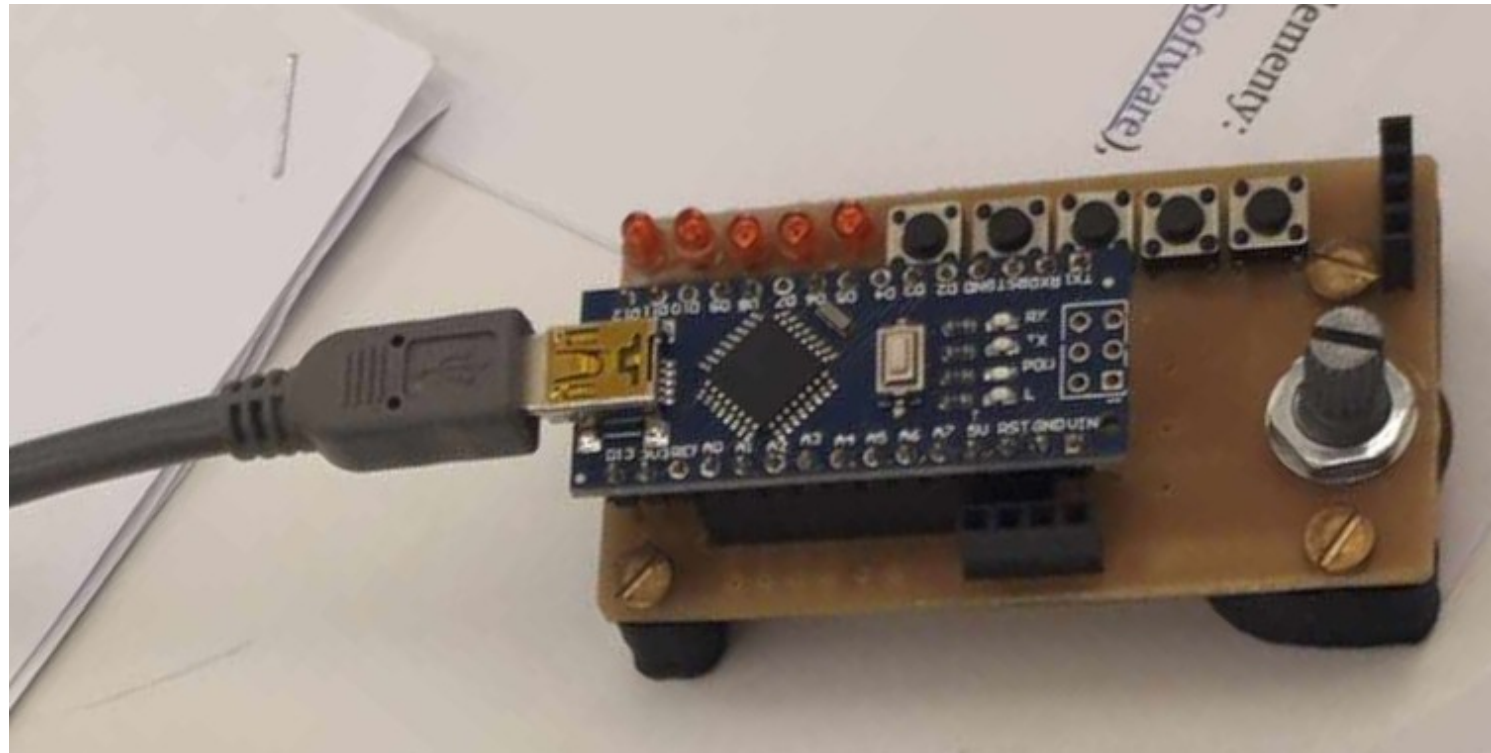


LED – Light emitting diode  
1 – light on  
0 – light off





# Microcomputers



## Arduino

- Flash memory: 32 KB
- SRAM: 2 KB
- Clock speed: 16 MHz



# Programming in pseudocode

simplified








- *As long as **condition** is true, repeat **code*** – a loop that will execute **code** over and over again as long as a certain **condition** is met,
- *If **condition** then do **code1*** – a conditional statement that will execute **code1** (once) only when a specific condition **condition** is met. This instruction may be followed by an additional instruction *otherwise **code2***, which will be executed if the previous condition is not met or *otherwise, if **another\_condition** then do **code3***.
- *Use **pin** as input/output* – if we want to use one of the pins, we must set it as input or output,
- *Read **pin logical value*** – allows us to read whether a given input is logical 0 or 1 (ie.: is button connected to **pin** pressed or not),
- *Set output **pin** as value **1 or 0*** – allows you to set a given output to 0 or 1,
- *Remember that **name** means **value*** – variable that remember some value (ie. number),
- *Add, subtract, multiply belowl,*
- *Wait **time***

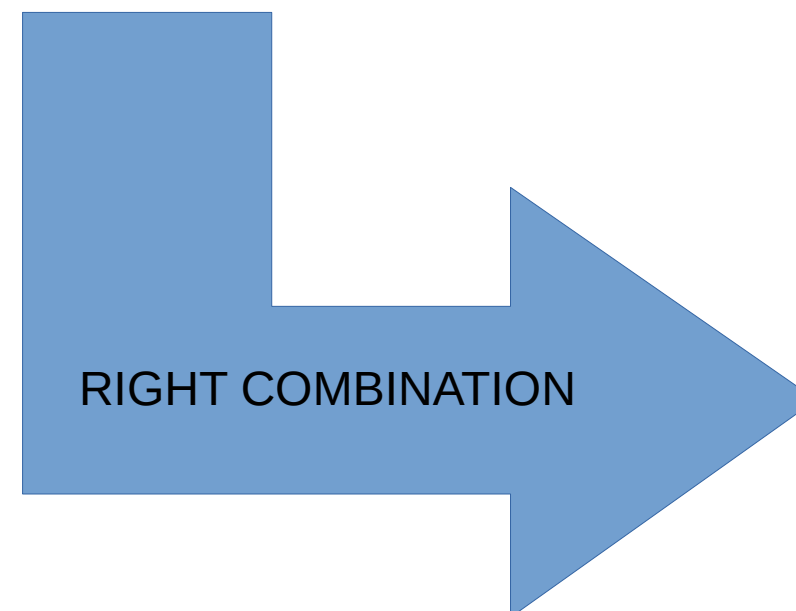


**Read first two pages of the instruction**

# Exercise 1: SAFE



				
Button 1 (pin 2)	Button 2 (pin 3)	Button 3 (pin 4)	Button 4 (pin 5)	Button 5 (pin 6)
D5	D6	D7	A4	A5



# Step two → translating pseudocode



note, there is an error in the printed instructions in this place ;)

<i>As long as condition is true, repeat code</i>	<code>while(condition){code}</code>
<i>If condition then do code1</i>	<code>if(condition){code}</code>
<i>Use pin as input/output</i>	<code>pinMode(pin, OUTPUT);</code> Or <code>pinMode(pin, INPUT);</code>
<i>Read pin logical value</i>	<code>digitalRead(pin);</code>
<i>Set output pin as...</i>	<code>digitalWrite(pin, HIGH);</code> Or <code>digitalWrite(pin, LOW);</code>
<i>Remember that... it's...</i>	<code>variable = 12;</code>
<i>Wait...</i>	<code>delay(1000);</code>



**Read pages up to 6th of the instruction.**

# Pin modes and variables



pinMode(pin, INPUT)



pinMode(pin, OUTPUT)



Variables



```
variable = 10;  
  
if(variable == 10){  
    do something  
}
```



# Now You are ready to work at You own

but first, upload  
the program we  
wrote and see if  
it works.



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