

Hardware



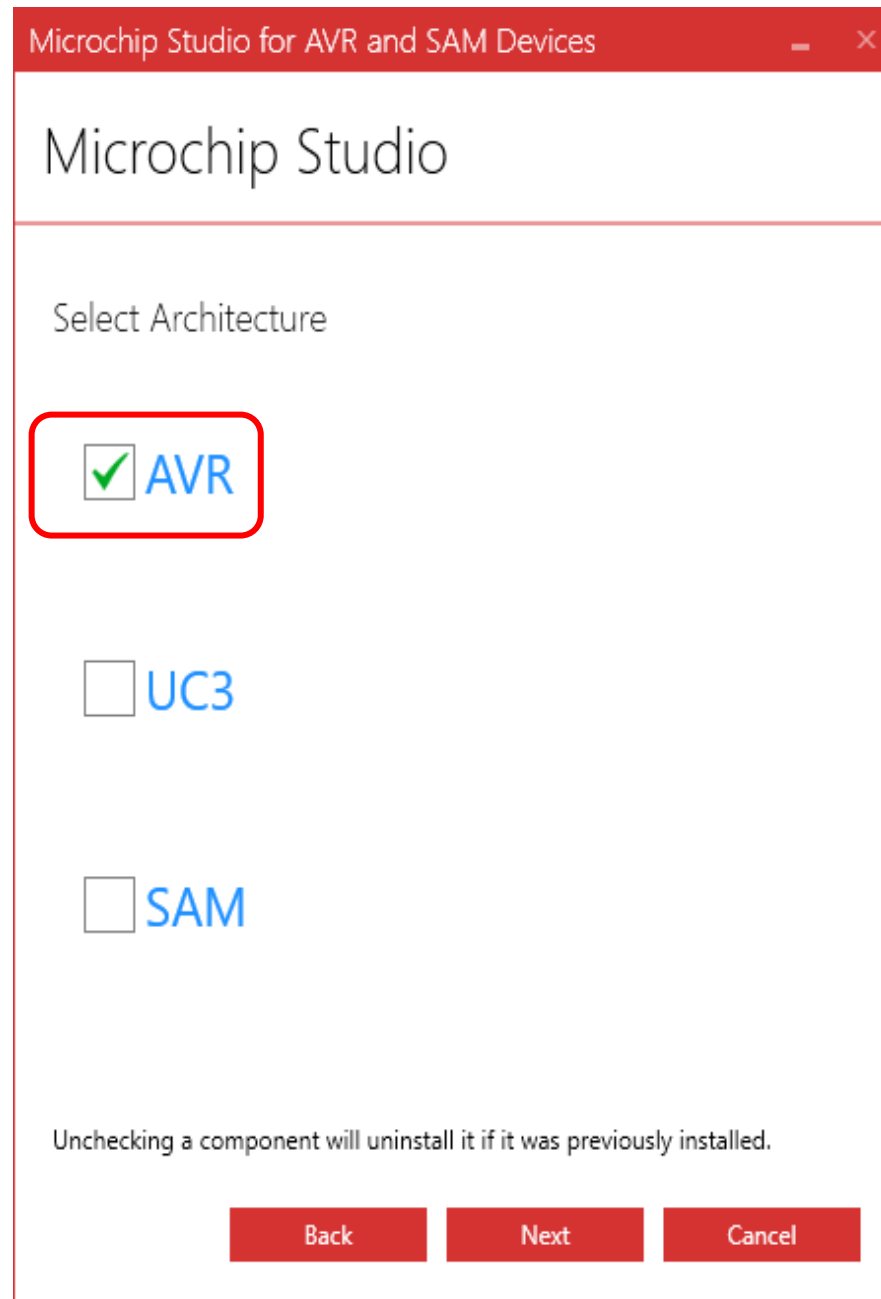
Firmware



Development Software



Embedded system



Vývoj programu pre ATmega328P - Arduino Uno

Start Page - Microchip Studio

Advanced Mode Quick Launch (Ctrl+Q)

File Edit View VAssistX ASF Project Debug Tools Window Help

Solution Explorer

Start Page

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Ak sú nejasnosti, pozrieť!

Start

- New Project...
- New Example Project...
- Open Project...

Recent

Keep page open after project load

Show page on startup

Error List

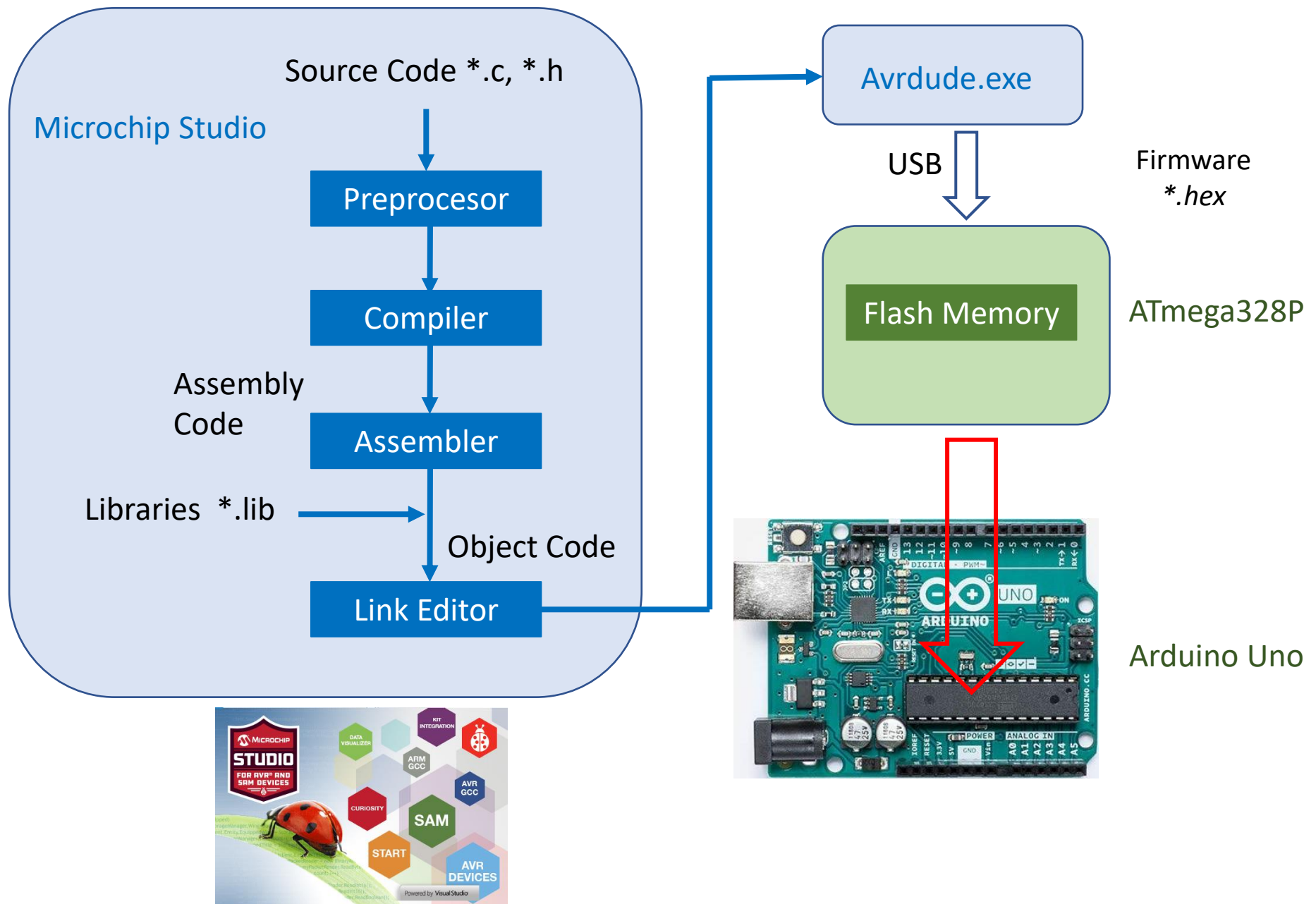
Entire Solution 0 Errors 0 Warnings 0 Messages

Search Error List

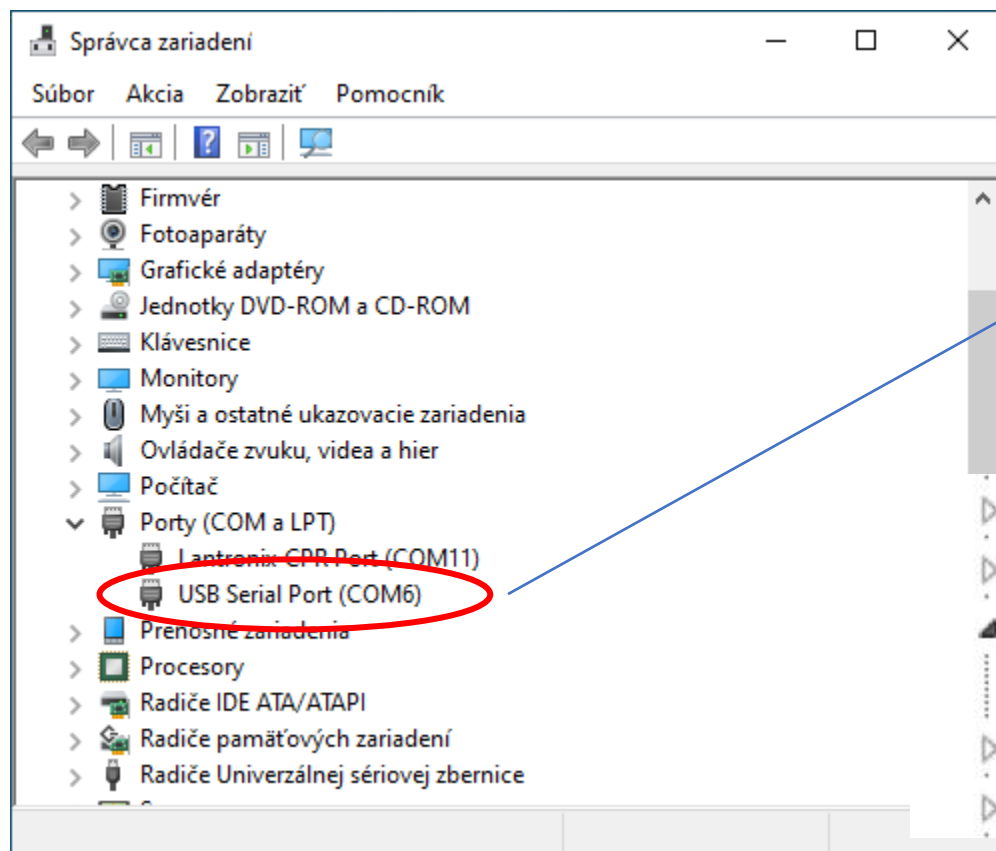
Output

Show output from:

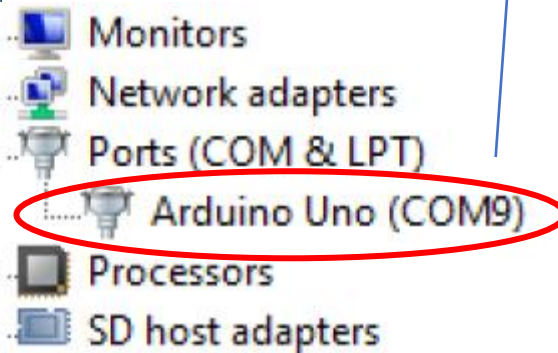
Ready



- ❑ Programovanie MCU ATmega328P na vývojovej doske *Arduino UNO* priamo z vývojového prostredia *Microchip Studio* zabezpečí program *Avrdude*.
- ❑ Vytvor na disku počítača adresár „C:\avrdude“ a nakopíruj do neho súbory „*avrdude.exe*“ a „*avrdude.conf*“ z <http://kte.fei.tuke.sk/livovsky/ZMT/avrdude>.
- ❑ Pripoj *Arduino UNO* k počítaču. V správcovi zariadení skontroluj správnosť pripojenia a číslo COM portu, cez ktorý bude počítač komunikovať s vývojovou doskou.

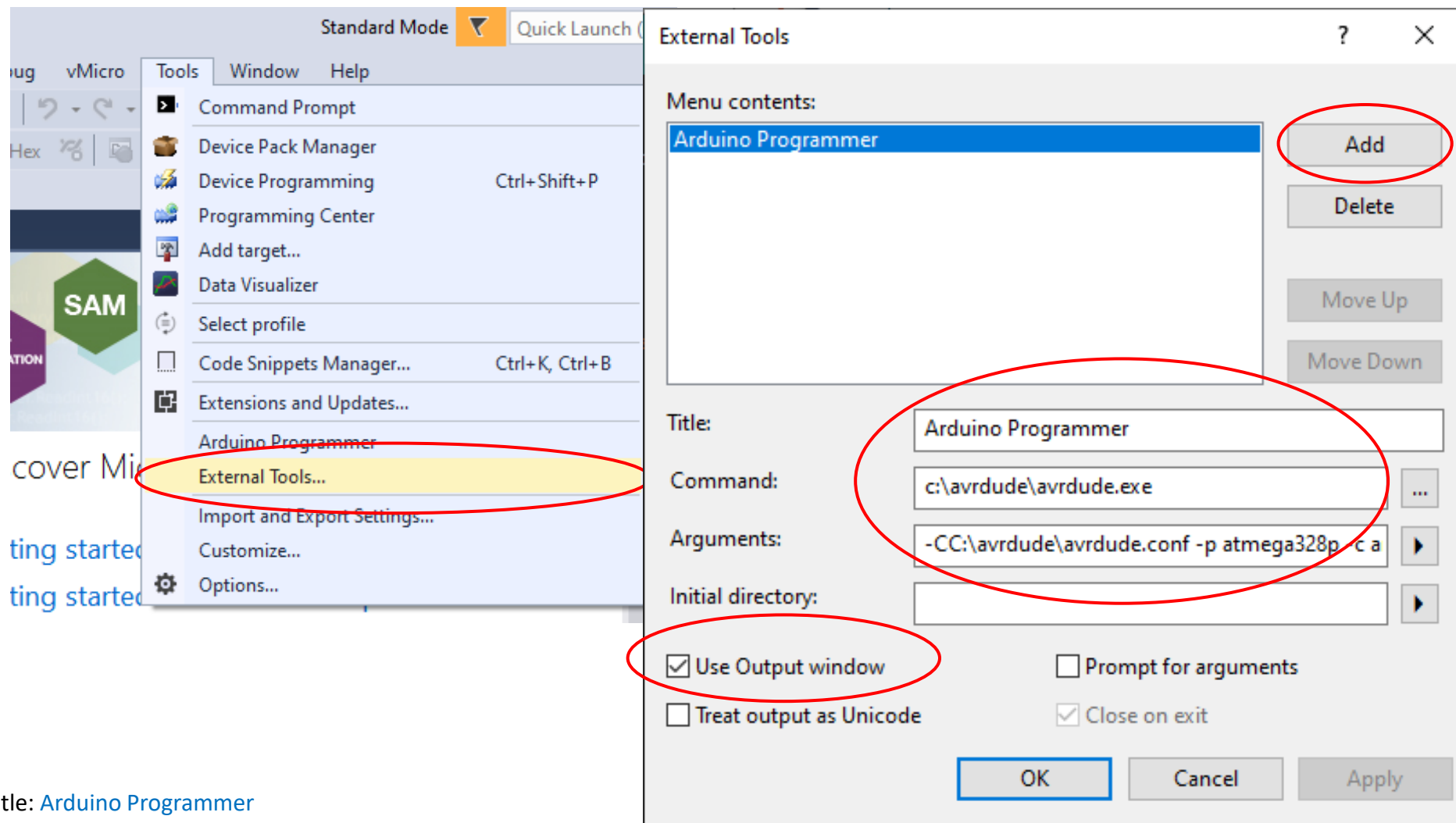


Např. „COM6“ alebo „COM9“



Nastavenie externého programátora v Microchip Studio pre Arduino UNO

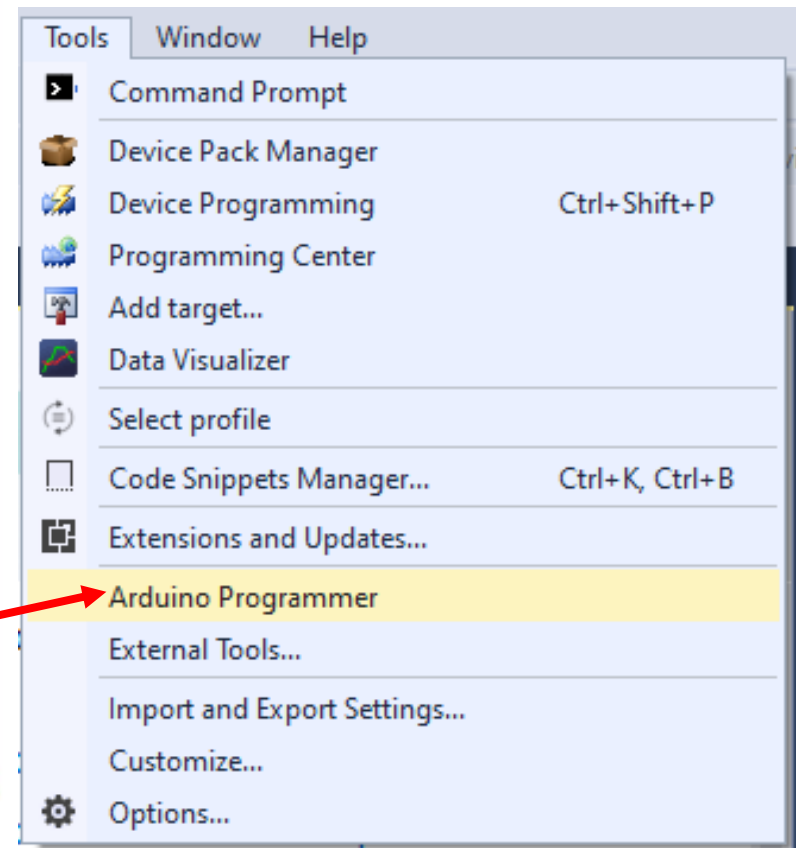
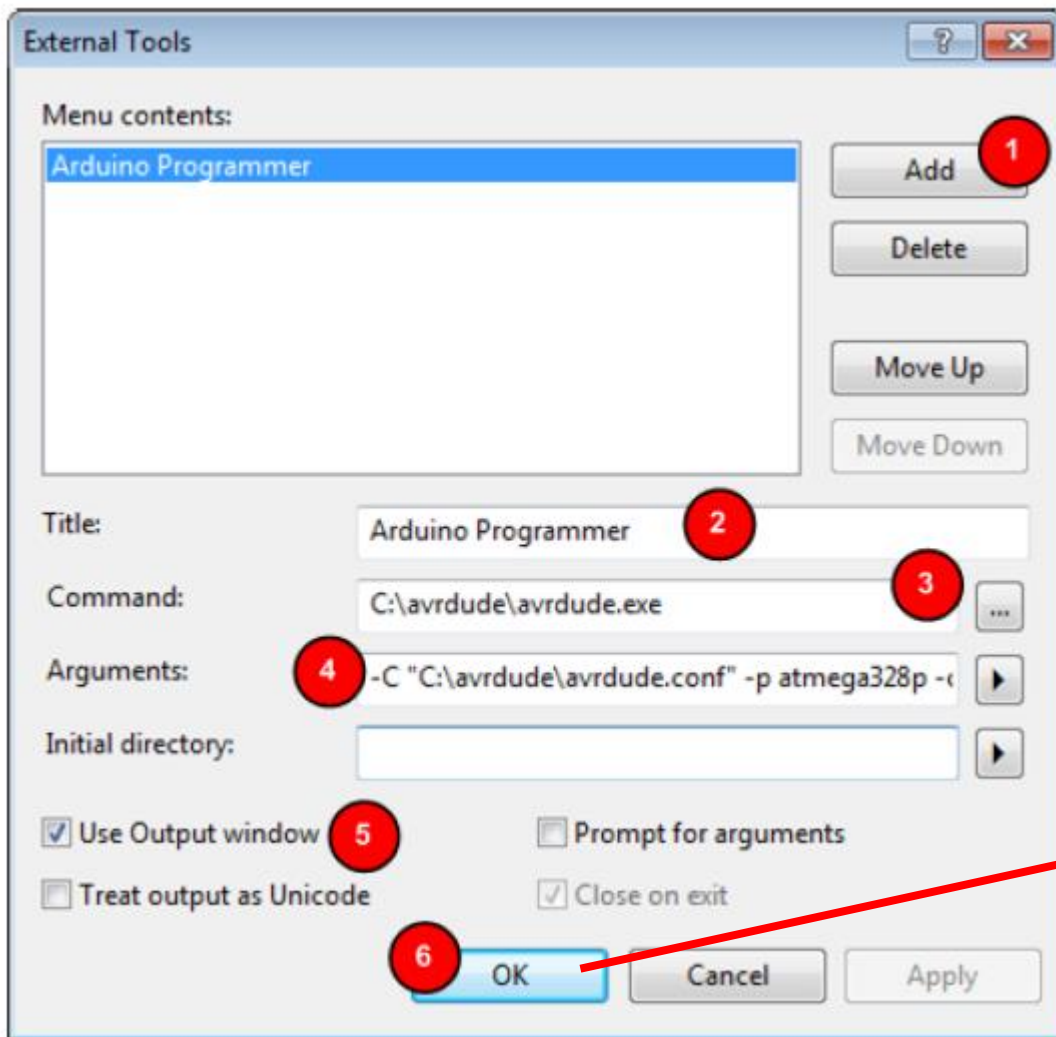
- ☐ Spuť IDE *Microchip Studio*
- ☐ V menu „Tools“ zvol „External Tools...“.
- ☐ Následne zvol „Add“ a vyplň nasledujúce položky. Potom „OK“.



Title: `Arduino Programmer`

Command: `c:\avrdude\avrdude.exe`

Arguments: `-CC:\avrdude\avrdude.conf -p atmega328p -c arduino -P COM6 -b 115200 -U flash:w:"$(ProjectDir)Debug\$(TargetName).hex":i`



- ❑ Ak sú problémy s nahrávaním programu do pamäte *flash* ATmega328P Arduino Nano a vypisuje sa chyba:

avrdude.exe: stk500_recv(): programmer is not responding

avrdude.exe: stk500_getsync() attempt 1 of 10: not in sync: resp=0xc5

- ❑ zmeňte parameter prenosovej rýchlosti v *Arguments* na **57600**.

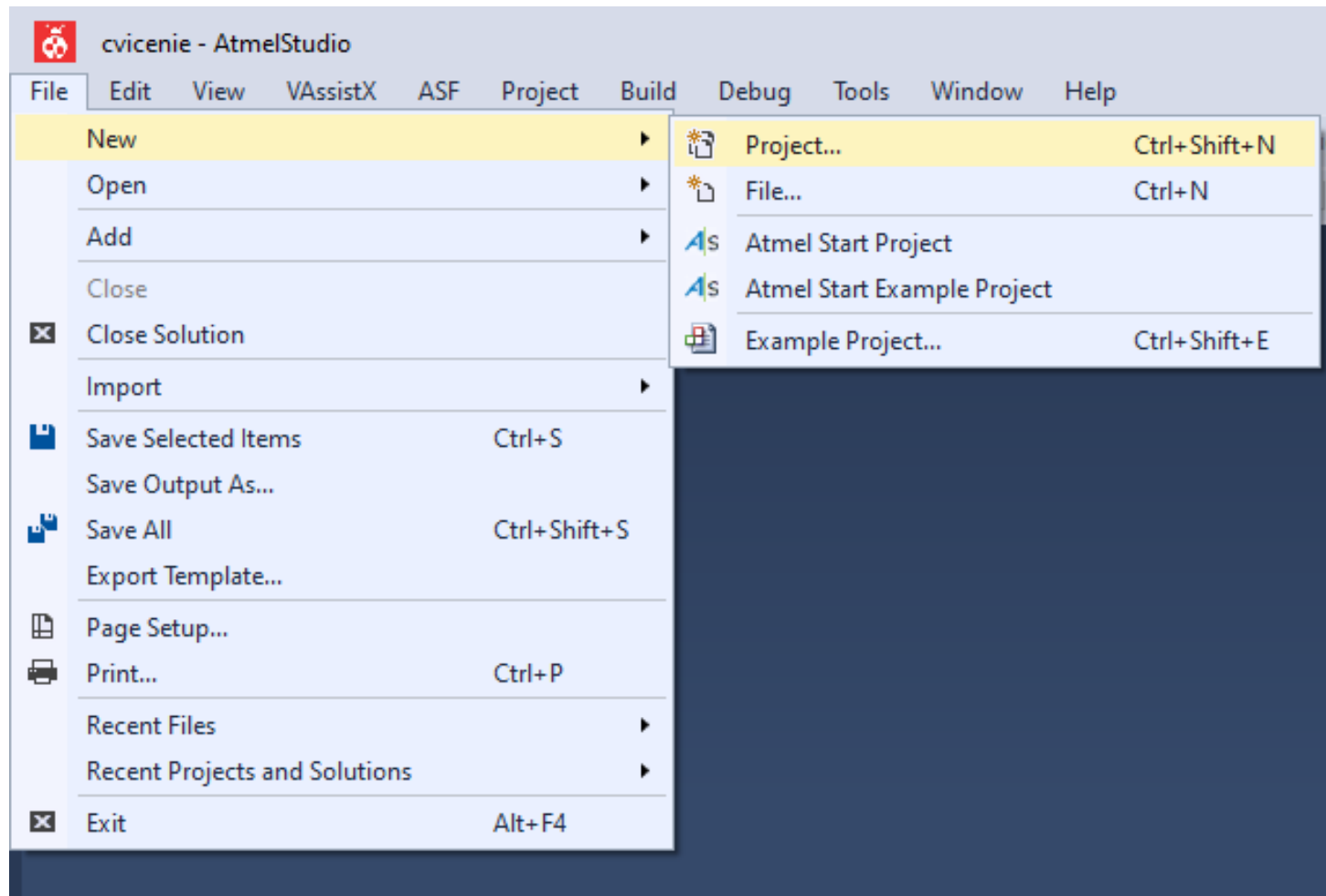


Title: **Arduino Programmer**

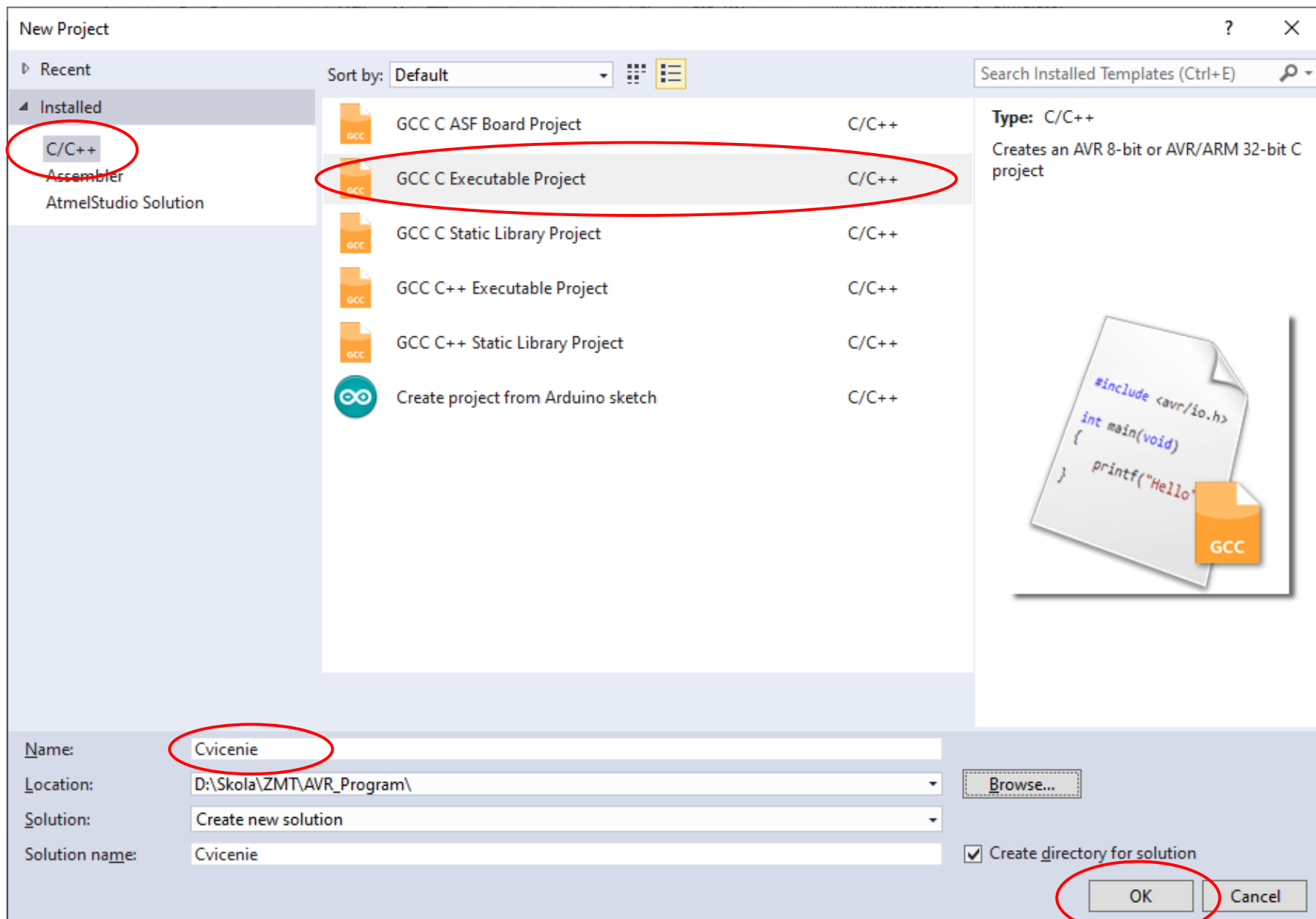
Command: **c:\avrdude\avrdude.exe**

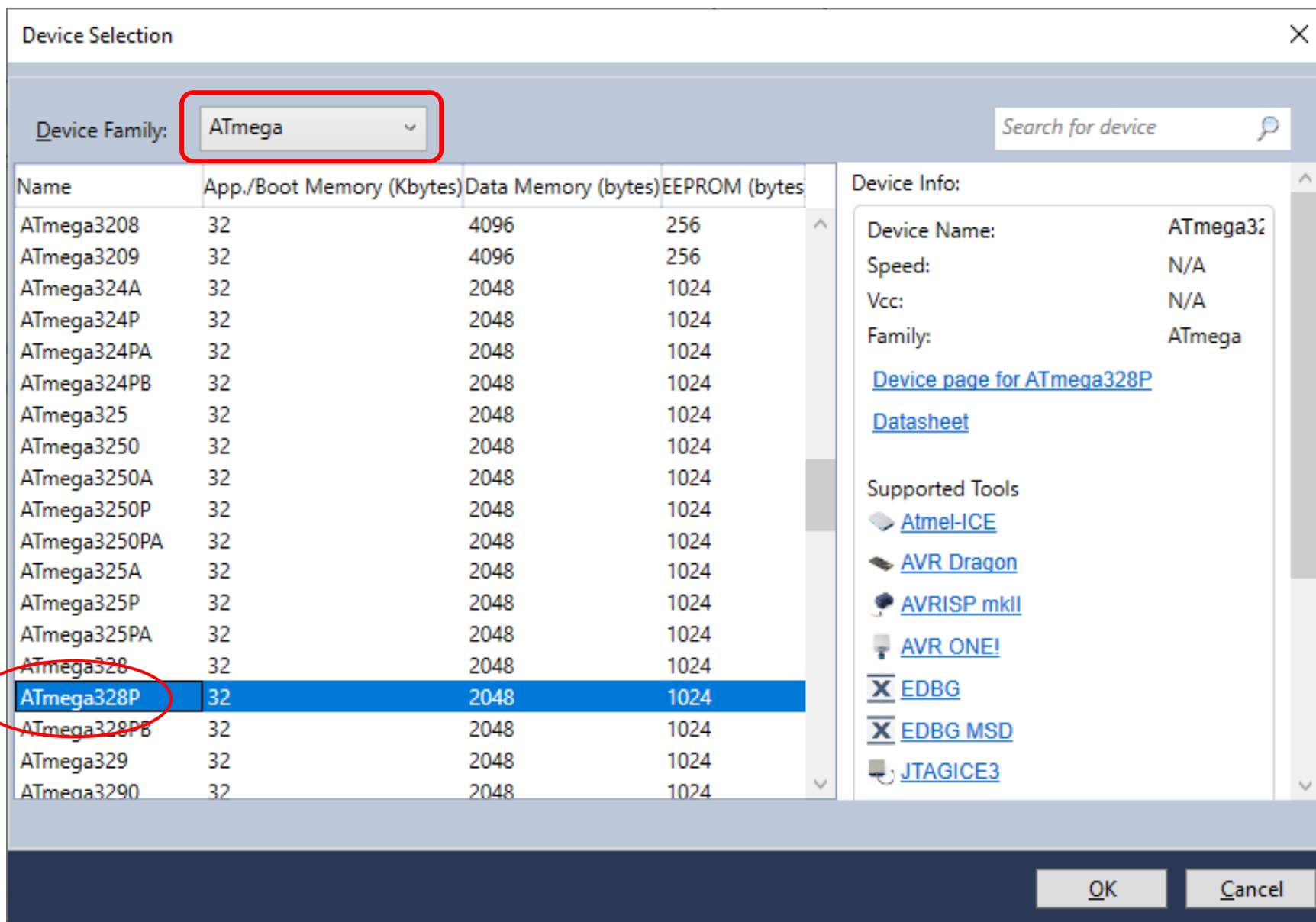
Arguments: **-CC:\avrdude\avrdude.conf -p atmega328p -c arduino -P COM6 -b 57600 -U flash:w:"\$(ProjectDir)Debug\\$(TargetName).hex":i**

Nový projekt „Mircochip Studio“

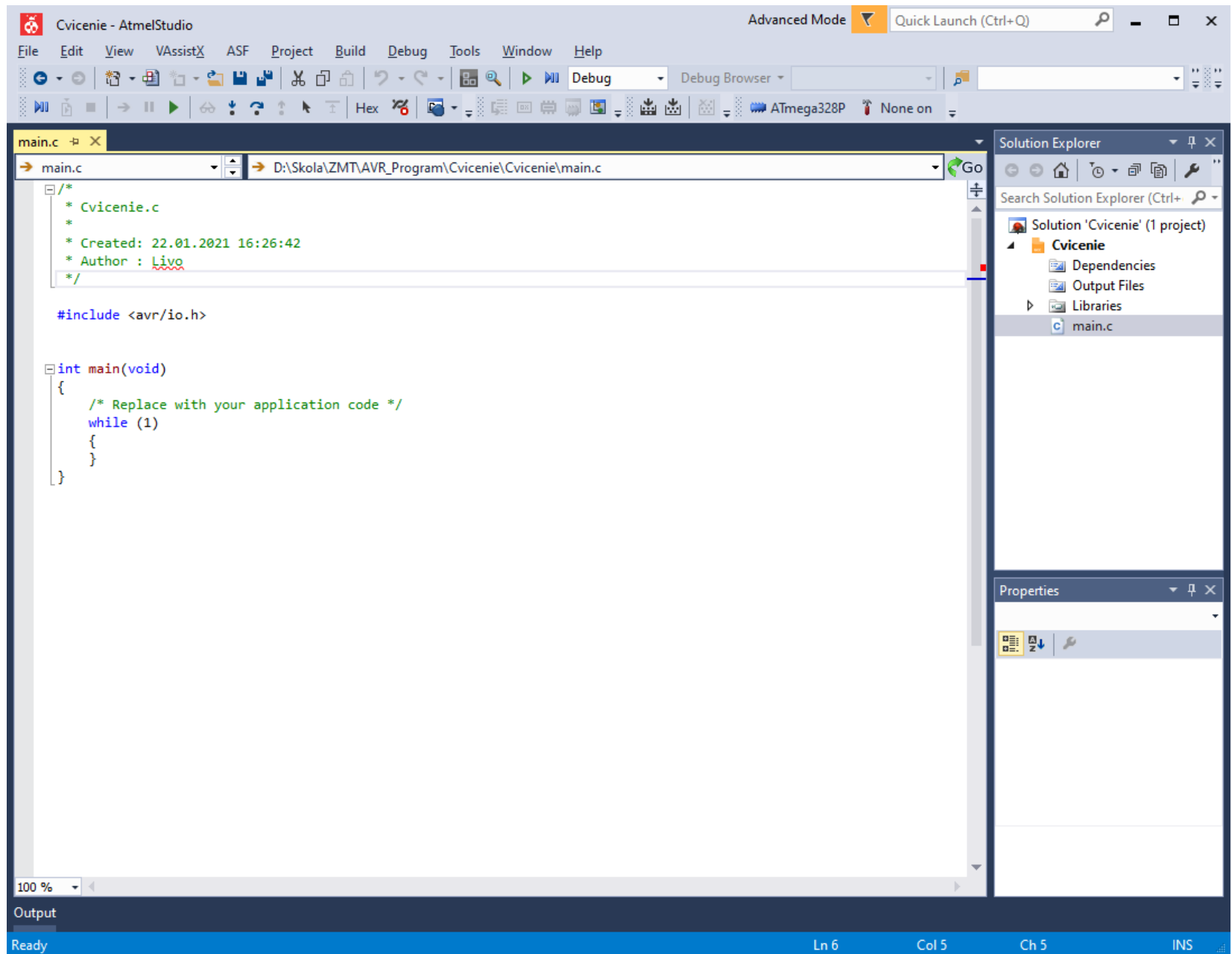


Nový projekt „Mircochip Studio“

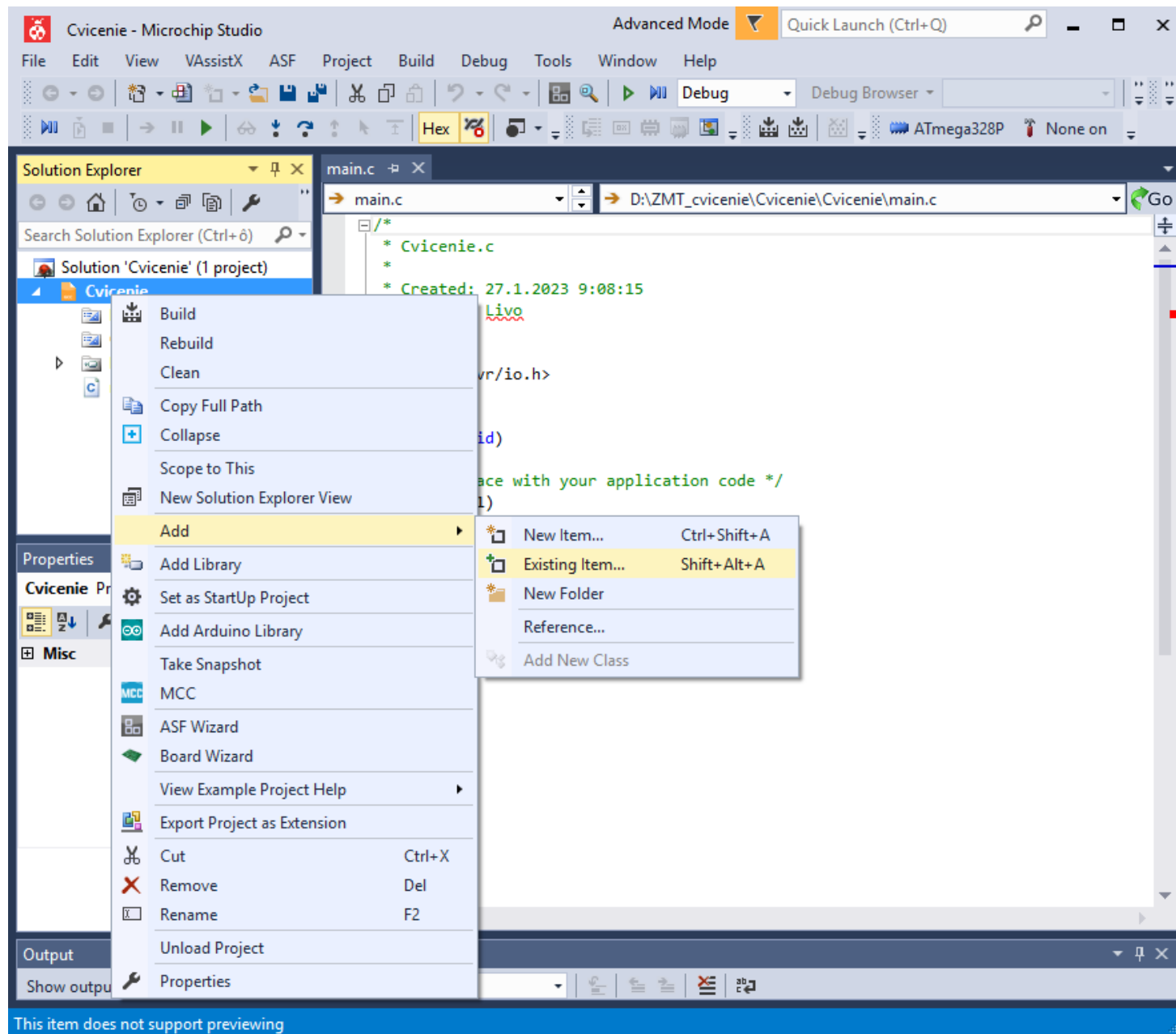




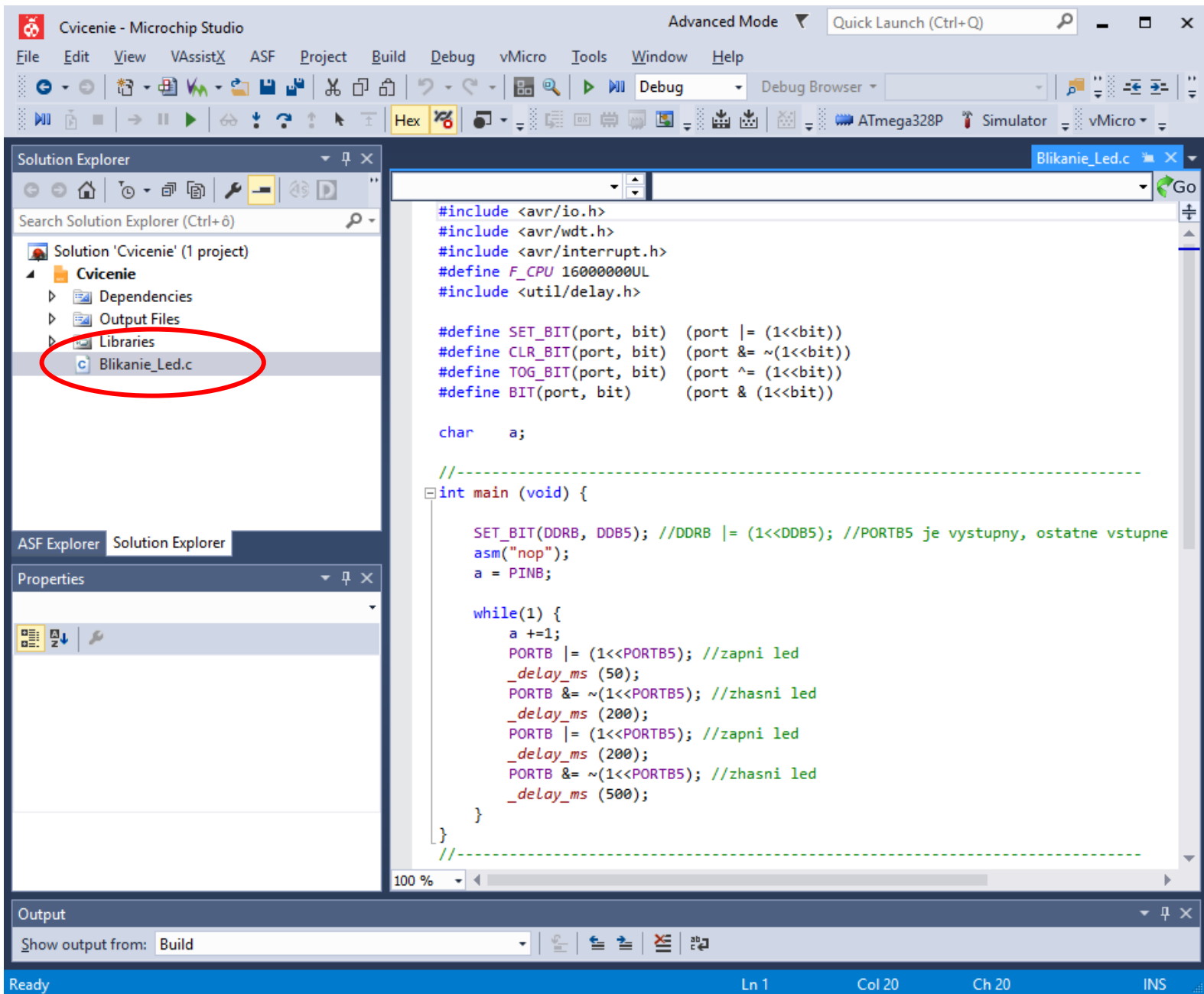
Nový projekt „Mircochip Studio“

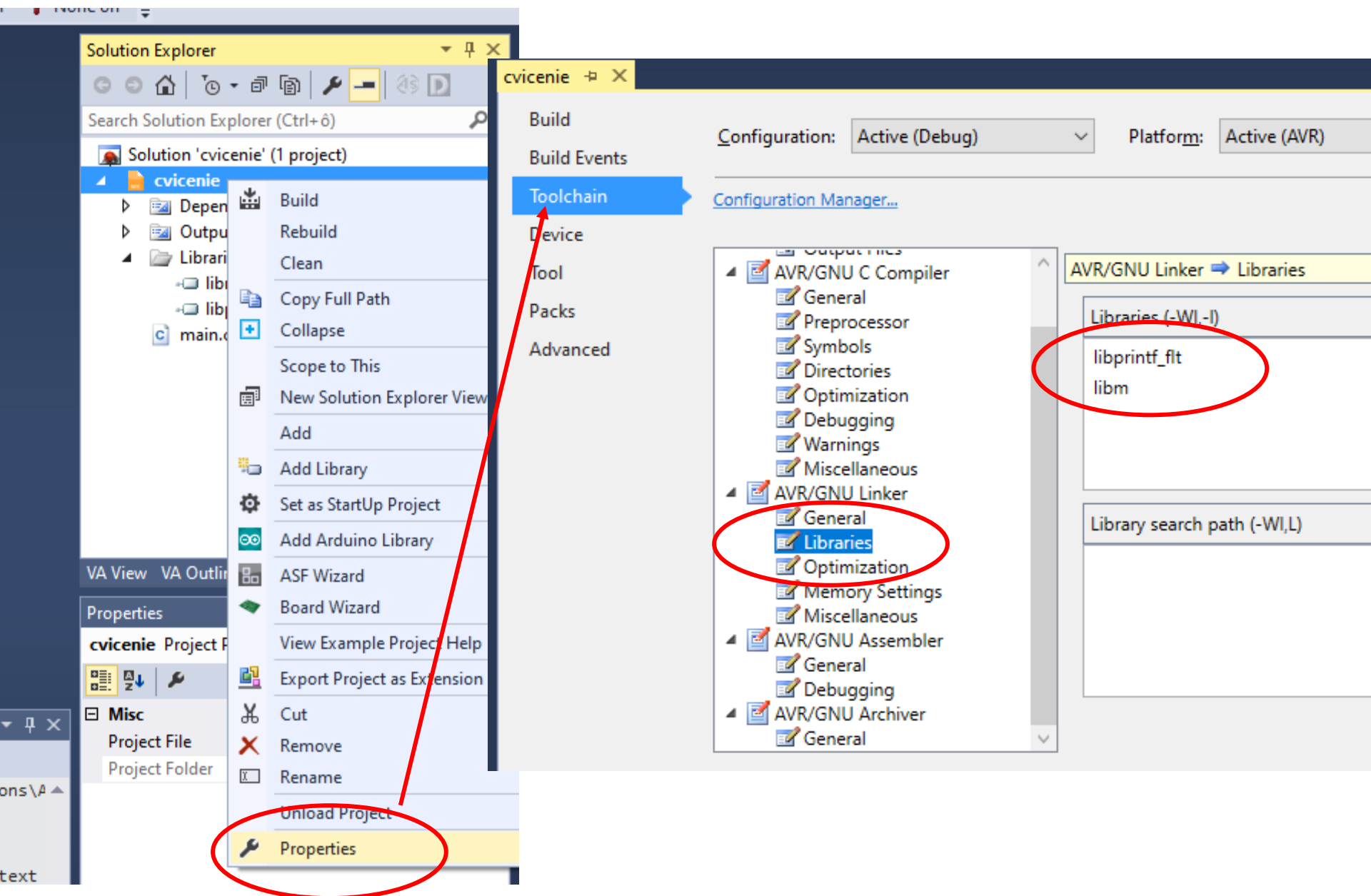


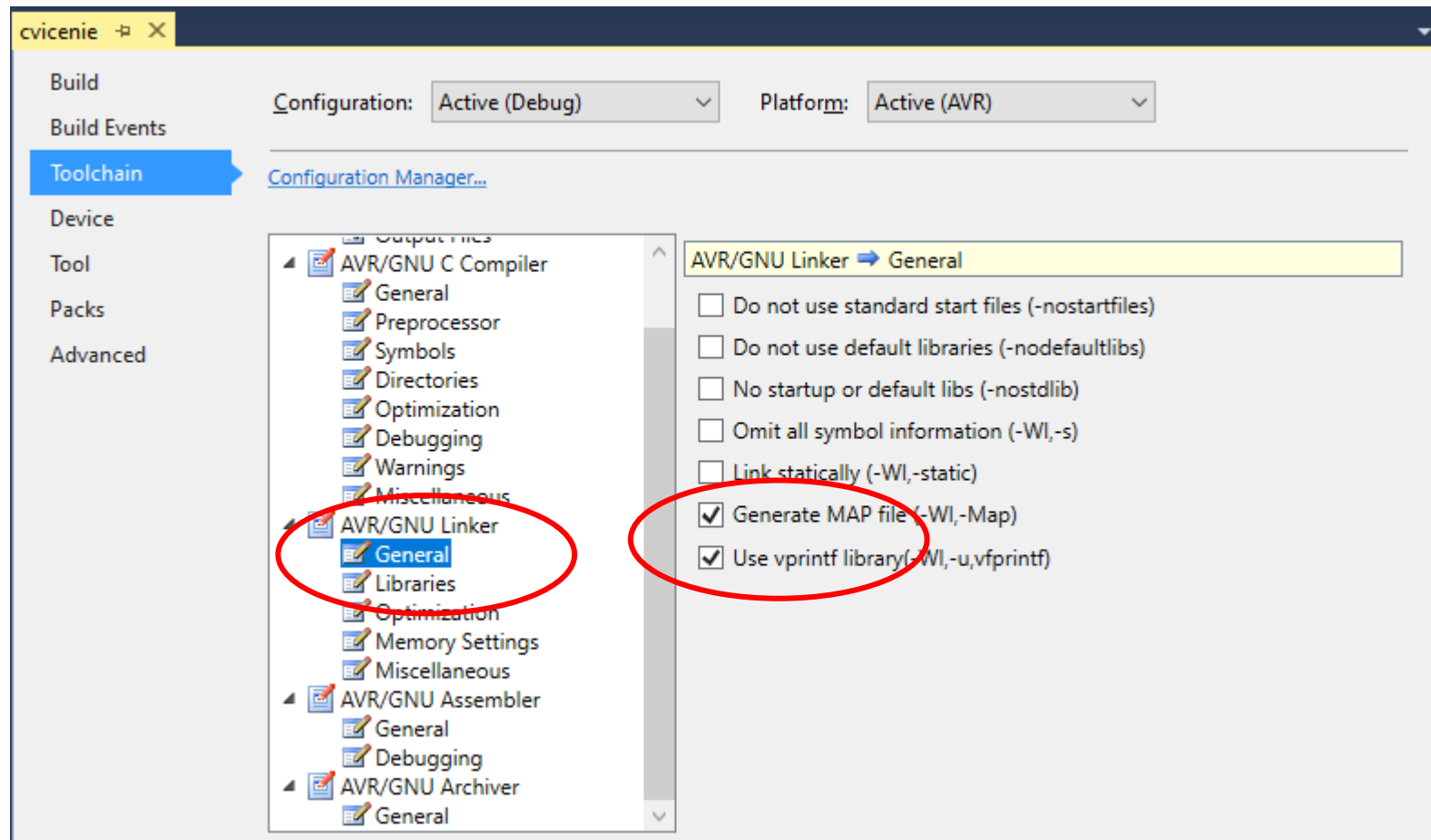
Projekt „Cvicienie“ – *main.c* nahrad' súborom *Blikanie_led.c*



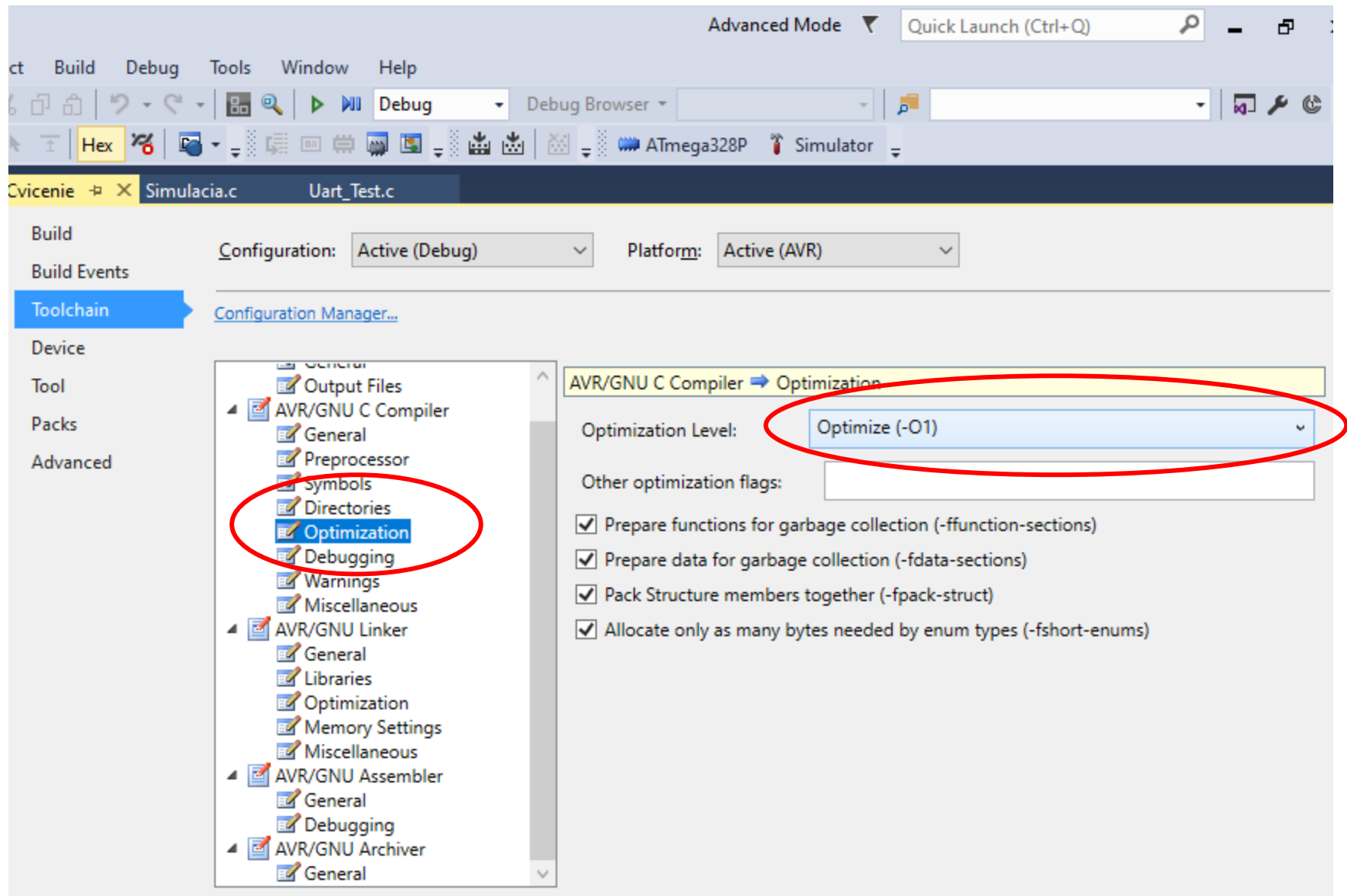
Projekt „Cvicienie“







Nastavenie „optimalizácia kódu“



Preklad projektu pomocou „Build Solution“ – F7, vygenerované output súbory

Solution Explorer

Search Solution Explorer (Ctrl+Q)

- Cvicenie
 - Dependencies
 - Output Files
 - Cvicenie.eep
 - Cvicenie.elf
 - Cvicenie.hex
 - Cvicenie.lss
 - Cvicenie.map
 - Cvicenie.srec

Properties

Cvicenie Project Properties

Output

Show output from: Build

```
"C:\Program Files (x86)\Atmel\Studio\7.0\toolchain\avr8\avr8-gnu-toolchain\bin\avr-objcopy.exe" -O srec -R .eeprom -R .fuse
"C:\Program Files (x86)\Atmel\Studio\7.0\toolchain\avr8\avr8-gnu-toolchain\bin\avr-size.exe" "Cvicenie.elf"
text    data    bss    dec    hex filename
3188     0      1   3189   c75 Cvicenie.elf
Done executing task "RunCompilerTask".
Task "RunOutputFileVerifyTask"
Program Memory Usage    : 3188 bytes  9,7 % Full
Data Memory Usage       : 1 bytes   0,0 % Full
Warning: Memory Usage estimation may not be accurate if there are sections other than .text sections in ELF file
Done executing task "RunOutputFileVerifyTask".
Done building target "CoreBuild" in project "Cvicenie.cproj".
Target "PostBuildEvent" skipped, due to false condition; ('$(PostBuildEvent)' != '') was evaluated as ('' != '').
Target "Build" in file "C:\Program Files (x86)\Atmel\Studio\7.0\Vs\Avr.common.targets" from project "E:\0PREDMETY\ZMT\AVR_Program\C
Done building target "Build" in project "Cvicenie.cproj".
Done building project "Cvicenie.cproj"

Build succeeded.
===== Rebuild All: 1 succeeded, 0 failed, 0 skipped =====
```

„Nahratie“ strojového kódu do ATmega328P na Arduino vývojovej doske

The screenshot shows the Microchip Studio IDE in Advanced Mode. The Tools menu is open, and the 'Arduino Programmer' option is highlighted. The Output window is also open, showing the progress of the programming process. The code editor displays C code for an AVR microcontroller.

Tools Menu:

- Command Prompt
- Device Pack Manager
- Device Programming (Ctrl+Shift+P)
- MPLAB MCC Standalone
- Programming Center
- Add target...
- Data Visualizer
- Select profile
- Code Snippets Manager... (Ctrl+K, Ctrl+B)
- Extensions and Updates...
- Arduino Programmer**
- External Tools...
- Import and Export Settings...
- Customize...
- Options...

Output Window:

Show output from: **Arduino Programmer COM3**

```
avrdude.exe: AVR device initialized and ready to accept instructions.

Reading | ##### | 100% 0.01s

avrdude.exe: Device signature = 0x1e950f (probably m328p)
avrdude.exe: NOTE: "flash" memory has been specified, an erase cycle will be performed
        To disable this feature, specify the -D option.
avrdude.exe: erasing chip
avrdude.exe: reading input file "E:\0PREDMET\ZMT\AVR_Program\Cvicienie\Cvicienie\Debug\Cvicienie.hex"
avrdude.exe: writing flash (3188 bytes):

Writing | ##### | 100% 1.19s

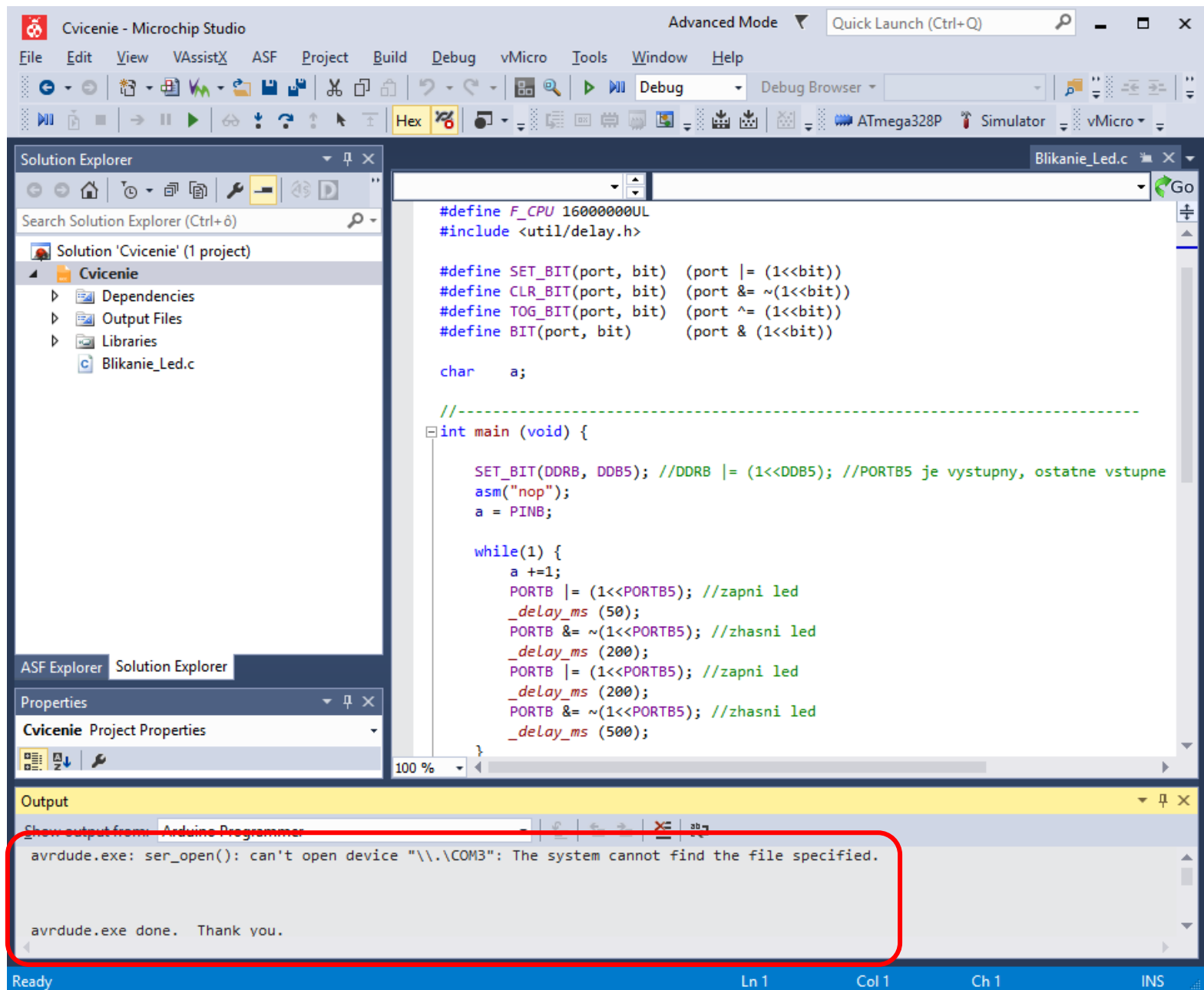
avrdude.exe: 3188 bytes of flash written
avrdude.exe: verifying flash memory against E:\0PREDMET\ZMT\AVR_Program\Cvicienie\Cvicienie\Debug\Cvicienie.hex:
avrdude.exe: load data flash data from input file E:\0PREDMET\ZMT\AVR_Program\Cvicienie\Cvicienie\Debug\Cvicienie.hex:
avrdude.exe: input file E:\0PREDMET\ZMT\AVR_Program\Cvicienie\Cvicienie\Debug\Cvicienie.hex contains 3188 bytes
avrdude.exe: reading on-chip flash data:

Reading | ##### | 100% 1.07s

avrdude.exe: verifying ...
avrdude.exe: 3188 bytes of flash verified

avrdude.exe: safemode: Fuses OK (E:00, H:00, L:00)
```

„Nahratie“ strojového kódu do ATmega328P na Arduino vývojovej doske



Nastavenie programu pre komunikáciu s doskou Arduino „Terminal“

