

Lab 11

CPS592 – Visual Computing and Mixed Reality

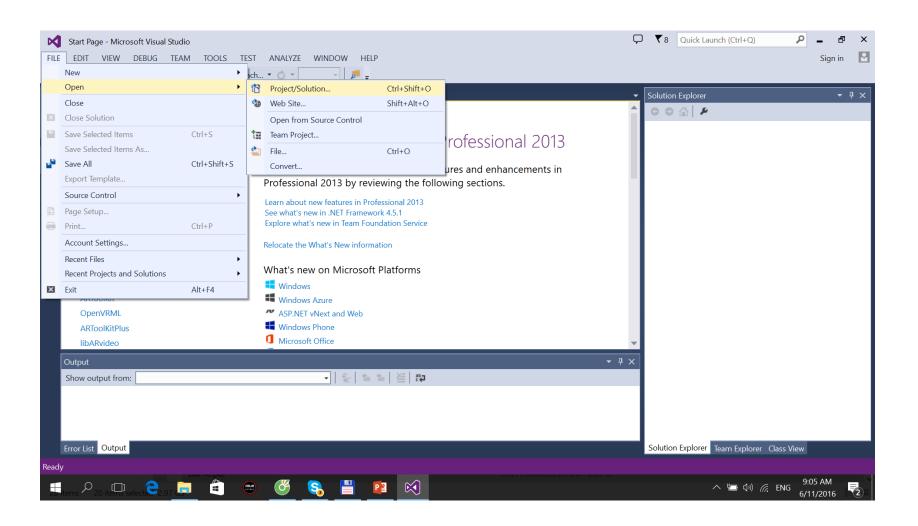
Objective

- Explore ARToolkit
 - Check the pattern (marker)
 - The flowchart of ARToolkit
- Compile the code
- Modify the code
 - Change the pattern (marker)
 - Change the superimposed object
 - Change the rotation of the object

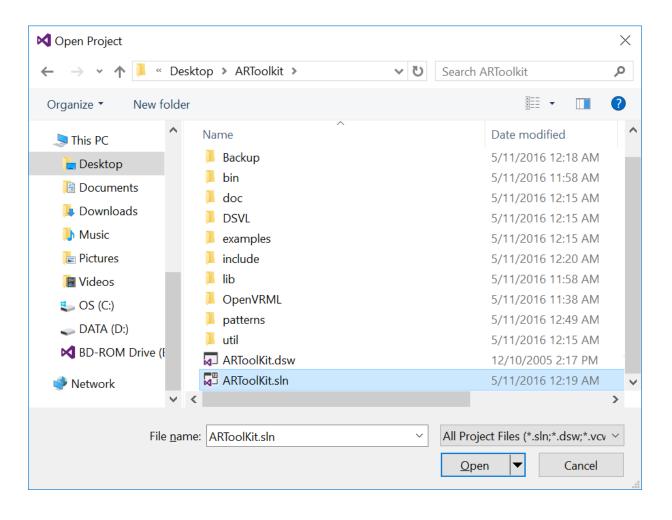
Preparation

- Open Visual Studio (version >= 2013)
- Download ARToolkit.zip1 from isidore
- Rename ARToolkit.zip1 to ARToolkit.zip and unzip it.

Open ARToolkit project with Visual Studio



Open ARToolkit project with Visual Studio



What are markers (patterns)?

- How do they look like?
 - Check folder "patterns"

pattKanji.pdf



pattHiro.pdf



What are markers (patterns)?

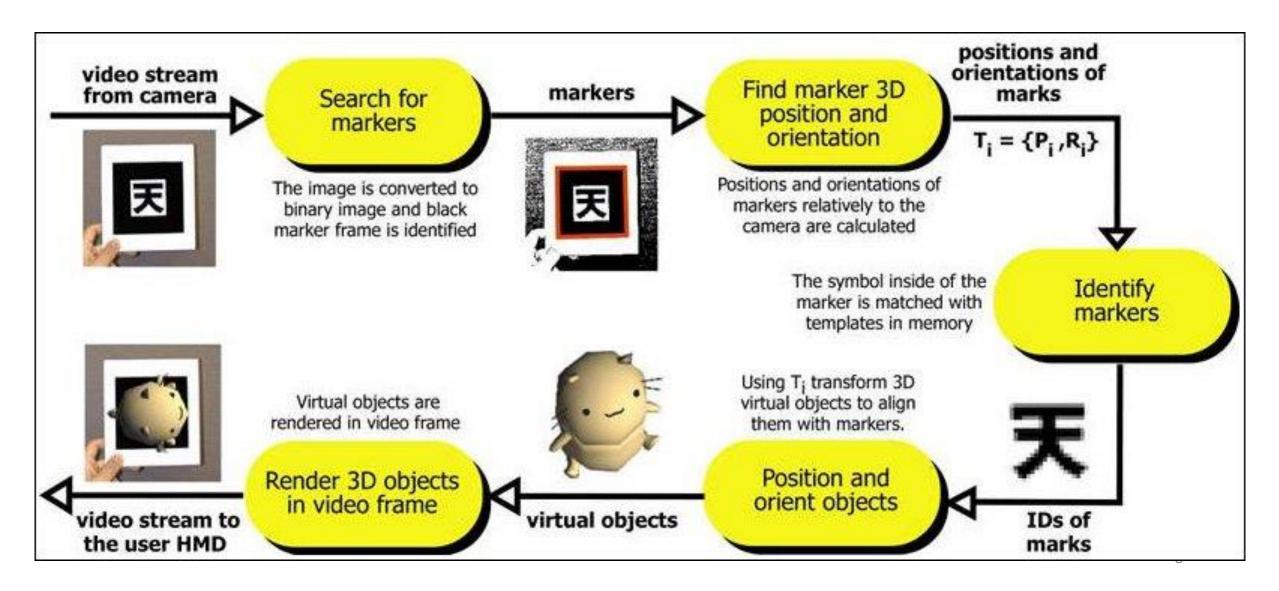
- How the program read the markers?
 - Check folder "\bin\Data\"

patt.kanji

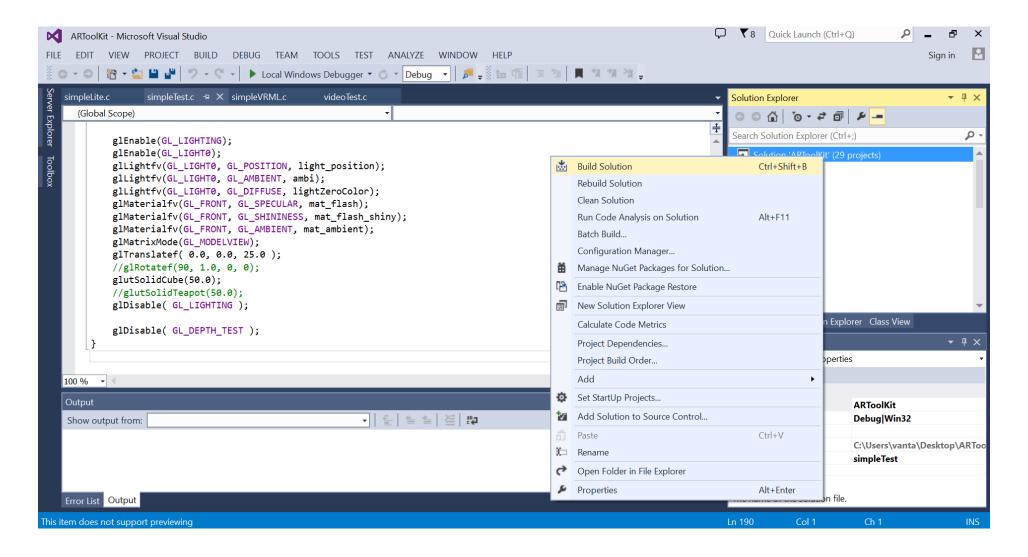
```
214 225 240 225 214 240 216 204 214 227 181 192 198 192 181 192
240 240 240 240 240 230 110 31 240 240 240 240 240 240 240 234
240 240 240 240 240 240 44 31 130 240 240 240 240 240 240 219
240 240 240 240 240 240 226 232 240 240 240 240 240 240 240 240
240 240 240 240 240 240 240 107 58 240 240 240 240 240 240 240 237
240 240 240 240 240 230 110 32 240 240 240 240 240 240 240 240
240 240 192 61 5 103 235 240 234 102 58 175 232 240 240 240 240 240 124 54 134 13 51 226 240 240 240 23 94 66 182 23 23 23 226 226 240 240 240 23 25 25 48 134 204 220 20
156 14 195 233 236 240 237 240 239 239 240 192 106 57 125 238
```

| 122 | 202 | 203 | 174 | 74 | 26 | 202 | 204 | 205 | 205 | 205 | 215 | 216 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 |

The flowchart of ARToolkit



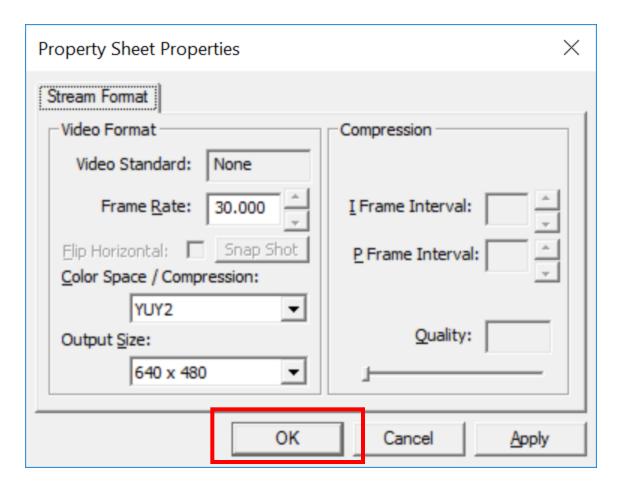
Compile the code



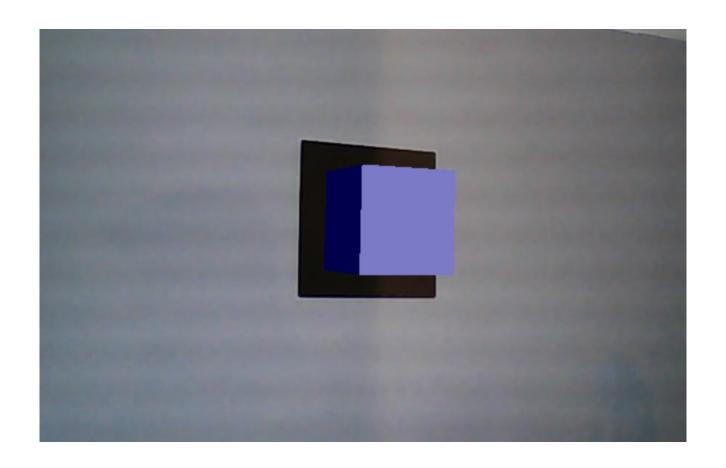
Run one example

C > Desktop > ARToolkit > bin			
Name	Date modified	Туре	Size
multi lestd.exe	5/11/2016 12:25 AM	Application	198 KR
multiTestd.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,509 KB
opengl32.dll	28/8/2002 12:41 PM	Application extension	670 KB
opticald.exe	5/11/2016 12:25 AM	Application	797 KB
nopticald.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,519 KB
paddleDemod.exe	5/11/2016 12:25 AM	Application	819 KB
paddleDemod.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,531 KB
paddleInteractionTestd.exe	5/11/2016 12:25 AM	Application	808 KB
paddleInteractionTestd.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,524 KB
paddleTestd.exe	5/11/2016 12:25 AM	Application	801 KB
🚨 paddleTestd.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,512 KB
rangeTestd.exe	5/11/2016 12:25 AM	Application	779 KB
🔝 rangeTestd.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,491 KB
relationTestd.exe	5/11/2016 12:25 AM	Application	779 KB
🔝 relationTestd.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,491 KB
simpleLited.exe	5/11/2016 12:25 AM	Application	774 KB
simpleLited.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,495 KB
simpleTest2d.exe	5/11/2016 12:25 AM	Application	780 KB
simpleTest2d.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,485 KB
simpleTestd.exe	6/11/2016 9:18 AM	Application	777 KB
SimpleTestd.iik	6/11/2016 9:18 AM	Incremental Linker File	1,483 KB

Run one example

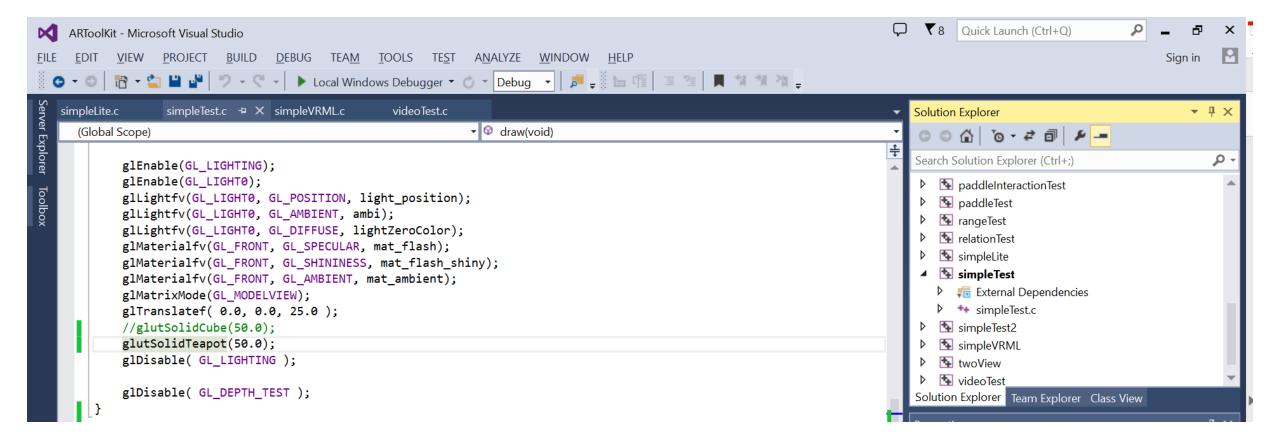


Run one example

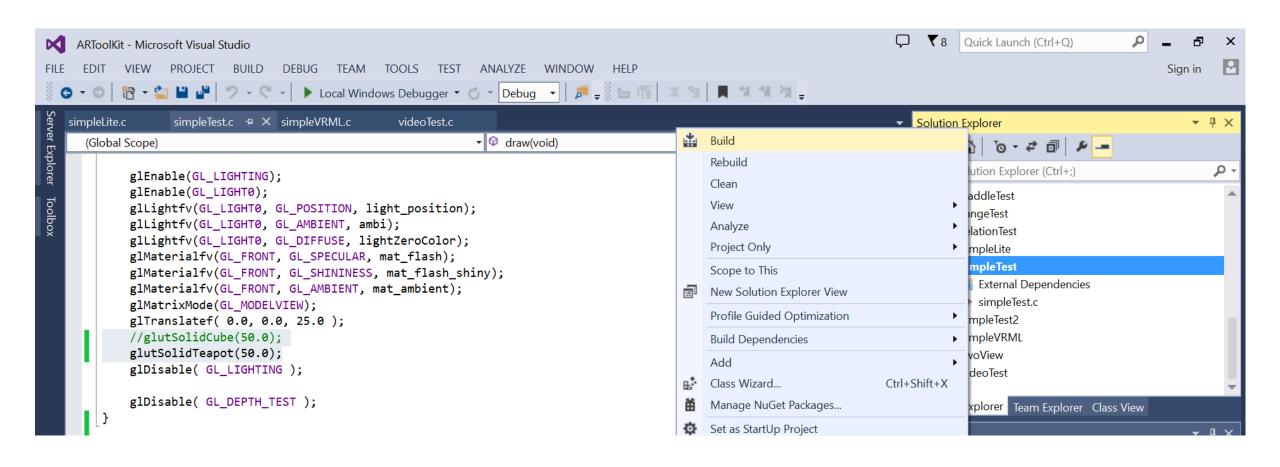


Modify the code

```
In simpleTest.c
//glutSolidCube(50.0);
glutSolidTeapot(50.0); //display a teapot instead
```



Compile the modified code



Run the modified code

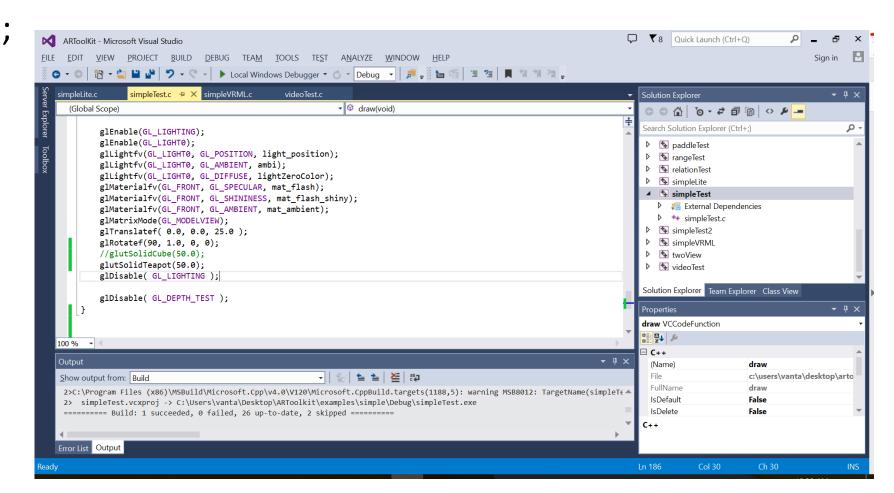
C > Desktop > ARToolkit > bin			
Name	Date modified	Type	Size
multi lestd.exe	5/11/2016 12:25 AM	Application	/98 KE
multiTestd.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,509 KE
opengl32.dll	28/8/2002 12:41 PM	Application extension	670 KE
opticald.exe	5/11/2016 12:25 AM	Application	797 KE
D opticald.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,519 KE
paddleDemod.exe	5/11/2016 12:25 AM	Application	819 KE
paddleDemod.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,531 KE
paddleInteractionTestd.exe	5/11/2016 12:25 AM	Application	808 KE
paddleInteractionTestd.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,524 KE
paddleTestd.exe	5/11/2016 12:25 AM	Application	801 KE
paddleTestd.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,512 KE
■ rangeTestd.exe	5/11/2016 12:25 AM	Application	779 KE
nangeTestd.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,491 KE
relationTestd.exe	5/11/2016 12:25 AM	Application	779 KE
☐ relationTestd.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,491 KE
simpleLited.exe	5/11/2016 12:25 AM	Application	774 KE
simpleLited.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,495 KE
■ simpleTest2d.exe	5/11/2016 12:25 AM	Application	780 KE
simpleTest2d.ilk	5/11/2016 12:25 AM	Incremental Linker File	1,485 KE
■ simpleTestd.exe	6/11/2016 9:18 AM	Application	777 KE
Simple Testd.iik	6/11/2016 9:18 AM	Incremental Linker File	1,483 KE

Run the modified code



Rotate the teapot

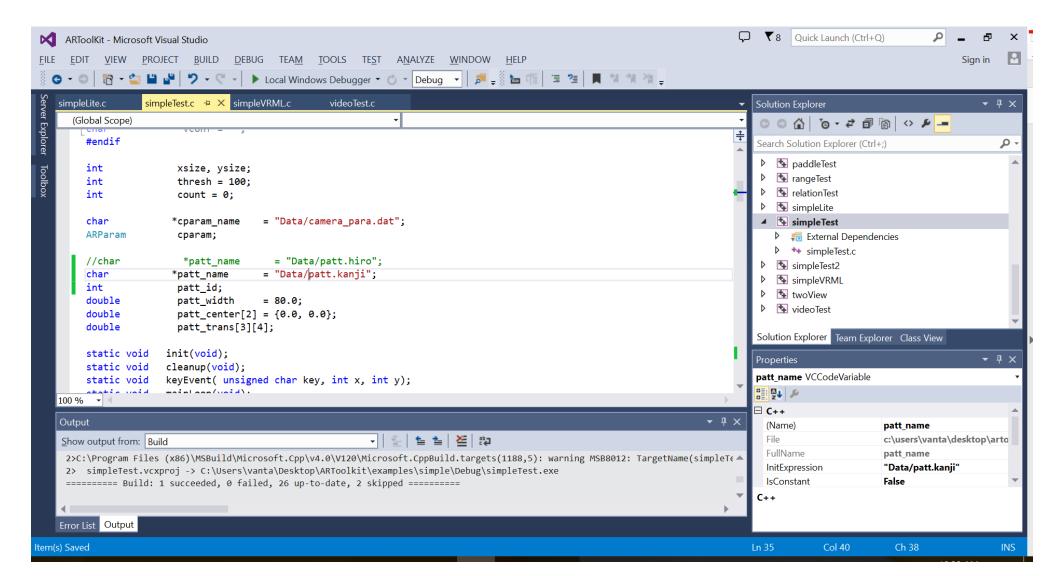
In simpleTest.c
glRotatef(90, 1.0, 0, 0);
//glutSolidCube(50.0);
glutSolidTeapot(50.0);



Compile the modified code and run it



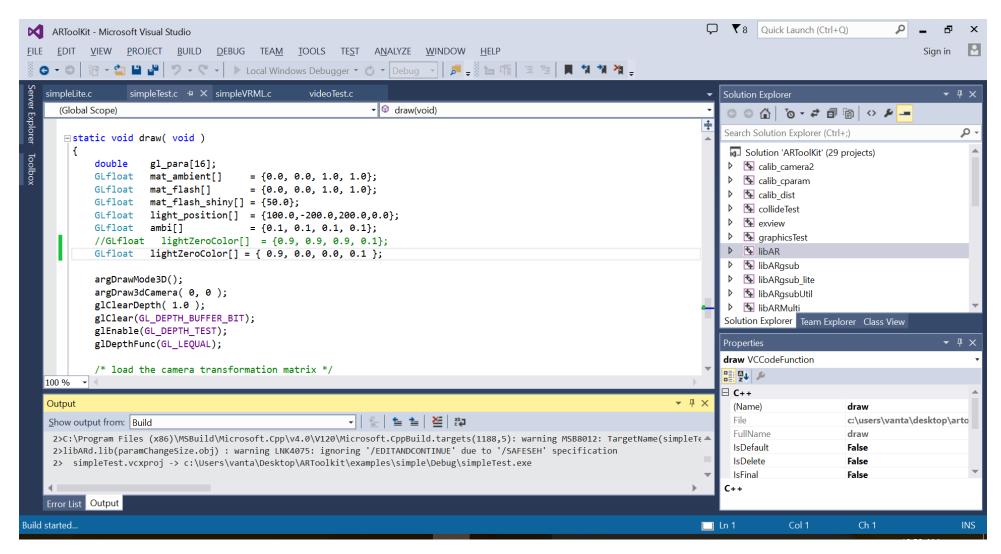
Change the pattern marker



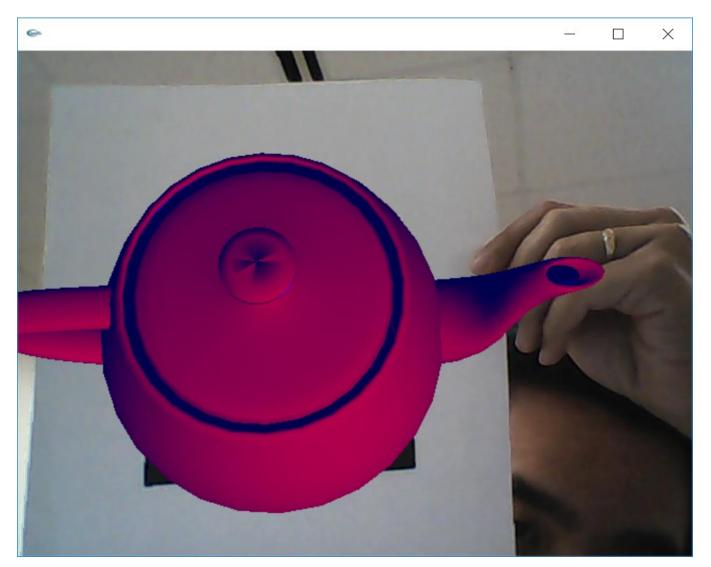
Compile the modified code and run it



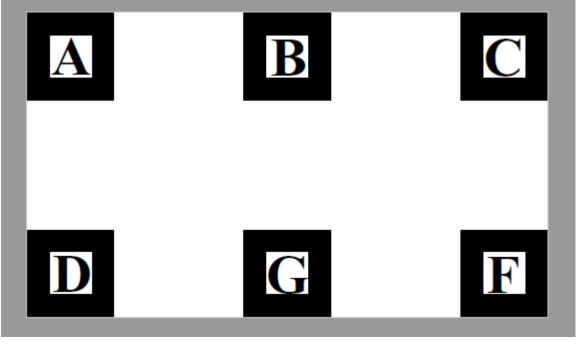
Change the lighting



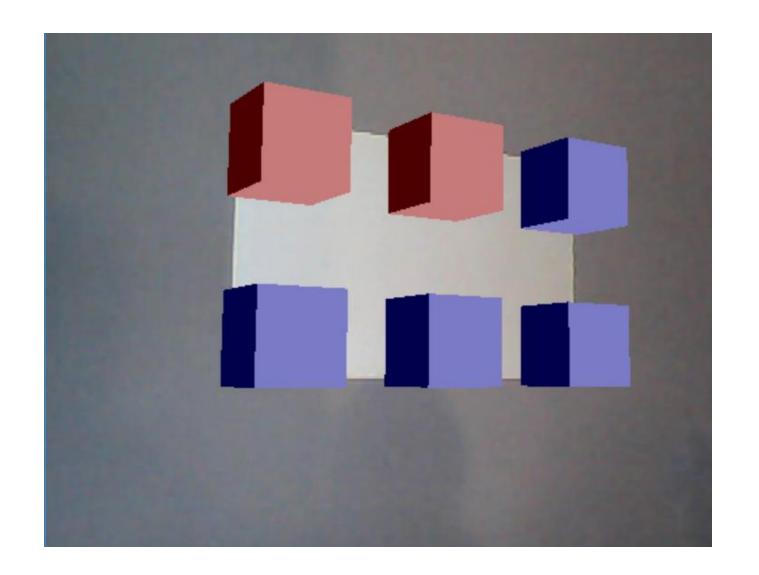
Compile the modified code and run it



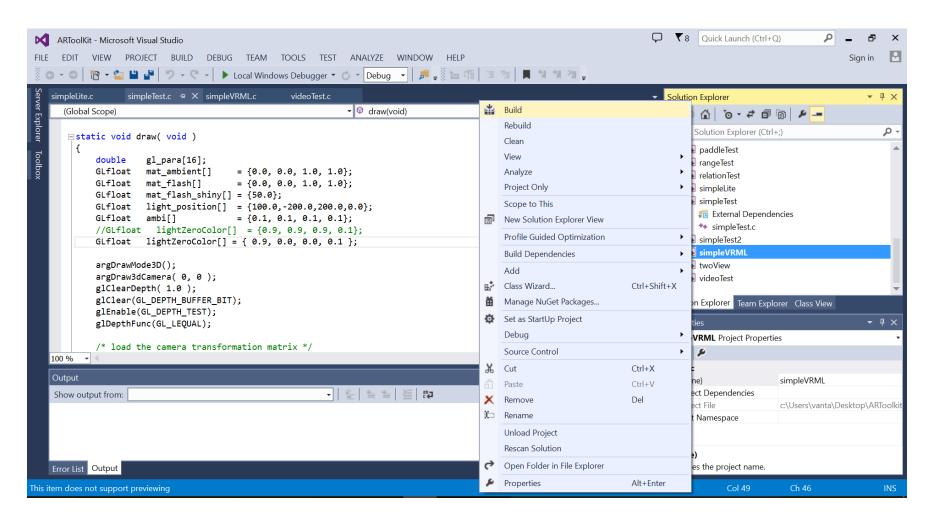
• Multi-marker



PC > Desktop > ARToolkit > bin				
Name	Date modified			
mk_pattd.exe	5/11/2016 12:25 AM			
nk_pattd.ilk	5/11/2016 12:25 AM			
modeTestd.exe	5/11/2016 12:25 AM			
nodeTestd.ilk	5/11/2016 12:25 AM			
msvcp71d.dll	20/8/2016 8:39 PM			
msvcr71d.dll	11/8/2016 11:48 AM			
■ multiTestd.exe	5/11/2016 12:25 AM			
multiTestd.ilk	5/11/2016 12:25 AM			
opengl32.dll	28/8/2002 12:41 PM			
opticald.exe	5/11/2016 12:25 AM			
opticald.ilk	5/11/2016 12:25 AM			
paddleDemod.exe	5/11/2016 12:25 AM			
paddleDemod.ilk	5/11/2016 12:25 AM			
paddleInteractionTestd.exe	5/11/2016 12:25 AM			



- simpleVRML
 - Compile the code

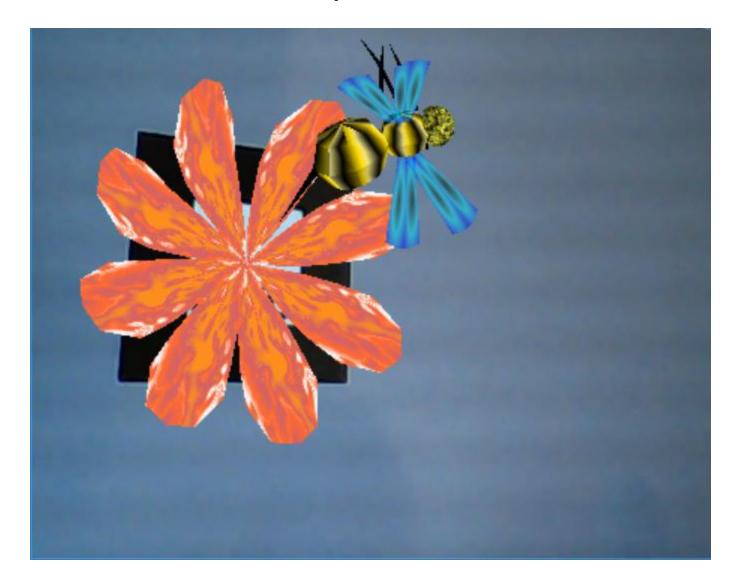


• simpleVRML



; PC > Desktop > ARToolkit > bin

Name	Date modified
opengl32.dll	28/8/2002 12:41 PM
opticald.exe	5/11/2016 12:25 AM
D opticald.ilk	5/11/2016 12:25 AM
paddleDemod.exe	5/11/2016 12:25 AM
paddleDemod.ilk	5/11/2016 12:25 AM
paddleInteractionTestd.exe	5/11/2016 12:25 AM
paddleInteractionTestd.ilk	5/11/2016 12:25 AM
paddleTestd.exe	5/11/2016 12:25 AM
🚨 paddleTestd.ilk	5/11/2016 12:25 AM
rangeTestd.exe	5/11/2016 12:25 AM
🔝 rangeTestd.ilk	5/11/2016 12:25 AM
relationTestd.exe	5/11/2016 12:25 AM
relationTestd.ilk	5/11/2016 12:25 AM
simpleLited.exe	5/11/2016 12:25 AM
simpleLited.ilk	5/11/2016 12:25 AM
simpleTest2d.exe	5/11/2016 12:25 AM
simpleTest2d.ilk	5/11/2016 12:25 AM
simpleTestd.exe	6/11/2016 10:29 AM
simpleTestd.ilk	6/11/2016 10:29 AM
simpleVRMLd.exe	5/11/2016 11:58 AM
simpleVRMLd.ilk	5/11/2016 11:58 AM
twoViewd.exe	5/11/2016 12:25 AM
htmoViewdilk	5/11/2016J2·25 AM



Q&A