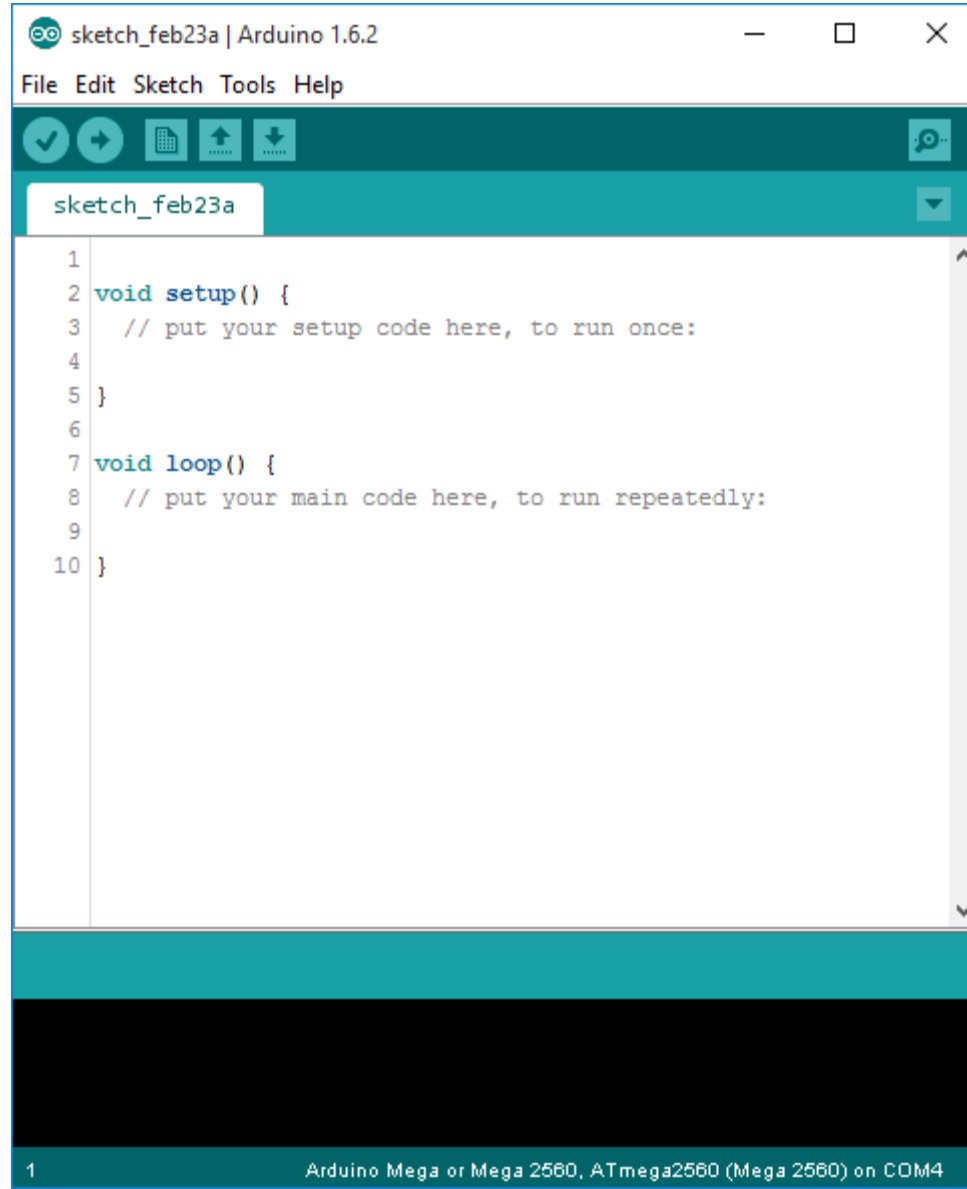


Arduino alapok

arduino-1.6.2-autocomplete-rc1



The image shows a screenshot of the Arduino IDE interface. The window title is "sketch_feb23a | Arduino 1.6.2". The menu bar includes "File", "Edit", "Sketch", "Tools", and "Help". The toolbar contains icons for a checkmark, a right arrow, a document, an upload button, a download button, and a speech bubble. The sketch name "sketch_feb23a" is displayed in a teal bar above the code editor. The code editor contains the following code:

```
1
2 void setup() {
3   // put your setup code here, to run once:
4
5 }
6
7 void loop() {
8   // put your main code here, to run repeatedly:
9
10 }
```

The bottom status bar shows "1" on the left and "Arduino Mega or Mega 2560, ATmega2560 (Mega 2560) on COM4" on the right.

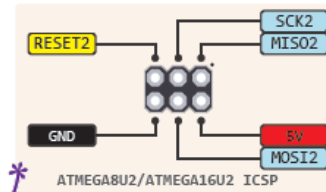
- Sketch ~ Solution
 - Forrás: .ino (1.0 előtt .pde)
 - .C, .CPP, .H
 - Külső könyvtárak (legacy / 3rd party)
 - Mintakódok (example)
- setup()
 - Induláskor fut le, kezdeti értékeket állít be, inicializálja a perifériákat
- loop()
- Referencia:
 - <https://www.arduino.cc/en/Reference/HomePage>

Hello world!

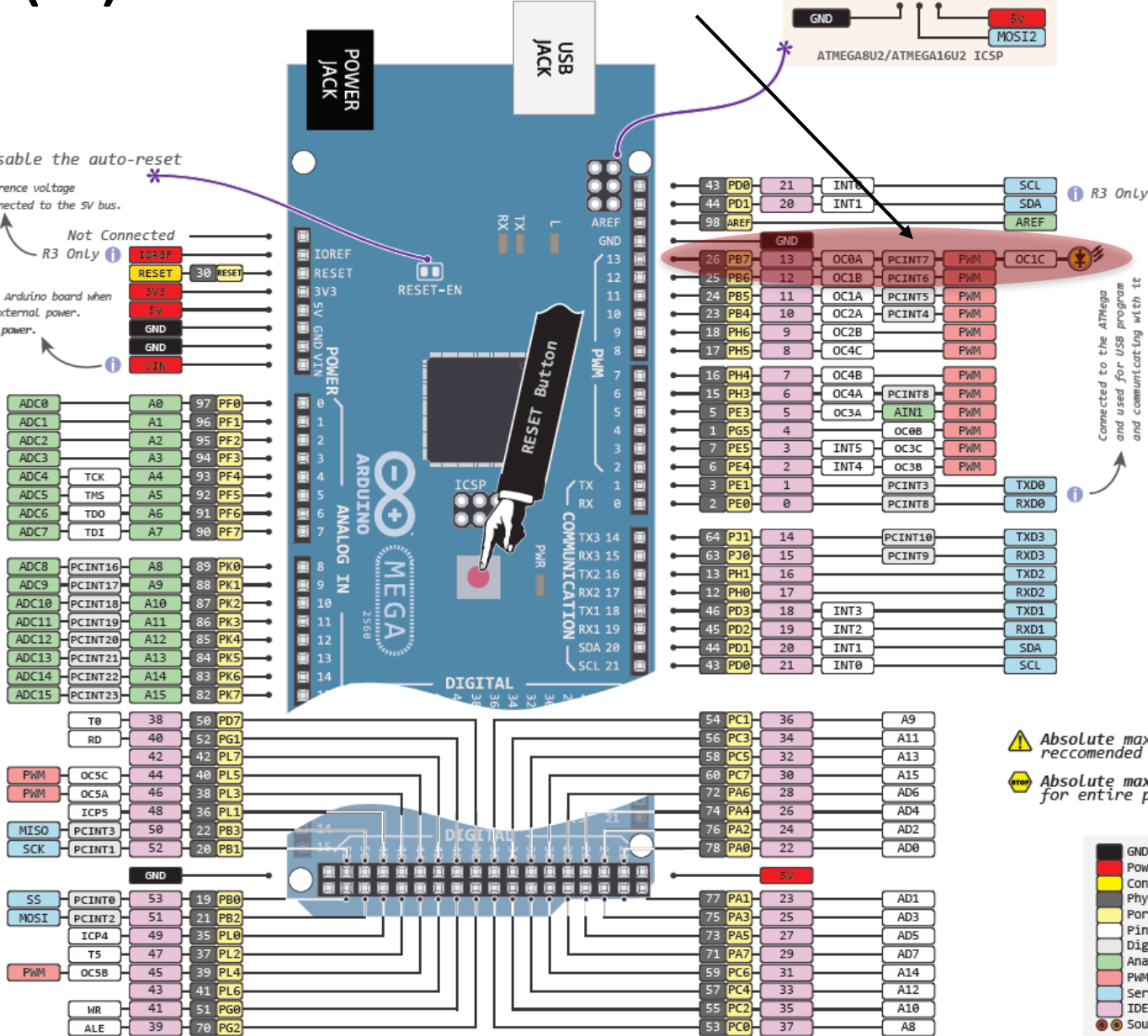
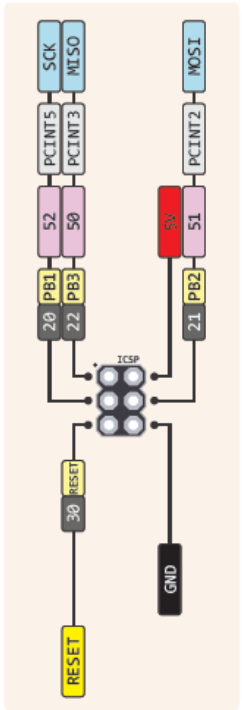
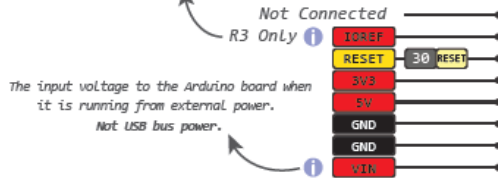
- Led villogtatás

ARDUINO MEGA PINOUT DIAGRAM

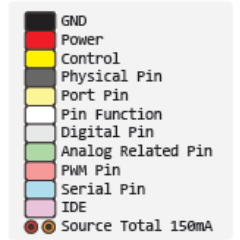
(D)13 = PB7 ≈ = LED



Cut to disable the auto-reset
 This provides a Logic reference voltage for shields that use it. It is connected to the 5V bus.



⚠ Absolute max per pin 40mA recommended 20mA
 ⚡ Absolute max 200mA for entire package



Hello world!

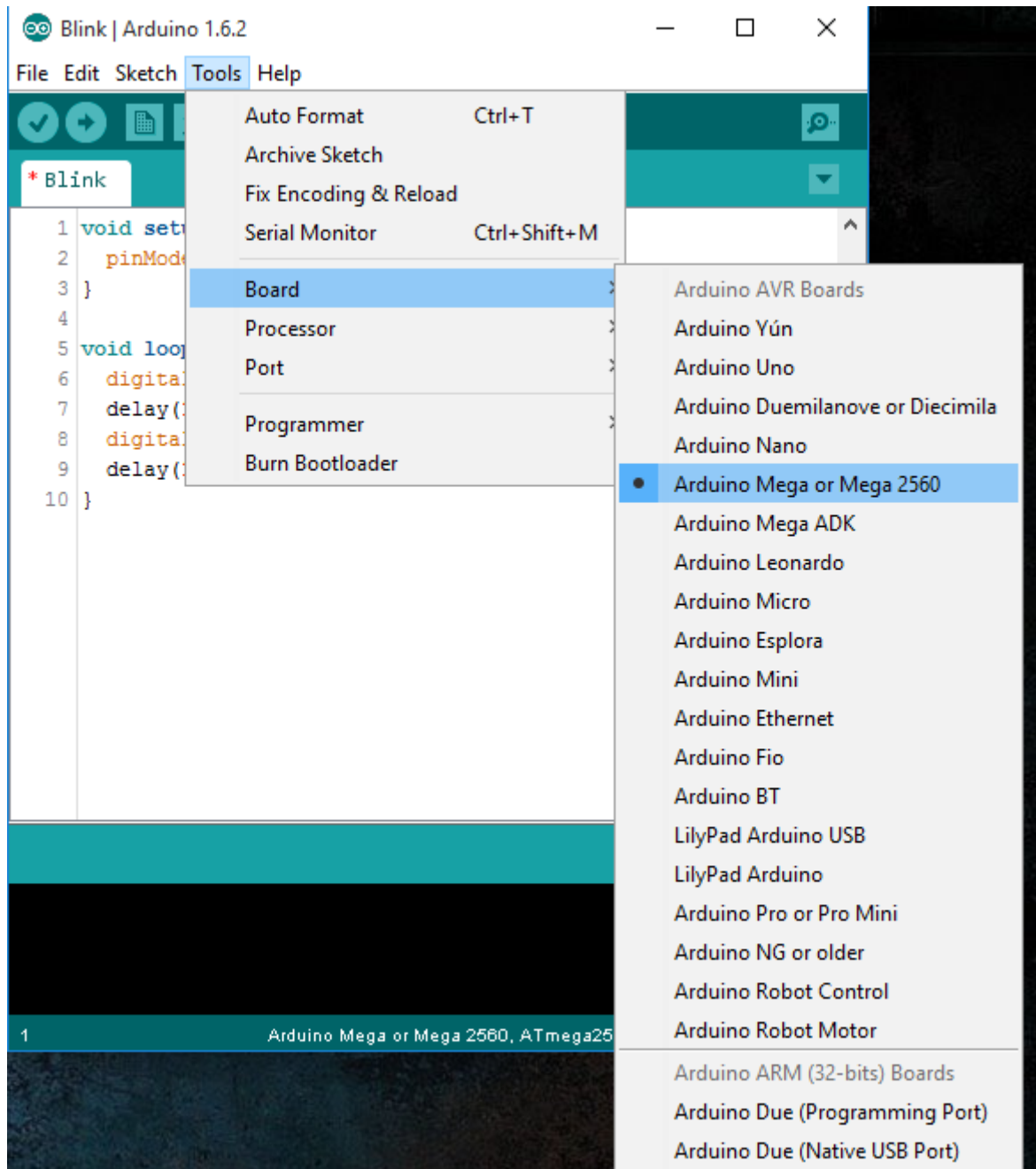
```
1 void setup() {
2   pinMode(13, OUTPUT);
3 }
4
5 void loop() {
6   digitalWrite(13, HIGH);
7   delay(1000);
8   digitalWrite(13, LOW);
9   delay(1000);
10 }
```

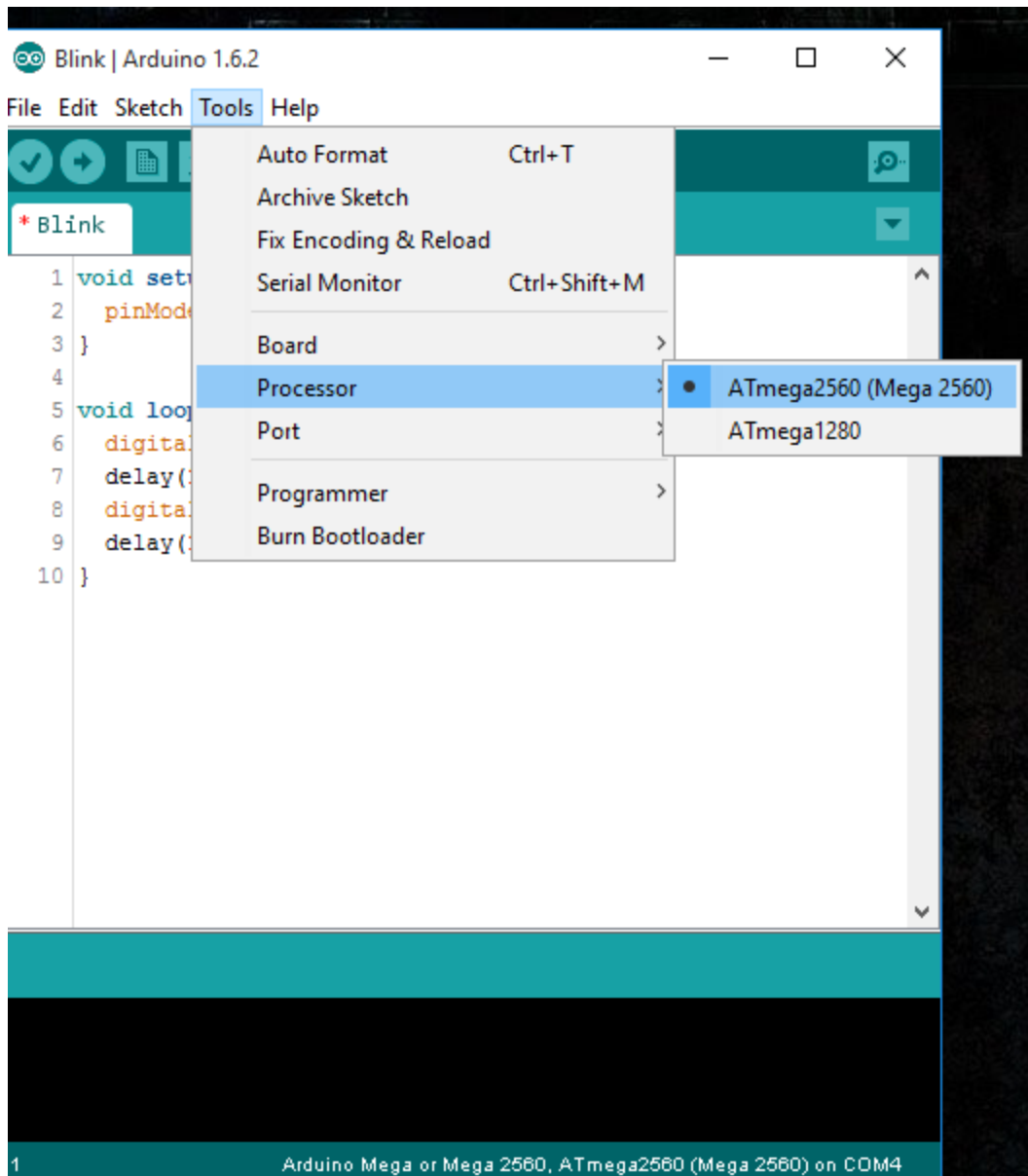
- pinMode(pin, mode)
- Pin: aktuális láb (13)
- Mode:
 - INPUT
 - OUTPUT
 - INPUT_PULLUP
- Arduino (Atmega) lábak alapbeállítása bemenet!
- Kimenet terhelhetősége max 40mA (20mA javasolt!)

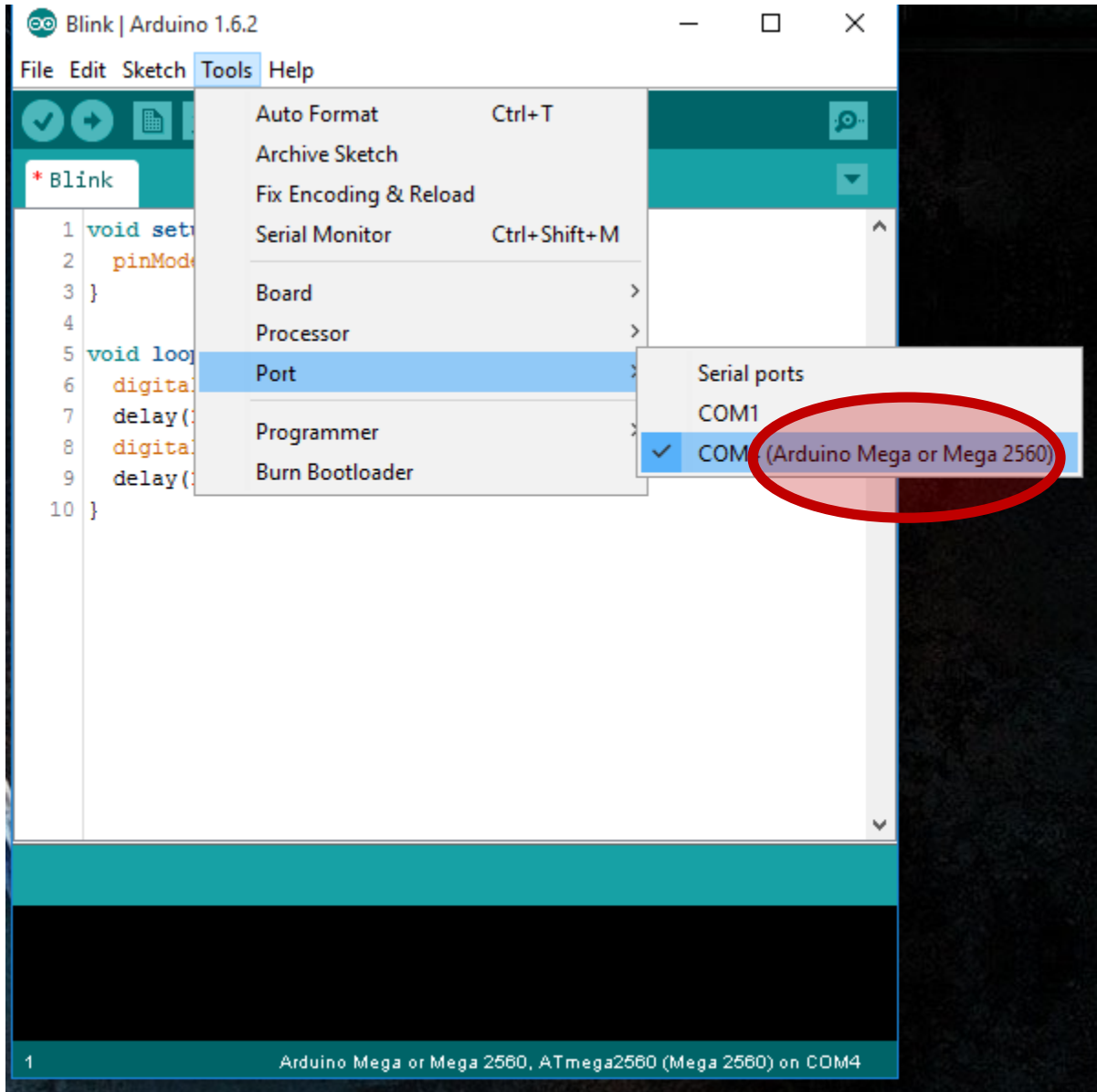
Hello world!

```
1 void setup() {
2   pinMode(13, OUTPUT);
3 }
4
5 void loop() {
6   digitalWrite(13, HIGH);
7   delay(1000);
8   digitalWrite(13, LOW);
9   delay(1000);
10 }
```

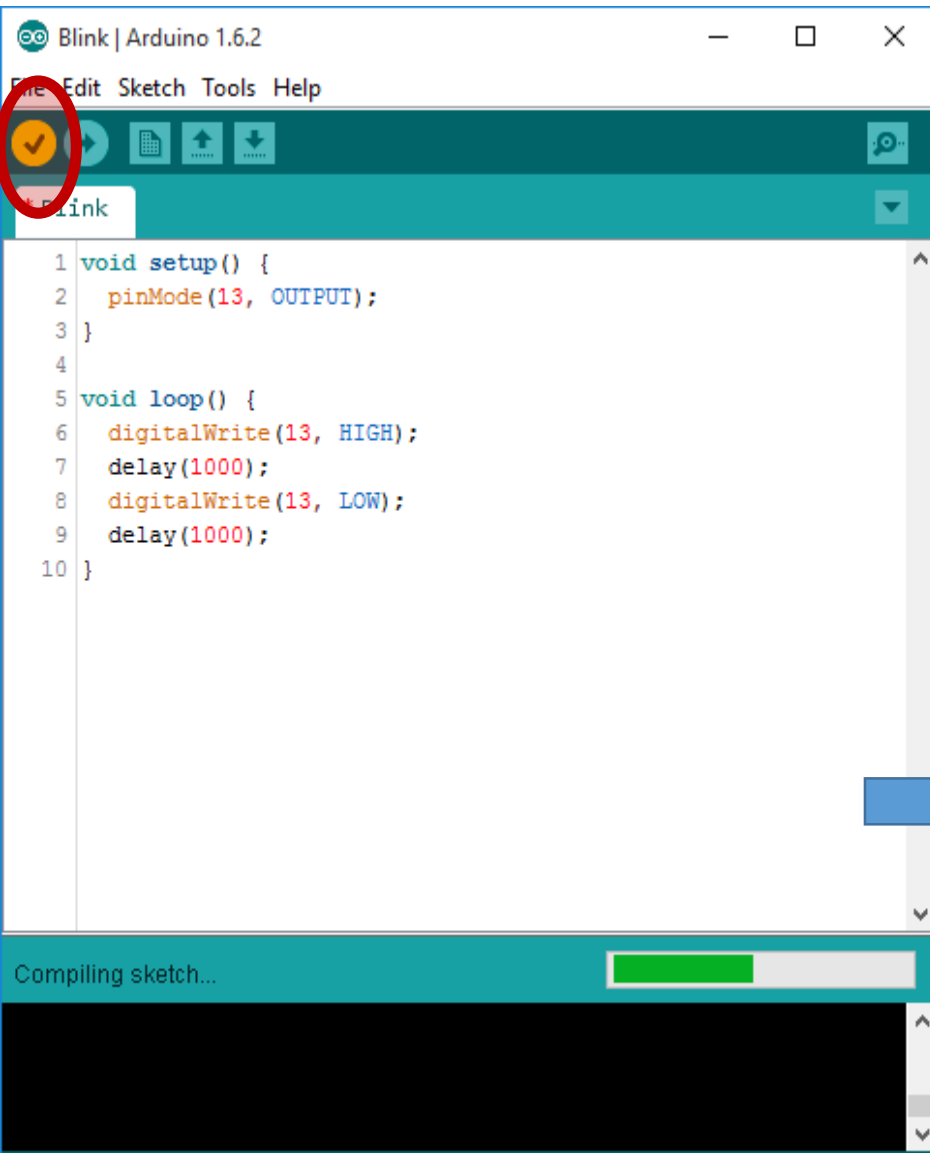
- digitalWrite(pin, value)
 - pin: Láb
 - Value: HIGH, LOW
- delay(ms)
 - Unsigned long ms: millisecc.
 - Nem maszkolja a megszakításokat!







Verify



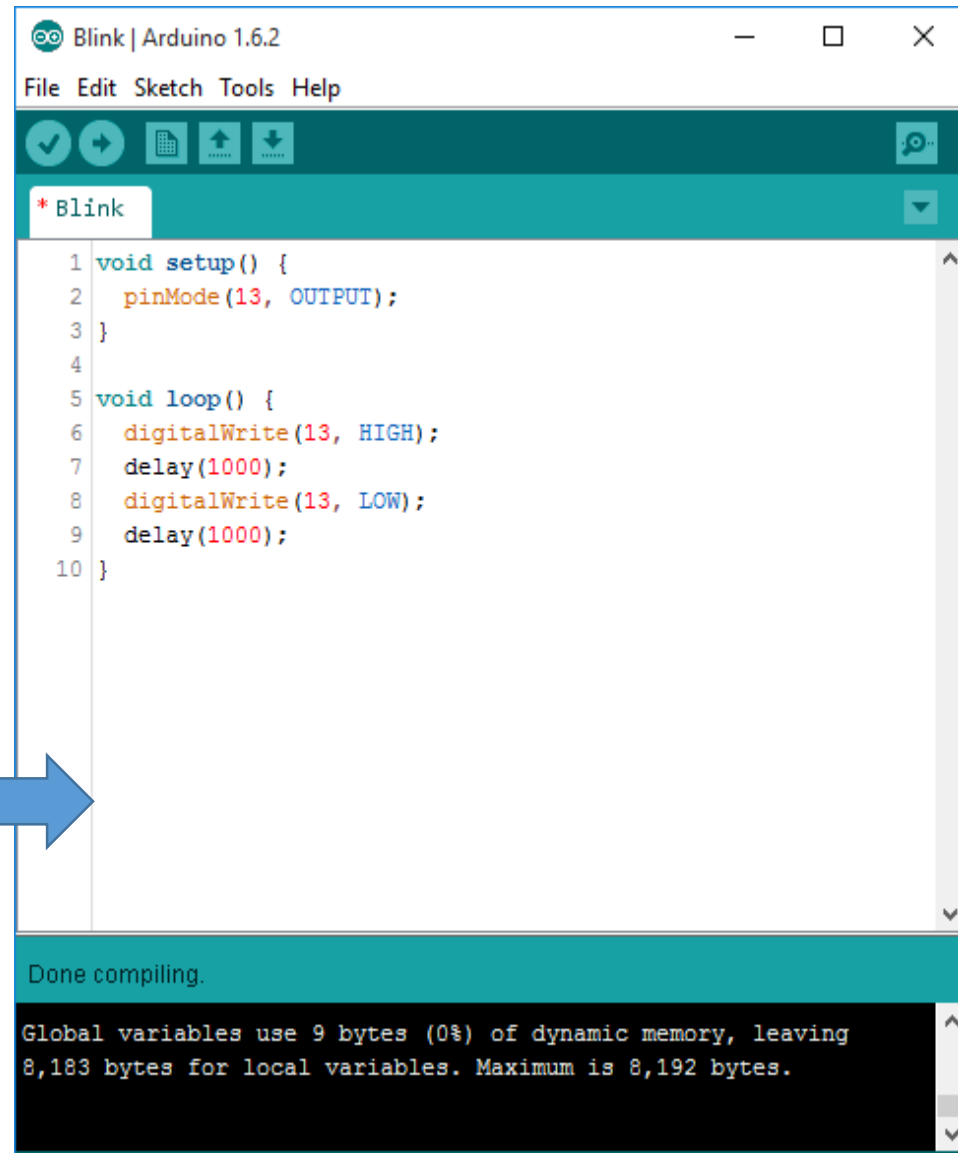
Blink | Arduino 1.6.2

File Edit Sketch Tools Help

Verify

```
1 void setup() {
2   pinMode(13, OUTPUT);
3 }
4
5 void loop() {
6   digitalWrite(13, HIGH);
7   delay(1000);
8   digitalWrite(13, LOW);
9   delay(1000);
10 }
```

Compiling sketch...



Blink | Arduino 1.6.2

File Edit Sketch Tools Help

* Blink

```
1 void setup() {
2   pinMode(13, OUTPUT);
3 }
4
5 void loop() {
6   digitalWrite(13, HIGH);
7   delay(1000);
8   digitalWrite(13, LOW);
9   delay(1000);
10 }
```

Done compiling.

Global variables use 9 bytes (0%) of dynamic memory, leaving 8,183 bytes for local variables. Maximum is 8,192 bytes.

Upload



Blink | Arduino 1.6.2

File Edit Sketch Tools Help

* Blink

```
1 void setup() {  
2   pinMode(13, OUTPUT);  
3 }  
4  
5 void loop() {  
6   digitalWrite(13, HIGH);  
7   delay(1000);  
8   digitalWrite(13, LOW);  
9   delay(1000);  
10 }
```

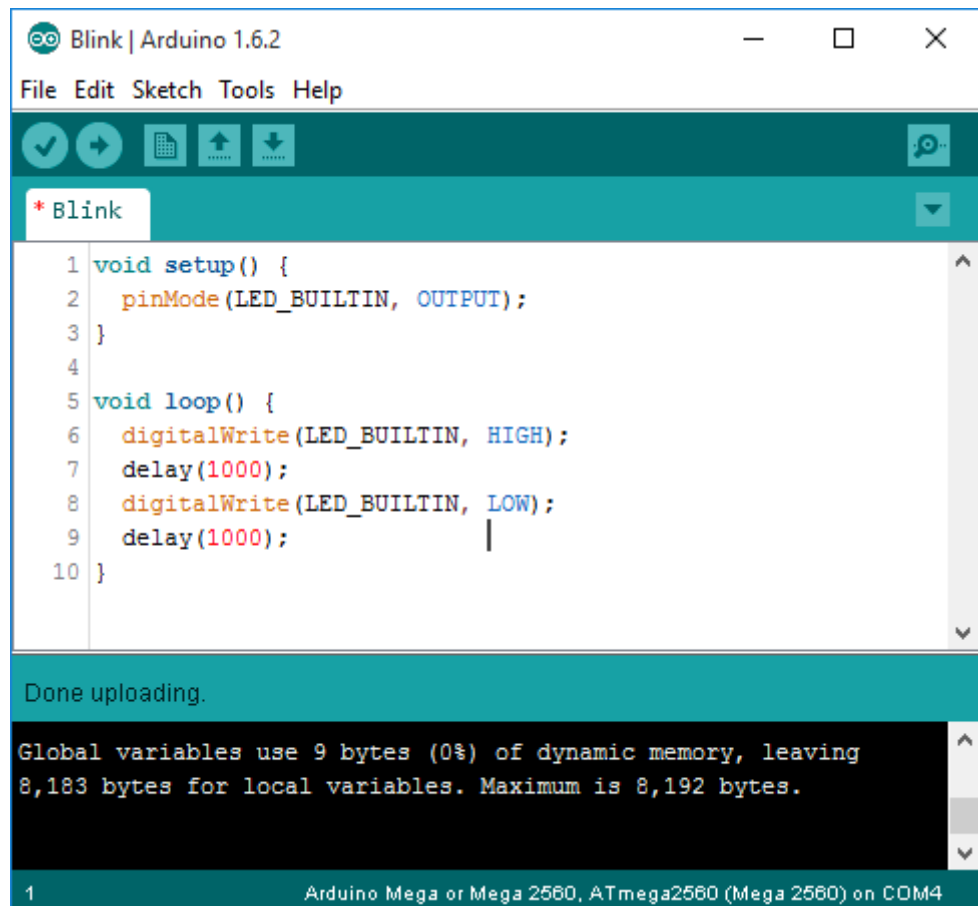
Done uploading.

Global variables use 9 bytes (0%) of dynamic memory, leaving 8,183 bytes for local variables. Maximum is 8,192 bytes.

1 Arduino Mega or Mega 2560, ATmega2560 (Mega 2560) on COM4

Konstansok

- LED_BUILTIN



```
Arduino IDE: Blink | Arduino 1.6.2
File Edit Sketch Tools Help
* Blink
1 void setup() {
2   pinMode(LED_BUILTIN, OUTPUT);
3 }
4
5 void loop() {
6   digitalWrite(LED_BUILTIN, HIGH);
7   delay(1000);
8   digitalWrite(LED_BUILTIN, LOW);
9   delay(1000);
10 }
Done uploading.
Global variables use 9 bytes (0%) of dynamic memory, leaving 8,183 bytes for local variables. Maximum is 8,192 bytes.
1 Arduino Mega or Mega 2560, ATmega2560 (Mega 2560) on COM4
```

U(S)ART

- Atmega: 4 uart
- Serial (0)
 - 0 (RX)
 - 1 (TX)
- Gyárilag bekötve VCP-re (FTDI, CN340)
- Arduino IDE serial monitorral megnyitható
- Serial.begin(baud)
 - 8n1 (8 adat bit, nincs paritás, 1 stop bit)
- Serial.begin(baud,config)
 - Config: pl. SERIAL_8N1 (the default)



* Blink



```
1 void setup() {  
2   pinMode(LED_ unsigned long baud  
3   Serial.begin(baud);  
4 }
```

```
5  
6 void loop() {  
7   digitalWrite(9600  
8   delay(1000); 14400  
9   digitalWrite(19200  
10  delay(1000); 28800  
11 }
```

1200
2400
4800
9600
14400
19200
28800
38400
57600
115200

Debug

Debug?



problem?

```
1 unsigned long time;
2
3 void setup() {
4     pinMode(LED_BUILTIN, OUTPUT);
5     Serial.begin(115200);
6 }
7
8 void loop() {
9     digitalWrite(LED_BUILTIN, HIGH);
10    Serial.print("Hello");
11    delay(1000);
12    digitalWrite(LED_BUILTIN, LOW);
13    Serial.println(" World!");
14    delay(1000);
15    time = millis();
16    Serial.println(time);
17 }
```



```
COM4 (Arduino Mega or Mega 2560)
```

Send

84017
Hello World!
86018
Hello World!
88017
Hello World!
90018
Hello World!
92019
Hello World!
94019
Hello World!
96020
Hello World!
98020
Hello World!
100021
Hello World!
102021
Hello World!
104022
Hello World!
106022
Hello World!
108022
Hello World!

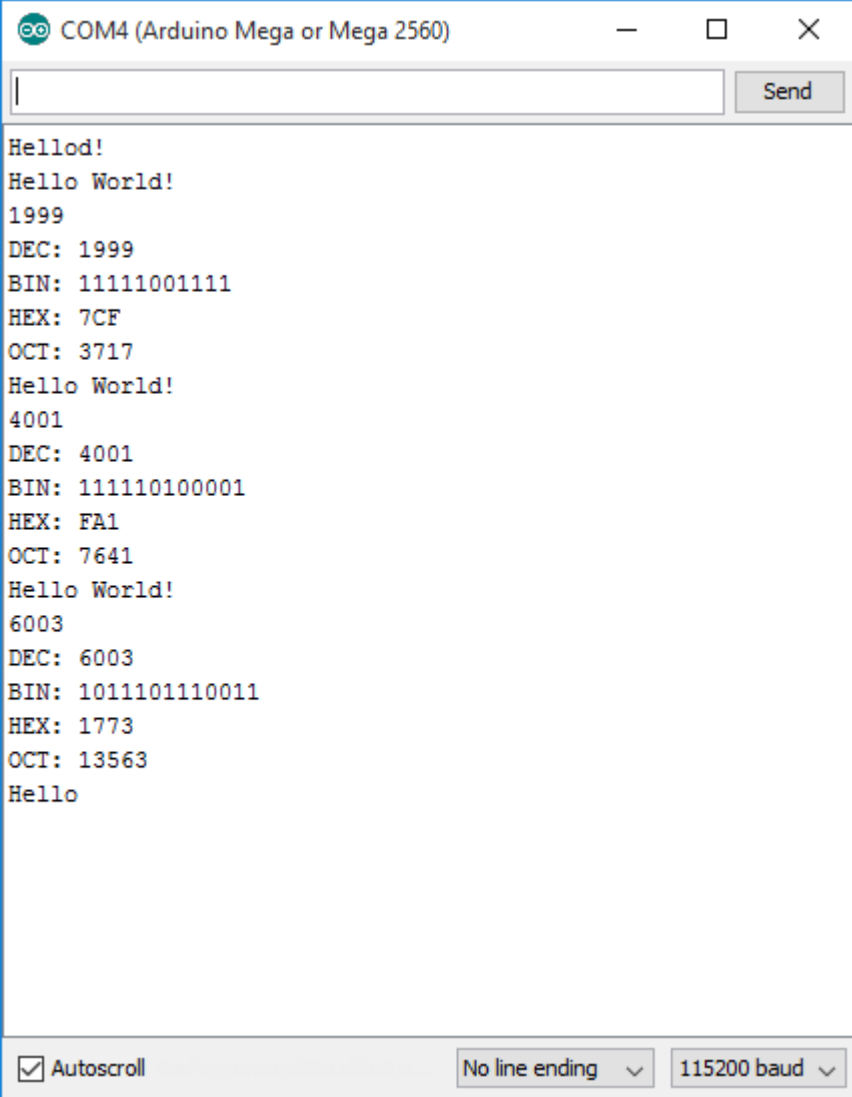
Autoscroll No line ending 115200 baud

millis()

- Visszatér a futásidővel (ms – unsigned long)
- Kb 50 nap után overflow

println()

```
15  time = millis();
16  Serial.println(time);
17  Serial.print("DEC: ");
18  Serial.println(time, DEC);
19  Serial.print("BIN: ");
20  Serial.println(time, BIN);
21  Serial.print("HEX: ");
22  Serial.println(time, HEX);
23  Serial.print("OCT: ");
24  Serial.println(time, OCT);
25 }
```



```
COM4 (Arduino Mega or Mega 2560)
```

Send

```
Hello!
Hello World!
1999
DEC: 1999
BIN: 11111001111
HEX: 7CF
OCT: 3717
Hello World!
4001
DEC: 4001
BIN: 111110100001
HEX: FA1
OCT: 7641
Hello World!
6003
DEC: 6003
BIN: 1011101110011
HEX: 1773
OCT: 13563
Hello
```

Autoscroll No line ending ▾ 115200 baud ▾

```
1 unsigned long time;
2
3 void setup() {
4     pinMode(LED_BUILTIN, OUTPUT);
5     Serial.begin(115200);
6 }
7
8 void loop() {
9     time=100;
10    while (Serial.available() > 0) {
11        time=Serial.parseInt();
12        Serial.println("Delay time: "+String(time));
13        if(Serial.read()=='\n'){
14            digitalWrite(LED_BUILTIN,1-digitalRead(LED_BUILTIN));
15        }
16    }
17    Serial.println(String(millis()));
18    delay(time);
19 }
```

int Serial.available()

- Visszatér a soros porton olvasásra elérhető byte-ok számával
 - Soros RX puffer
 - Max. 64 byte

long Serial.parseInt()

- 0...9, '-' karaktereken kívül kihagy mindent
- Hibás karakterek esetén 0-t ad vissza


```
1 String s;
2
3 void setup() {
4     pinMode(LED_BUILTIN, OUTPUT);
5     Serial.begin(115200);
6 }
7
8 void loop() {
9     while (Serial.available() > 0) {
10         s=Serial.readStringUntil('\n');
11         Serial.println("");
12         Serial.println("Simon says: "+s);
13
14
15     }
16     Serial.print(".");
17     delay(250);
18 }
```