

goo.gl/r43Jm9

Dream it, Build it!

Create Mobile Apps with App Inventor

MISF STEM Conference
2017



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Code Savvy

**authorized Google Education
Trainer**



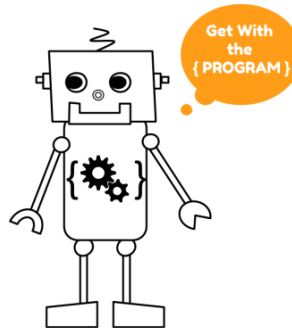
[Code Savvy](#) is a not-for-profit organization inspiring kids and teens to become code-savvy, that is, to understand the kind of creative thinking that goes into coding, and to try out programming computers and devices. Code Savvy is determined to bring more diversity -- gender and ethnic diversity -- to computer science.



Code Savvy™



Technovation[MN]



Eileen King



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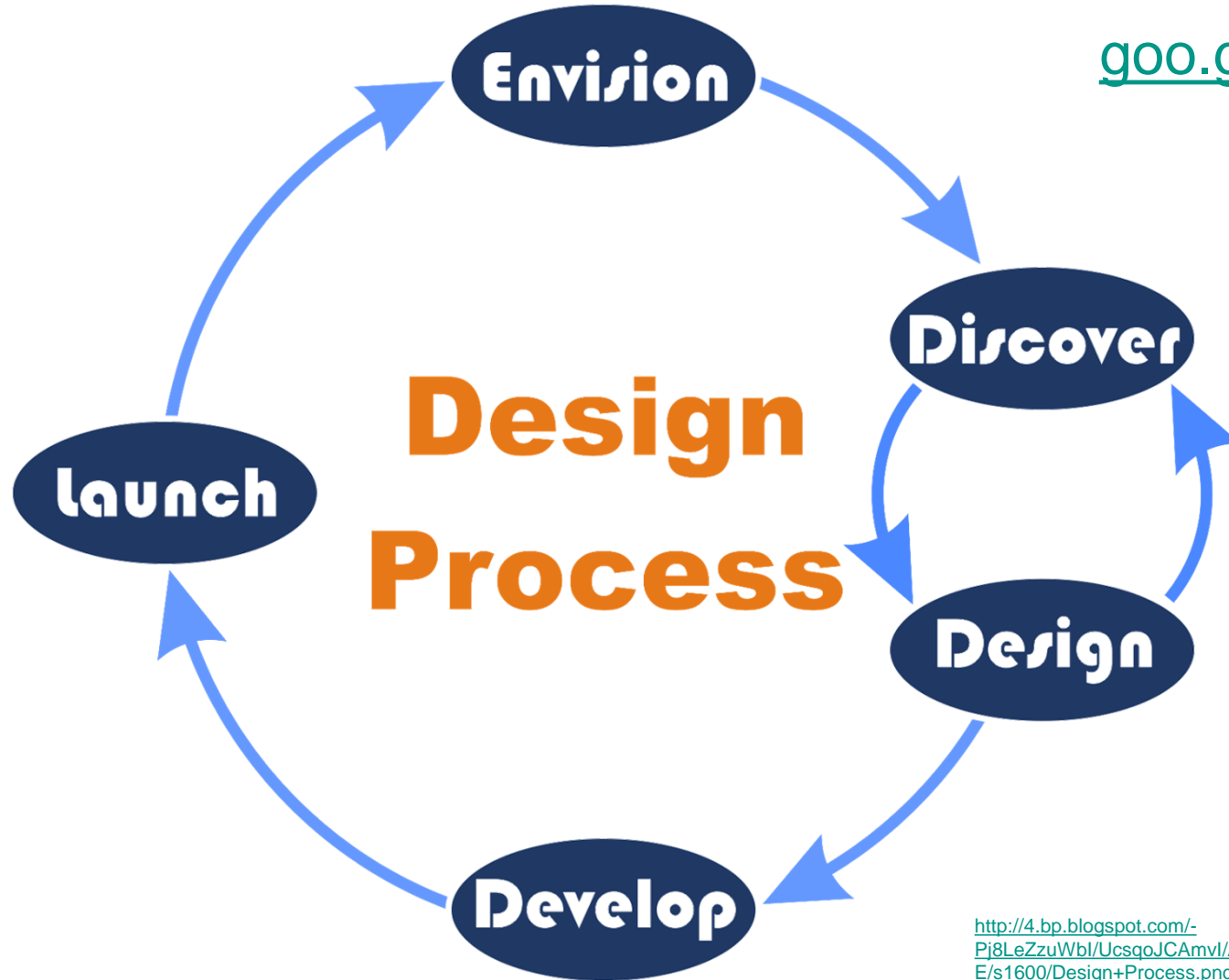
IB MYP Design Teacher

*Lakes International Language Academy,
Forest Lake*

Camp Innovation Counselor

The Bakken Museum

CoderDojo Champion

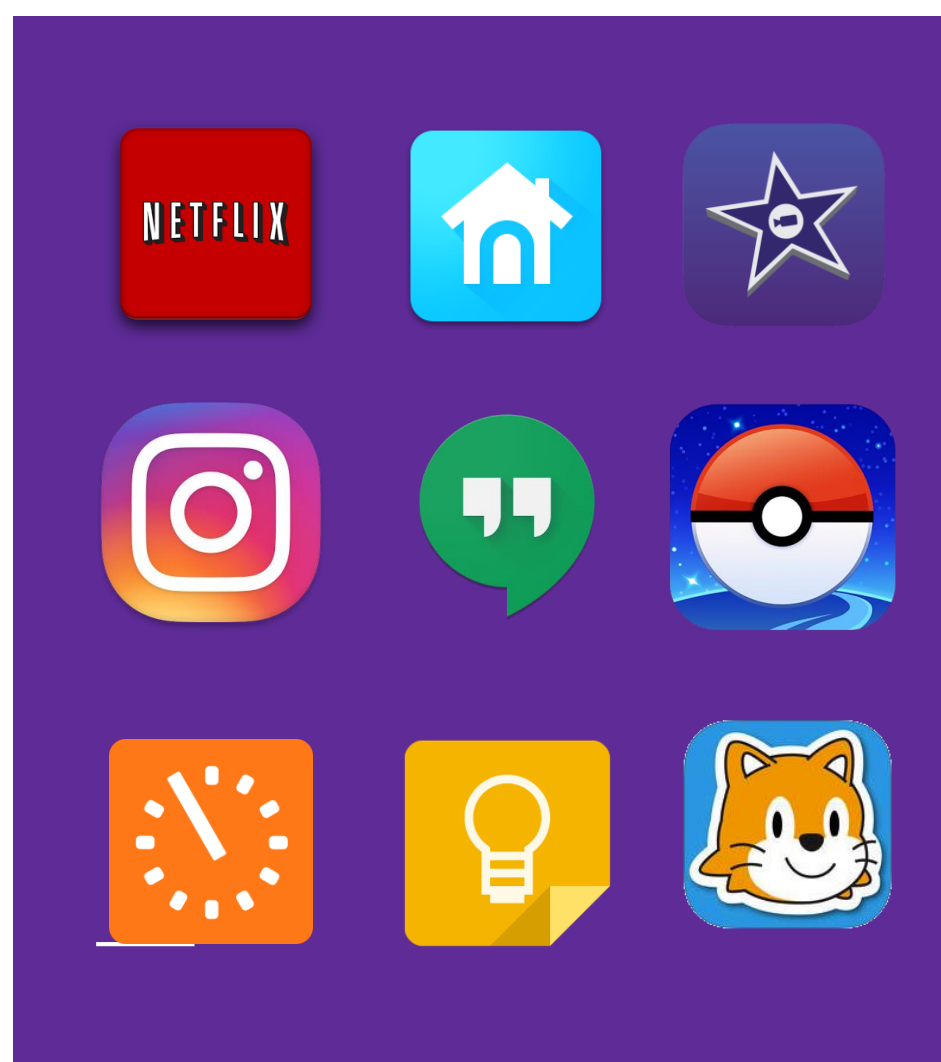


Design Process

Why develop apps?

Apps make many things more accessible...

What are your favorite apps?



Apps Can Be Designed for Any Audience

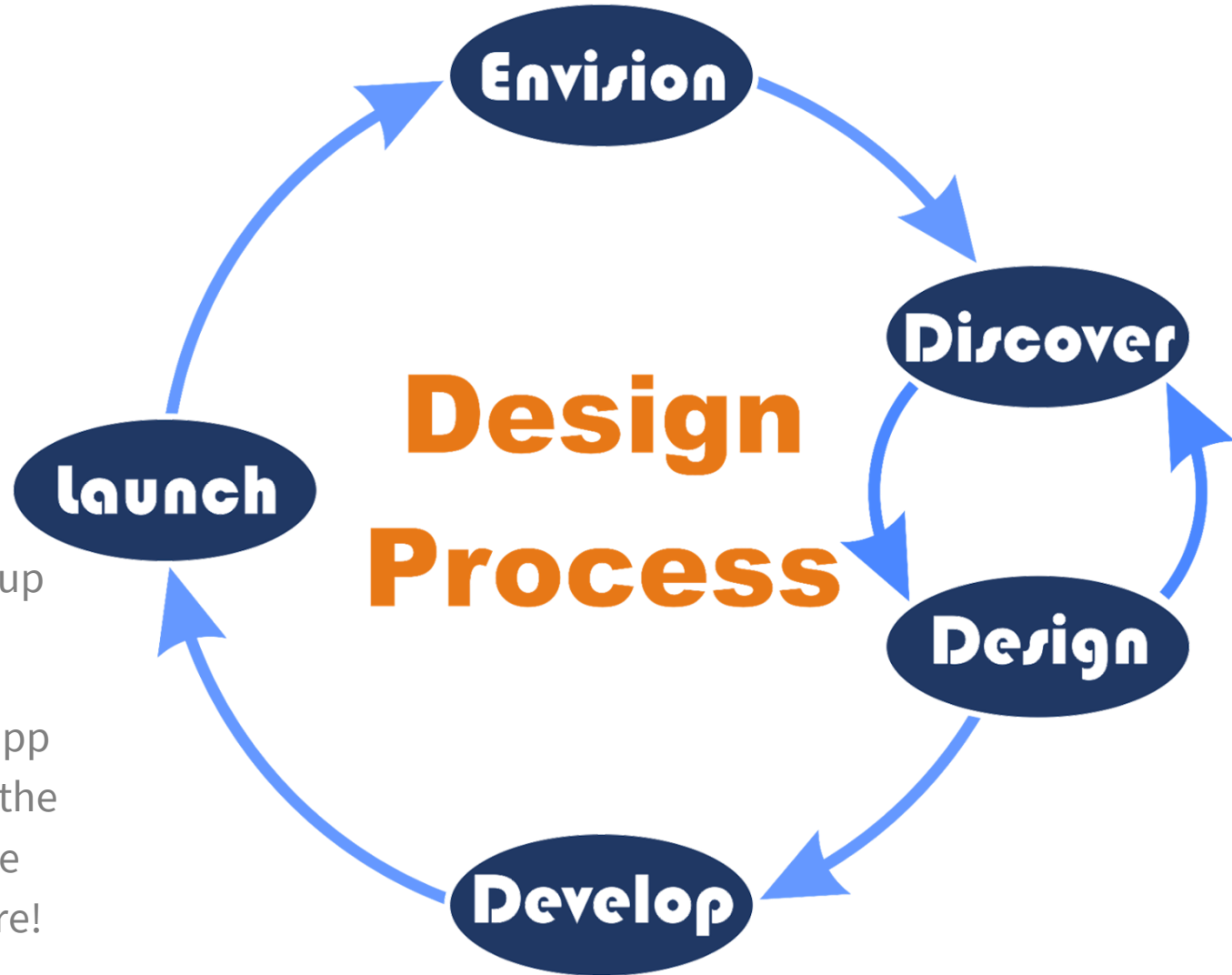


**Apps start with
an IDEA.**

**An opportunity
for solving a
problem.**



Challenge: Envision



Get together with a group of 3-5.

Brainstorm your best app idea that is inspired by the random nouns you were given. Be ready to share!

Some not-so-scientific rules about “good ideas”

Make something average better. Make something expensive more affordable. Make something that targets one market more accessible to another. Simplicity typically wins.

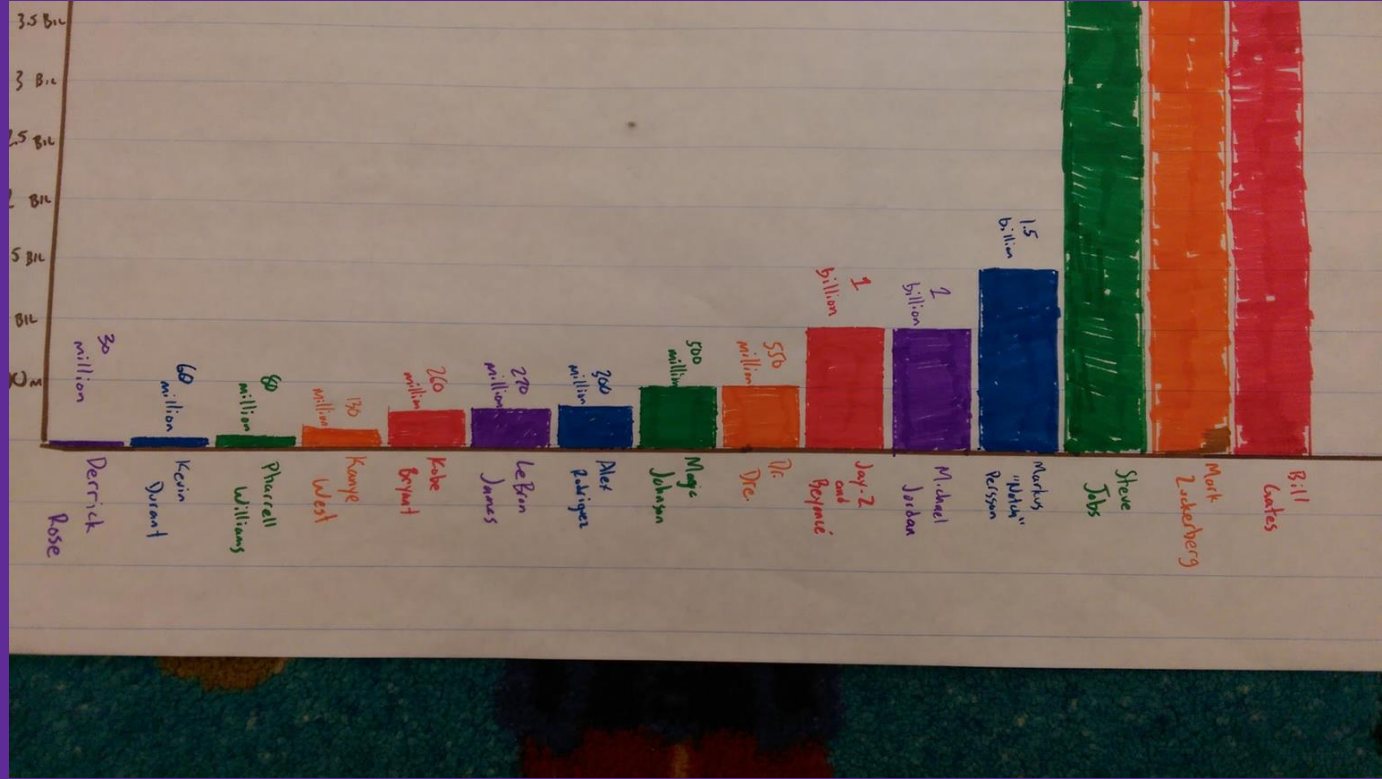
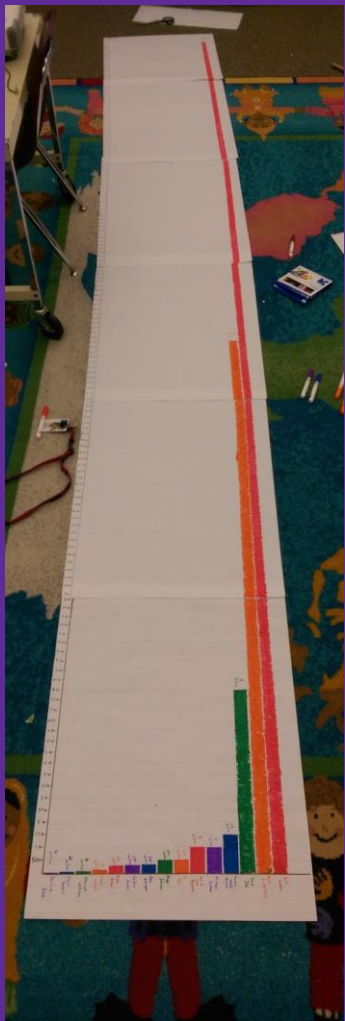
Build flexibility into it. Will it bend as challenged or just break?

Make educated assumptions about how it can scale or operate.

Build to capitalize on the now.

Do your research. Know your market.

App Development in the Classroom



This graph compares the net worth of a variety of athletes and entertainers with tech entrepreneurs...who do you think is on the far right?

```
when ButtonRed .Click
do set DrawingCanvas . PaintColor to [red]

when ButtonBlue .Click
do set DrawingCanvas . PaintColor to [blue]

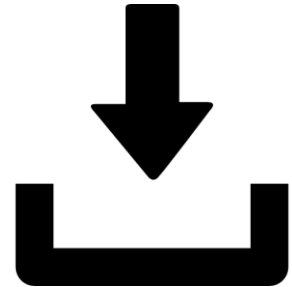
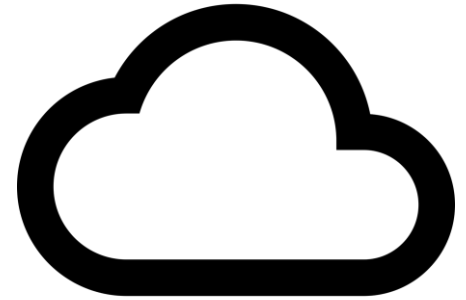
when ButtonGreen .Click
do set DrawingCanvas . PaintColor to [green]
```



Google™
Apps for Education



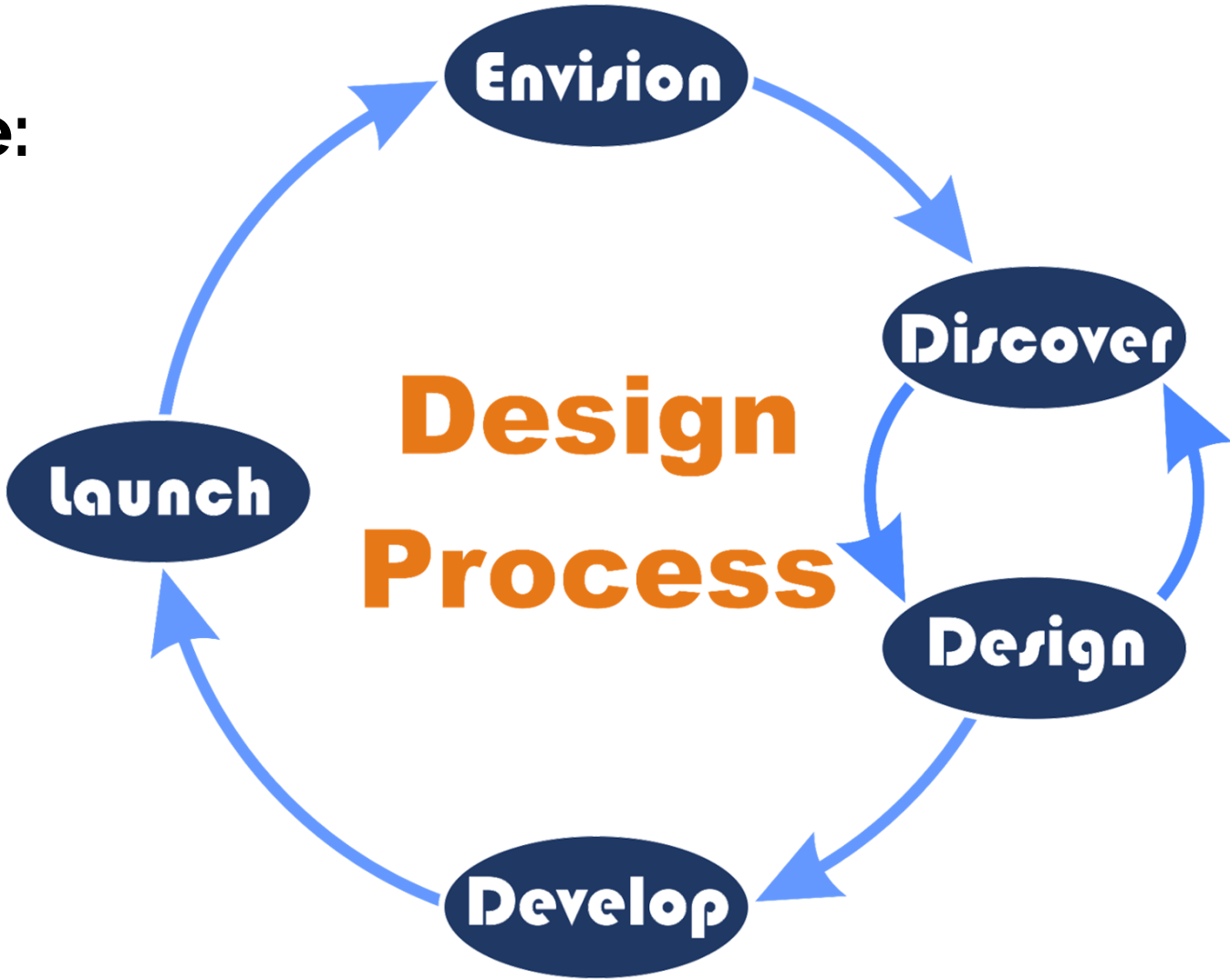
Why App Inventor?



Build your project on
your computer

Test it in real-time on
your device

**Challenge:
Discover**



Let's Dig In!

Navigate to the [MIT AppInventor](#) website

Click on **Create Apps** in the upper right hand corner.

Login with your Google Account.

Let's Take a Tour!

Start a New Project

Palettes

Viewer

Components List

Properties Panel

Hands on

[Hello Purr](#)

[Cat image](#)

(Google Images - Tools - Labeled for Reuse)

[Meow sound](#)

([Soundbible](#) is a good source for other sounds)



Test Your App!



**Build your project on
your computer**



**Test it in real-time on
your device**

Connecting a device:

MIT AI2 Companion -
Required local app



Live preview!

**App Challenge:
Remix Hello Purr
to create an app
that is helpful in
the real world**



Start Simple to Build Skills

(Resources are linked)

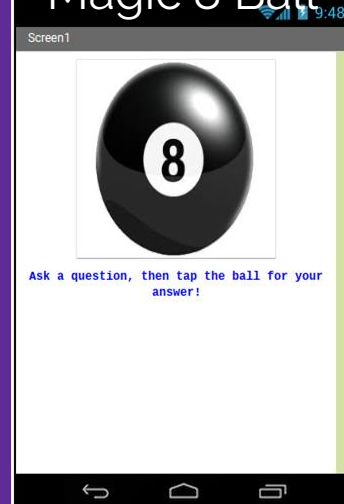
Hello Purr



Soundboard



Magic 8 Ball



Paint Pot



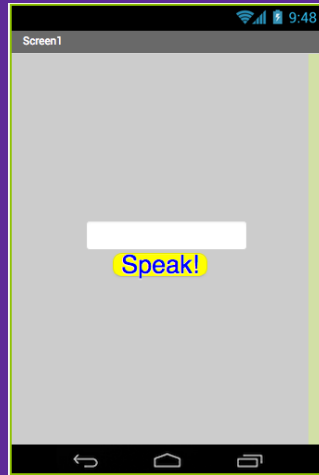
Start Simple to Build Skills

(Resources are linked)

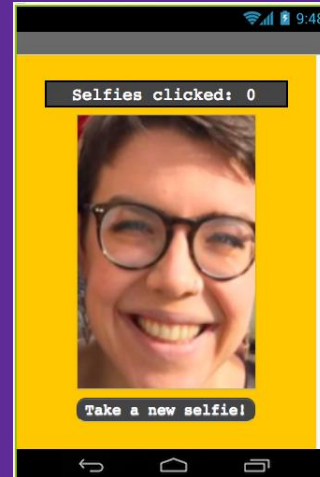
Soundboard



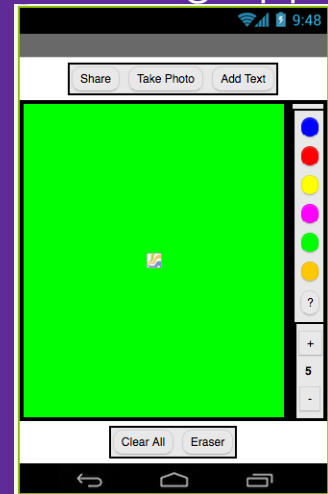
Talk to Me



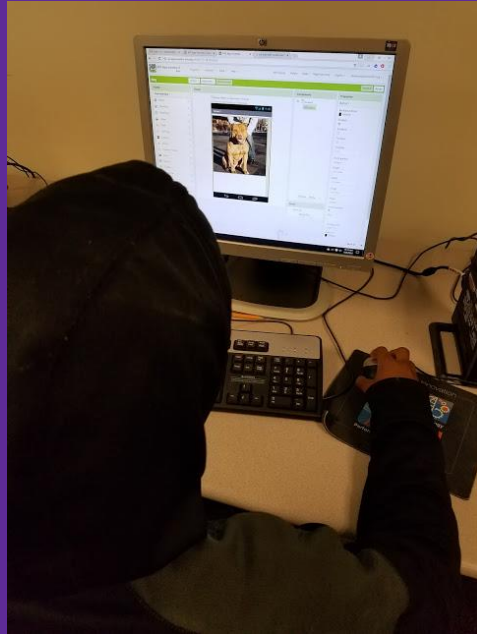
Selfie Clicker



Drawing App



Encourage Remixing



Design Project: Develop Solutions to Help Others

Approach #1: Invent



[@BTwarek](#)

<CS4ALL>
San Francisco
Unified School District

DESIGN PROJECT
developing solutions to help others

Project Sequence:

- Explore problems
- Envision solutions
- [Discover similar existing apps](#)
- Design new app
- Develop and program app
- Prototype and beta test
- Launch app
- Get feedback and improve

Approach #2: Adapt

Project Sequence:

- Read user profiles
- Brainstorm ways to adapt existing apps to meet users' needs
- Choose one, and write design brief and specification
- Adapt app
- Test against specification



[Profiles and student journal](#)

New App Ideas Developed



Talking Pictionary

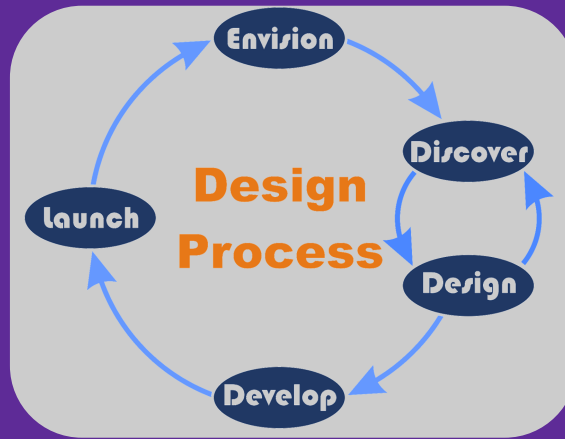


**Affirmations and
Social Emotional
Learning**



**Bulldog Cafe
Ordering App**

NGSS Engineering Standards



Students who demonstrate understanding can:

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Students who demonstrate understanding can:

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Students who demonstrate understanding can:

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

Students who demonstrate understanding can:

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Strand ID		CCSS
Reading	Science & Technical Subjects	
Key Ideas and Details	RI.11-12.3. Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.	
Craft and Structure	RI.11-12.4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines faction in Federalist No. 10).	
Integration of Knowledge and Ideas	RI.11-12.7. Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.	
Writing	Science & Technical Subjects	
Text Types and Purposes	W.11-12.1.A. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.	

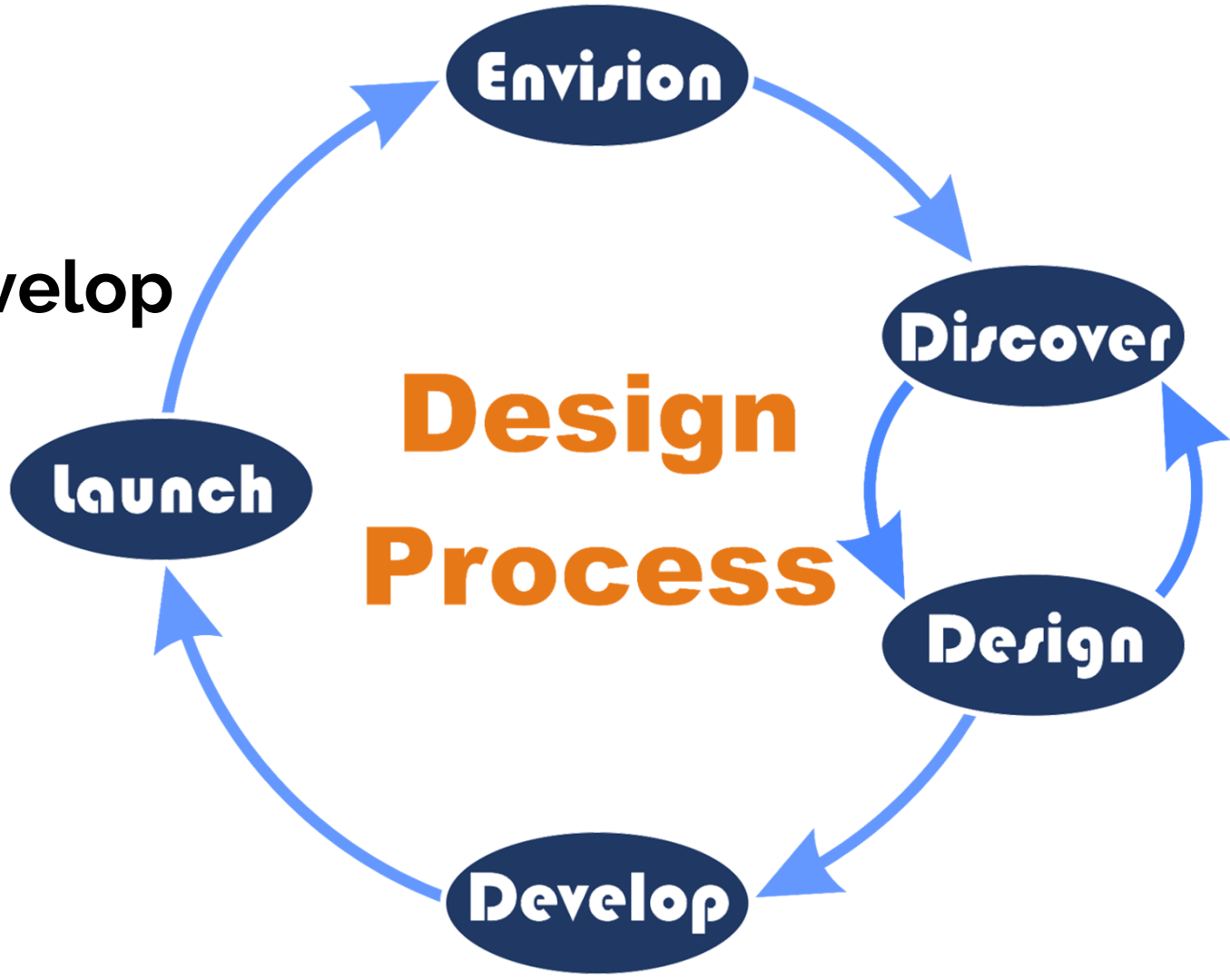
Speaking & Listening	
Comprehension and Collaboration	SL.11-12.2. Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
Presentation of Knowledge and Ideas	SL.11-12.5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning and evidence, and to add interest.
Language	
Vocabulary Acquisition and Use	L.11-12.6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
Math	
Mathematical Practice	MP2. Reason abstractly and quantitatively.

Source: National Governors Association Center for Best Practices, Council of Chief State School Officers Title: Center for Best Practices, Council of Chief State School Officers, Washington D.C. Copyright Date: 2015

Connections to your Classroom



Design & Develop



Envision

Discover

Design

Develop

launch

**Design
Process**

App Inventor Challenge

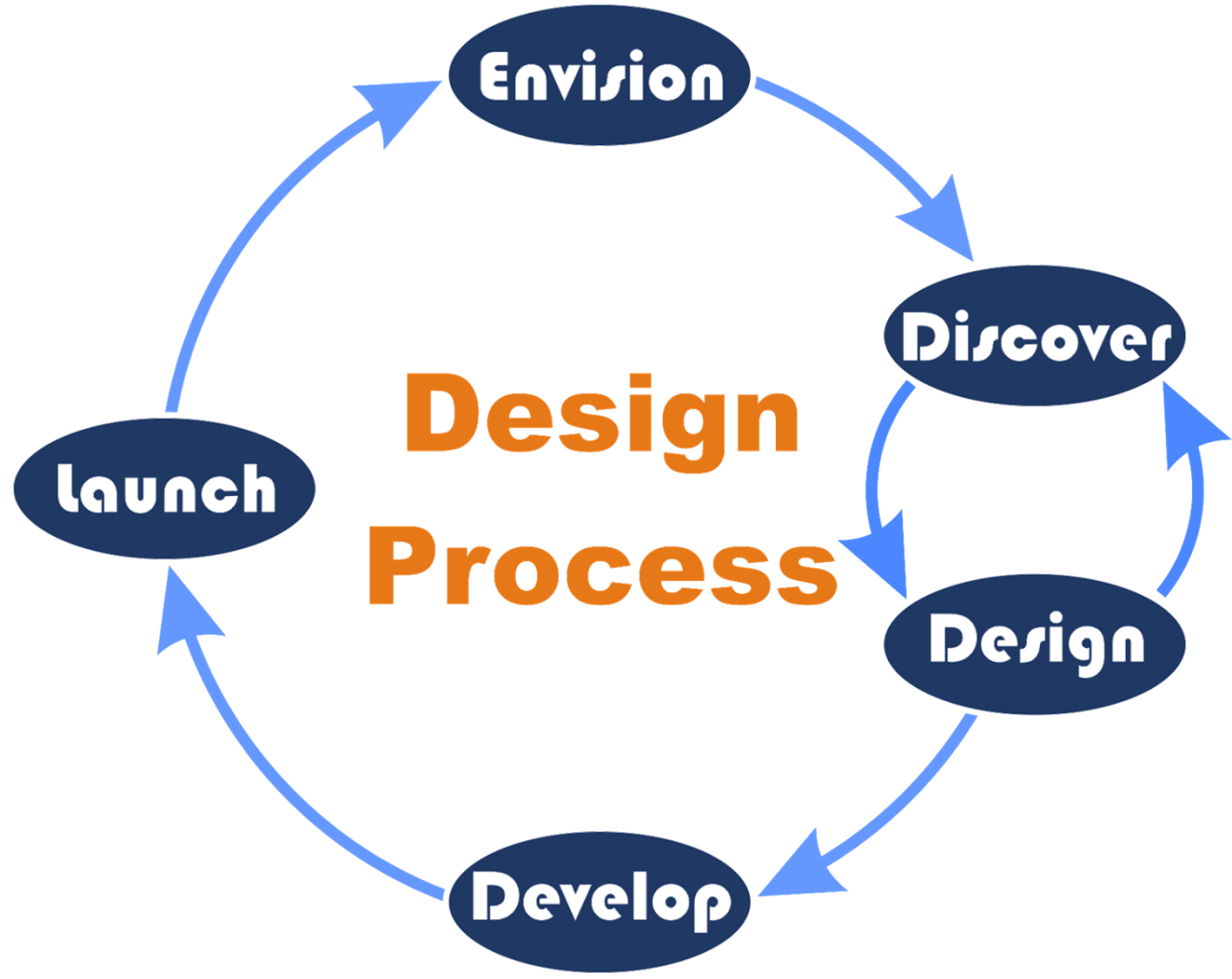
Work with a partner or small group to create an app with App Inventor that addresses a problem or challenge in your school or community!

- 2-3 people
- 1 computer
- 1 tablet
- [App Inventor tutorials](#)

[This year's TechnovationMN winners](#)



Launch



Apps in the World



MIT App Inventor @MITAppInventor · Oct 21

Check out Run 4 Prez, an App Inventor-created game for the presidential election season by @youthradio



Youth-Made Civics App Puts Facts Back Into Politics

Run 4 Prez is a race-style game where you compete against an opponent to see who gets to the White House first. Get your electoral facts wrong, ...

youthradio.org

Apps in the World



Apps in the World (and these from MN)



MIT App Inventor Retweeted



MIT Engineering @MITEngineering · Dec 5

Bay Area teen uses @MITAppInventor to make it a snap to share vital allergy info



Danville teen wins congressional app challenge

Jasmine Steele, 16, won a congressional app challenge in Congressman Mark DeSaulnier district and her app "Allergy Blast" will be featured at th...

eastbaytimes.com

Apps in the World (and these from MN)

MIT App Inventor Retweeted



Kellyanne Mahoney @ka_mahoney · Mar 24

Tidy Earth #technovation team talking #SocEnt with @donegoodteam. Their idea is like #PokemonGO but for trash! @masstcefc @MITAppInventor



Programs to Consider

These are a few programs that empower learners to use app development for real-world problem solving!



Resources

Curriculum:

[CS for SF: Computer Science is for Everyone Middle School Curriculum](#)

[Samsung Mobile App Academy \(Scholastic\), 9-12](#)

[Online Mobile Computer Science Principles Course](#)

[App Inventor Course in a Box - Lesson Plans](#)

[App Inventor for Educators Resource Site](#)

[Coding Concept Cards](#)

[App Inventor Hour of Code Tutorials](#)

[App Inventor's YouTube Channel](#)

People to Follow:

Bryan Twarek - [@BTwarek](#)

David Wolber - [@wolberd](#)

MIT App Inventor - [@MITAppInventor](#)

Technovation - [@Technovation](#)



Get involved!

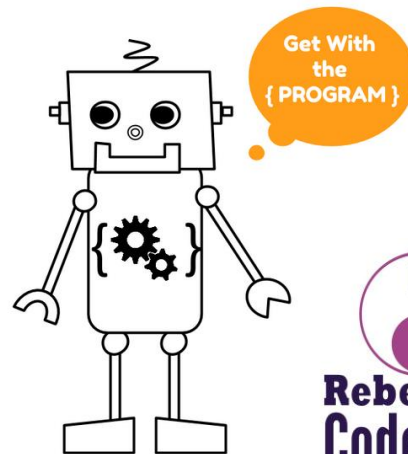


Code Savvy™

www.codesavvy.org



[#mncodes](https://twitter.com/mncodes)



Technovation[MN]

App Inventor

3. Text to Speech

Make your phone speak to you! Allow the user to type a phrase in a text box. Then, when the user presses a button, use the TextToSpeech component to let the phone say the text that the user typed.

<http://ai2.appinventor.mit.edu>

3.

Drag these components on the viewer:

Basic:  Button  TextBox

Other Stuff:  TextToSpeech

Click the Blocks button and snap these blocks together.

```
when Button1 .Click
do call TextToSpeech1 .Speak
    message TextBox1 . Text
```

When the button is dicked, the phone will say the text inside of the textbox.

4.

Drag these components on the viewer:

Sensors:  AccelerometerSensor

Media:  Sound

Click the Blocks button and snap these blocks together.



When the user shakes the phone, the sound component vibrates the phone for 500 milliseconds.

App Inventor

4. Shake it

When you shake your phone, you can make your phone shake too. Use the Accelerometer Sensor to detect when the user shakes the phone, and use the Sound component to vibrate the phone.

<http://ai2.appinventor.mit.edu>

App Inventor

5. Speech Recognition

Want your phone to write down what you say? When the user clicks a button, use the Speech Recognizer component to get what the user says, and display the text in a label.

<http://ai2.appinventor.mit.edu>

5.

Drag these components on the viewer:

Basic:  Button  Label

Other Stuff:  SpeechRecognizer

Click the Blocks button and snap these blocks together.

```
when Button1.Click
do call SpeechRecognizer1.GetText

when SpeechRecognizer1.AfterGettingText
result
do set Label1.Text to SpeechRecognizer1.Result
```

When the button is clicked, the Speech Recognizer starts listening. When it's finished listening, the text is shown in the label.

App Inventor

6. Drawing

You can draw pictures with your finger on your phone. Detect when someone is dragging their finger on a canvas, and draw a line from their old finger position to their new one.

You can also add a button to clear the canvas, so someone else can make a new drawing.

<http://ai2.appinventor.mit.edu>

6.
Drag these components on the viewer:

Basic:  Canvas  Button

Height: 300 pixels

Width: 300 pixels

Click the Blocks button and snap these blocks together.

```
when Canvas1.Dragged
startX, startY, prevX, prevY, currentX, currentY, draggedSprite
do
  call Canvas1.DrawLine
    x1: get prevX
    y1: get prevY
    x2: get currentX
    y2: get currentY

when Button1.Click
do
  call Canvas1.Clear
```

When the user drags their finger on the canvas, a line is drawn between where their finger started and stopped.

App Inventor

7. Fling a ball

Swipe a finger on your phone, and have a ball move in the same direction. When a user flings their finger on a Canvas, the heading and the speed of a ball on the canvas can be set to the heading and speed of the user's finger.

Alpha test website:

<http://ai2.appinventor.mit.edu>


7.

Drag these components on the viewer:

Basic:  Canvas

Height: 300 pixels

Width: 300 pixels

Animation:  Ball

Place on top of Canvas

Click the Blocks button and snap these blocks together.

```
when Canvas1 .Flung
  x, y, speed, heading, xvel, yvel, flungSprite
do
  set Ball1 . Heading to get heading
  set Ball1 . Speed to get speed
```

When the user flings the canvas, the ball's heading and speed are set to the finger's heading and speed.

App Inventor

8. Tilt to move

Have a ball move around as you tilt your phone. As the user tilts their phone, the phone will update a ball's heading and speed every second to match the angle and magnitude from the Orientation Sensor.

Alpha test website:

<http://ai2.appinventor.mit.edu>


8.

Drag these components on the viewer:

Basic:  Canvas  Clock

Height: 300 pixels

Width: 300 pixels

Animation:  Ball

Place on top of Canvas

Sensors:  OrientationSensor

Click the Blocks button and snap these blocks together.

```
when Clock1.Timer
do
  set Ball Heading to OrientationSensor1.Angle
  set Ball Speed to OrientationSensor1.Magnitude * 100
```

When the timer fires, the ball's heading and speed are set to the angle and magnitude of the Orientation Sensor.

App Inventor

9. Take a Picture

You can take pictures of your friends inside of your app. Use the Camera component to take a picture when the user clicks a button. After the picture is taken, change the background of the screen to be the picture.

<http://ai2.appinventor.mit.edu>

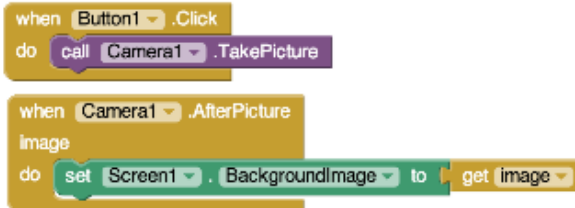
9.

Drag these components on the viewer:

Basic:  Button

Media:  Camera

Click the Blocks button and snap these blocks together.



When the user clicks Button1, the user can take a picture. After the picture is taken, it becomes the background image for Screen1.

App Inventor


10. Make a video



Want to record a video in your app? Have the user click a button to start recording a video using the Camcorder component. After they've finished, put the video in a Video Player component, and let the user press a button to watch their video.

<http://ai2.appinventor.mit.edu>

10.

Drag these components on the viewer:

Basic:  Button x 2

Media:  Camcorder  VideoPlayer
Height: 200 pixels
Width: 200 pixels

Click the Blocks button and snap these blocks together.

```
when Button1.Click
do call Camcorder1.RecordVideo

when Camcorder1.AfterRecording
clip
do set VideoPlayer1.Source to get clip

when Button2.Click
do call VideoPlayer1.Start
```

When the user clicks Button1, the video recording starts. After the recording is finished, the video is put in the video player. When the user clicks Button2, the video plays.