

User Interaction: Intro to Multi-Touch

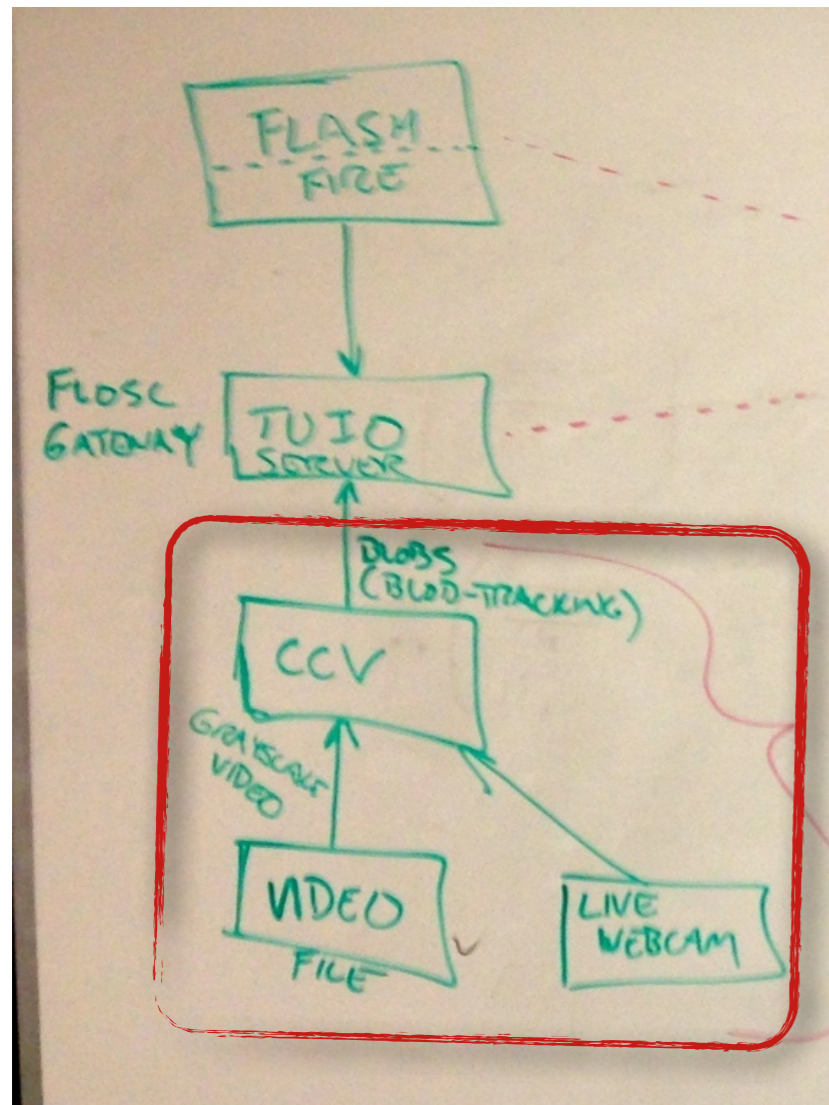
Associate Professor Donald J. Patterson
INF 133 Fall 2012



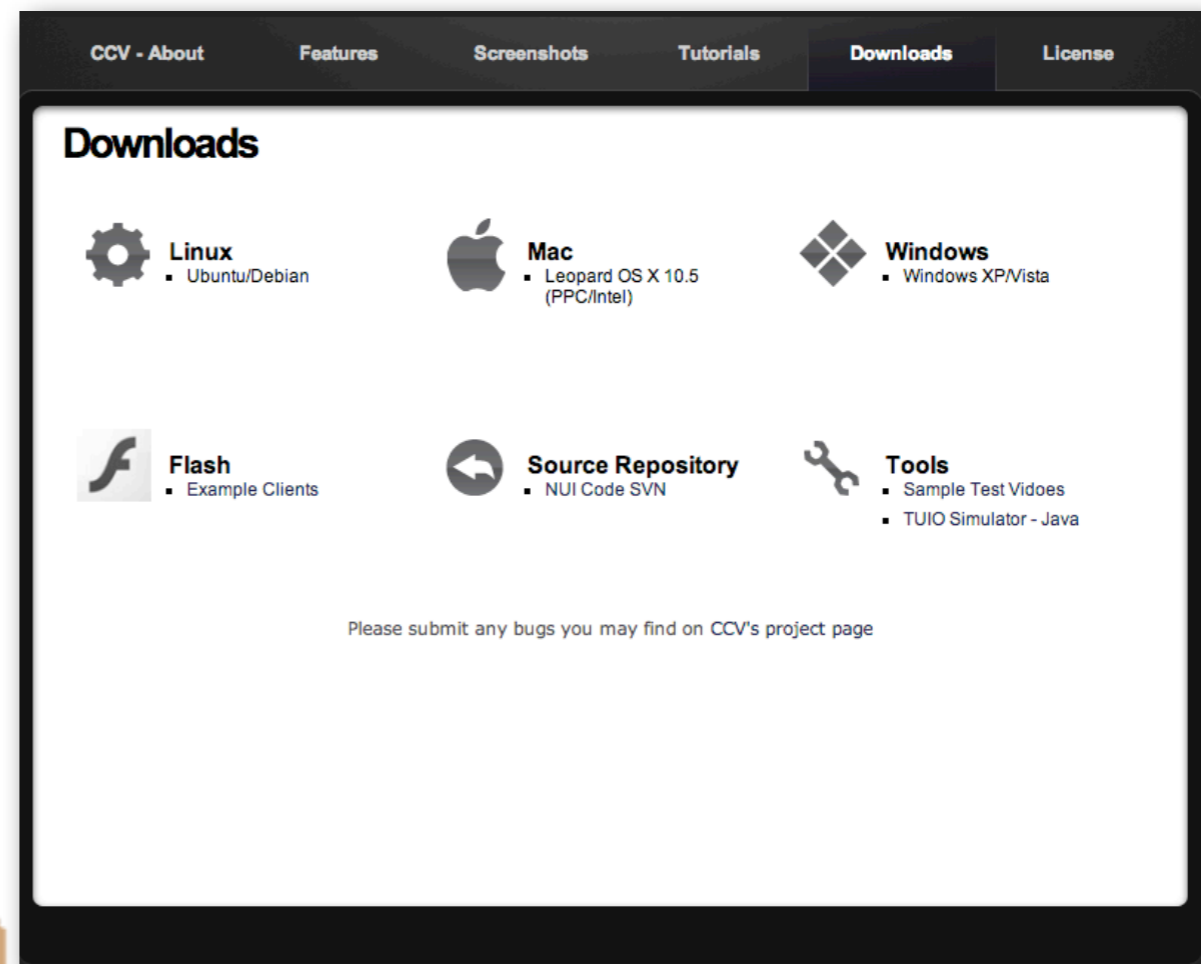
Review Assignment #6



How to do what we did in class



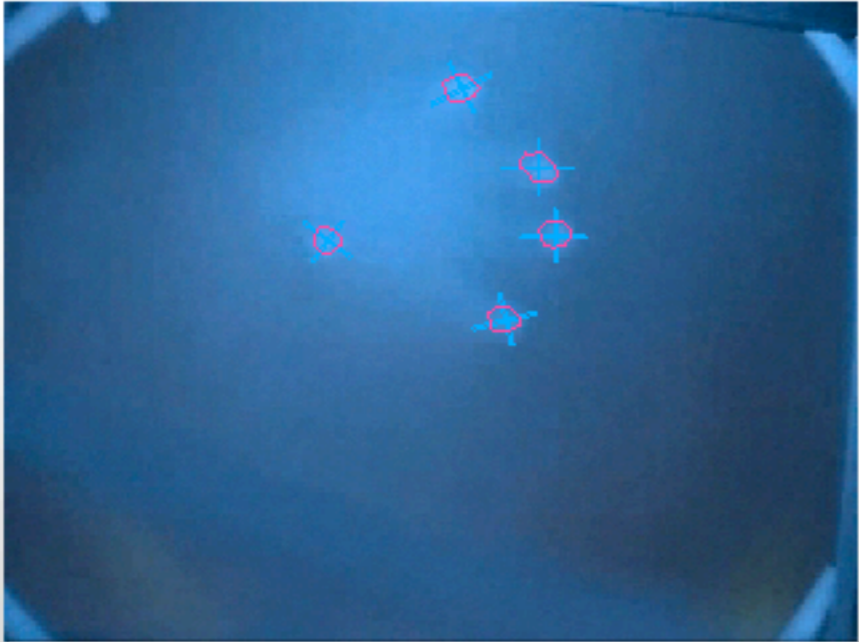
- Download Community Core Vision
- <http://ccv.nuigroup.com/>



How to do what we did in class

Community Core Vision

Source Image

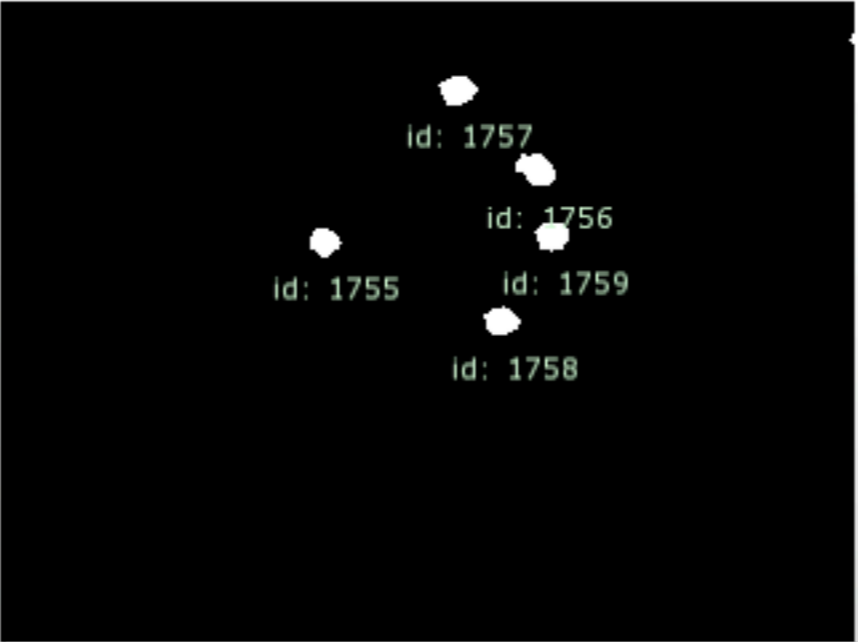


Source Image SHOW OUTLINES (O) SHOW IDS (I)

USE CAMERA PREVIOUS CAMERA NEXT CAMERA

USE VIDEO

Tracked Image



Tracked Image TRACK DRAW BLOBS

IMAGE THRESHOLD: 12 MOVEMENT THRESHOLD: 0

MIN BLOB SIZE: 11 MAX BLOB SIZE: 172

Background

REMOVE BG (B)

DYNAMIC SUBTRACT

LEARN SPEED: 1

Smooth

SMOOTH: 1

Highpass

BLUR: 29

NOISE: 3

Amplify

AMPLIFY: 35

Source Properties

CAMERA SETTINGS (V)

FLIP VERTICAL (J)

FLIP HORIZONTAL (H)

GPU Properties

GPU MODE (G)

Communication

SEND TUJO OSC (T)

SEND TUJO TOP | FOR FLASH (F)

SEND HEIGHT & WIDTH

Calibration

ENTER CALIBRATION (C)

Files

SAVE SETTINGS (S)

Calc. Time [ms]: 5

Video [Res]: 320 x 240

Video [fps]: 30

Sending OSC messages to:
Host: 127.0.0.1
Port: 3333

Press spacebar to toggle fast mode

| ~ | tbeta.nuigroup.com

How to do what we did in class

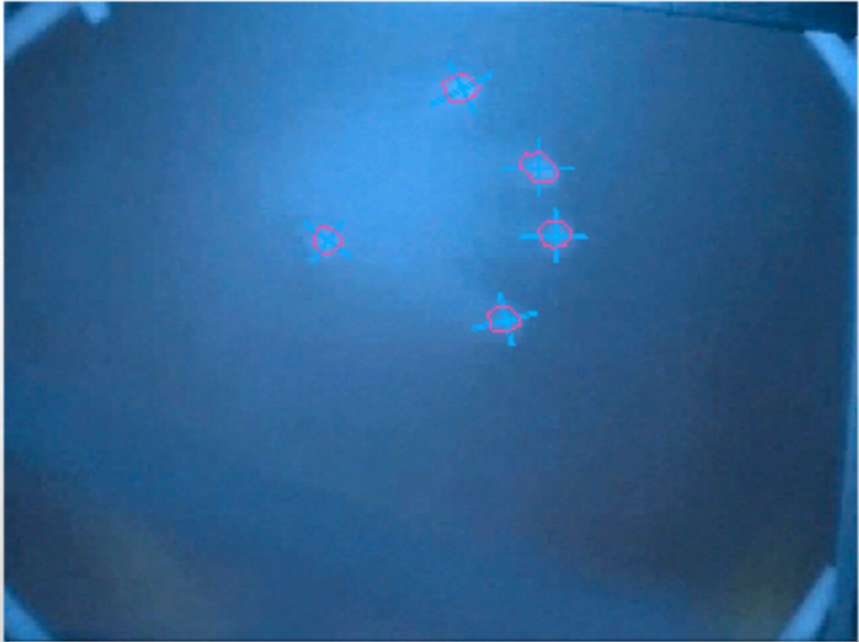
The screenshot displays the 'Community Core Vision' application interface. It is divided into several sections:

- Source Image:** Shows a blue-tinted image with red outlines around detected objects. A red-bordered box with the text 'Choose the source' is overlaid on this image.
- Tracked Image:** Shows the same image with white blobs and their IDs: 'id: 1755', 'id: 1756', 'id: 1757', 'id: 1758', and 'id: 1759'.
- Source Image Controls:** Includes checkboxes for 'SHOW OUTLINES (O)', 'SHOW IDS (I)', 'USE CAMERA', 'PREVIOUS CAMERA', 'NEXT CAMERA', and 'USE VIDEO'. The 'USE VIDEO' checkbox is highlighted with a red circle.
- Tracked Image Controls:** Includes a 'TRACK DRAW BLOBS' checkbox and sliders for 'IMAGE THRESHOLD: 12', 'MOVEMENT THRESHOLD: 0', 'MIN BLOB SIZE: 11', and 'MAX BLOB SIZE: 172'.
- Processing Pipeline:** A sequence of four images showing the steps: 'Background' (with 'REMOVE BG (B)' and 'DYNAMIC SUBTRACT' checkboxes), 'Smooth' (with 'SMOOTH: 1' slider), 'Highpass' (with 'BLUR: 29' and 'NOISE: 3' sliders), and 'Amplify' (with 'AMPLIFY: 35' slider).
- Source Properties:** Includes 'CAMERA SETTINGS (V)', 'FLIP VERTICAL (J)', and 'FLIP HORIZONTAL (H)' checkboxes.
- GPU Properties:** Includes a 'GPU MODE (G)' checkbox.
- Communication:** Includes 'SEND TUJO OSC (T)', 'SEND TUJO TOP | FOR FLASH (F)', and 'SEND HEIGHT & WIDTH' checkboxes.
- Calibration:** Includes an 'ENTER CALIBRATION (C)' checkbox.
- Files:** Includes a 'SAVE SETTINGS (S)' checkbox.
- Performance:** Shows 'Calc. Time [ms]: 5', 'Video [Res]: 320 x 240', and 'Video [fps]: 30'.
- OSC Messages:** Shows 'Sending OSC messages to: Host: 127.0.0.1, Port: 3333'.
- Footer:** Includes the text 'Press spacebar to toggle fast mode' and the URL 'tbeta.nuigroup.com'.

How to do what we did in class

Community Core Vision

Source Image

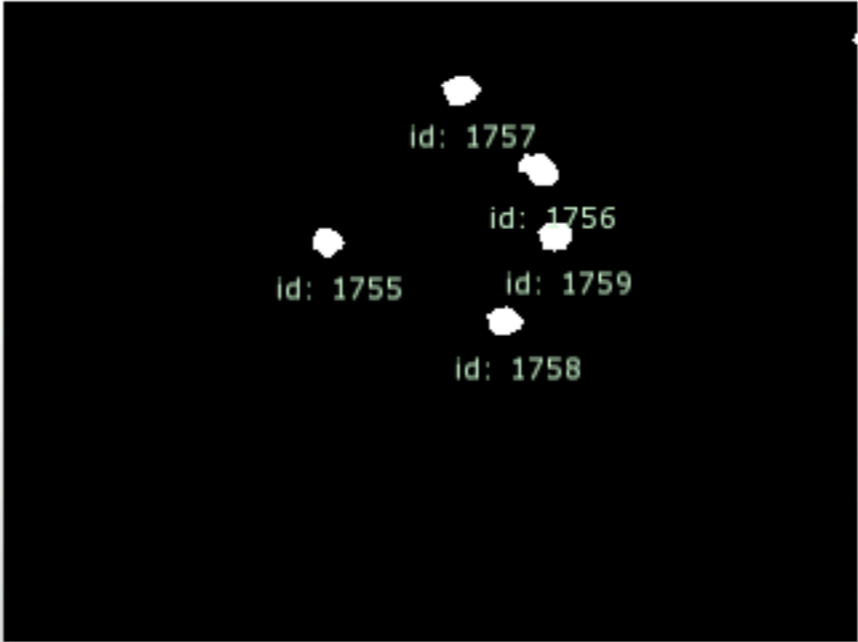


Source Image SHOW OUTLINES (O) SHOW IDS (I)

USE CAMERA PREVIOUS CAMERA NEXT CAMERA

USE VIDEO

Tracked Image



Tracked Image TRACK DRAW BLOBS

IMAGE THRESHOLD: 12 MOVEMENT THRESHOLD: 0

MIN BLOB SIZE: 11 MAX BLOB SIZE: 172

Background

REMOVE BG (B)

DYNAMIC SUBTRACT

LEARN SPEED: 1

Smooth

SMOOTH: 1

Highpass

BLUR: 29

NOISE: 3

Amplify

AMPLIFY: 35

Source Properties

CAMERA SETTINGS (V)

FLIP VERTICAL (J)

FLIP HORIZONTAL (H)

GPU Properties

GPU MODE (G)

Communication

SEND TUIO OSC (T)

SEND TUIO TOP | FOR FLASH (F)

SEND HEIGHT & WIDTH

Calibration

ENTER CALIBRATION (C)

Files

SAVE SETTINGS (S)

Calc. Time [ms]: 5

Video [Res]: 320 x 240

Video [fps]: 30

Sending OSC messages to:
Host: 127.0.0.1
Port: 3333

Press spacebar to toggle fast mode

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How to do what we did in class

The screenshot displays the 'Community Core Vision' application interface. It is divided into several sections:

- Source Image:** Shows a blue-tinted image with red outlines around detected objects. Below it are controls for 'SHOW OUTLINES (O)' and 'SHOW IDS (I)', both checked. Other options include 'USE CAMERA', 'PREVIOUS CAMERA', 'NEXT CAMERA', and 'USE VIDEO'.
- Tracked Image:** Shows a black image with white blobs and their IDs: 'id: 1755', 'id: 1756', 'id: 1757', 'id: 1758', and 'id: 1759'. Below it are controls for 'TRACK DRAW BLOBS' (checked) and various threshold sliders: 'IMAGE THRESHOLD: 12', 'MOVEMENT THRESHOLD: 0', 'MIN BLOB SIZE: 11', and 'MAX BLOB SIZE: 172'.
- Processing Pipeline:** A sequence of four images showing the background subtraction process. A red-bordered box highlights the 'Background' step with 'REMOVE BG (B)' and 'DYNAMIC SUBTRACT' checked. Other steps include 'Smooth' (SMOOTH: 1), 'Highpass' (BLUR: 29, NOISE: 3), and 'Amplify' (AMPLIFY: 35).
- Control Panels:** On the right, there are panels for 'Source Properties' (CAMERA SETTINGS, FLIP VERTICAL, FLIP HORIZONTAL), 'GPU Properties' (GPU MODE), 'Communication' (SEND TUJO OSC, SEND TUJO TOP | FOR FLASH, SEND HEIGHT & WIDTH), 'Calibration' (ENTER CALIBRATION), and 'Files' (SAVE SETTINGS).
- Status and Settings:** At the bottom right, it shows 'Calc. Time [ms]: 5', 'Video [Res]: 320 x 240', 'Video [fps]: 30', and 'Sending OSC messages to: Host: 127.0.0.1, Port: 3333'. A red text prompt says 'Press spacebar to toggle fast mode'.

Subtract static background

Background

- REMOVE BG (B)
- DYNAMIC SUBTRACT

LEARN SPEED: 1

Smooth

SMOOTH: 1

Highpass

BLUR: 29

NOISE: 3

Amplify

AMPLIFY: 35

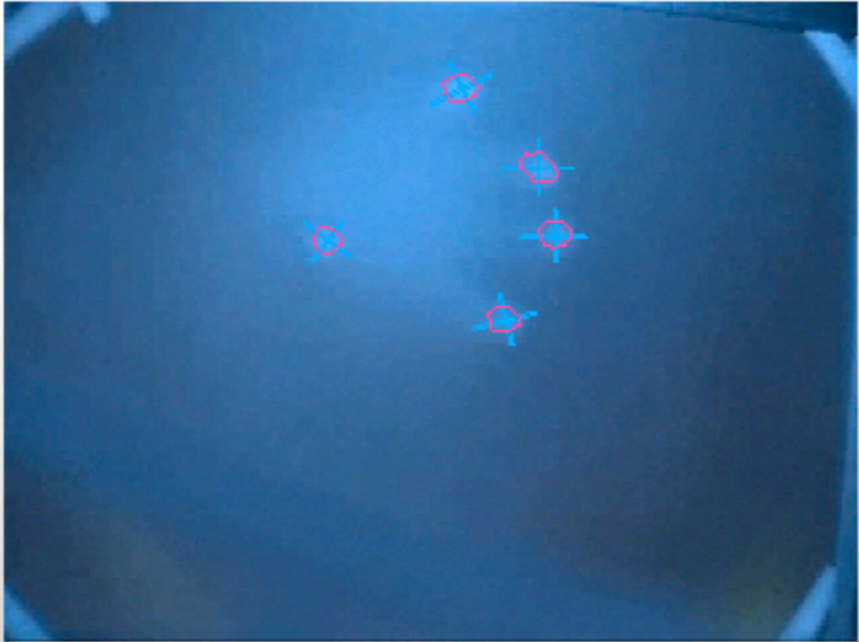
Press spacebar to toggle fast mode

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How to do what we did in class

Community Core Vision

Source Image

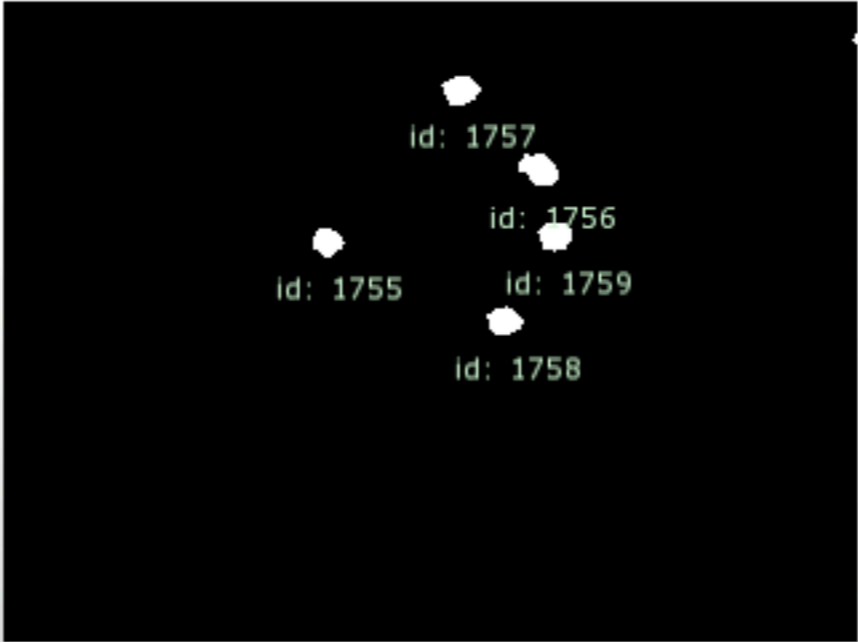


Source Image SHOW OUTLINES (O) SHOW IDS (I)

USE CAMERA PREVIOUS CAMERA NEXT CAMERA

USE VIDEO

Tracked Image



Tracked Image TRACK DRAW BLOBS

IMAGE THRESHOLD: 12 MOVEMENT THRESHOLD: 0

MIN BLOB SIZE: 11 MAX BLOB SIZE: 172

Background

REMOVE BG (B)

DYNAMIC SUBTRACT

LEARN SPEED: 1

Smooth

SMOOTH: 1

Highpass

BLUR: 29

NOISE: 3

Amplify

AMPLIFY: 35

Source Properties

CAMERA SETTINGS (V)

FLIP VERTICAL (J)

FLIP HORIZONTAL (H)

GPU Properties

GPU MODE (G)

Communication

SEND TUIO OSC (T)

SEND TUIO TOP | FOR FLASH (F)

SEND HEIGHT & WIDTH

Calibration

ENTER CALIBRATION (C)

Files

SAVE SETTINGS (S)

Calc. Time [ms]: 5

Video [Res]: 320 x 240

Video [fps]: 30

Sending OSC messages to:
Host: 127.0.0.1
Port: 3333

Press spacebar to toggle fast mode

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How to do what we did in class

The screenshot displays the 'Community Core Vision' software interface. It is divided into several sections:

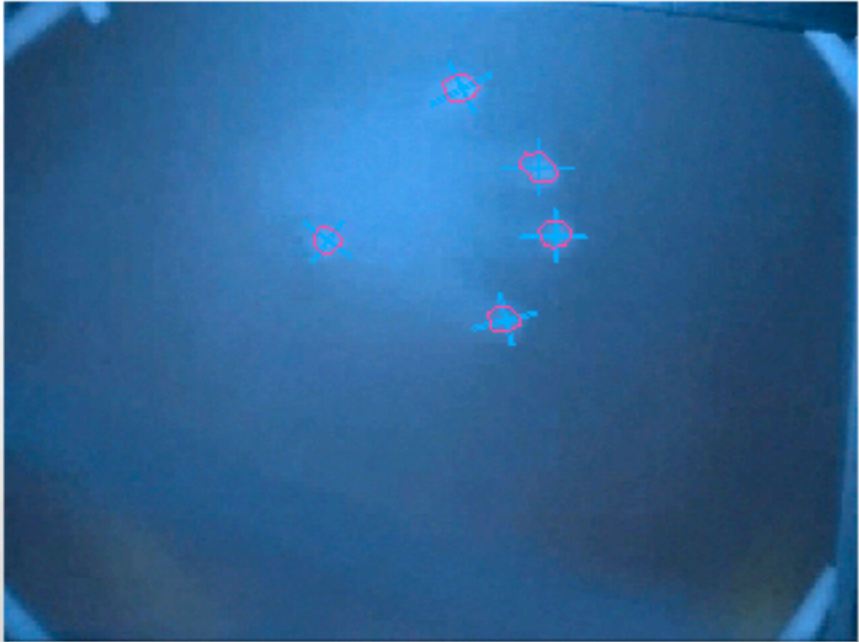
- Source Image:** Shows a blue-tinted image with red outlines around detected objects. Below it are controls for 'SHOW OUTLINES (O)' and 'SHOW IDS (I)', both checked. Other options include 'USE CAMERA', 'PREVIOUS CAMERA', 'NEXT CAMERA', and 'USE VIDEO'.
- Tracked Image:** Shows a black image with white blobs and their IDs: 'id: 1755', 'id: 1756', 'id: 1757', and 'id: 1758'. Below it are controls for 'TRACK DRAW BLOBS' (checked) and sliders for 'IMAGE THRESHOLD: 12', 'MOVEMENT THRESHOLD: 0', 'MIN BLOB SIZE: 11', and 'MAX BLOB SIZE: 172'.
- Background:** Includes 'REMOVE BG (B)', 'DYNAMIC SUBTRACT', and 'LEARN SPEED: 1'.
- Smooth:** A red box highlights the 'Smooth' control, which is checked and has a 'SMOOTH: 1' slider.
- Highpass:** Includes 'BLUR: 29' and 'NOISE: 3' sliders.
- Amplify:** Includes an 'AMPLIFY: 35' slider.
- Source Properties:** Includes 'CAMERA SETTINGS (V)', 'FLIP VERTICAL (J)', and 'FLIP HORIZONTAL (H)'. 'CAMERA SETTINGS' is checked.
- GPU Properties:** Includes 'GPU MODE (G)', which is checked.
- Communication:** Includes 'SEND TUJO OSC (T)' (checked), 'SEND TUJO TOP | FOR FLASH (F)', and 'SEND HEIGHT & WIDTH' (checked).
- Calibration:** Includes 'ENTER CALIBRATION (C)'.
- Files:** Includes 'SAVE SETTINGS (S)'.
- System Status:** Shows 'Calc. Time [ms]: 5', 'Video [Res]: 320 x 240', and 'Video [fps]: 30'. It also indicates 'Sending OSC messages to: Host: 127.0.0.1, Port: 3333'.
- Footer:** Includes the text 'Press spacebar to toggle fast mode' and the URL 'tbeta.nuigroup.com'.

Smooth the video

How to do what we did in class

Community Core Vision

Source Image

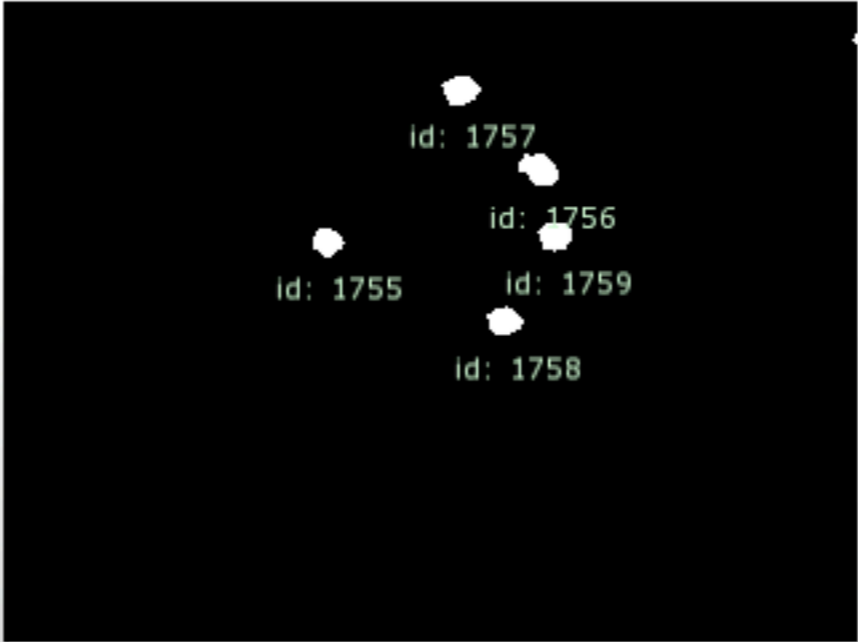


Source Image SHOW OUTLINES (O) SHOW IDS (I)

USE CAMERA PREVIOUS CAMERA NEXT CAMERA

USE VIDEO

Tracked Image



Tracked Image TRACK DRAW BLOBS

IMAGE THRESHOLD: 12 MOVEMENT THRESHOLD: 0

MIN BLOB SIZE: 11 MAX BLOB SIZE: 172

Source Properties

CAMERA SETTINGS (V)

FLIP VERTICAL (J)

FLIP HORIZONTAL (H)

GPU Properties

GPU MODE (G)

Communication

SEND TUIO OSC (T)

SEND TUIO TOP | FOR FLASH (F)

SEND HEIGHT & WIDTH

Calibration

ENTER CALIBRATION (C)

Files

SAVE SETTINGS (S)

Calc. Time [ms]: 5

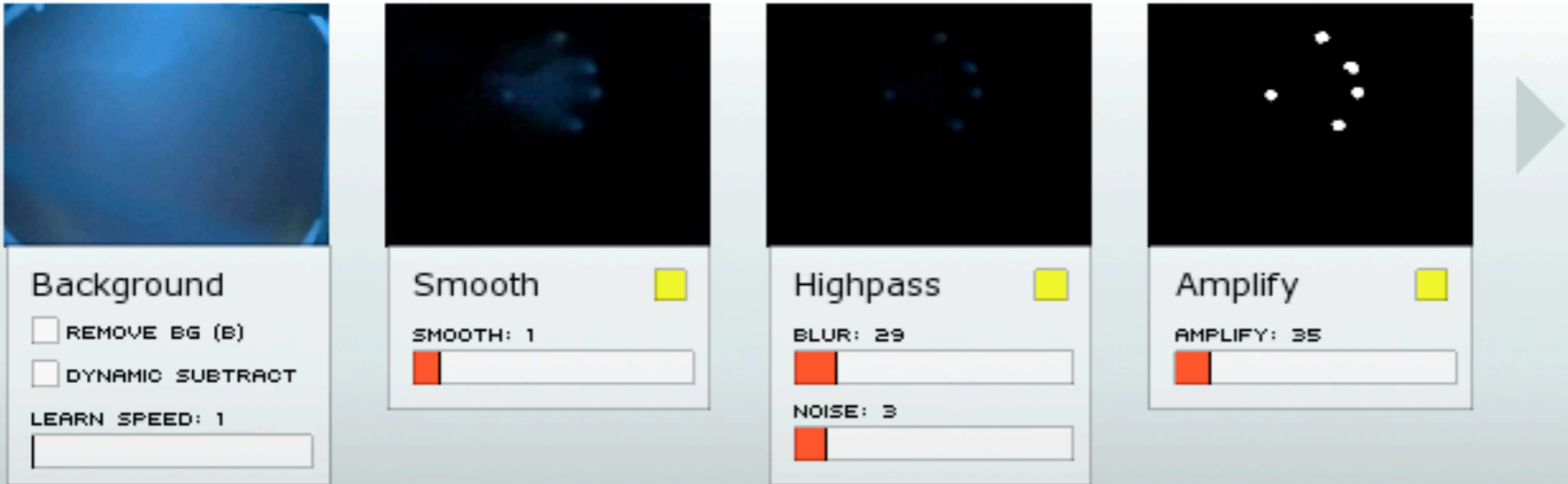
Video [Res]: 320 x 240

Video [fps]: 30

Sending OSC messages to:
Host: 127.0.0.1
Port: 3333

Press spacebar to toggle fast mode

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Background REMOVE BG (B) DYNAMIC SUBTRACT

LEARN SPEED: 1

Smooth

SMOOTH: 1

Highpass

BLUR: 29

NOISE: 3

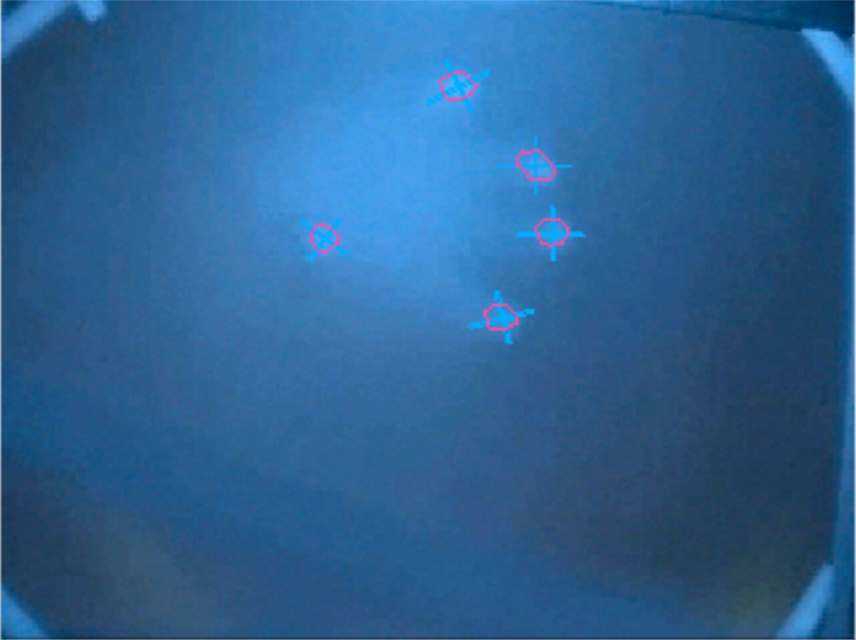
Amplify

AMPLIFY: 35

How to do what we did in class

Community Core Vision

Source Image

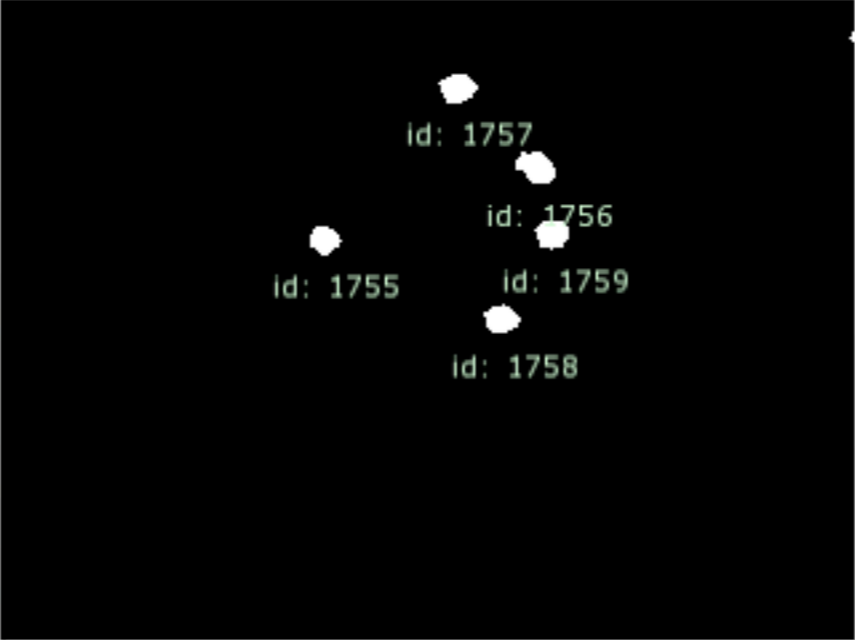


Source Image SHOW OUTLINES (O) SHOW IDS (I)

USE CAMERA PREVIOUS CAMERA NEXT CAMERA

USE VIDEO

Tracked Image



Tracked Image TRACK DRAW BLOBS

IMAGE THRESHOLD: 12 MOVEMENT THRESHOLD: 0

MIN BLOB SIZE: 11 MAX BLOB SIZE: 172

Background

REMOVE BG (B)

DYNAMIC SUBTRACT

LEARN SPEED: 1

Smooth

SMOOTH: 1

Highpass

BLUR: 29

NOISE: 3

Amplify

AMPLIFY: 35

Source Properties

CAMERA SETTINGS (V)

FLIP VERTICAL (J)

FLIP HORIZONTAL (H)

GPU Properties

GPU MODE (G)

Communication

SEND TUJO OSC (T)

SEND TUJO TOP | FOR FLASH (F)

SEND HEIGHT & WIDTH

Calibration

ENTER CALIBRATION (C)

Files

SAVE SETTINGS (S)

Calc. Time [ms]: 5

Video [Res]: 320 x 240

Video [fps]: 30

Sending OSC messages to:
Host: 127.0.0.1
Port: 3333

Press spacebar to toggle fast mode

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Eliminate "static"

Highpass

BLUR: 29

NOISE: 3

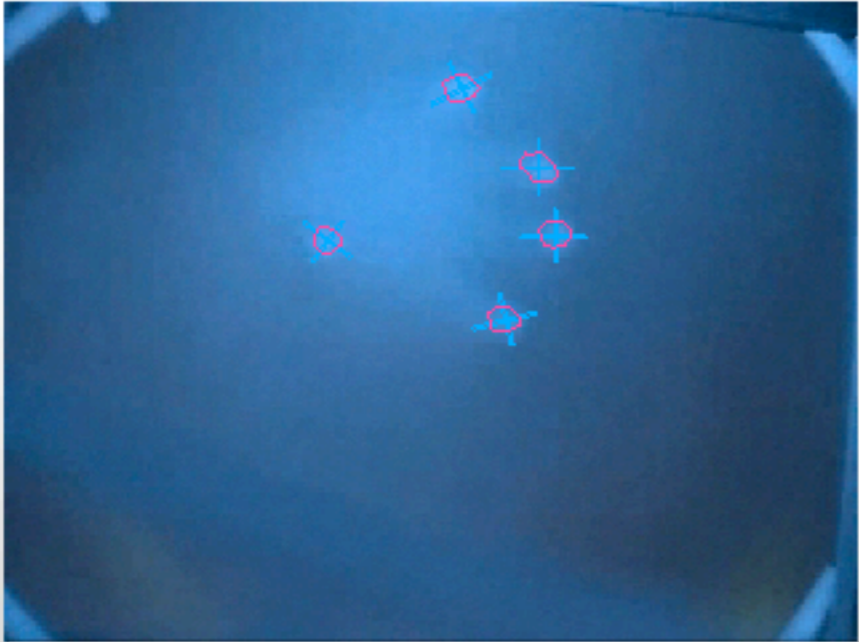
Amplify

AMPLIFY: 35

How to do what we did in class

Community Core Vision

Source Image

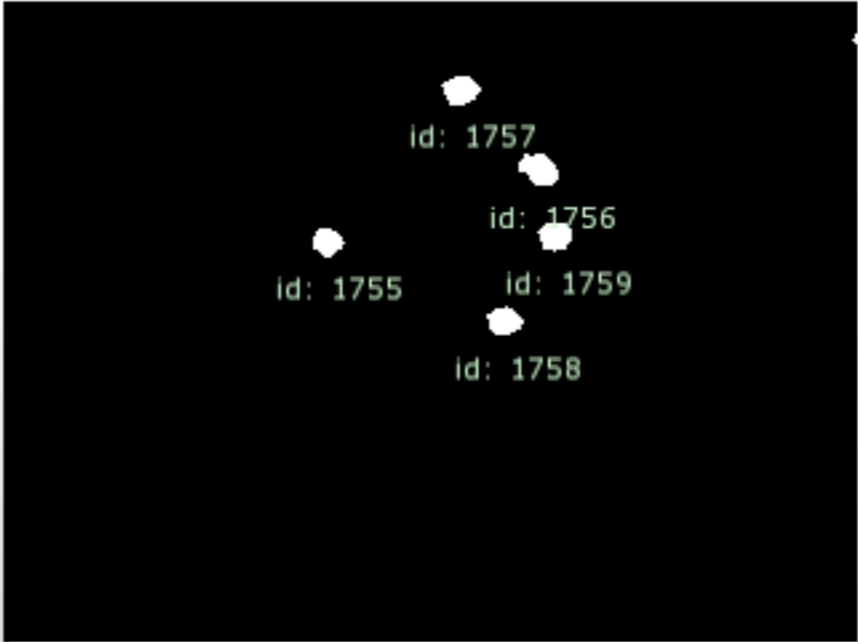


Source Image SHOW OUTLINES (O) SHOW IDS (I)

USE CAMERA PREVIOUS CAMERA NEXT CAMERA

USE VIDEO

Tracked Image



Tracked Image TRACK DRAW BLOBS

IMAGE THRESHOLD: 12 MOVEMENT THRESHOLD: 0

MIN BLOB SIZE: 11 MAX BLOB SIZE: 172

Source Properties

CAMERA SETTINGS (V)

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GPU Properties

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SEND TUIO OSC (T)

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ENTER CALIBRATION (C)

Files

SAVE SETTINGS (S)

Calc. Time [ms]: 5

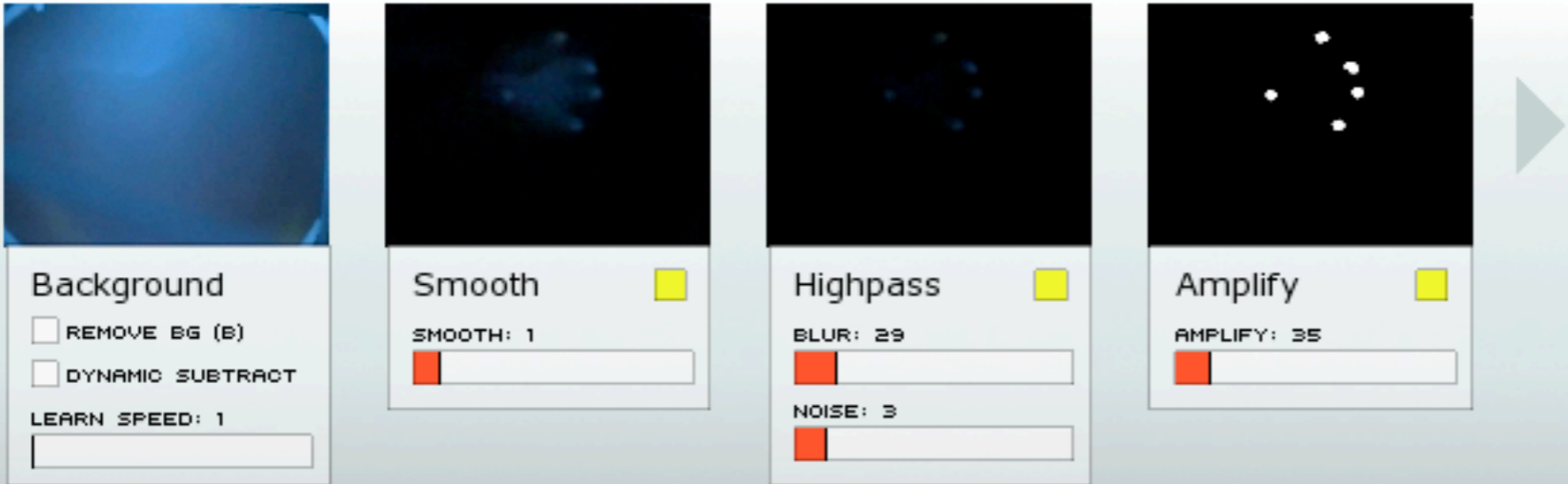
Video [Res]: 320 x 240

Video [fps]: 30

Sending OSC messages to:
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Background REMOVE BG (B) DYNAMIC SUBTRACT

LEARN SPEED: 1

Smooth

SMOOTH: 1

Highpass

BLUR: 29

NOISE: 3

Amplify

AMPLIFY: 35

How to do what we did in class

The screenshot displays the 'Community Core Vision' software interface. It is divided into several sections:

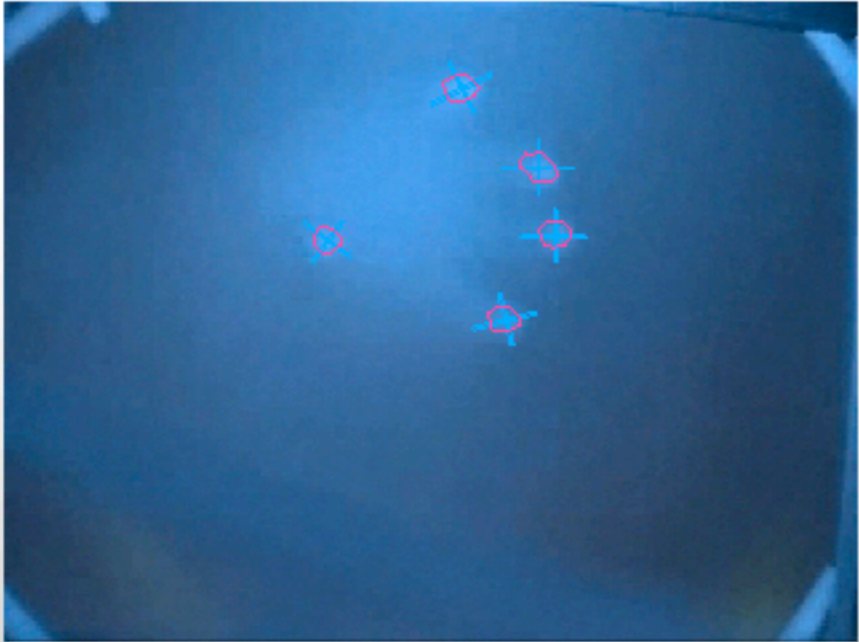
- Source Image:** Shows a blue-tinted image with red outlines and IDs (1755, 1756, 1757, 1758, 1759) overlaid on objects.
- Tracked Image:** Shows the same objects as white blobs on a black background, with their IDs (1755-1759) displayed.
- Control Panels:**
 - Source Image:** Includes checkboxes for 'SHOW OUTLINES (O)', 'SHOW IDS (I)', 'USE CAMERA', 'PREVIOUS CAMERA', 'NEXT CAMERA', and 'USE VIDEO'.
 - Tracked Image:** Includes checkboxes for 'TRACK DRAW BLOBS', and sliders for 'IMAGE THRESHOLD: 12', 'MOVEMENT THRESHOLD: 0', 'MIN BLOB SIZE: 11', and 'MAX BLOB SIZE: 172'.
 - Background:** Includes checkboxes for 'REMOVE BG (B)' and 'DYNAMIC SUBTRACT', and a 'LEARN SPEED: 1' slider.
 - Smooth:** Includes a 'SMOOTH: 1' slider and a checked 'GPU MODE (G)' checkbox.
 - Highpass:** Includes 'BLUR: 29' and 'NOISE: 3' sliders and checked 'GPU MODE (G)' checkboxes.
 - Amplify:** Includes an 'AMPLIFY: 35' slider and a checked 'GPU MODE (G)' checkbox. This panel is highlighted with a red rounded rectangle.
- Right Panel:** Contains sections for 'Source Properties' (CAMERA SETTINGS, FLIP VERTICAL, FLIP HORIZONTAL), 'GPU Properties' (GPU MODE), 'Communication' (SEND TUJO OSC, SEND TUJO TOP | FOR FLASH, SEND HEIGHT & WIDTH), 'Calibration' (ENTER CALIBRATION), and 'Files' (SAVE SETTINGS).
- Status Bar:** Shows 'Sending OSC messages to: Host: 127.0.0.1 Port: 3333' and 'Press spacebar to toggle fast mode'. The URL 'tbeta.nuigroup.com' is visible at the bottom.

Boost the signal

How to do what we did in class

Community Core Vision

Source Image

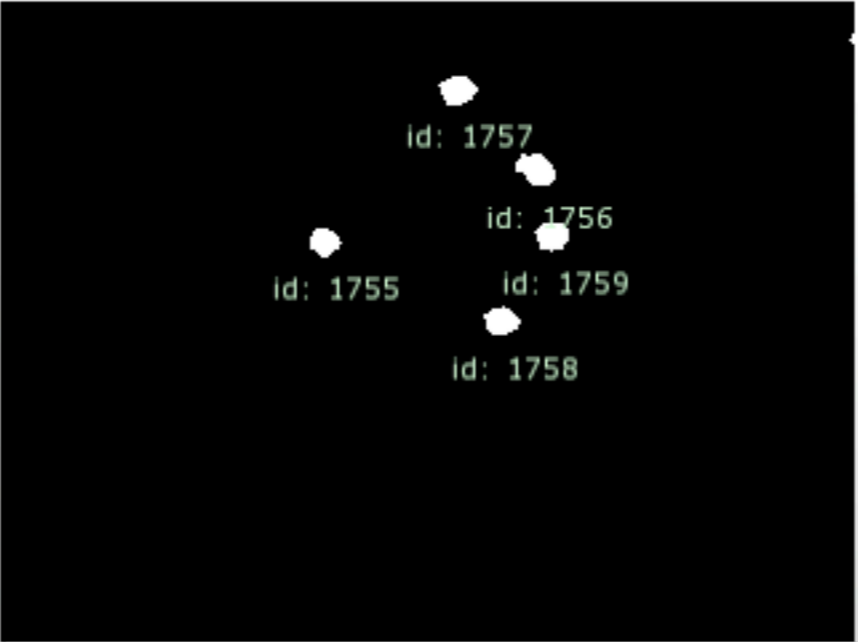


Source Image SHOW OUTLINES (O) SHOW IDS (I)

USE CAMERA PREVIOUS CAMERA NEXT CAMERA

USE VIDEO

Tracked Image



Tracked Image TRACK DRAW BLOBS

IMAGE THRESHOLD: 12 MOVEMENT THRESHOLD: 0

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REMOVE BG (B)

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LEARN SPEED: 1

Smooth

SMOOTH: 1

Highpass

BLUR: 29

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Amplify

AMPLIFY: 35

Source Properties

CAMERA SETTINGS (V)

FLIP VERTICAL (J)

FLIP HORIZONTAL (H)

GPU Properties

GPU MODE (G)

Communication

SEND TUIO OSC (T)

SEND TUIO TOP | FOR FLASH (F)

SEND HEIGHT & WIDTH

Calibration

ENTER CALIBRATION (C)

Files

SAVE SETTINGS (S)

Calc. Time [ms]: 5

Video [Res]: 320 x 240

Video [fps]: 30

Sending OSC messages to:
Host: 127.0.0.1
Port: 3333

Press spacebar to toggle fast mode

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How to do what we did in class

The screenshot displays the 'Community Core Vision' software interface. It is divided into several sections:

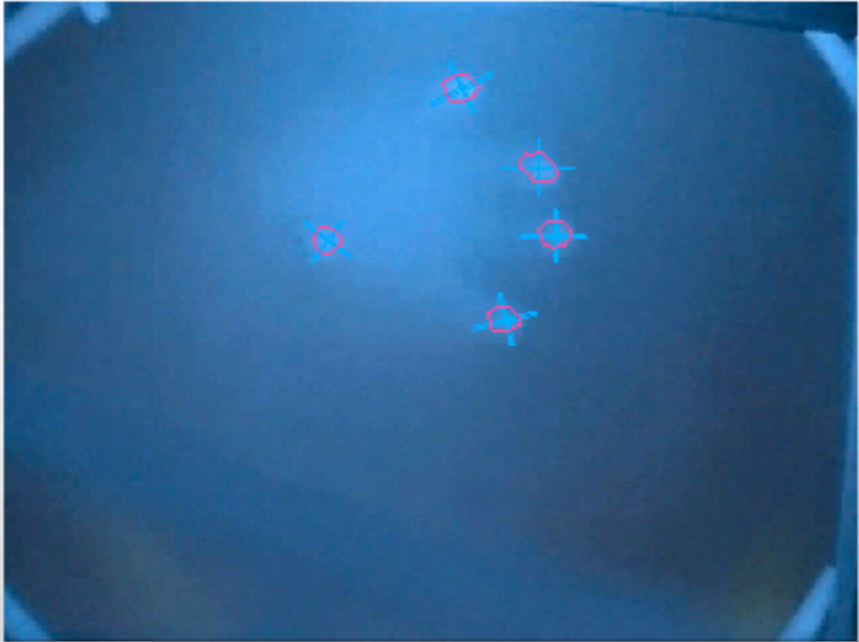
- Source Image:** Shows a blue-tinted image of a hand with red outlines and blue crosses marking detected features.
- Tracked Image:** Shows the same image with white blobs and their IDs (1755, 1756, 1757, 1758, 1759) overlaid.
- Control Panels:**
 - Source Image:** Includes checkboxes for 'SHOW OUTLINES (O)', 'SHOW IDS (I)', 'USE CAMERA', 'PREVIOUS CAMERA', 'NEXT CAMERA', and 'USE VIDEO'.
 - Tracked Image:** Includes a 'TRACK DRAW BLOBS' checkbox and sliders for 'IMAGE THRESHOLD: 12', 'MOVEMENT THRESHOLD: 0', 'MIN BLOB SIZE: 11', and 'MAX BLOB SIZE: 172'.
 - Background:** Includes checkboxes for 'REMOVE BG (B)' and 'DYNAMIC SUBTRACT', and a 'LEARN SPEED: 1' slider.
 - Smooth:** Includes a 'SMOOTH: 1' slider.
 - Highpass:** Includes a 'BLUR: 29' slider and a 'NOISE: 3' slider.
 - Amplify:** Includes an 'AMPLIFY: 35' slider.
- Right Panel:** Contains sections for 'Source Properties' (CAMERA SETTINGS, FLIP VERTICAL, FLIP HORIZONTAL), 'GPU Properties' (GPU MODE), 'Communication' (SEND TUJO OSC, SEND TUJO TOP | FOR FLASH, SEND HEIGHT & WIDTH), 'Calibration' (ENTER CALIBRATION), and 'Files' (SAVE SETTINGS).
- Status/Info:** Shows 'Calc. Time [ms]: 5', 'Video [Res]: 320 x 240', 'Video [fps]: 30', and 'Sending OSC messages to: Host: 127.0.0.1, Port: 3333'.
- Footer:** Includes the text 'Press spacebar to toggle fast mode' and the URL 'tbeta.nuigroup.com'.

A red-bordered callout box is overlaid on the 'Tracked Image' section, containing the text: **Decide what counts as a blob**. A red rounded rectangle highlights the 'Tracked Image' control panel.

How to do what we did in class

Community Core Vision

Source Image

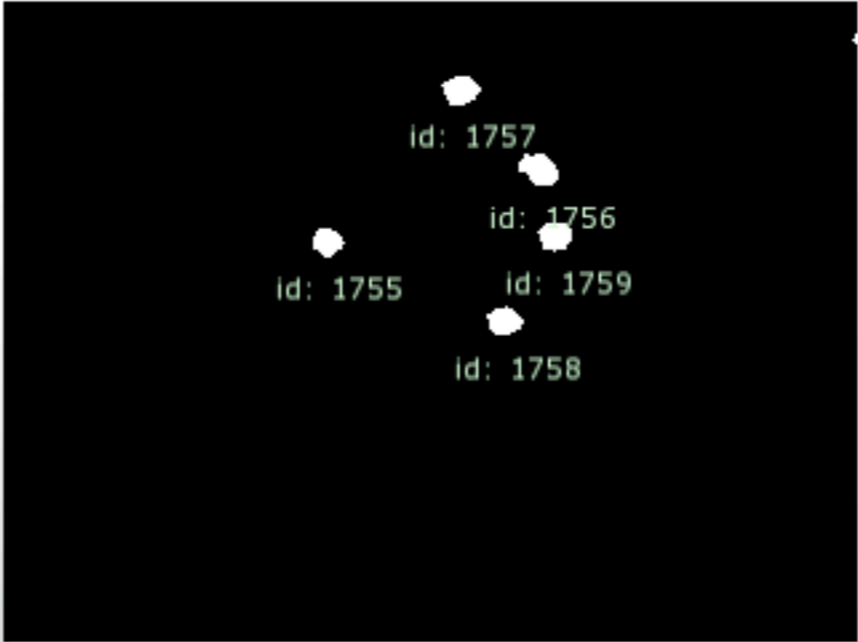


Source Image SHOW OUTLINES (O) SHOW IDS (I)

USE CAMERA PREVIOUS CAMERA NEXT CAMERA

USE VIDEO

Tracked Image



Tracked Image TRACK DRAW BLOBS

IMAGE THRESHOLD: 12 MOVEMENT THRESHOLD: 0

MIN BLOB SIZE: 11 MAX BLOB SIZE: 172

Background

REMOVE BG (B)

DYNAMIC SUBTRACT

LEARN SPEED: 1

Smooth

SMOOTH: 1

Highpass

BLUR: 29

NOISE: 3

Amplify

AMPLIFY: 35

Source Properties

CAMERA SETTINGS (V)

FLIP VERTICAL (J)

FLIP HORIZONTAL (H)

GPU Properties

GPU MODE (G)

Communication

SEND TUIO OSC (T)

SEND TUIO TOP | FOR FLASH (F)

SEND HEIGHT & WIDTH

Calibration

ENTER CALIBRATION (C)

Files

SAVE SETTINGS (S)

Calc. Time [ms]: 5

Video [Res]: 320 x 240

Video [fps]: 30

Sending OSC messages to:
Host: 127.0.0.1
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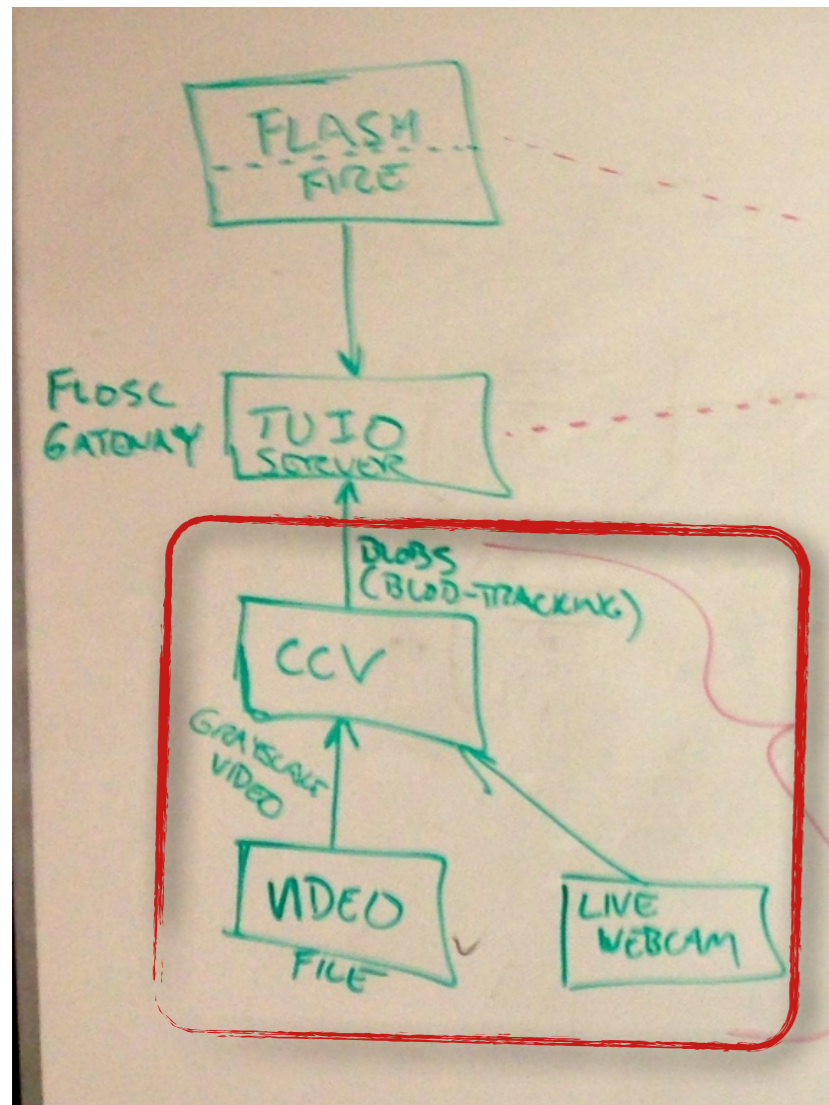
How to do what we did in class

The screenshot displays the 'Community Core Vision' software interface. It is divided into several sections:

- Source Image:** Shows a blue-tinted image with red outlines and blue crosses marking detected features. Below it are controls for 'SHOW OUTLINES (O)' and 'SHOW IDS (I)', both checked. There are also checkboxes for 'USE CAMERA', 'PREVIOUS CAMERA', 'NEXT CAMERA', and 'USE VIDEO'.
- Tracked Image:** Shows the same image with white blobs and their IDs: 'id: 1755', 'id: 1756', 'id: 1757', 'id: 1758', and 'id: 1759'. Below it are controls for 'TRACK DRAW BLOBS' (checked) and sliders for 'IMAGE THRESHOLD: 12', 'MOVEMENT THRESHOLD: 0', 'MIN BLOB SIZE: 11', and 'MAX BLOB SIZE: 172'.
- Processing Pipeline:** A row of four small image windows with navigation arrows. From left to right: 'Background' (REMOVE BG (B) and DYNAMIC SUBTRACT checkboxes, LEARN SPEED: 1 slider), 'Smooth' (SMOOTH: 1 slider), 'Highpass' (BLUR: 29 and NOISE: 3 sliders), and 'Amplify' (AMPLIFY: 35 slider).
- Settings Panel (Right):** A vertical sidebar with sections: 'Source Properties' (CAMERA SETTINGS (V), VERTICAL (J), HORIZONTAL (H)), 'GPU Properties' (GPU MODE (G) checked), 'Communication' (SEND TUIO OSC (T) checked, SEND TUIO TOP | FOR FLASH (F) unchecked, SEND HEIGHT & WIDTH checked), 'Calibration' (ENTER CALIBRATION (C) unchecked), and 'Files' (SAVE SETTINGS (S) unchecked). At the bottom, it shows 'Calc. Time [ms]: 5', 'Video [Res]: 320 x 240', 'Video [fps]: 30', and 'Sending OSC messages to: Host: 127.0.0.1, Port: 3333'. A red box highlights the top part of this panel with the text 'Settings you may need to mess with'. A red arrow points from this text to the 'SEND TUIO OSC (T)' checkbox.
- Footer:** 'Press spacebar to toggle fast mode' and ' | ~ | tbeta.nuigroup.com'.

Settings you may need to mess with

How to do what we did in class



- There is also a configuration file
 - config.xml
 - GUI settings can be typed



How to do what we did in class

```
<?xml version="1.0" ?>
<CONFIG>
  <!--////////////////////////////////////
      YOU CAN MANUALLY EDIT THE FEATURES BELOW
  ////////////////////////////////// -->
  <!--// CAMERA SETTINGS // -->
  <CAMERA_0>
    <USECAMERA>1</USECAMERA>
    <DEVICE>1</DEVICE>
    <WIDTH>320</WIDTH>
    <HEIGHT>240</HEIGHT>
    <FRAMERATE>120</FRAMERATE>
  </CAMERA_0>
  <!--// NETWORK COMMUNICATION SETTINGS //-->
  <NETWORK>
    <LOCALHOST>127.0.0.1</LOCALHOST>
    <TUIO>0</TUIO>
    <TUIOPORT_OUT>3333</TUIOPORT_OUT>
    <TUIOFLASHPORT_OUT>3000</TUIOFLASHPORT_OUT>
  </NETWORK>
  <!--// VIDEO SETTINGS // -->
  <VIDEO>
    <FILENAME>test_videos/RearDI.m4v</FILENAME>
  </VIDEO>
  <!--// BLOB SETTINGS // -->
  <BLOBS>
    <MAXNUMBER>20</MAXNUMBER>
  </BLOBS>
  //////////////////////////////////
```



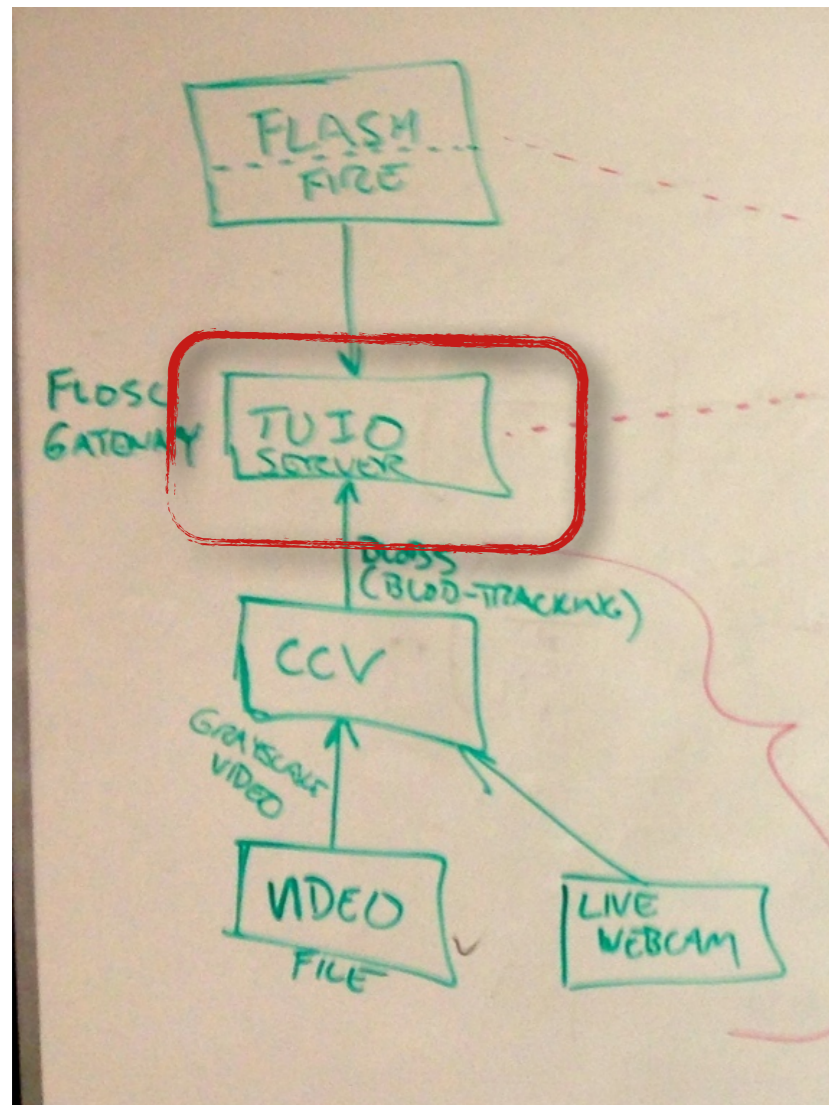
How to do what we did in class

```
<!--//////////////////////////////////////>

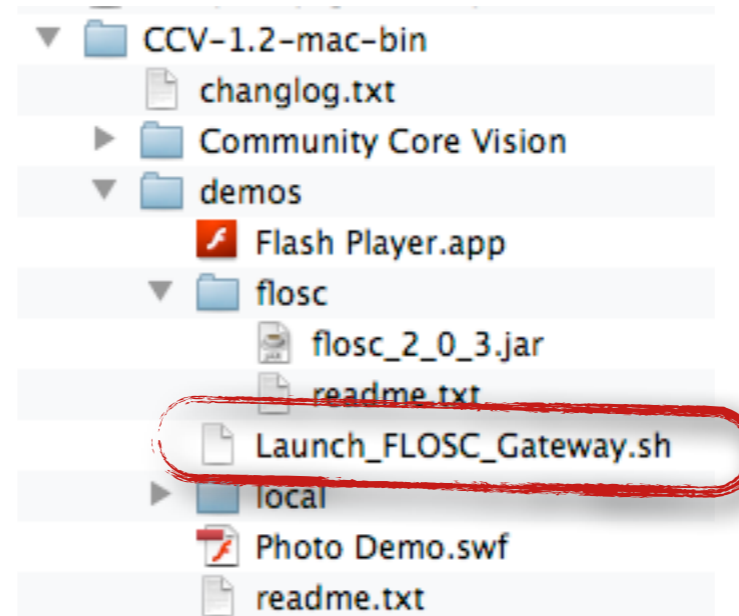
    DO NOT EDIT THE VALUES BELOW

////////////////////////////////////// -->
<APPLICATION>
  <TITLE>Community Core Visision</TITLE>
  <VERSION>1.2.0</VERSION>
</APPLICATION>
<WINDOW>
  <WIDTH>950</WIDTH>
  <HEIGHT>600</HEIGHT>
</WINDOW>
<BOOLEAN>
  <PRESSURE>4</PRESSURE>
  <LABELS>1</LABELS>
  <OUTLINES>1</OUTLINES>
  <LEARNBG>0</LEARNBG>
  <TUIO>1</TUIO>
  <VMIRROR>0</VMIRROR>
  <HMIRROR>0</HMIRROR>
  <HIGHPASS>1</HIGHPASS>
  <AMPLIFY>1</AMPLIFY>
  <SMOOTH>0</SMOOTH>
  <GPU>1</GPU>
  <DYNAMICCBG>1</DYNAMICCBG>
  <SNAPSHOT>0</SNAPSHOT>
  <MINIMODE>0</MINIMODE>
  <HEIGHTWIDTH>1</HEIGHTWIDTH>
  <OSCMODE>1</OSCMODE>
  <TCPMODE>0</TCPMODE>
  <TRACKDARK>1</TRACKDARK>
</BOOLEAN>
<INT>
  <MINMOVEMENT>2</MINMOVEMENT>
  <MINBLOBSIZE>11</MINBLOBSIZE>
  <MAXBLOBSIZE>86</MAXBLOBSIZE>
  <!--// FILTERS SETTERS //-->
  <THRESHOLD>43</THRESHOLD>
  <HIGHPASSBLUR>40</HIGHPASSBLUR>
  <HIGHPASSNOISE>8</HIGHPASSNOISE>
  <HIGHPASSAMP>35</HIGHPASSAMP>
  <SMOOTH>1</SMOOTH>
  <BGLEARNRATE>450.099976</BGLEARNRATE>
</INT>
</CONFIG>
```

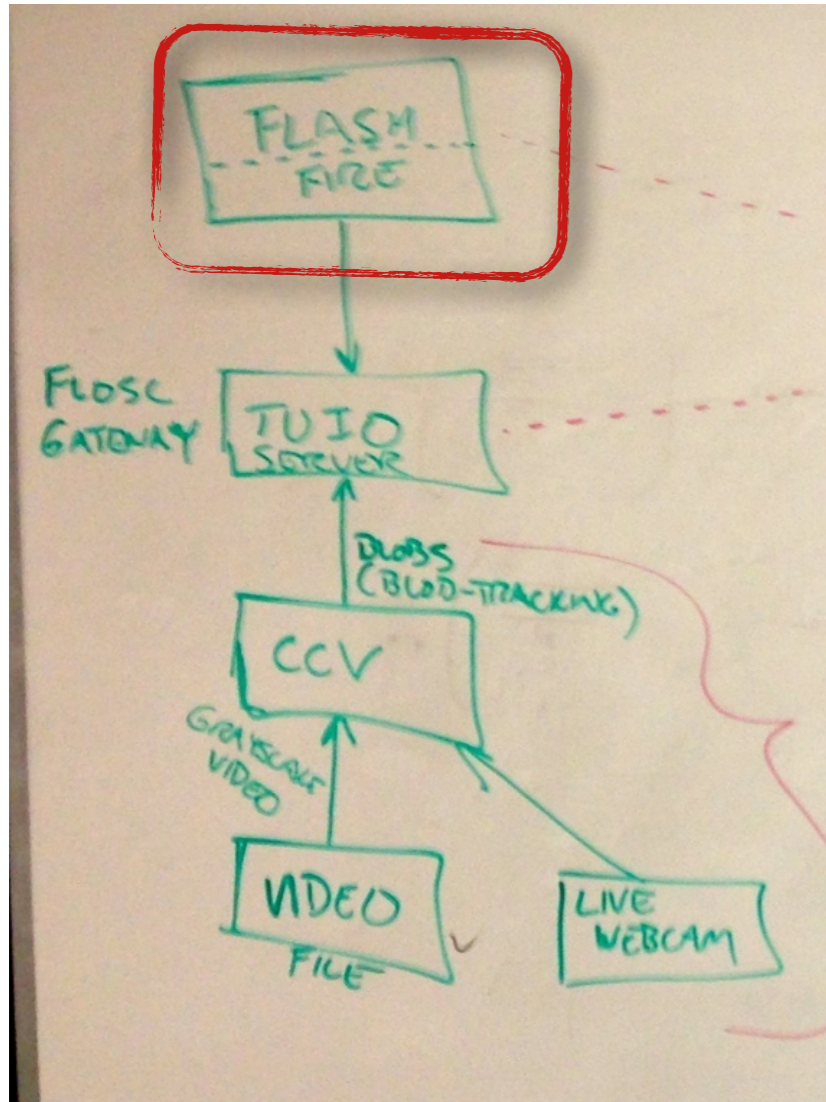
How to do what we did in class



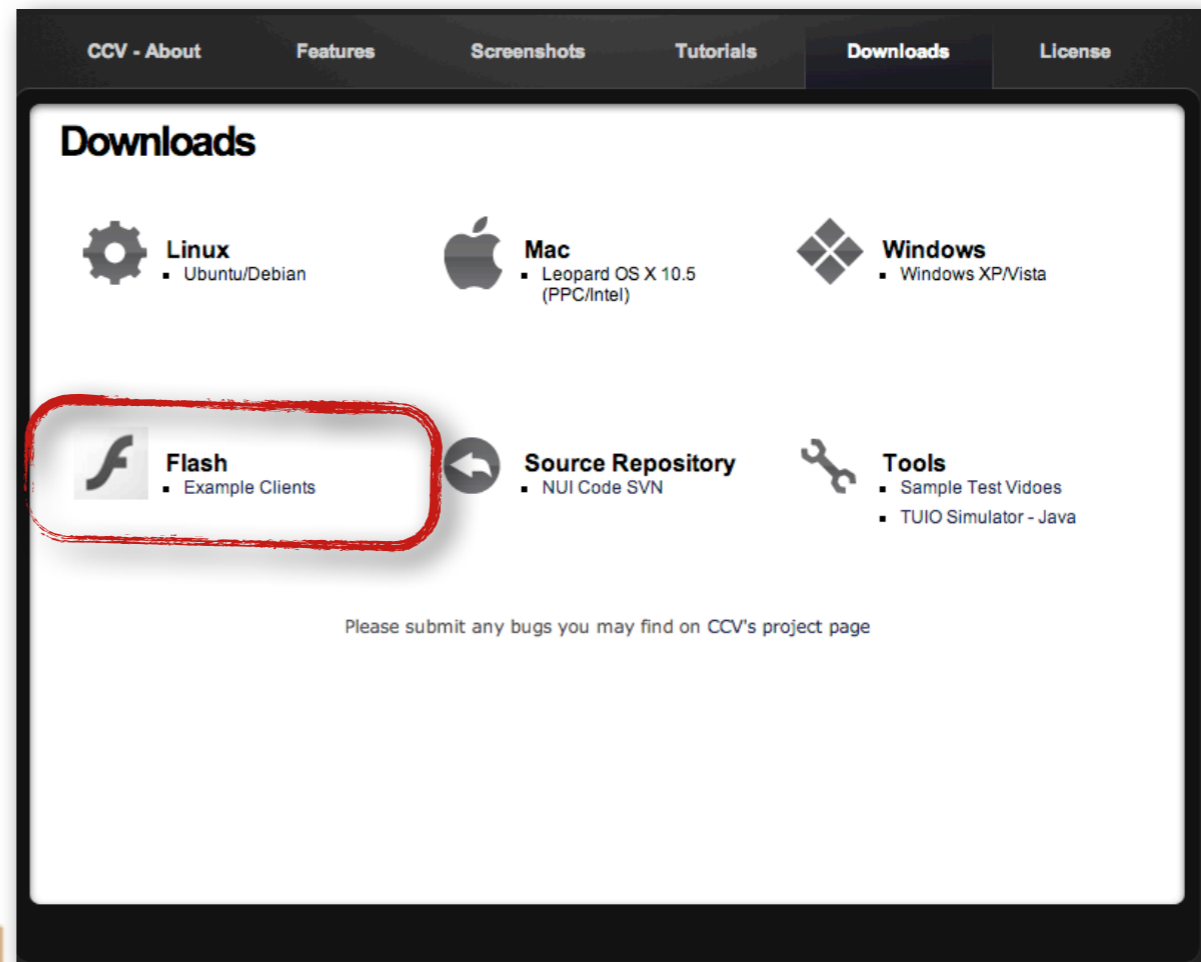
- For Flash Demos run the TUJO server standalone



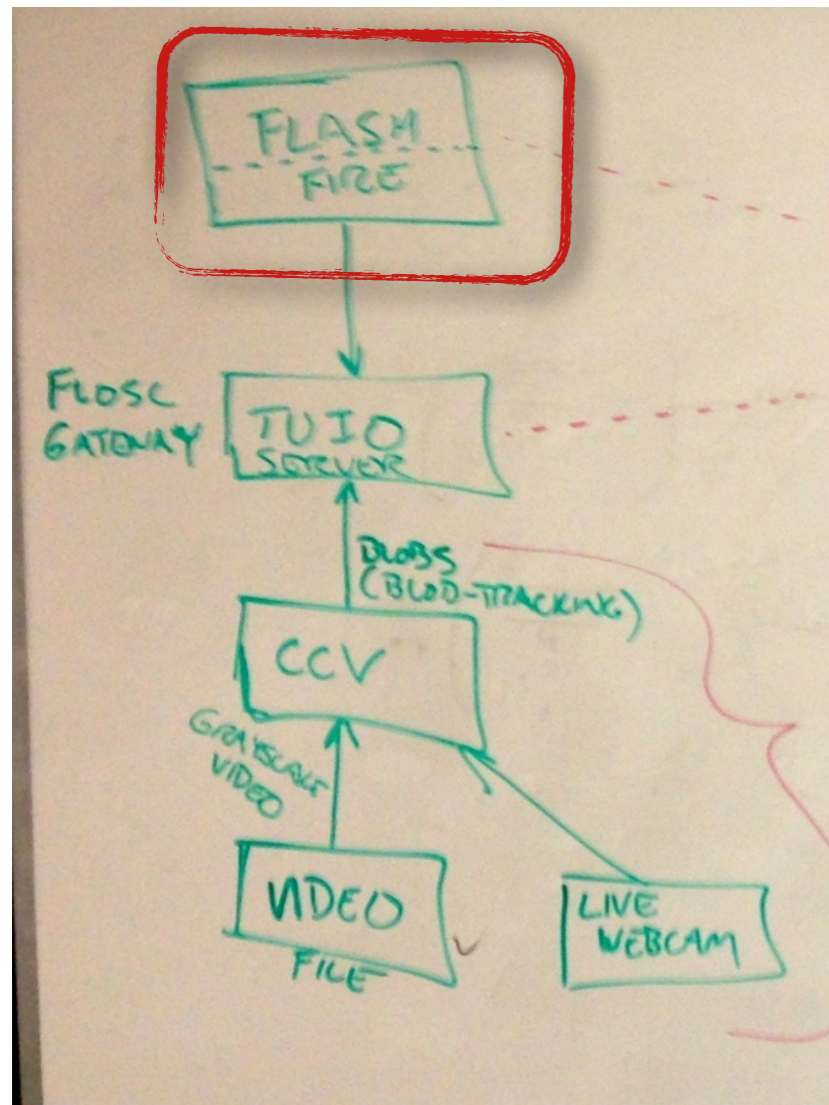
How to do what we did in class



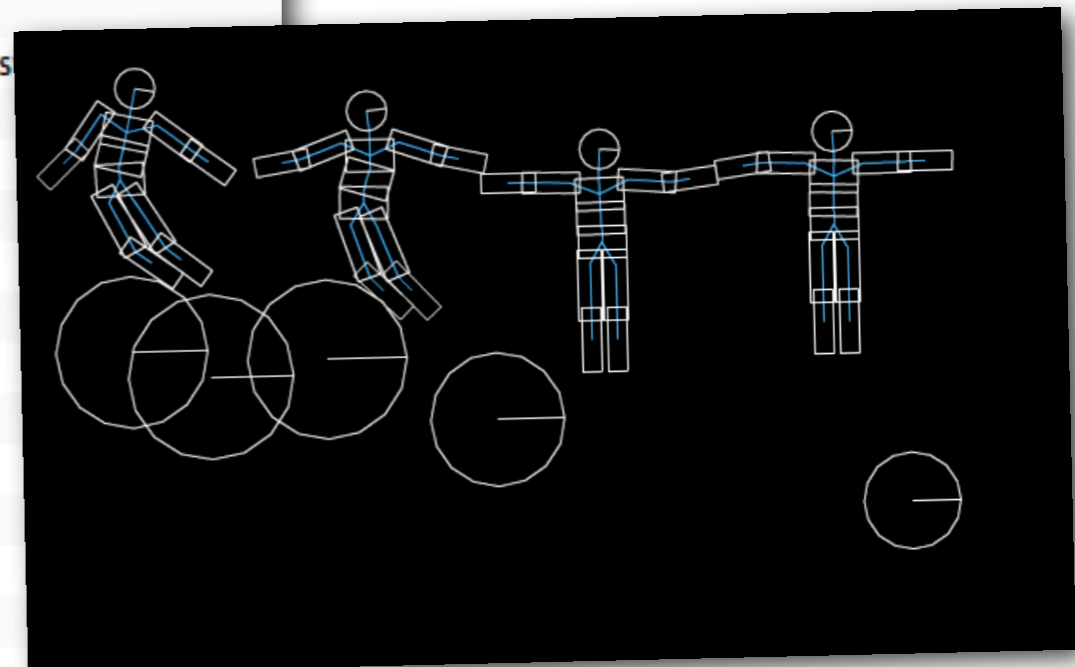
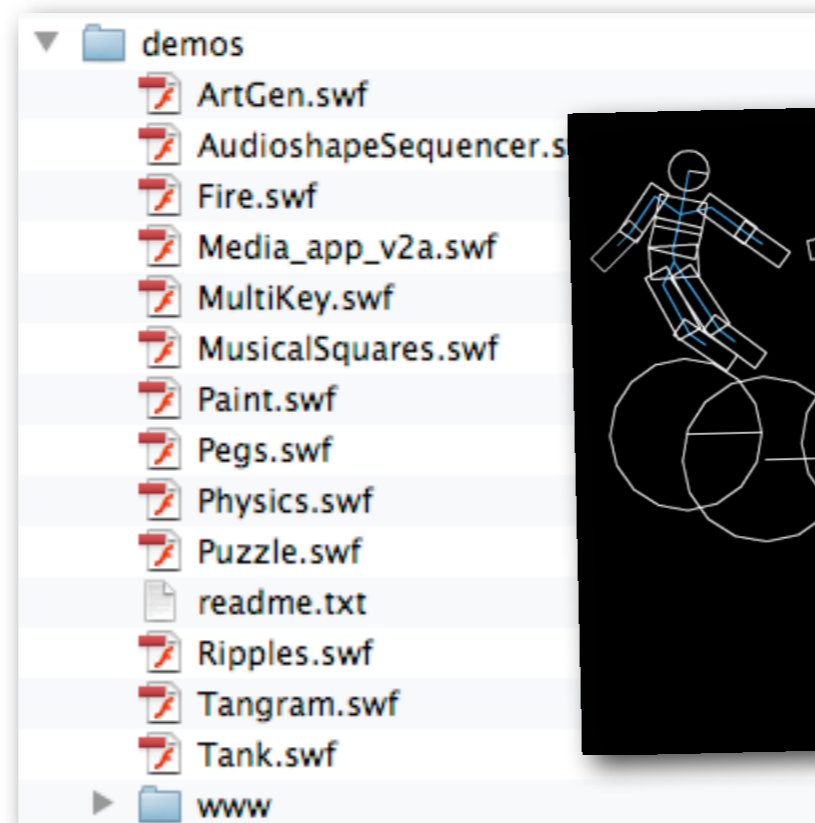
- Download Flash Demos
- <http://ccv.nuigroup.com/>



How to do what we did in class

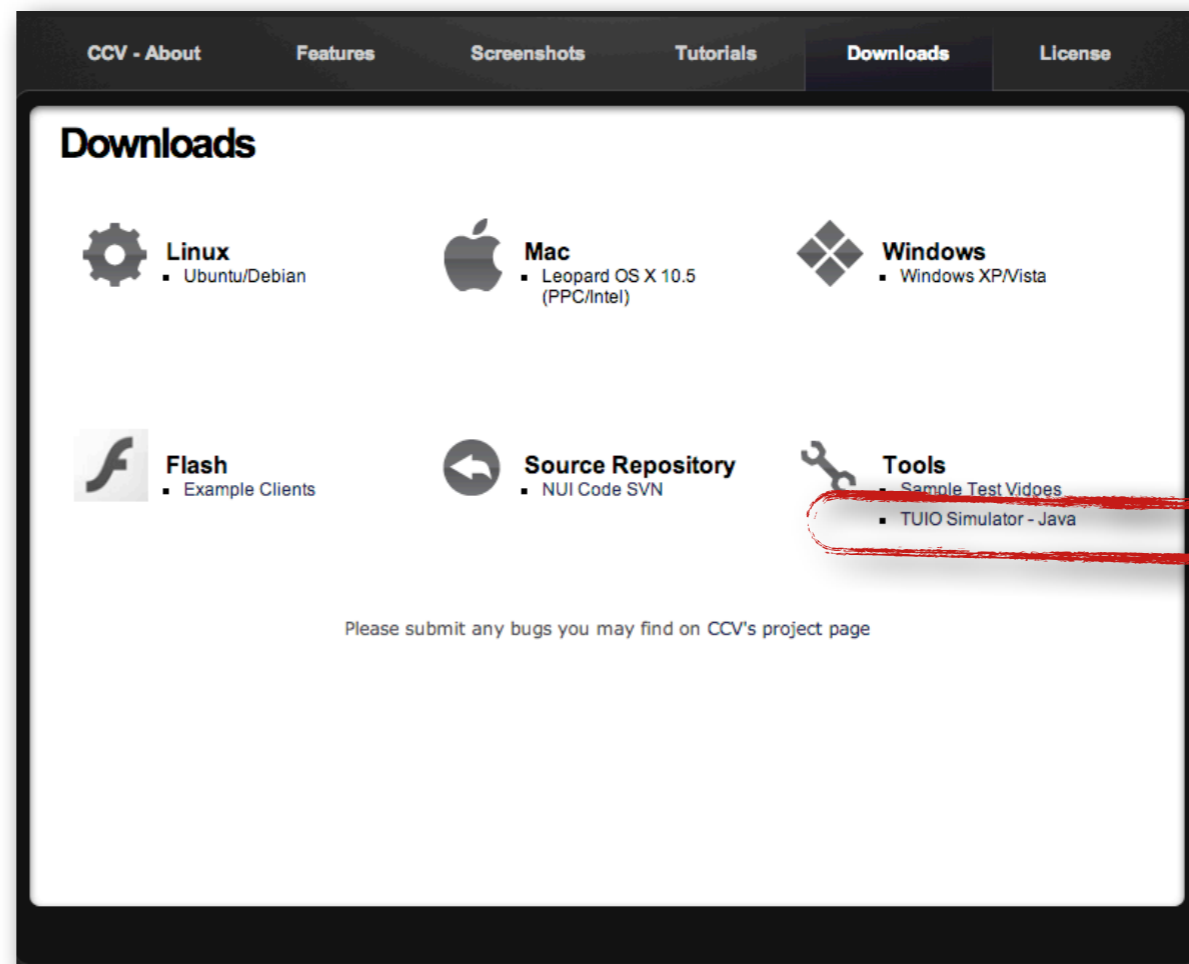
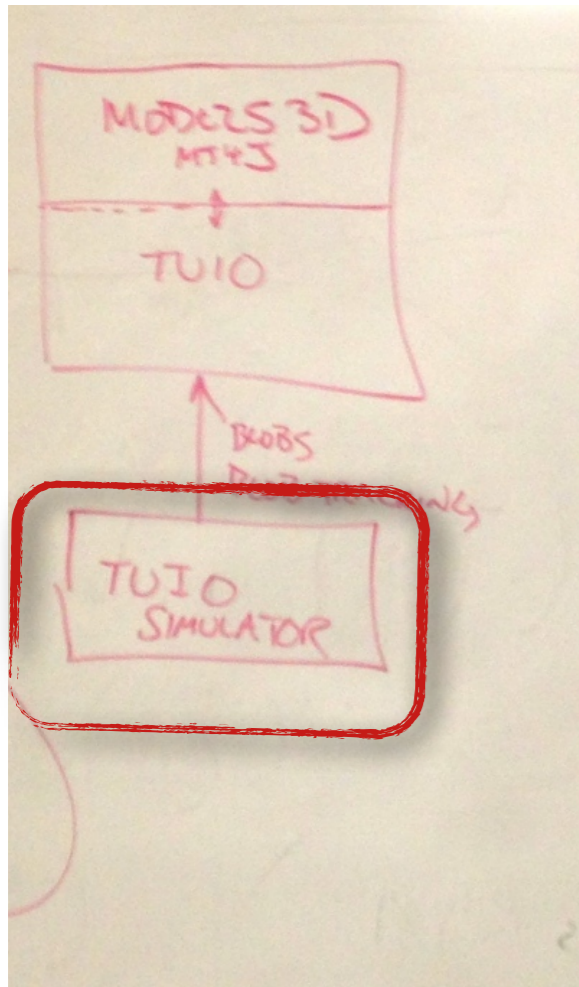


- Download Flash Demos

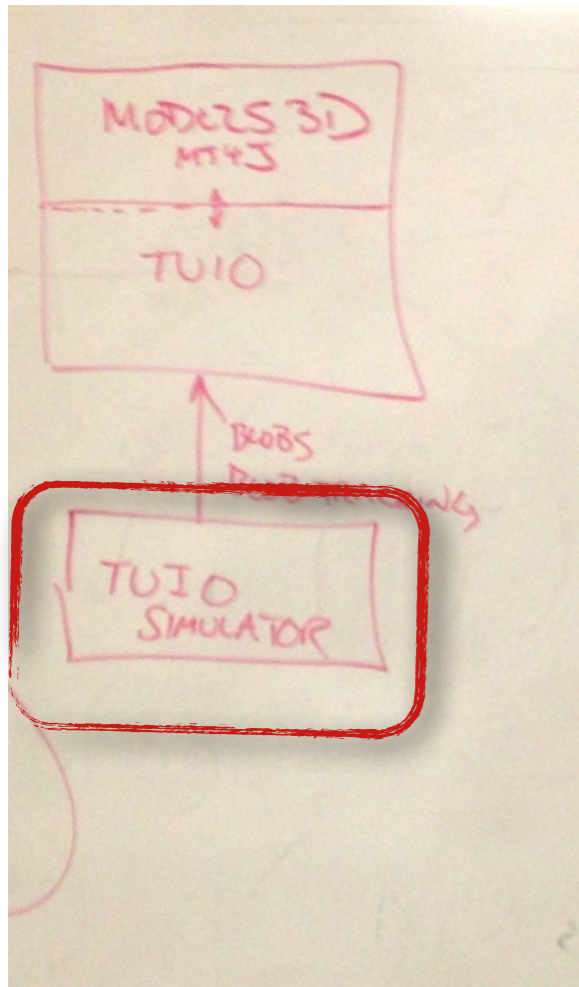


How to do what we did in class

- Download TUIO Simulator

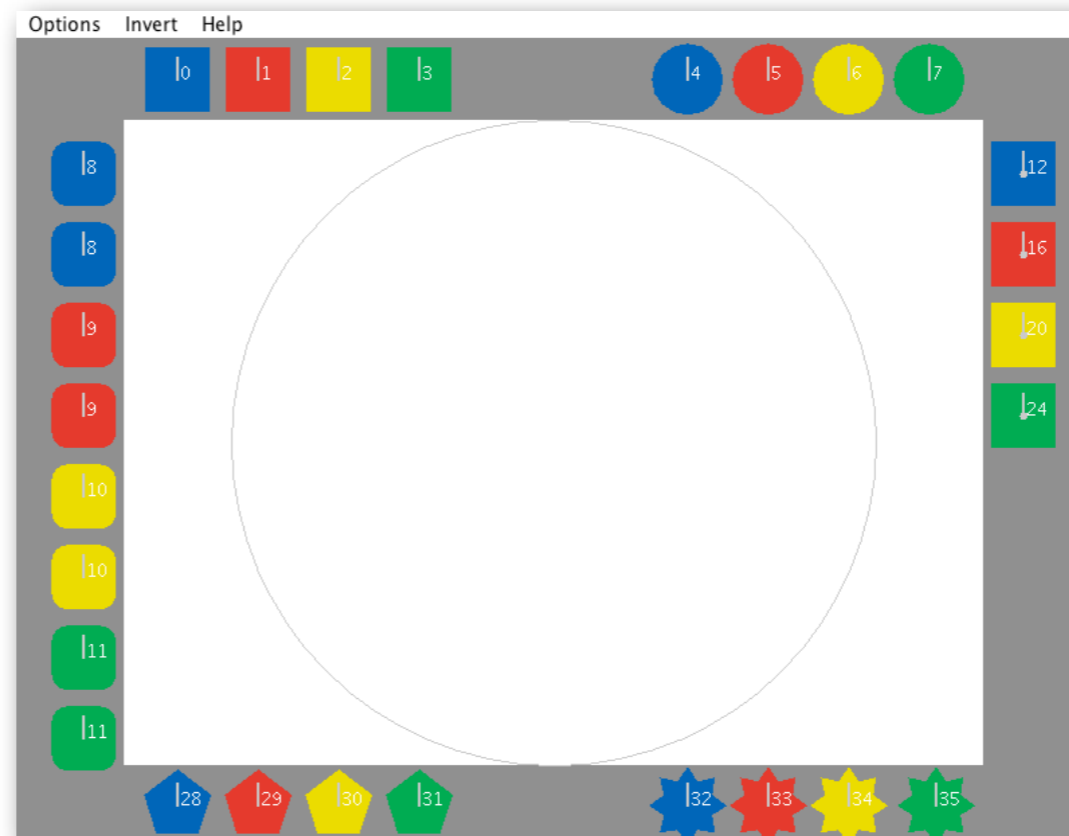


How to do what we did in class



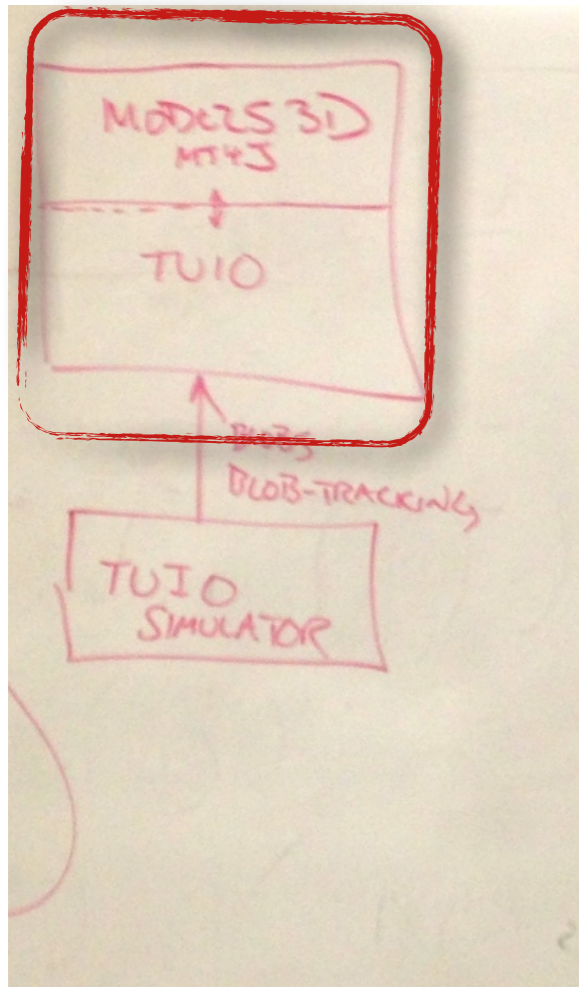
- Run as a java program

```
$ java -jar TuioSimulator.jar  
sending TUIO messages to 127.0.0.1:3333
```



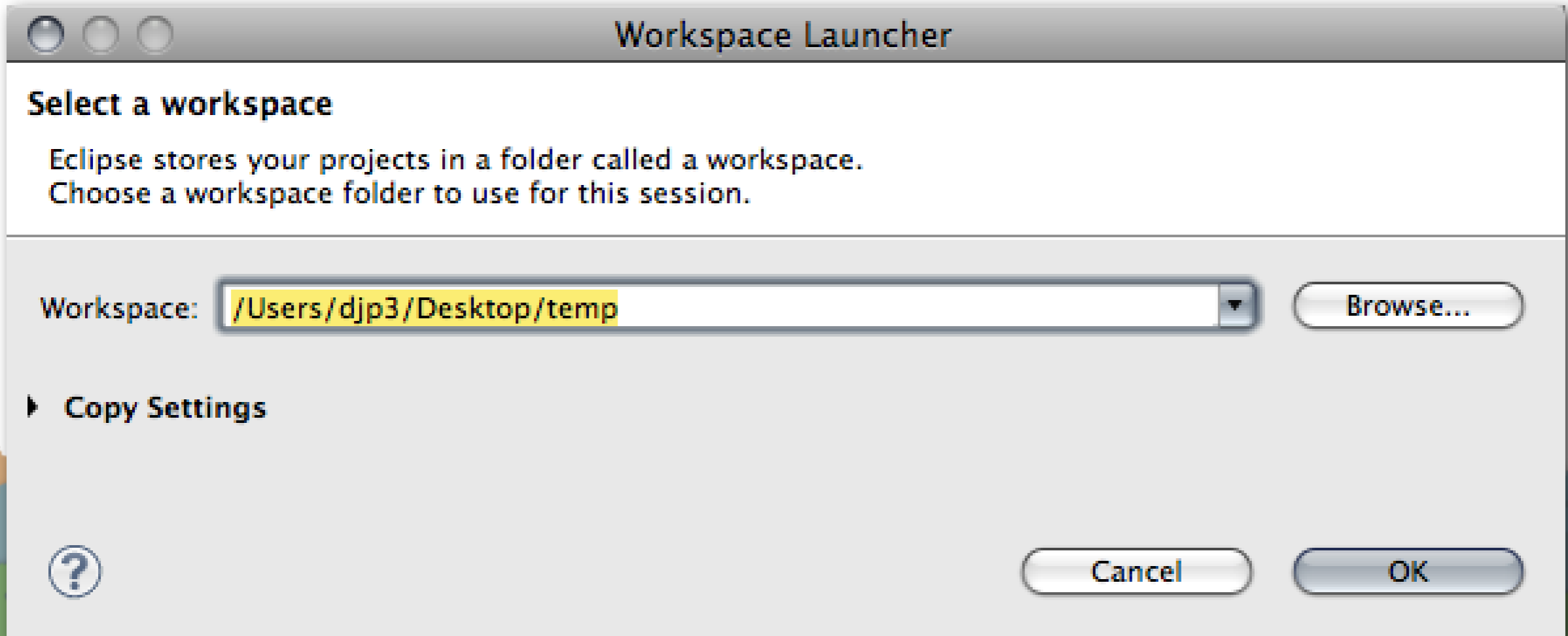
How to do what we did in class

- Setup MT4J in Eclipse



Getting the software going

- Download and Install Eclipse
 - <http://www.eclipse.org/>
- Download MT4J
 - <http://www.mt4j.org/mediawiki/index.php/Downloads>
- Pick a directory and create a new workspace in Eclipse



Getting the software going

- Create a new Java Project in Eclipse

The screenshot shows the 'New Java Project' dialog box in Eclipse. The title bar reads 'New Java Project'. Below the title bar, the text says 'Create a Java Project' and 'Create a Java project in the workspace or in an external location.' There is a folder icon in the top right corner.

The 'Project name' field contains 'Assignment04'. The 'Use default location' checkbox is checked. The 'Location' field shows '/Users/djp3/Desktop/temp/Assignment04' with a 'Browse...' button to its right.

The 'JRE' section has three radio buttons: 'Use an execution environment JRE:' (selected), 'Use a project specific JRE:', and 'Use default JRE (currently 'JVM 1.5.0 (MacOS X Default)')'. The selected option has a dropdown menu showing 'JavaSE-1.6'. The other two options have dropdown menus showing 'JVM 1.5.0 (MacOS X Default)'. There is a 'Configure JREs...' link to the right of the third option.

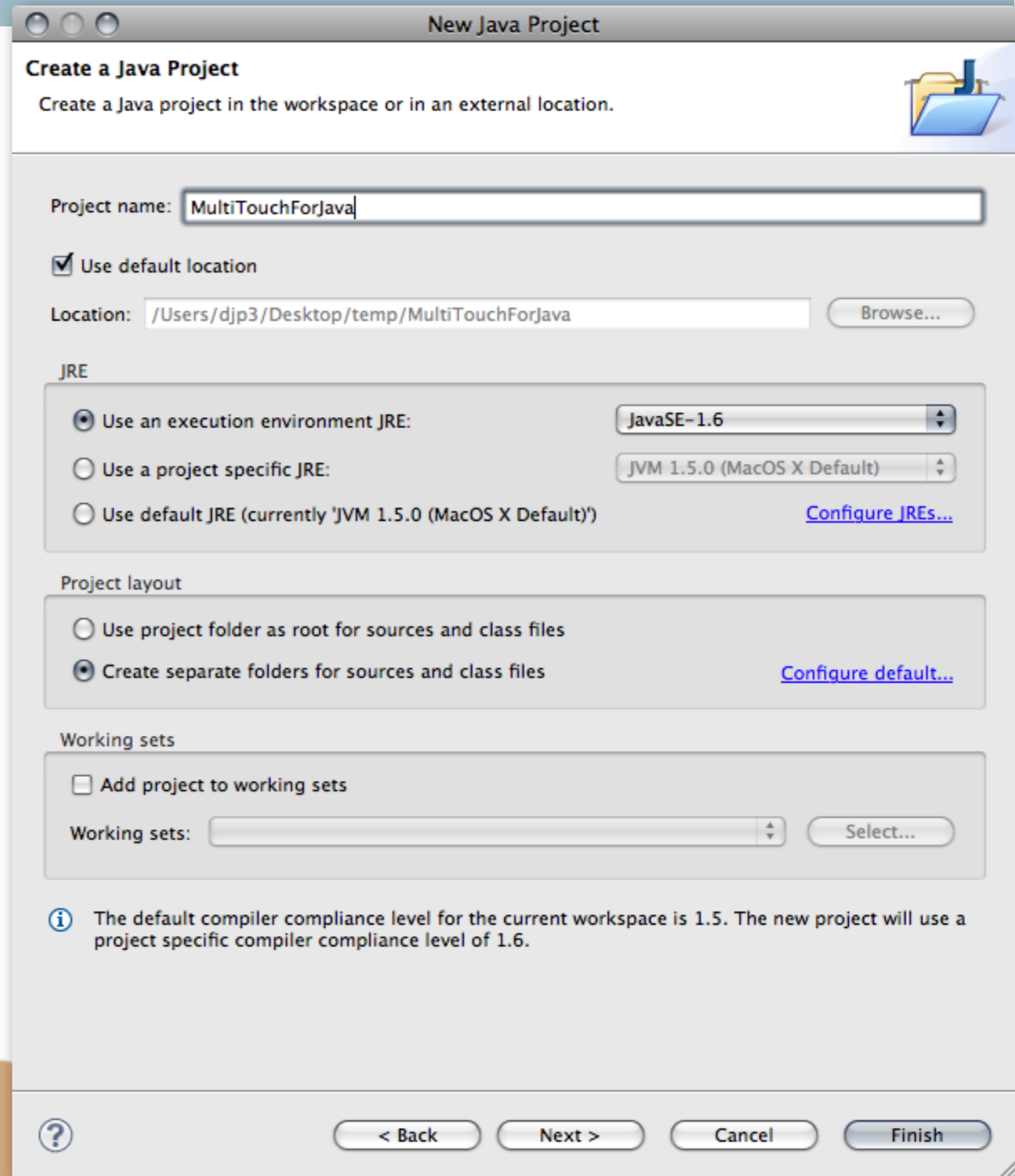
The 'Project layout' section has two radio buttons: 'Use project folder as root for sources and class files' and 'Create separate folders for sources and class files' (selected). There is a 'Configure default...' link to the right of the second option.

The 'Working sets' section has a checkbox 'Add project to working sets' which is unchecked. Below it is a 'Working sets:' field with a dropdown menu and a 'Select...' button.

At the bottom, there is an information icon and a message: 'The default compiler compliance level for the current workspace is 1.5. The new project will use a project specific compiler compliance level of 1.6.' Below this message are four buttons: '< Back', 'Next >', 'Cancel', and 'Finish'.

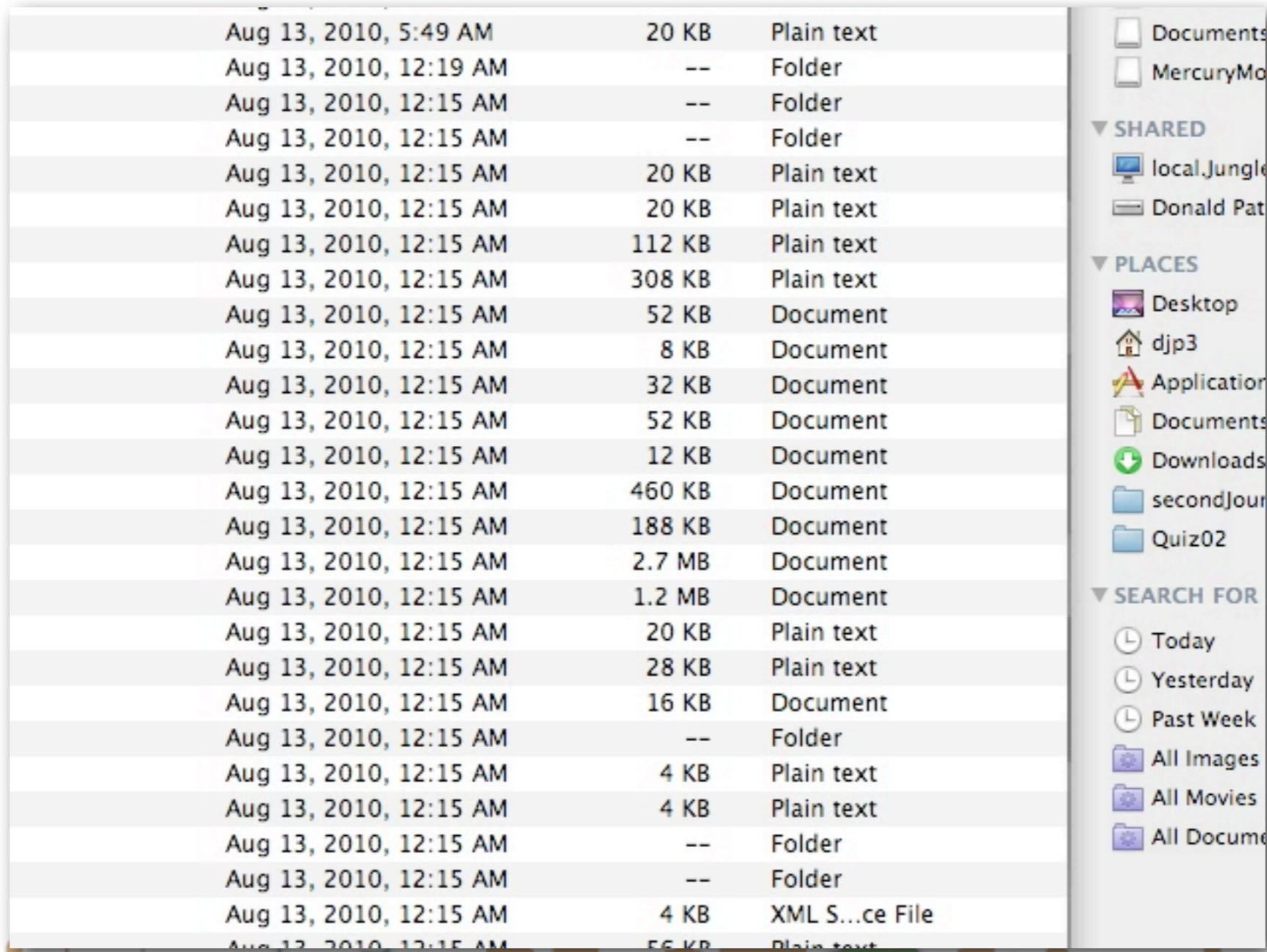
Getting the software going

- Create a new Java Project in Eclipse for MT4J



Getting the software going

- Move MT4J to the new project and refresh in Eclipse



Aug 13, 2010, 5:49 AM	20 KB	Plain text
Aug 13, 2010, 12:19 AM	--	Folder
Aug 13, 2010, 12:15 AM	--	Folder
Aug 13, 2010, 12:15 AM	--	Folder
Aug 13, 2010, 12:15 AM	20 KB	Plain text
Aug 13, 2010, 12:15 AM	20 KB	Plain text
Aug 13, 2010, 12:15 AM	112 KB	Plain text
Aug 13, 2010, 12:15 AM	308 KB	Plain text
Aug 13, 2010, 12:15 AM	52 KB	Document
Aug 13, 2010, 12:15 AM	8 KB	Document
Aug 13, 2010, 12:15 AM	32 KB	Document
Aug 13, 2010, 12:15 AM	52 KB	Document
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Aug 13, 2010, 12:15 AM	--	Folder
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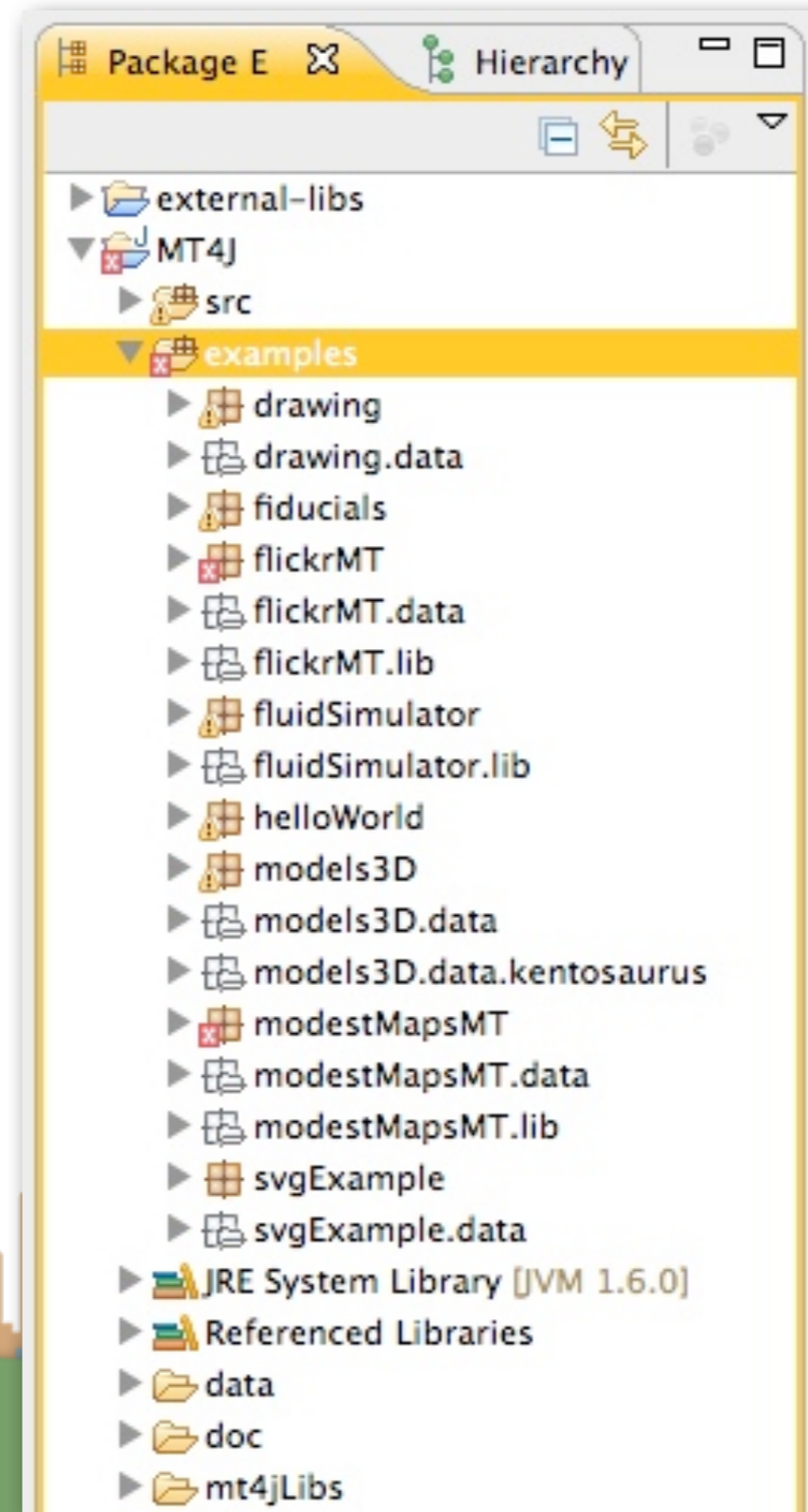
To get the examples running

- Add all the .jar files in the mt4jLibs directory into the build path for the MT4J project.
- Right click -> Build path -> “Add to Build Path”
- Make sure “examples” is in your build path as a source directory. (Look at the project properties)



Getting the software going

- When you run an MT4J program the TUIO server is built in
 - Hello World
 - Test Scene
 - MTGestures
 - Space Scene
 - Fluid Simulator



Getting the software going

- The MT4J page has information on how to use MT4J
 - It's a visualization system
 - It is complicated
 - Start with an example
 - Then modify it

MT4j

wiki search

Main Page

Main Page

MT4j – Multitouch for Java™ – is an open source Java™ framework, created for rapid development of visually rich applications. MT4j is designed to support different kinds of input devices with a special focus on multi-touch support.

MT4j Features

- can be used for 2D, 3D or 2.5D (pseudo-3D) applications
- cross-platform – currently tested under Windows 7™, XP™, Vista™, Ubuntu Linux and Mac OSX™
- extensible, component based scene graph structure (similar to Java™'s swing framework)
- input abstraction layer – support for all sorts of input devices can be easily added
- supports the new Windows 7™ Touch features natively and all the compliant multi-touch hardware
- supports Apple™'s multi-touch mice and trackpads
- supports the TUIO protocol, which is provided by finger and object tracking software such as ReaVision, CCV or Touché
- flexible multitouch gesture system – you can define your own multitouch gestures
- the most common multitouch gestures are already included and can be registered modularly with any component for a pluggable behaviour changeable at runtime
- software or hardware accelerated graphics rendering (using OpenGL)
- includes many graphical objects e.g.: rectangles, round rectangles, ellipses, polygons, lines, triangle meshes, spheres, cubes, etc. with support for textures, gradients, fill- and outline color
- includes prebuilt UI components e.g.: buttons, text, lists, sliders and a multitouch enabled keyboard
- support for loading and fast rendering of vector graphics from Scalable Vector Graphics (SVG) files
- supports bitmap and vector fonts (SVG and True Type Fonts)
- imports 3D objects from .3ds and .obj files with textures and creates normals for smooth shading
- precise picking/selection of all geometric objects in 2D or 3D space – most gestures are supported in 3D
- animation support
- built on top of Processing, which allows you to use its many features and libraries
- test your multitouch application by using one – or even multiple mice connected to your pc (Windows, Linux)
- MT4j is open source and released under the GPL License.

Quick Links

- Downloads
- Documentation
 - Installation
 - How to Start?
 - Developer's Guide
 - Code Snippets
 - Examples
 - Architecture Overview
 - API Reference
- FAQ (Frequently Asked Questions)
- Blog

News

MT4j on Android
04.04.11., 10:58, read / post comments

MT4j Interim Release (v 0.98)
04.04.11., 08:50, read / post comments

Our workshop in Berlin, Germany
01.04.11., 08:16, read / post comments

MT4j Roadmap
16.11.10., 05:30, read / post comments

Home of MT4j

Universität Stuttgart
Institut für Arbeitswissenschaft und
Technologemanagement IAT

Fraunhofer
IAO

NUI Group
Visit the NUI Group Community

Showcase: MT4j – Android Edition: First Alpha Version

MT4j - Android Edition: Demo: First Alpha Version More info

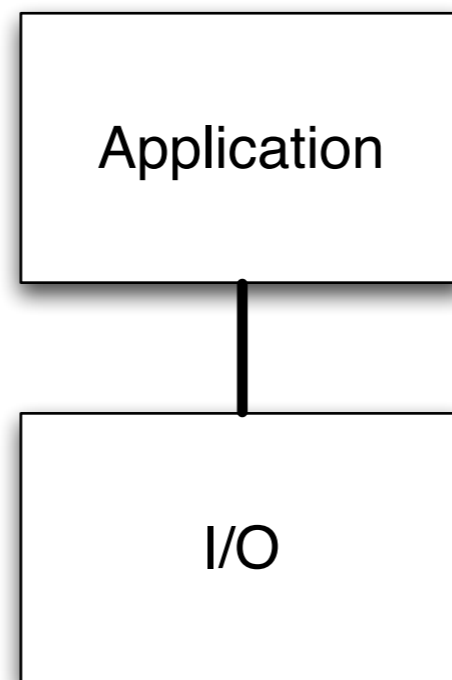
Multi-Touch Shell example

Running three MT-apps

Powered By MediWiki contact

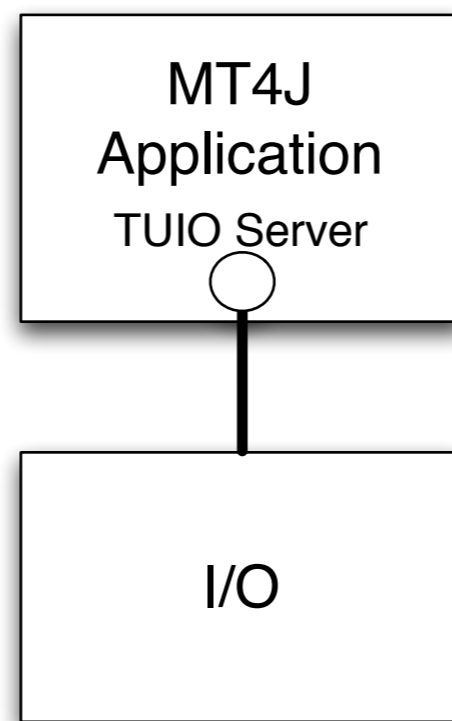
How to go about doing Assignment #6

- Get an end-to-end demo running with off the shelf stuff
- Then slowly replace the pieces with your implementations



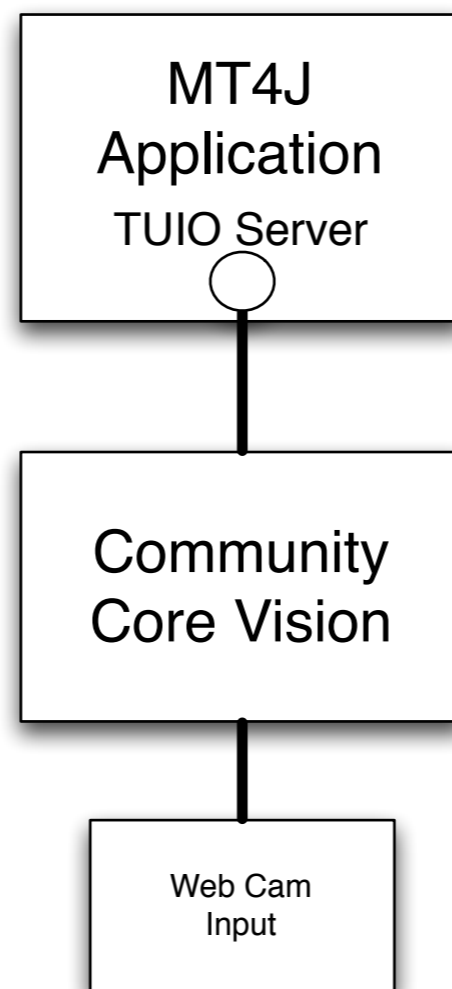
How to go about doing Assignment #6

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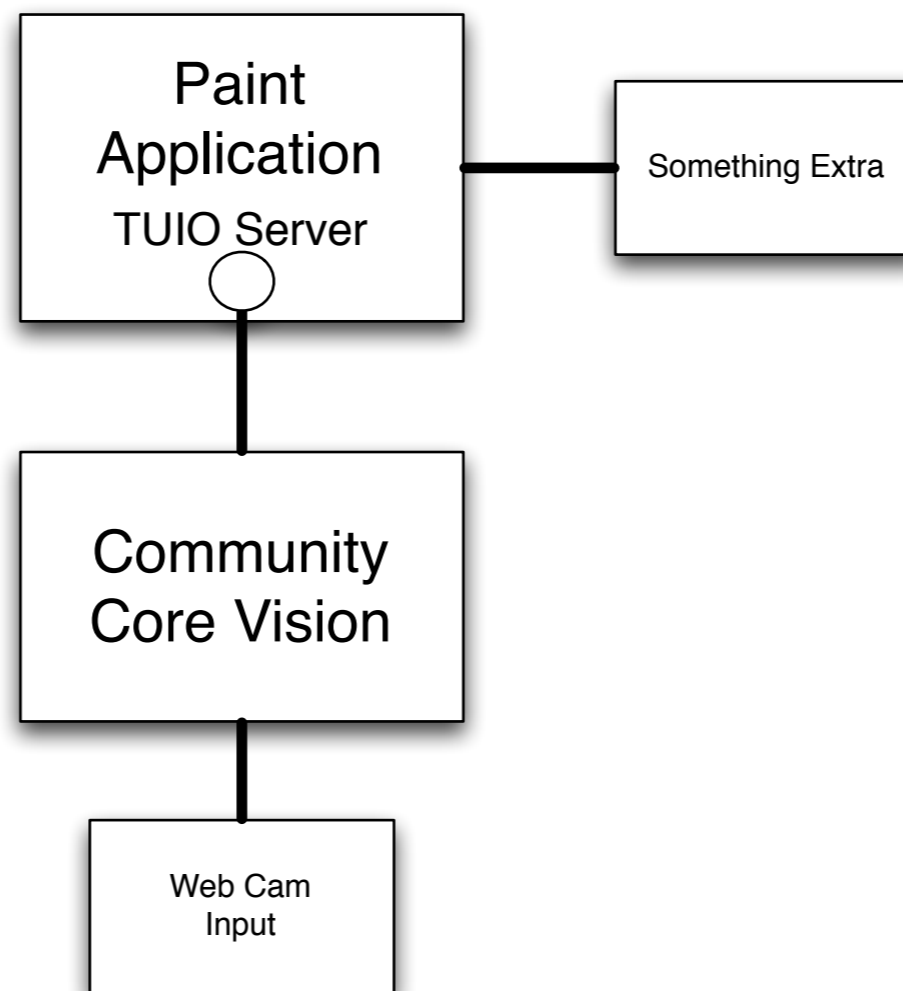
How to go about doing Assignment #6

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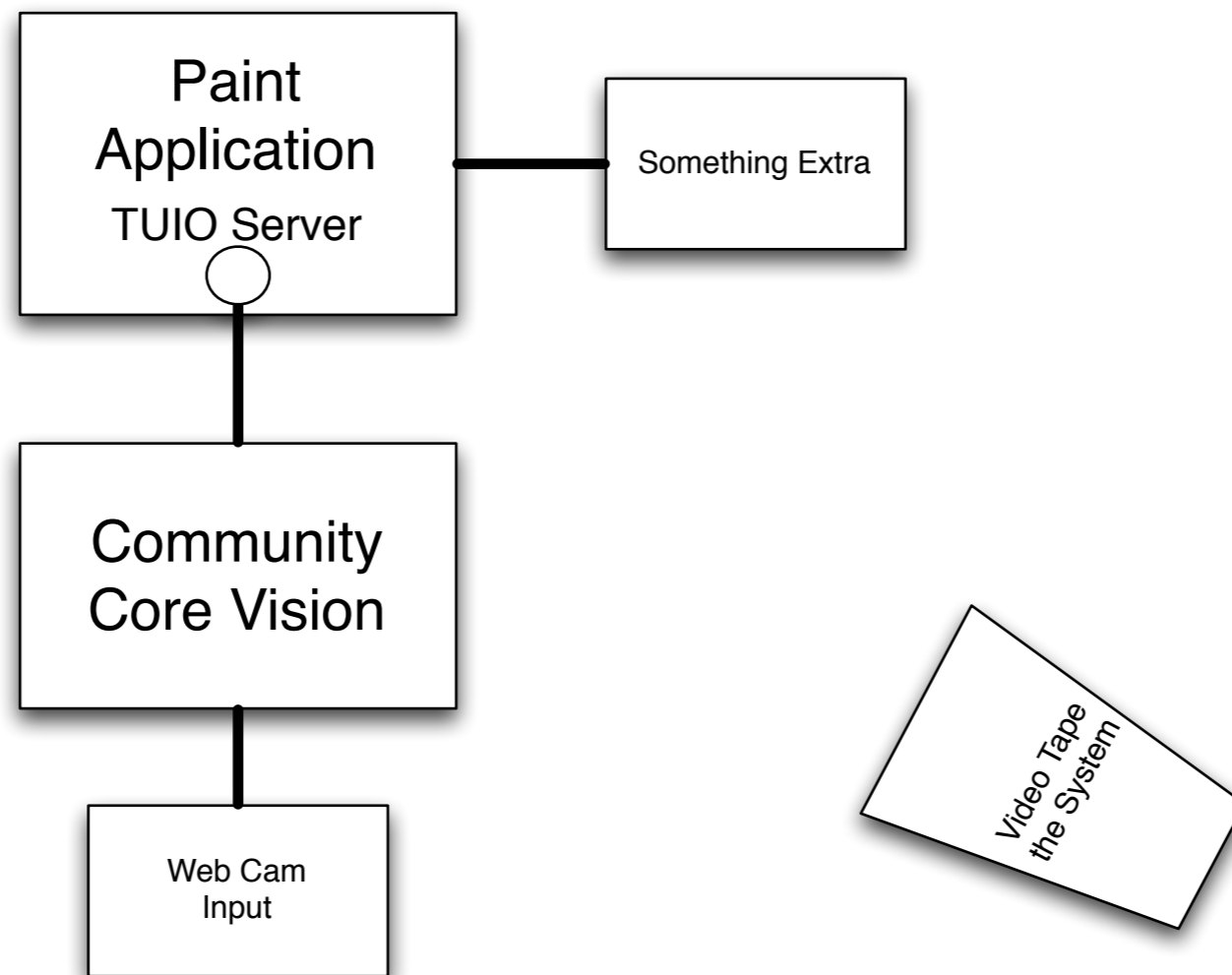
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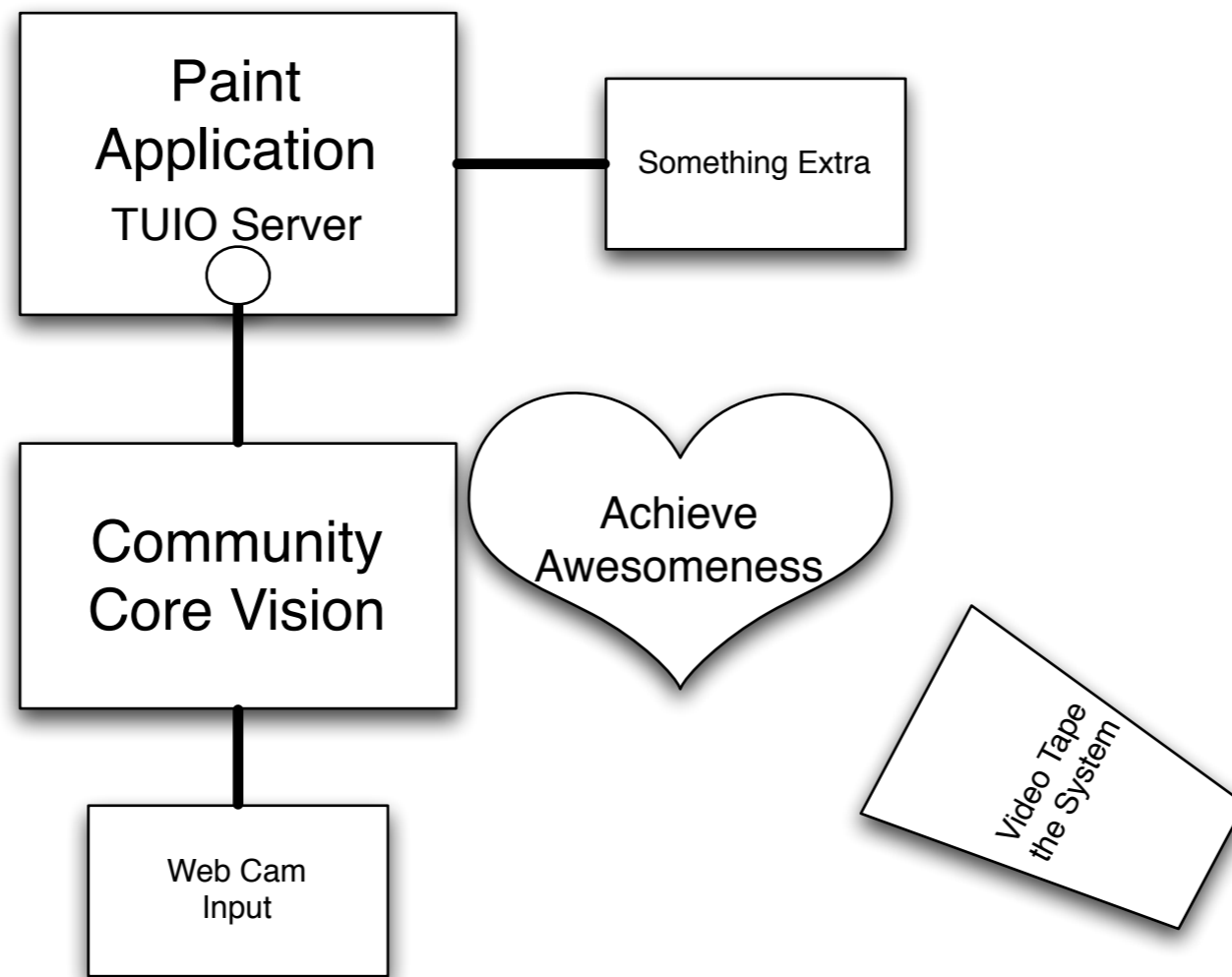
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How to go about doing Assignment #6

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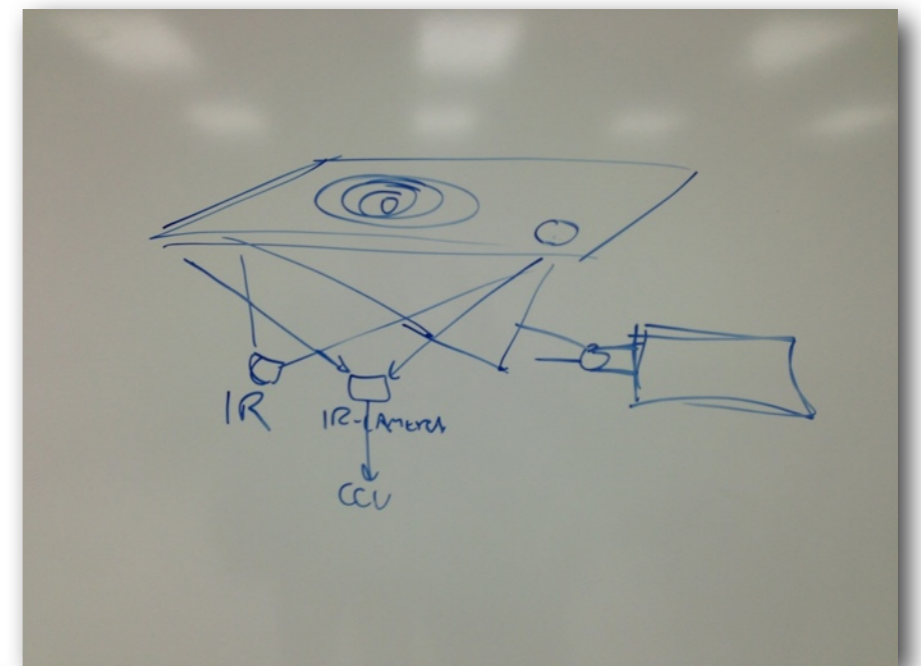
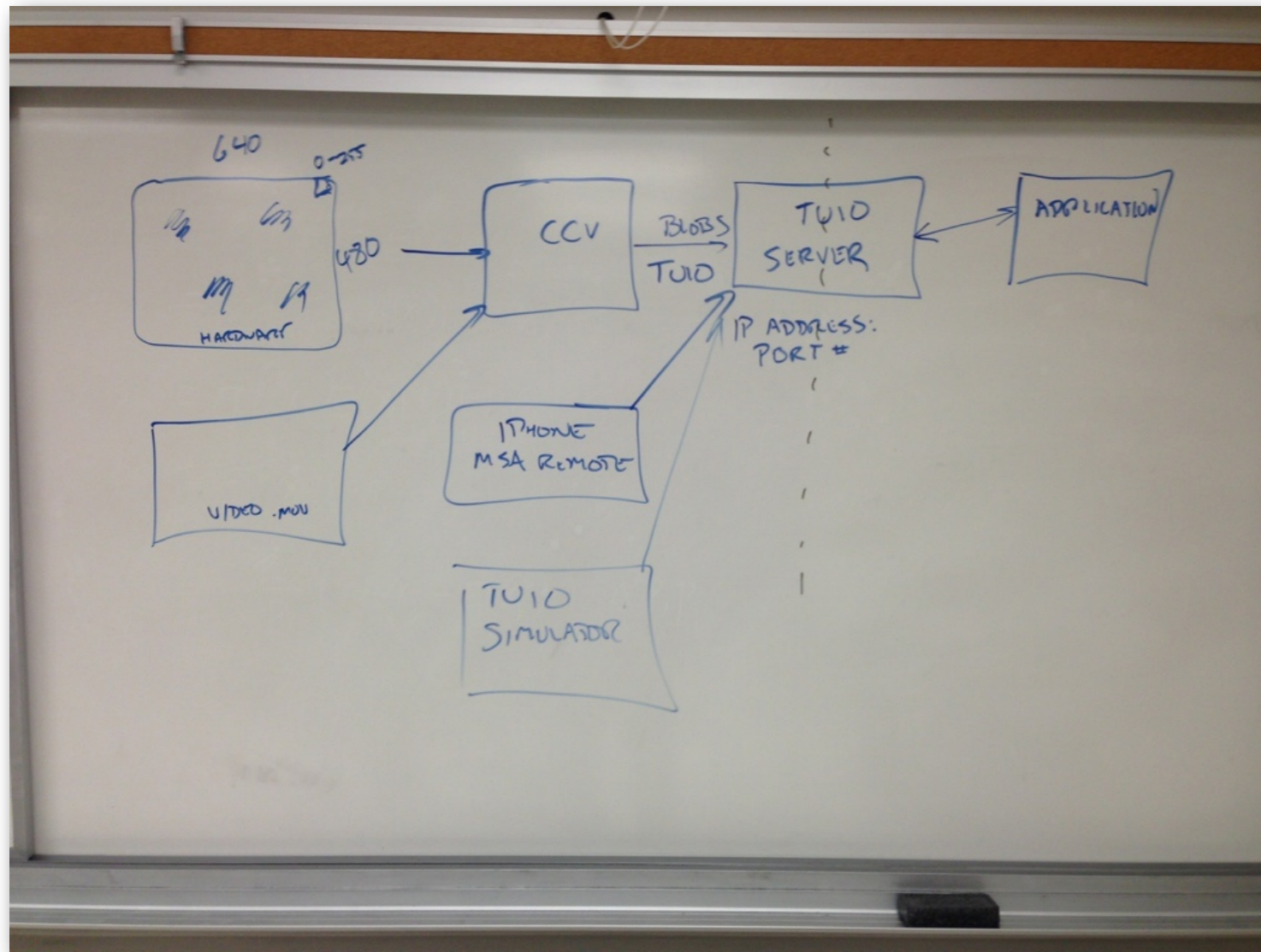


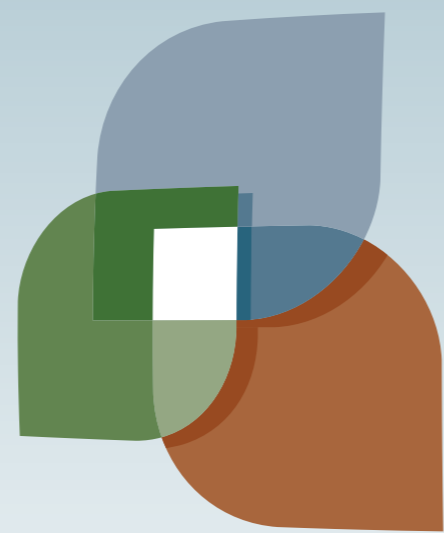
How to go about doing Assignment #6

- Options for increased awesomeness
 - Do a different application than a paint program
 - Make sure it needs multi-touch (talk to prof.)
 - Do a different input than a webcam
 - Make sure it is more than just a download (talk to prof.)
- Remember this can be a portfolio piece!



How to go about doing Assignment #6





L U C I

