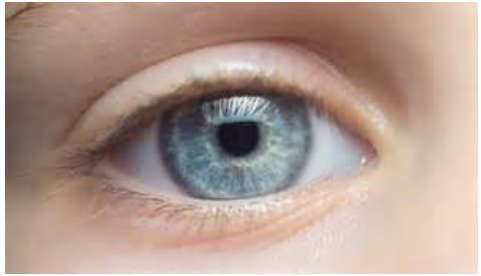
Day 2

How Do We Communicate?

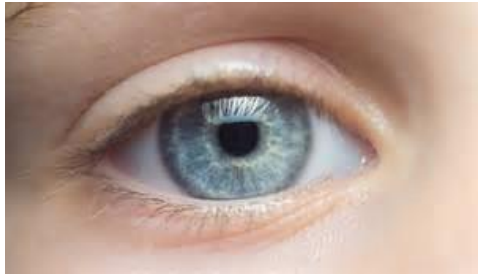
How Do We Communicate

Visually



How Do We Communicate

Visually

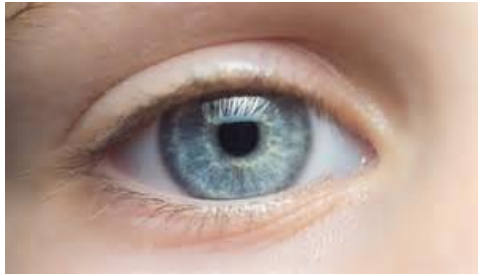


Words/Reading

Non-verbal gestures

How Do We Communicate

Visually



Words/Reading

Non-verbal gestures

Auditory

How Do We Communicate

Visually

Words/Reading

Non-verbal gestures

Expressions

Auditory

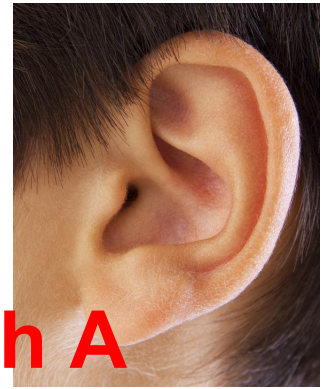
Speaking

Other Sounds

How Do We Communicate

Visually

Auditory



How Do We Interact With A Computer?

Words/Reading

Non-verbal gestures

Expressions

Speaking

Other Sounds

How Do We Communicate

Visually

Words/Reading

Non-verbal gestures

Expressions

Tactile

Moving a mouse

Typing on a keyboard

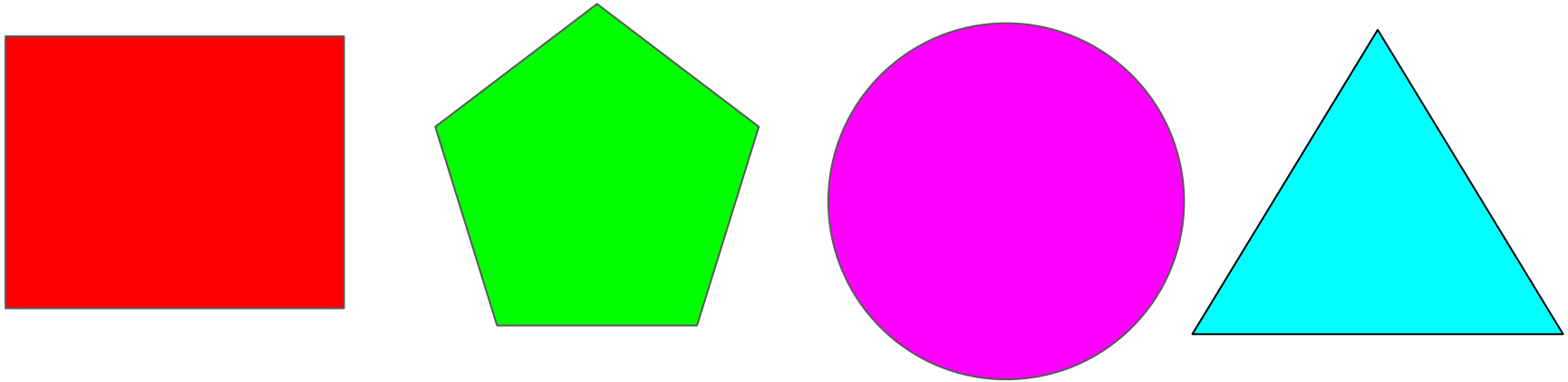
Auditory

Speaking

Other Sounds

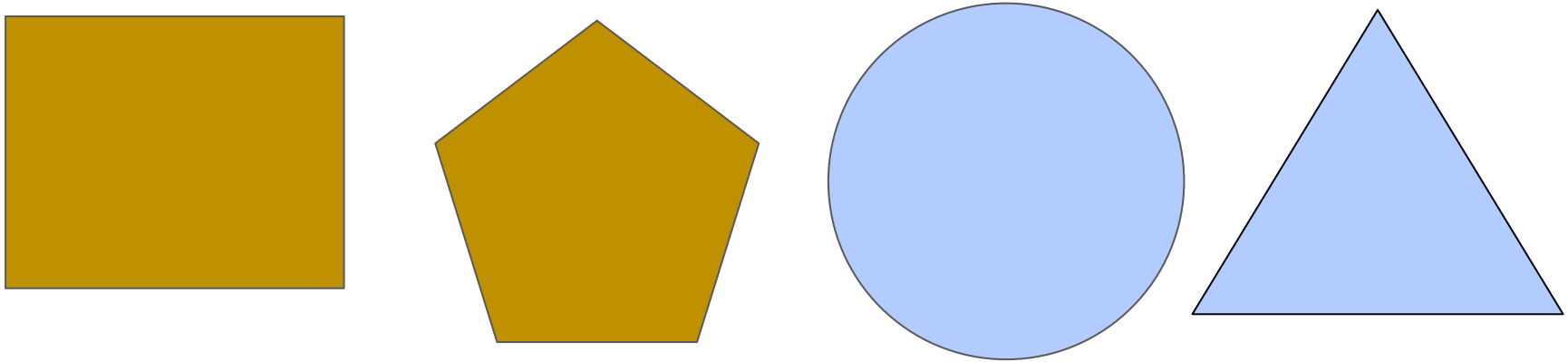
How To Communicate

How would you get me to pick one of these?



How To Communicate

How would you get me to pick one of these if I had dog vision?



How To Communicate

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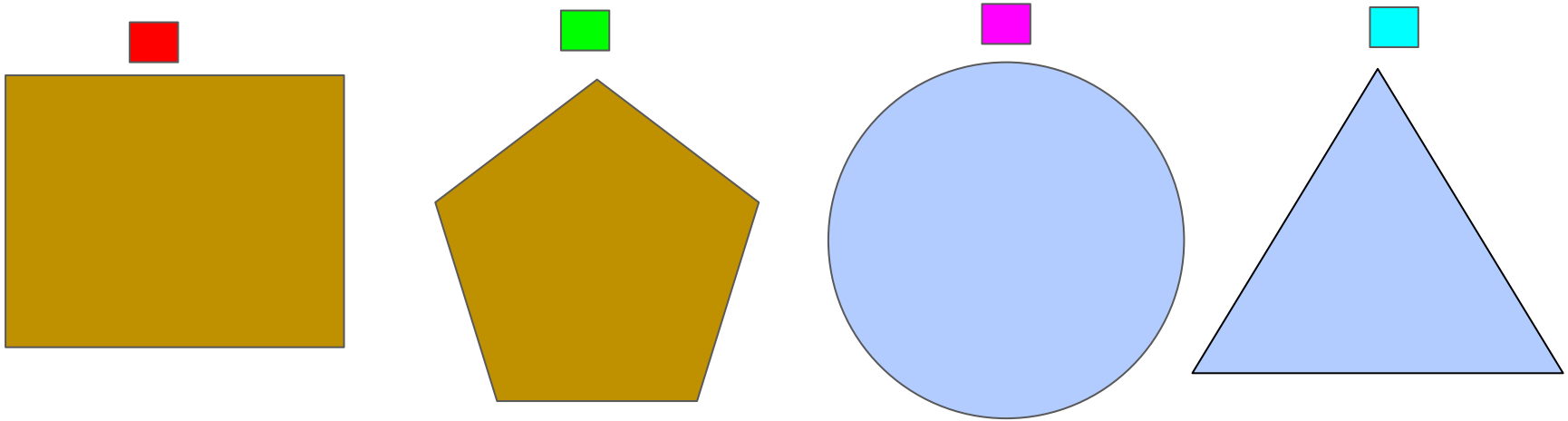
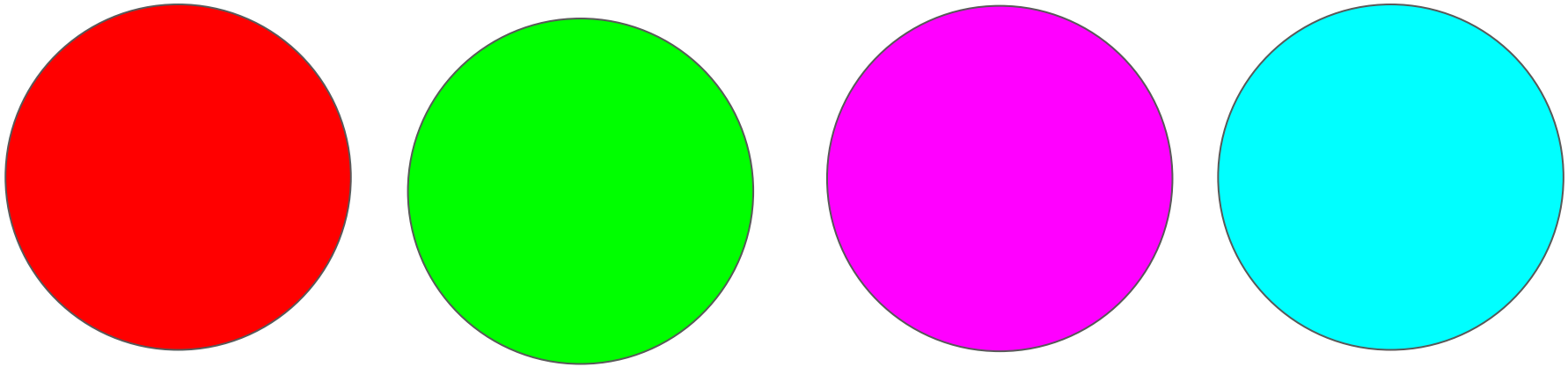


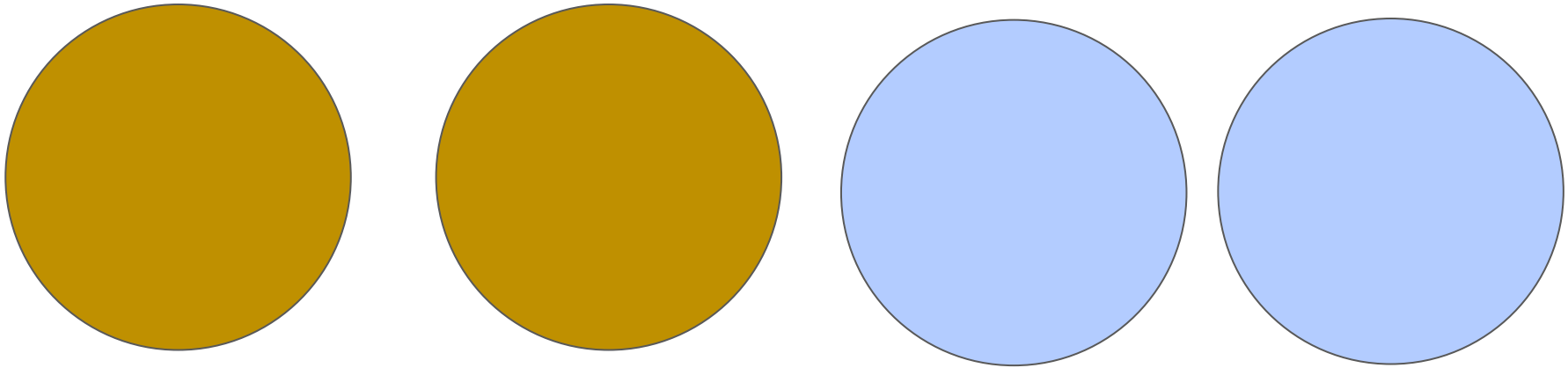
How To Communicate

Let’s Change the Shapes!



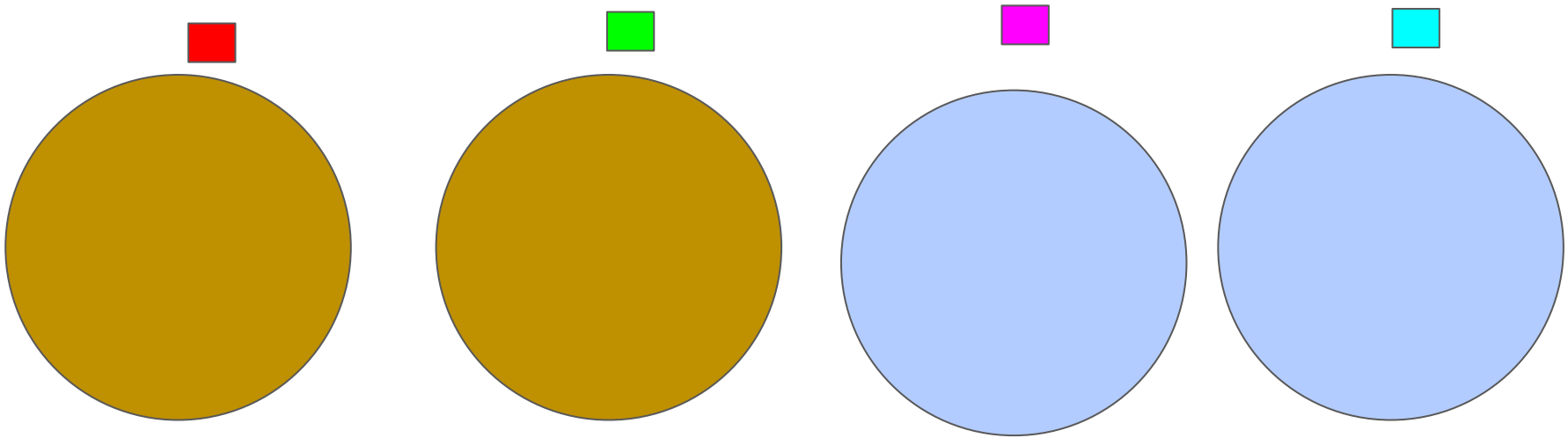
How To Communicate

Apply Some Dog Vision!



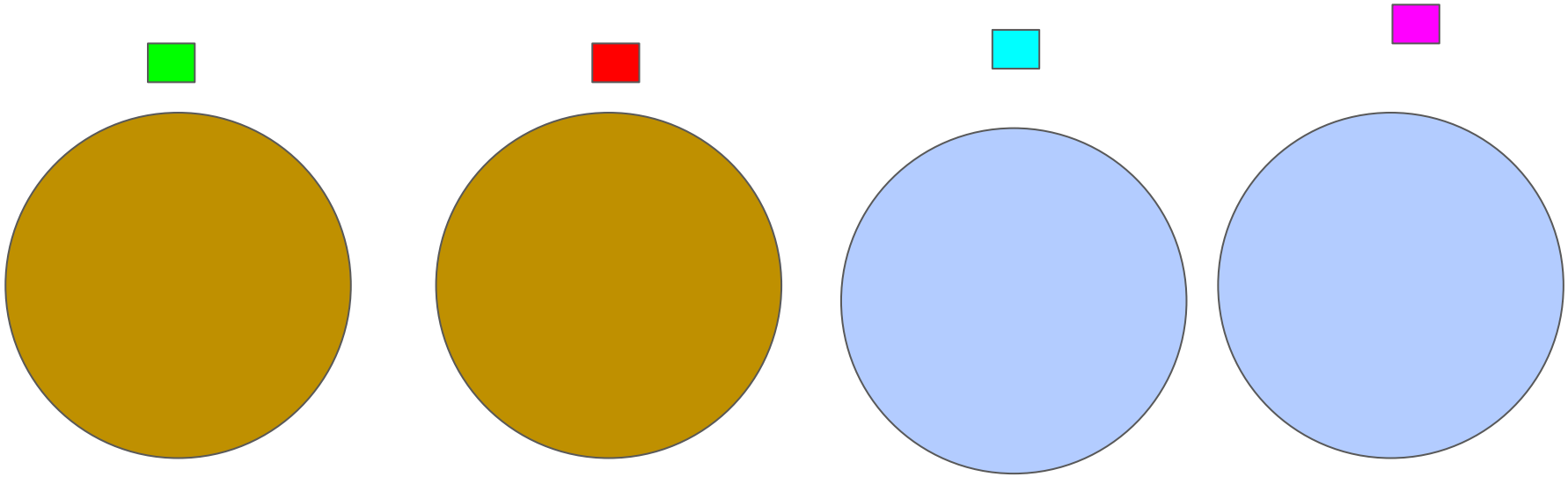
How To Communicate

Now How Do I Pick One?



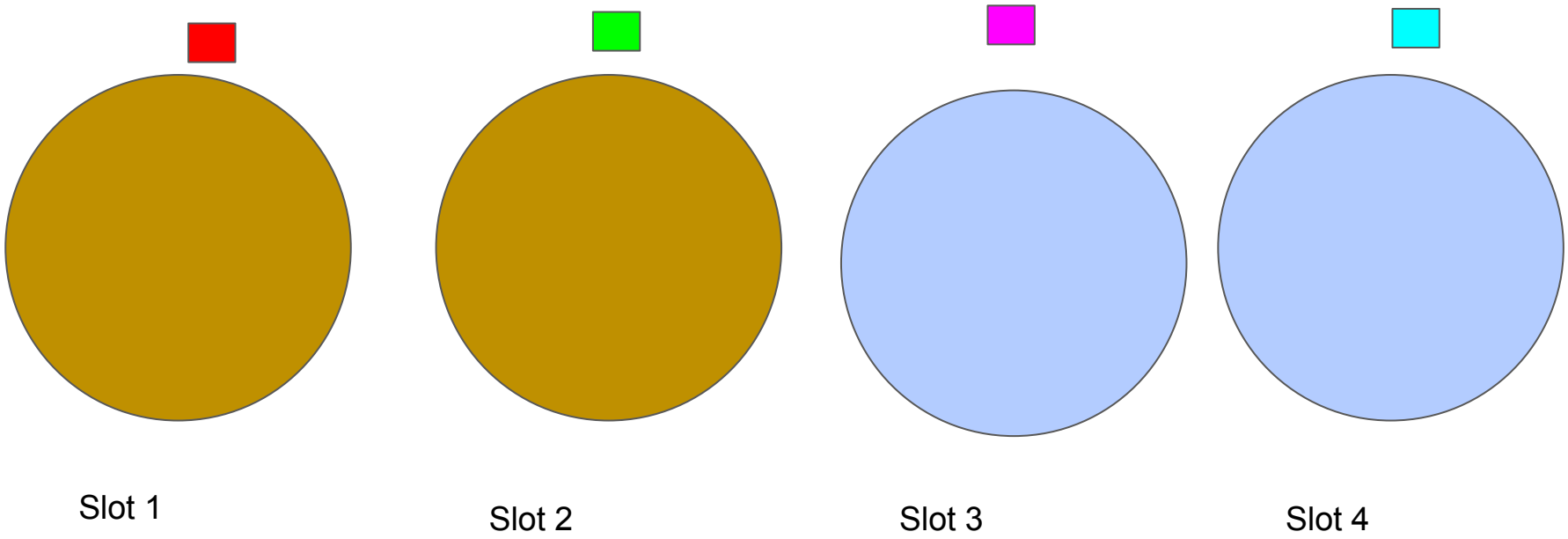
How To Communicate

Did They Move?

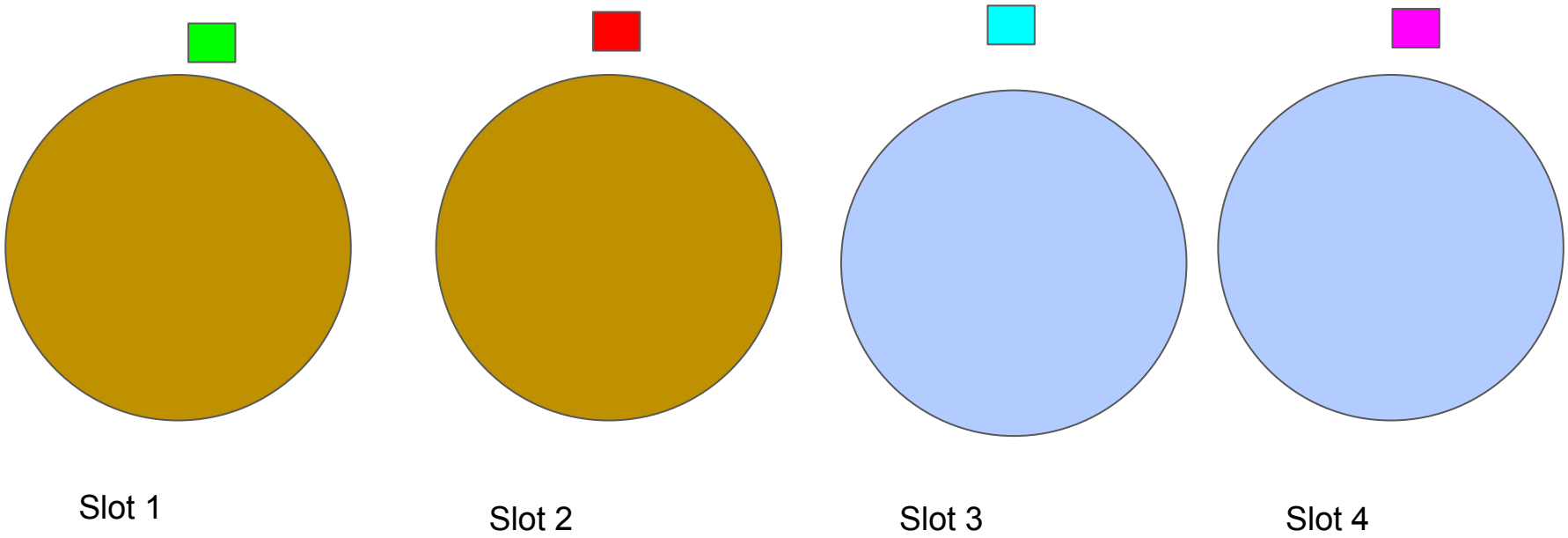


How To Communicate

If the location was fixed?

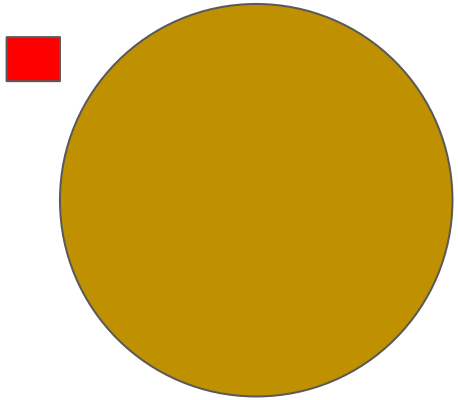


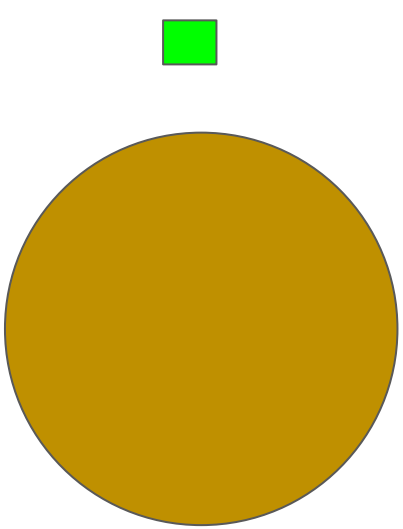
How To Communicate

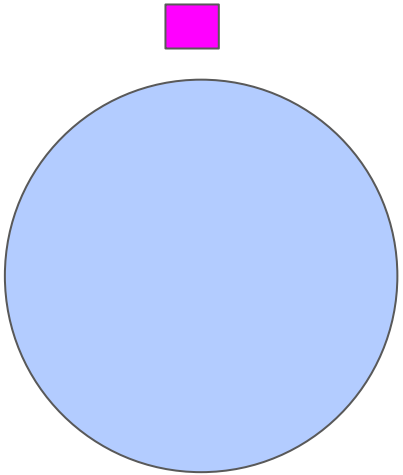


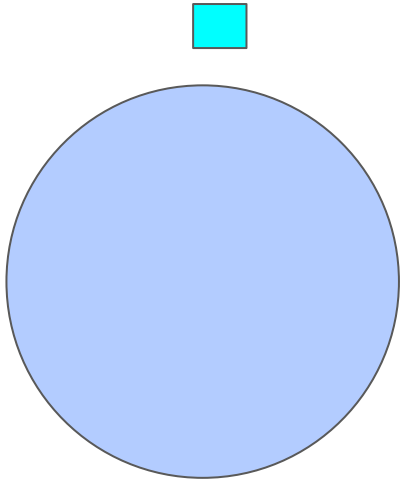
How To Communicate

What If the could be anywhere









Communicating With Visually Impaired with Computers

Computers:

Take Input and Produce an Output

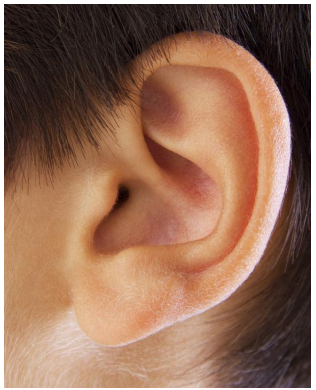
In other words:

They can sense and provide **feedback**.

Communicating With Visually Impaired with Computers

How can we provide feedback with ways other than visually?

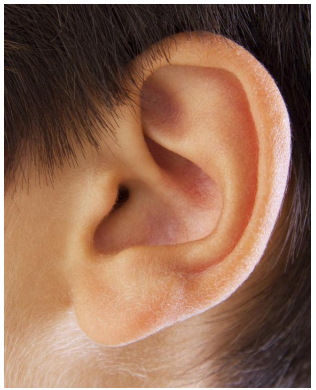
Auditory



Communicating With Visually Impaired with Computers

How can we provide feedback with ways other than visually?

Auditory

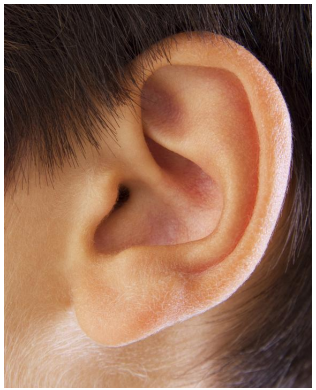


Tactile

Communicating With Visually Impaired with Computers

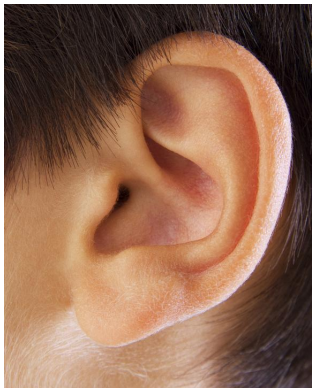
How?

Auditory



Communicating With Visually Impaired with Computers

Auditory



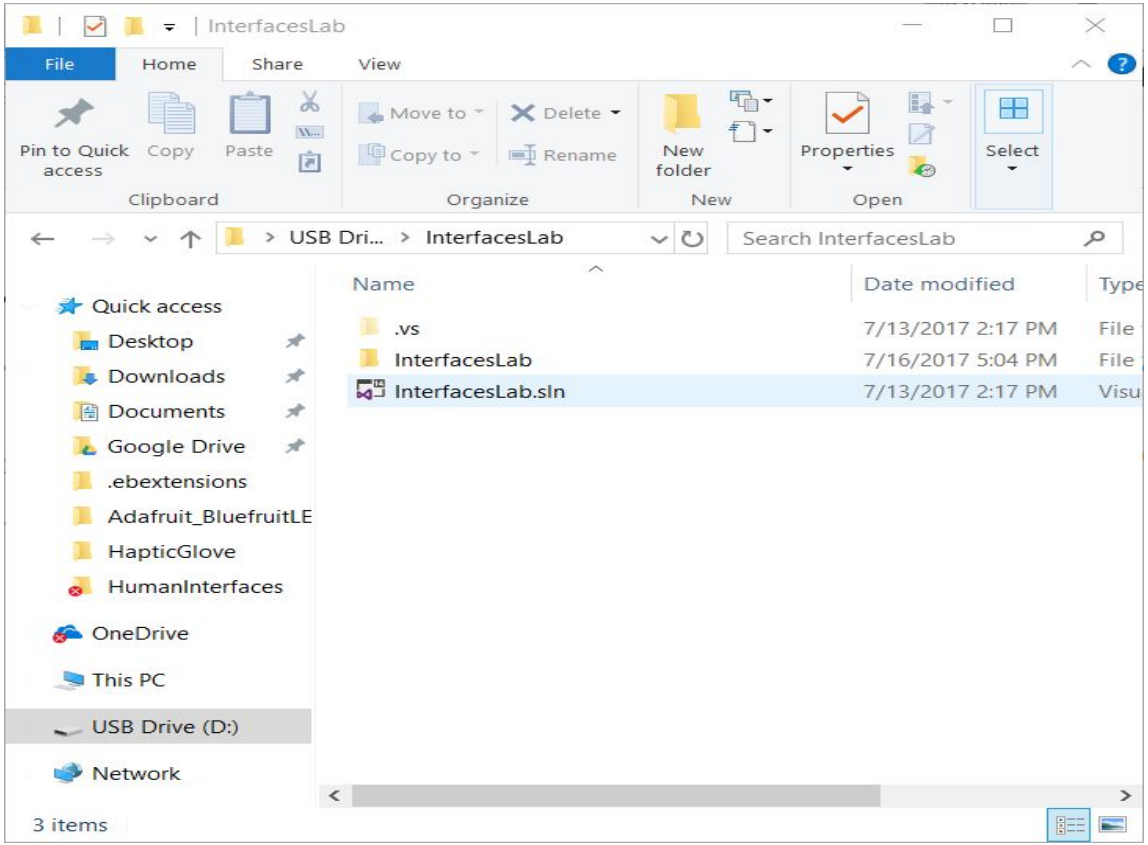
How?

- Verbal Instructions

Activity 1

Activity - Experimenting With Feedback

1. Get Into Groups of 2
2. Copy the InterfacesLab folder, from the flash drive Day 2/srcs to your desktop
3. Double-Click on the InterfacesLab.sln file.



Activity - Experimenting With Feedback

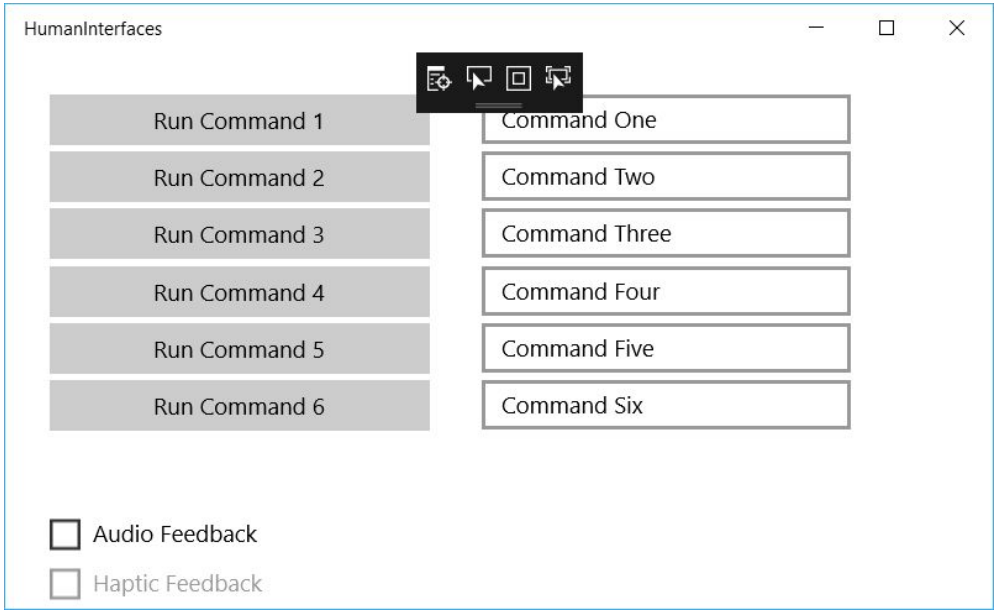
1. At the top, press the green triangle. It should say local machine

Activity - Experimenting With Feedback

When the application opens there are 6 buttons labeled “Run Command” 1-6.

Clicking these buttons will then have the computer speak the text in the box next to it.

Note: Make sure you check the “Audio Feedback” Box



Activity A - Using Audio

Now using various items available, have one member of your group guide the other to pick up one of the products while being blindfolded.

Then switch so everyone gets a turn.

Things to think about:

- How many commands do you need?
- How fast can you complete it?

Audio Feedback - Recap

How did you do?

What were the most effective commands?

What would make it easier?

How many commands did you end up needing? Was 6 enough? Too much?

What is the minimum number of commands you need to accomplish the task?

Communicating With Visually Impaired with Computers

How?

Tactile

Communicating With Visually Impaired with Computers

Tactile

How?

Vibration motors:

Different Patterns? Placement?

Activity 2

Haptic Feedback

This time we will be experimenting with haptic feedback.

For this exercise we will be trying to interface with a glove that has motors on it that can be controlled via software.

Get into groups.

Haptic Feedback - The Glove

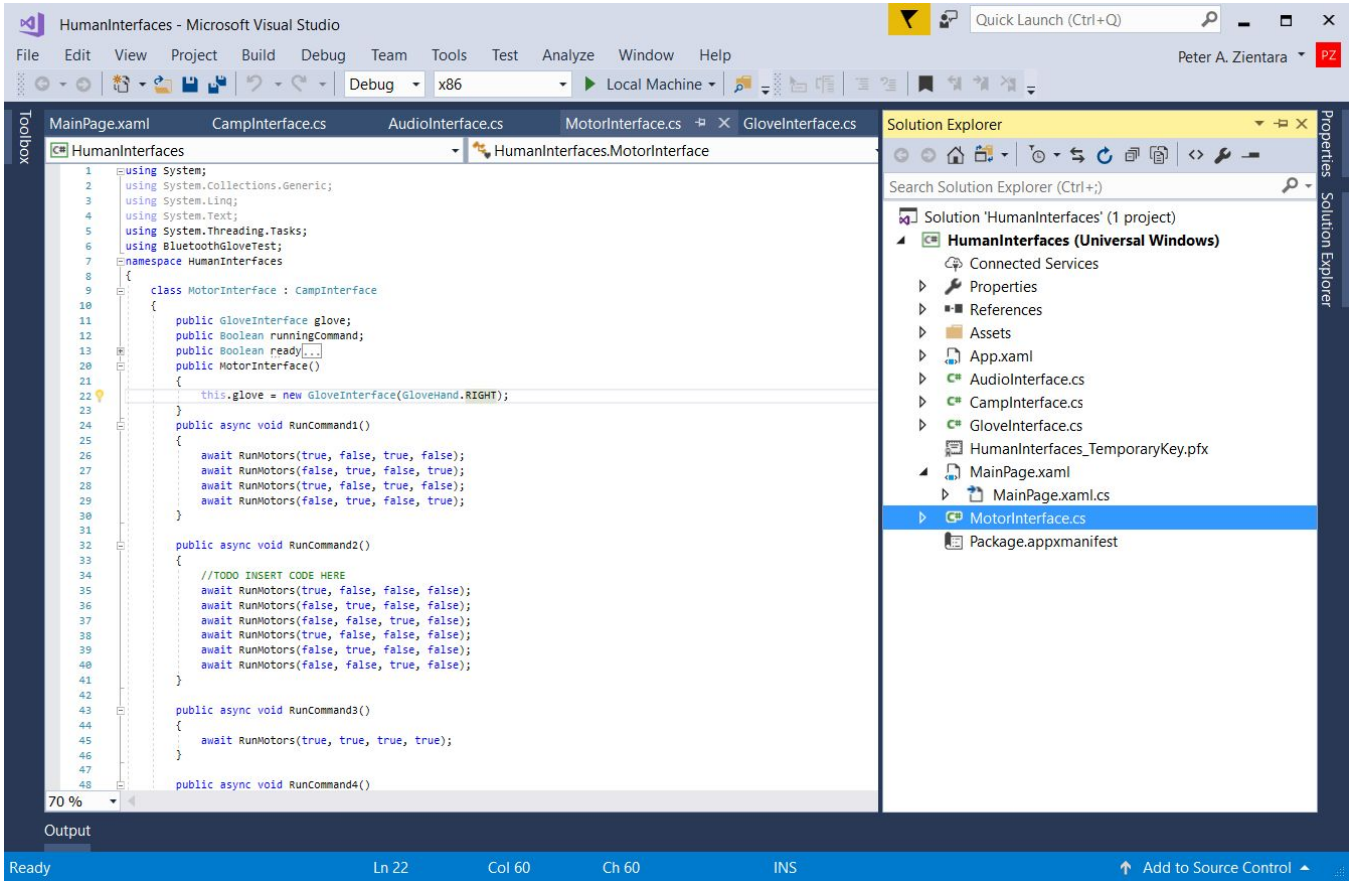
Four Motors

Located at various positions on the glove.

How To Program

Open the solution explorer “View > Solution Explorer”

Double click the MotorInterface.cs file.



How To Program

You will see six functions, RunCommand1(), RunCommand2() etc.

To interface with the motors, create patterns, etc. you will have to insert code into each of these functions which correspond to the buttons from the first activity.

The line to copy and paste is as follows:

```
await RunMotors(true, true, true, true);
```

This line will run all of the motors for .5 seconds.

Anything that is “true” can be changed to “false” to turn of the corresponding motor for .5 seconds

How To Program

Look at the RunCommand1() for an example.

The motors are laid out in the following order:

Left, Top, Right, Bottom.

Haptic Feedback - Recap

How did you do?

What were the most effective commands?

What would make it easier?

How many commands did you end up needing? Was 6 enough? Too much?

What is the minimum number of commands you need to accomplish the task?

Making It Automatic

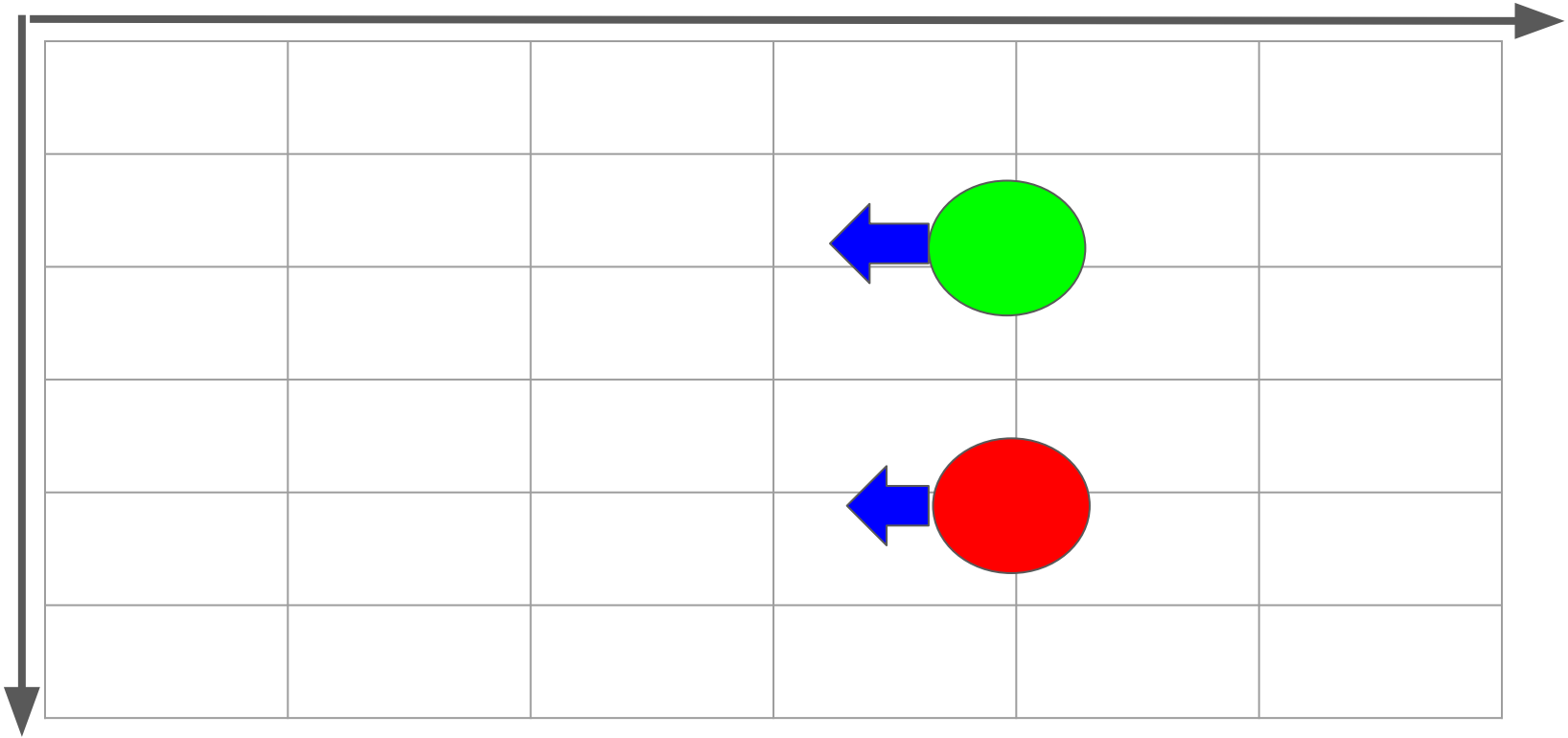
Automatic Guidance - How?

Being able to issue effective commands is only the first challenge!

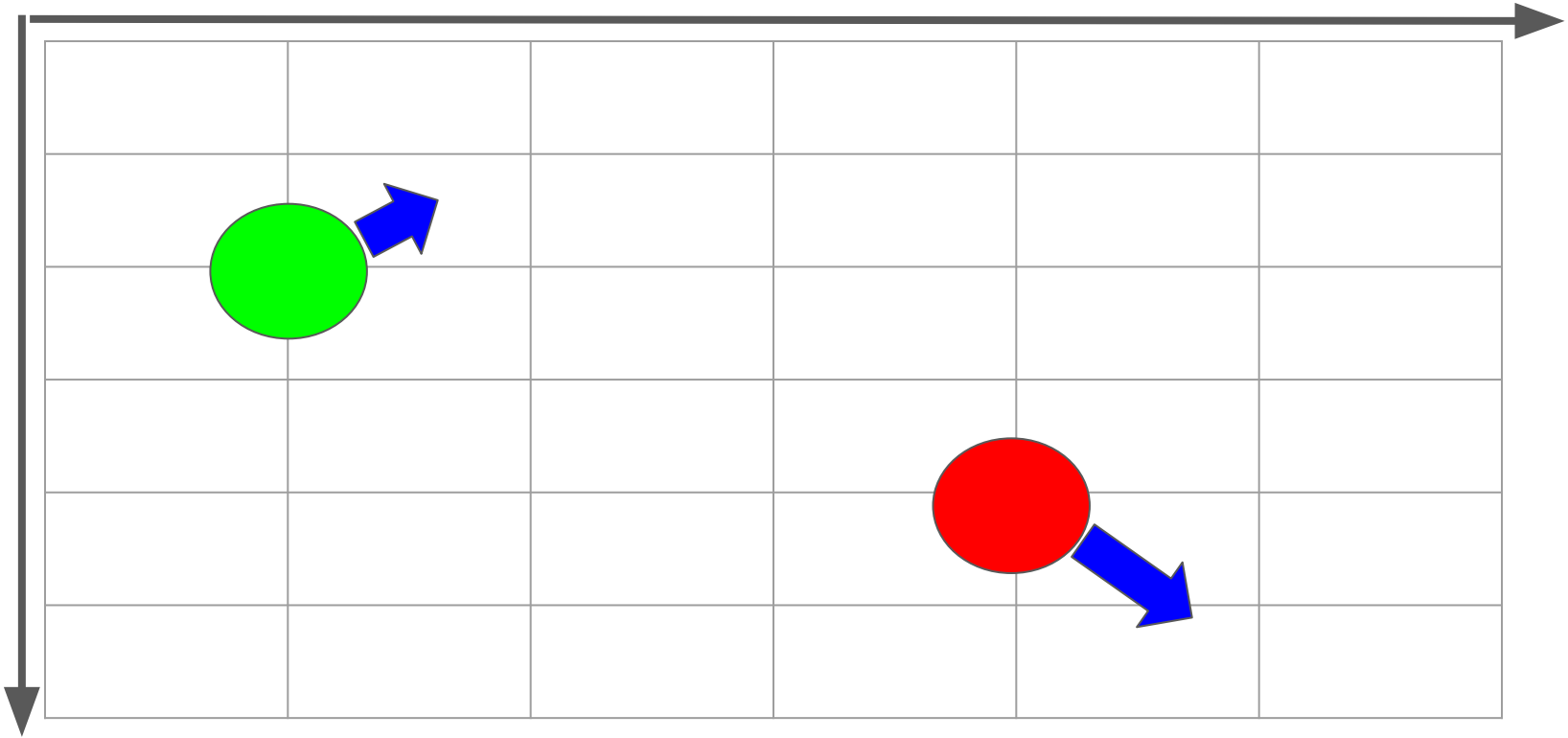
What would be some challenges to making this process automatic?

- Object Recognition - What object to I guide you to?
- Localization - Where am I?

Coordinate Systems



Coordinate Systems



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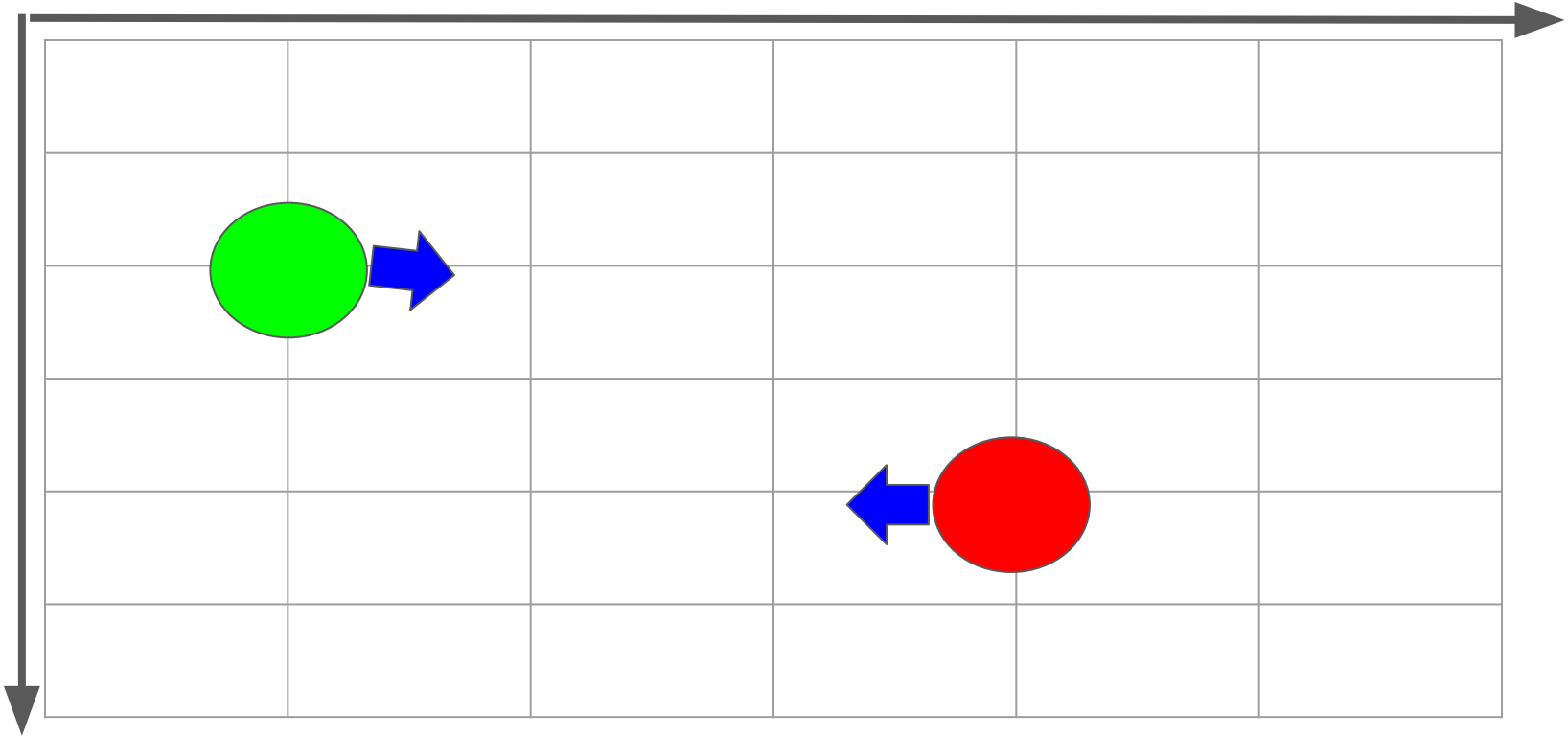

Coordinate Systems

How to we orient a camera?

Where do we place it?

Coordinate Systems

How to we orient a camera?

Where do we place it?

Hand?

Coordinate Systems

How to we orient a camera?

- Where do we place it?
  - Hand?
  - Shoulder?

Coordinate Systems

How to we orient a camera?

- Where do we place it?
  - Hand?
  - Shoulder?
  - Head?

Hololens Demo

Head mounted camera.

You can place a marker and be guided to find it visually or through audio.