

Atmel Studio

An Introductory Tutorial

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Initialize Project

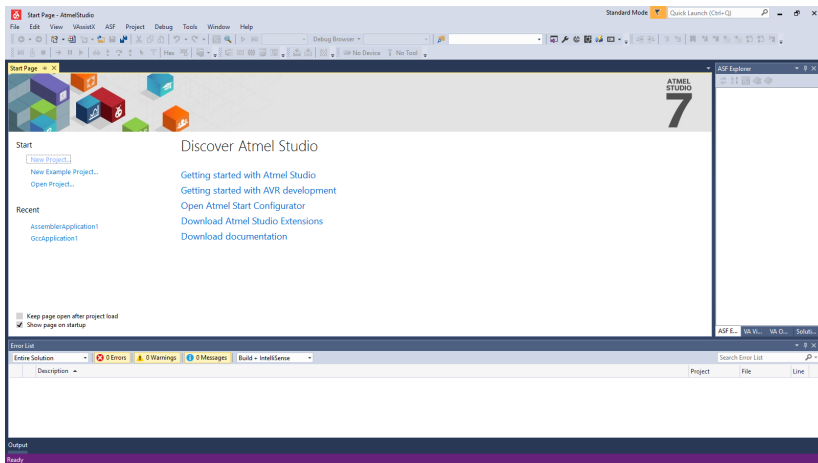
Coding

Generate Hex File

Debugging

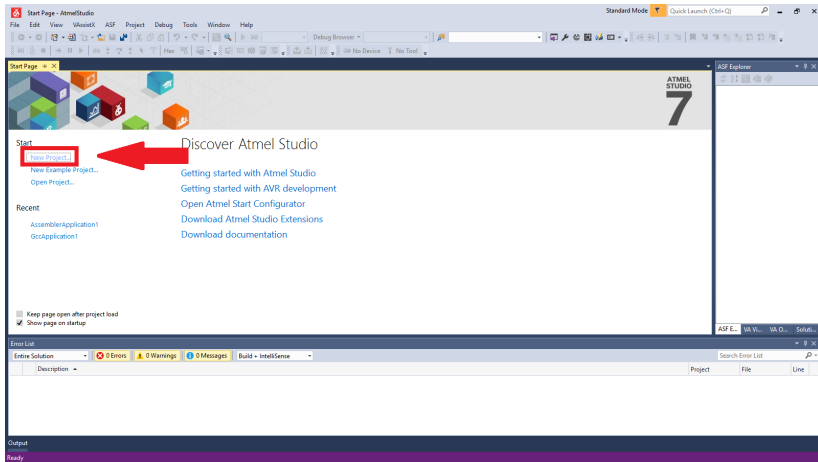
Initialize Project

Open Atmel Studio 7.0



Initialize Project

Click on New Project



Initialize Project

Project Type

- ▶ **ASF Board Project**

The project contains built-in libraries

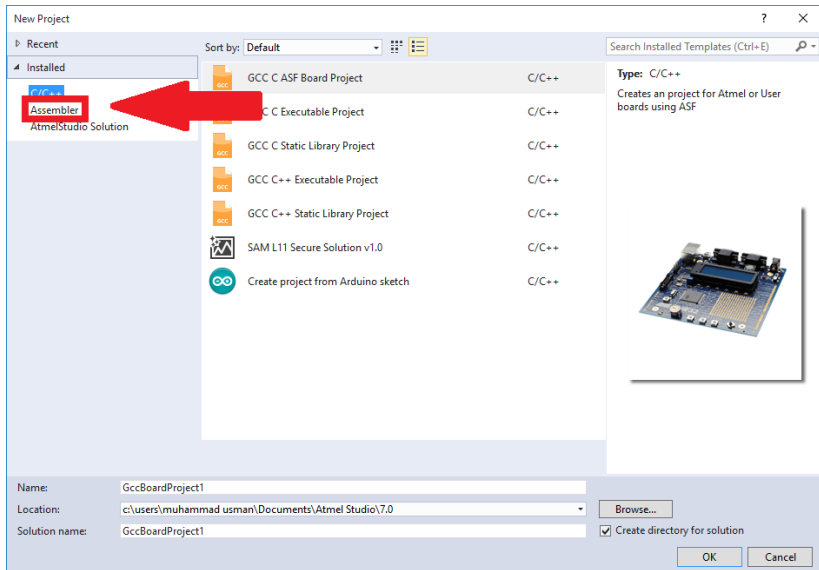
- ▶ **C Executable Project**

Project for bare-metal C programming

Initialize Project

Project Type

Click on Assembler



New Project

Recent

Installed

Sort by: Default

Search Installed Templates (Ctrl+E)


ASM

AVR Assembler Project

Assembler

Type: Assembler

Creates an AVR 8-bit Assembler project



Name: AssemblerApplication2

Location: c:\users\muhammad usman\Documents\Atmel Studio\7.0

Solution name: AssemblerApplication2

Browse...

☒ Create directory for solution

OK

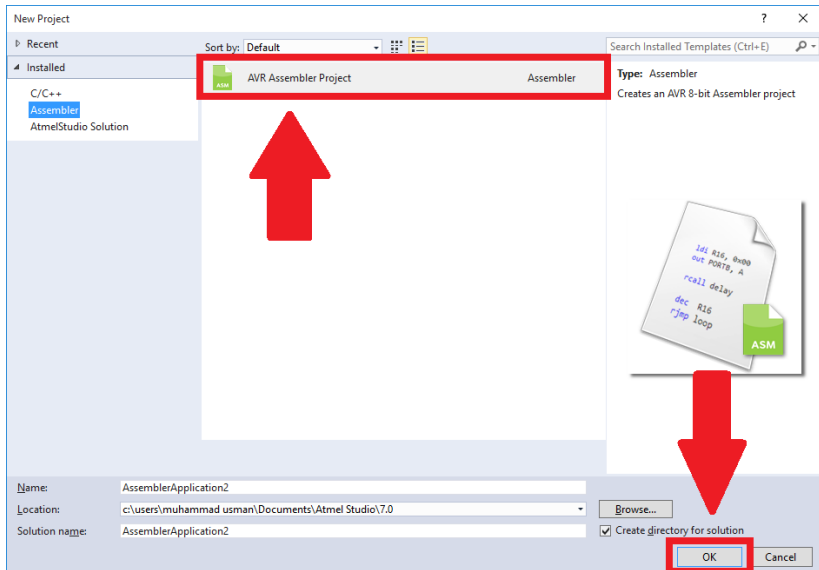
Cancel

Initialize Project

Project Type

Select AVR Assembler Project

Click OK



Initialize Project


Select μ C

Type in the search box

ATmega16A

Device Selection

Device Family: All

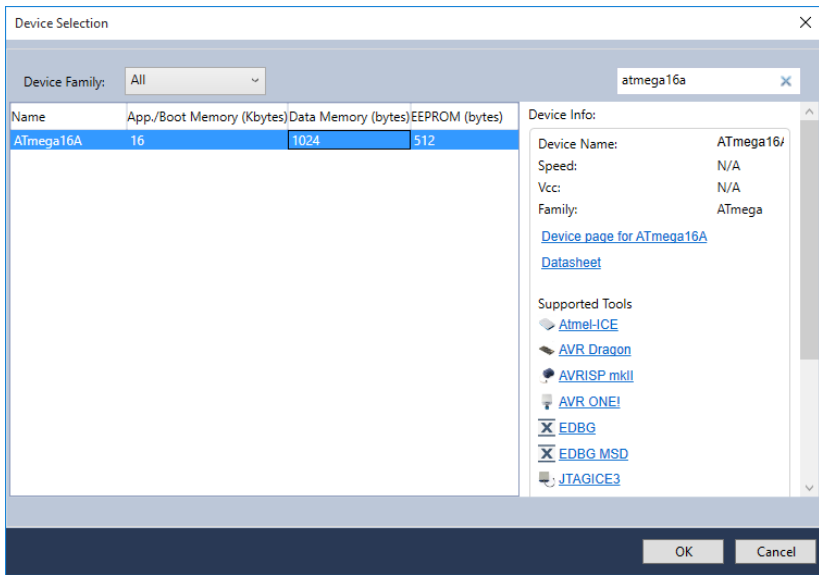


Name	App./Boot Memory (Kbytes)	Data Memory (bytes)	EEPROM (bytes)
AT90CAN128	128	4096	4096
AT90CAN32	32	2048	1024
AT90CAN64	64	4096	2048
AT90PWM1	8	512	512
AT90PWM161	16	1024	512
AT90PWM216	16	1024	512
AT90PWM28	8	512	512
AT90PWM316	16	1024	512
AT90PWM38	8	512	512
AT90PWM81	8	256	512
AT90USB1286	128	8192	4096
AT90USB1287	128	8192	4096
AT90USB162	16	512	512
AT90USB646	64	4096	2048
AT90USB647	64	4096	2048
AT90USB82	8	512	512
ATA5272	8	512	512
ATA5505	16	512	512
ATA5700M322	64	1024	2176

Device Info:

No device selected

OKCancel

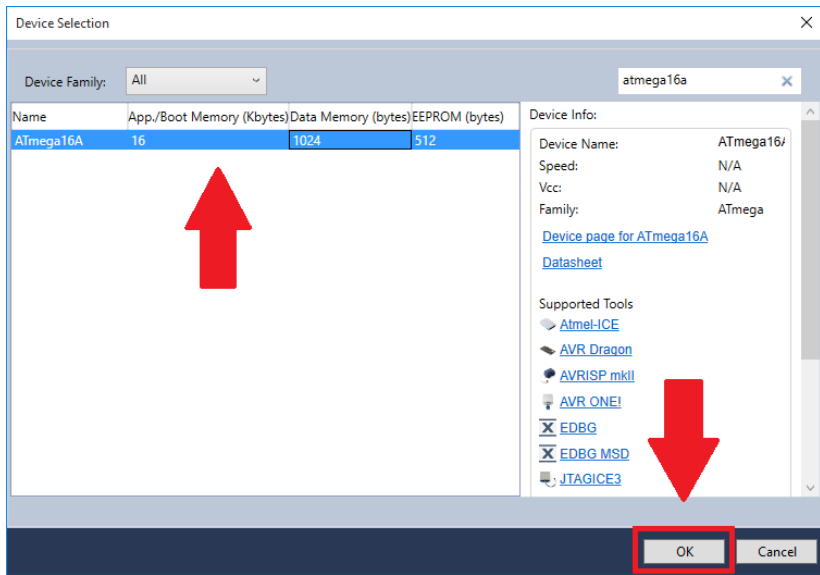


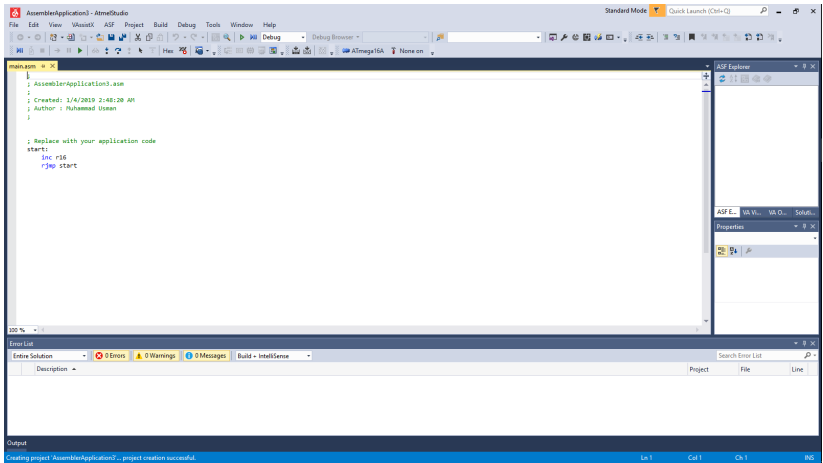
Initialize Project

Select μC

Select ATmega16A

Click OK



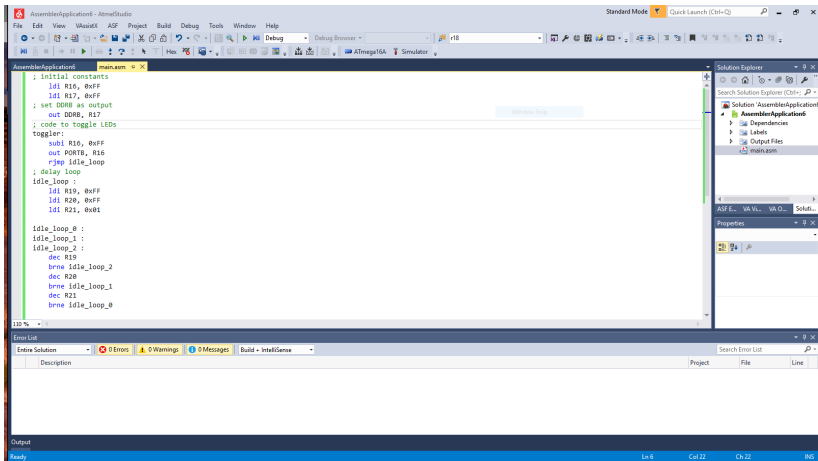


Coding

Editor window appears

Copy & Paste the lab 1 code

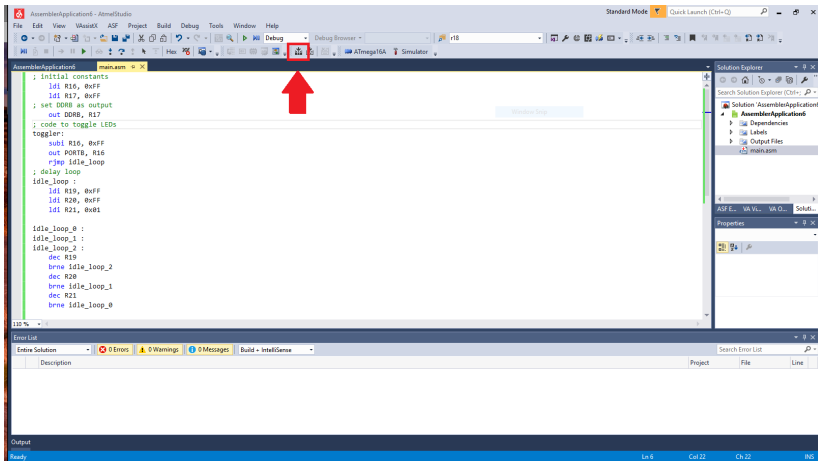
Save



Hex File

Build Solution

Press the Build button



Hex File

Locate

Documents

└─ Atmel Studio

└─ 6.0

└─ AssemblerApplicationX

└─ .vs {...}

└─ AsseblerApplicationX

└─ Debug

└─ AssemblerApplicationX.hex

└─ AssemblerApplicationX.lss

└─ AssemblerApplicationX.map

└─ AssemblerApplicationX.obj

└─ AssemblerApplicationX.tmp

└─ AssemblerApplicatinoX.asmproj

└─ AssemblerApplicationX.compinfo

└─ main.asm

└─ AssemblerApplicationX.atsln

Hex File

Locate

Documents

└─ Atmel Studio

└─ 6.0

└─ AssemblerApplicationX

└─

└─ AssemblerApplicationX

└─ Debug

└─ AssemblerApplicationX.hex

└─

└─

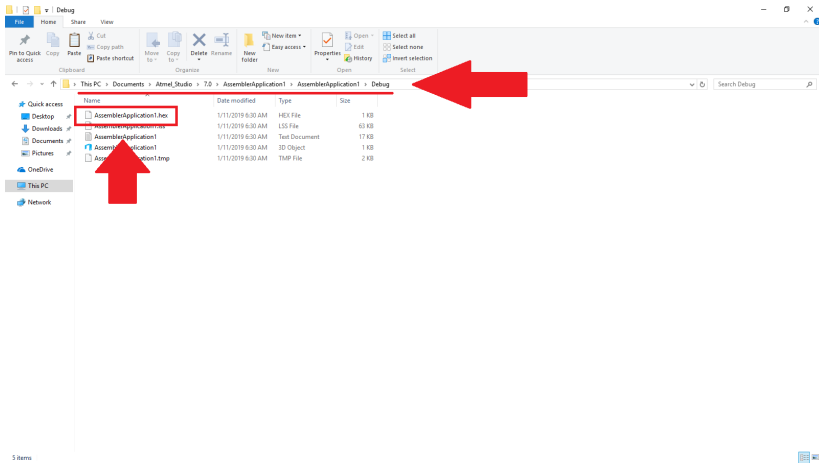
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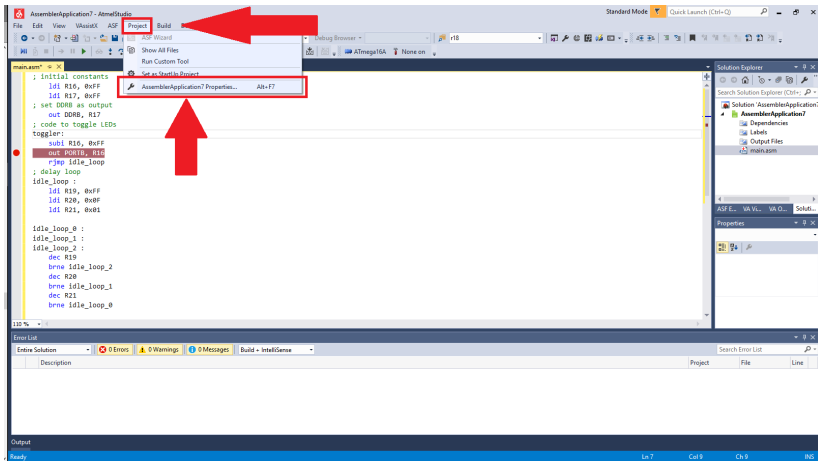
└─

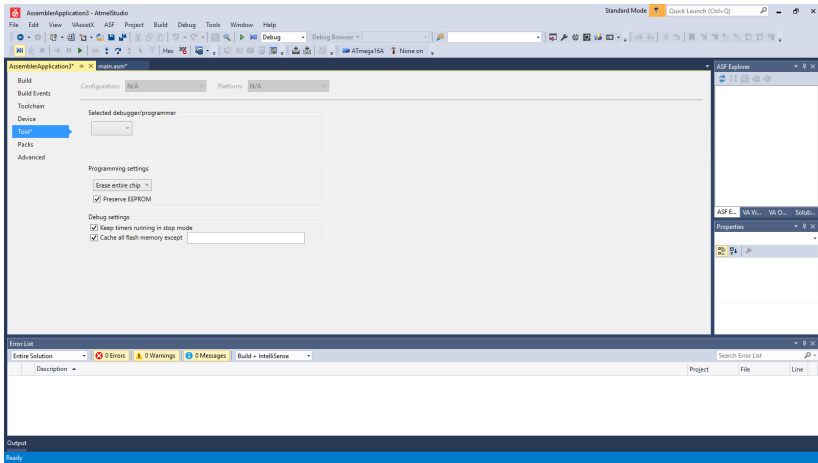


Debugging

Select Simulator

Project > AssemblerApplicationX Properties... > Tools



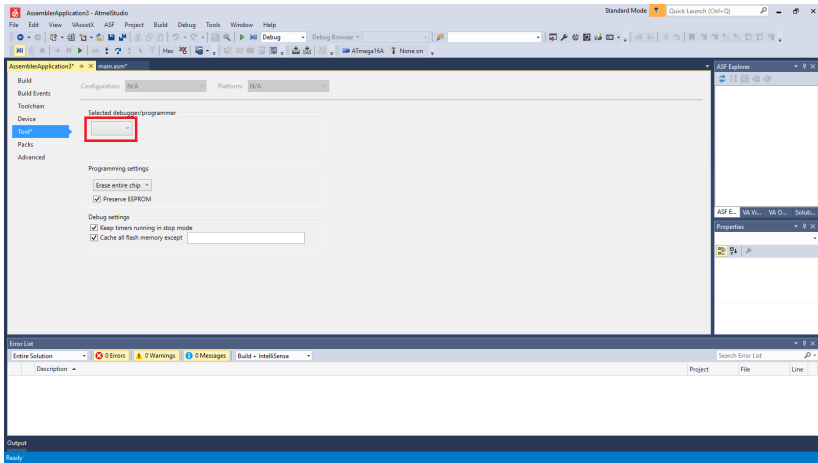


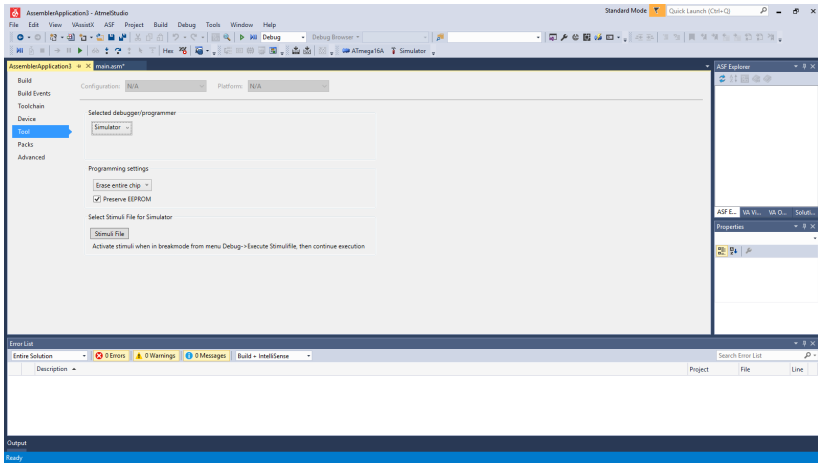
Debugging

Select Simulator

Select **Simulator** in “Selected debugger/programmer”

Save

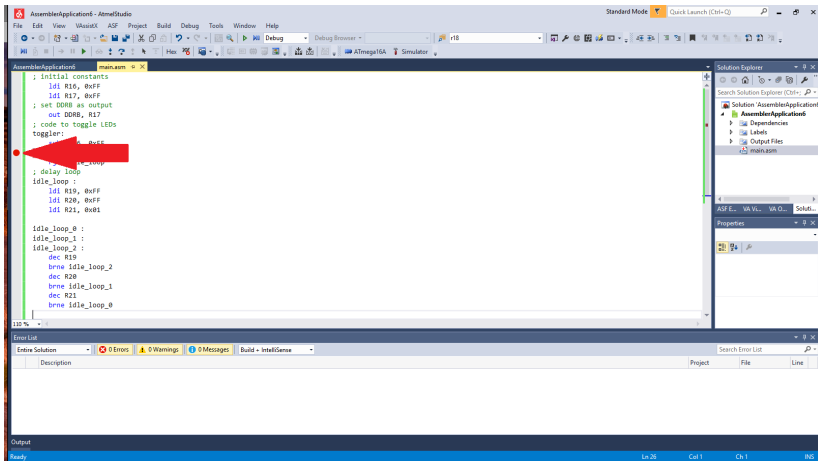




Debugging

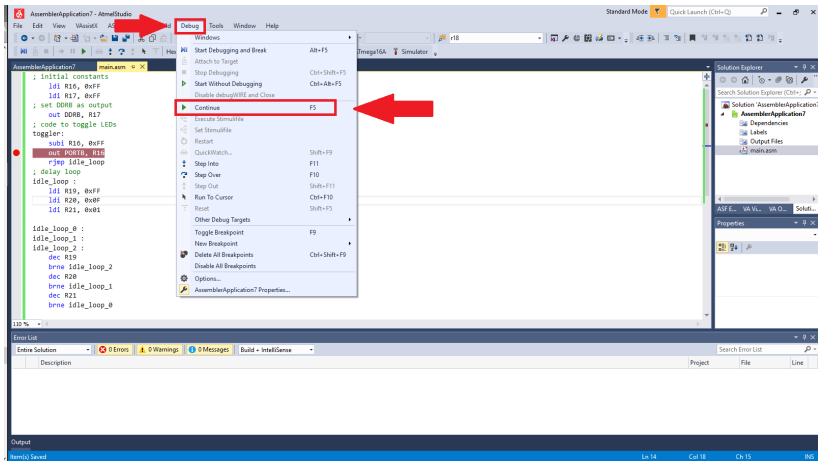
Initialize Debugging

Add a breakpoint by clicking in grey panel left to code



Initialize Debugging

Debug > Continue



AssemblyApplication7 (Debugging) - AtmelStudio

File Edit View UsartX ASF Project Build Debug Tools Window Help

Debug Browser - r18

AssemblyApplication7 main.asm

```
; Initial constants
ldi R16, 0xFF
ldi R17, 0xFF
; set DDRB as output
out DDRB, R17
; code to toggle LEDs
toggle:
subi R16, 0xFF
out PORTB, R16
rjmp idle_loop
; delay loop
idle_loop :
ldi R19, 0xFF
ldi R20, 0x0F
ldi R21, 0x01

idle_loop_0 :
idle_loop_1 :
idle_loop_2 :
dec R19
brne idle_loop_2
dec R20
brne idle_loop_1
dec R21
brne idle_loop_0
```

Processor Status

Name	Value
Program Counter	0x00000004
Stack Pointer	0x0000
X Register	0x0000
Y Register	0x0000
Z Register	0x0000
Status Register	0x00000000
Cycle Counter	4
Frequency	1,000 Mhz
Stop Watch	4.00 µs
Registers	
R00	0x00
R01	0x00
R02	0x00
R03	0x00
R04	0x00
R05	0x00
R06	0x00
R07	0x00
R08	0x00
R09	0x00
R10	0x00
R11	0x00
R12	0x00

Registers

R00 = 0x00 R01 = 0x00 R02 = 0x00 R03 = 0x00
R04 = 0x00 R05 = 0x00 R06 = 0x00 R07 = 0x00
R08 = 0x00 R09 = 0x00 R10 = 0x00 R11 = 0x00
R12 = 0x00 R13 = 0x00 R14 = 0x00 R15 = 0x00
R16 = 0x00 R17 = 0xFF R18 = 0x00 R19 = 0x00
R20 = 0x00 R21 = 0x00 R22 = 0x00 R23 = 0x00
R24 = 0x00 R25 = 0x00 R26 = 0x00 R27 = 0x00
R28 = 0x00 R29 = 0x00 R30 = 0x00
R31 = 0x00

Memory 4

prog FLASH Address: 0x0000

Address	Value
0x0000	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF
0x0001	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF
0x0002	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF
0x0003	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF
0x0004	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF
0x0005	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF
0x0006	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF
0x0007	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF
0x0008	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF
0x0009	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF
0x000A	0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF

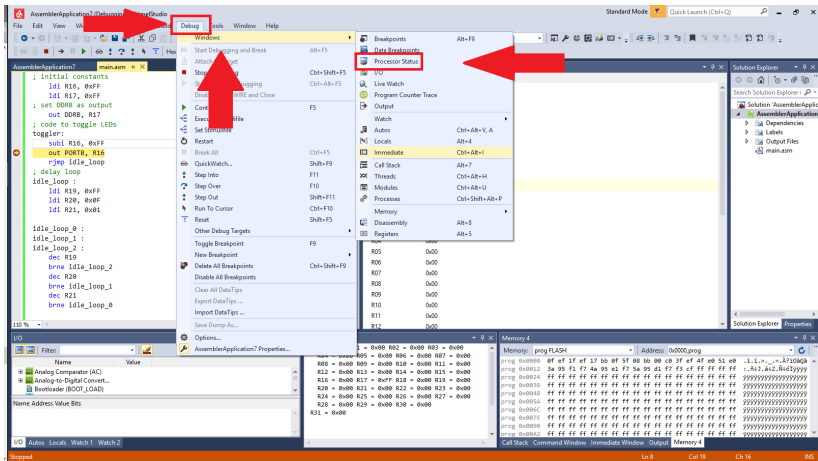
Call Stack Command Window Immediate Window Output Memory 4

Stopped

Debugging

Processor Status

Debug > Windows > Processor Status



Processor Status



Name	Value
Program Counter	0x00000004
Stack Pointer	0x0000
X Register	0x0000
Y Register	0x0000
Z Register	0x0000
Status Register	I T H S V N Z C
Cycle Counter	57789
Frequency	1.000 MHz
Stop Watch	57,789.00 μ s

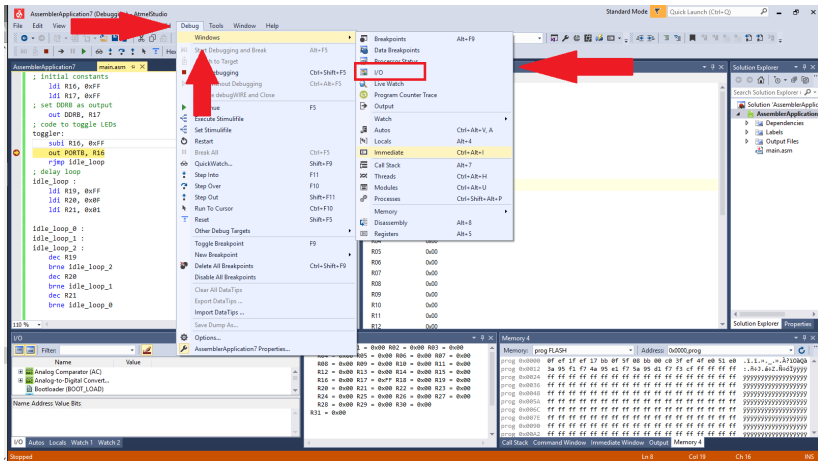
Registers

R00	0x00
R01	0x00
R02	0x00
R03	0x00
R04	0x00
R05	0x00
R06	0x00

Debugging

I/O

Debug > Windows > I/O



Debugging

I/O

Select relevant port

