arthur:

a great programming language

Ingredients for an arthur program

- 1 MP4 of ballers dunking
- 4 strings: "Hello my dear friends. Welcome to my world" || "Do you like Arthur yet?" || "Please enjoy Arthur today." || "Arthur lives"
- 1 MP3 of a glass breaking sound
- 1 color: red
- ~35 lines of real live code

Let's show a sample!

BALL EM

What?

High level media manipulation language run primarily in Java that compiles to finished static canvas-y JavaScript sites.

Data Types: Primitives

```
num x = 5;
string x = “This language is great!”;
color x = <<255, 0, 255>>;
color x = CHARTREUSE;
```

All initialized with literals ||||||||||||||||||||

Realtime manipulation

Data Types: Non-Primitives

```
Video x = video("arthurShow.mp4");
Sound x = sound("inDaClub.mp3");
Image x = image("starwars.jpg");
```

Initialized with files ||||||||||||||||||||||||||
Java manipulation

What would happen if you…

- Added a color to a sound?
- Multiplied two strings?
- Turned a sound into a picture?

We figured it out!!!!

The main ideas

There are ***two*** *sides to arthur*

- First: A creative process with unusual results
    - Morphology between medias
    - A space to experiment
    - Output with a wow factor

The main ideas, cont'd.

- Second: A suite of editing possibilities in a **single** package
  - Eliminates need for multiple software tools for different types of media
  - Condenses heavy-duty media manipulation routines into **very simple & very small code styles**

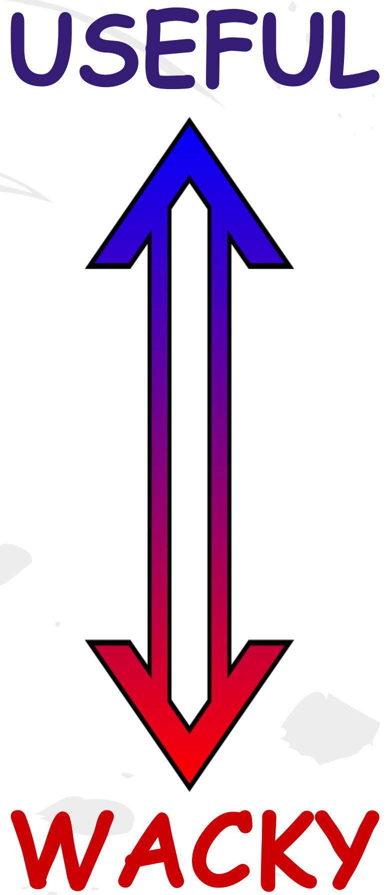
Casting & interoperability

All types can be cast (->) to one another.

The operands of (+, -, /, *) can be of **any** two types!

Casting

- Video->Sound extracts sound from a video and saves it as an MP3
- Video->Image samples & combines frames from the video
- Image->color gets you the average color of all the pixels in the image
- string->Sound performs "text to speech"
- number->Sound ??? try it and find out



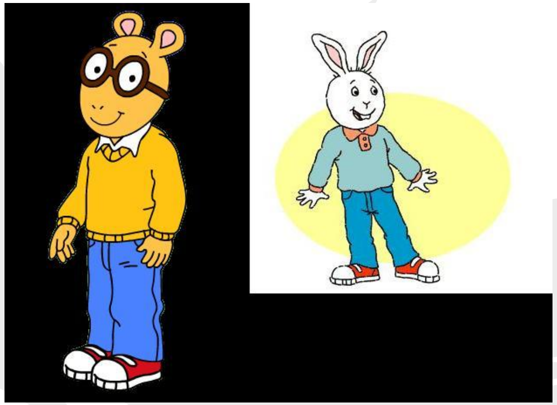
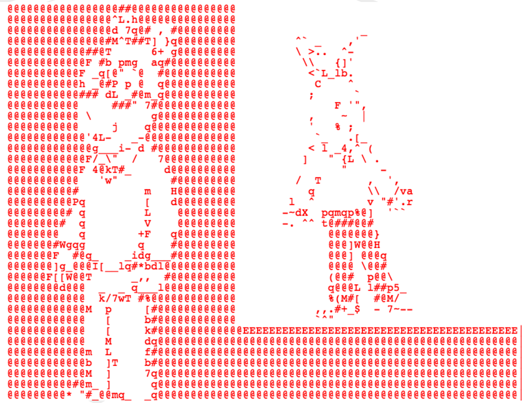
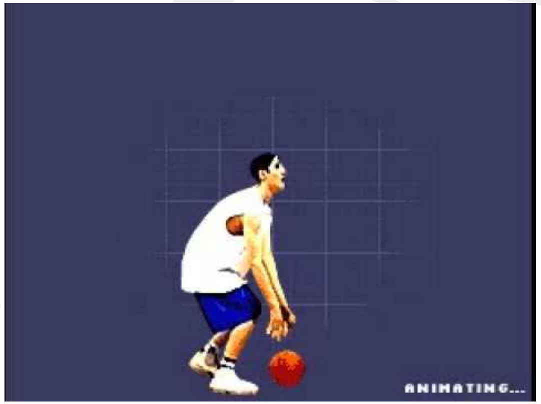
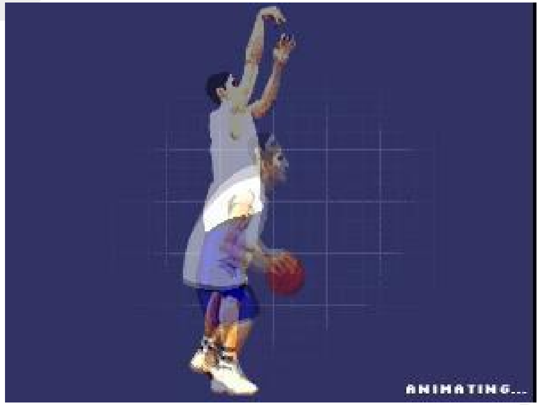


Image -> string





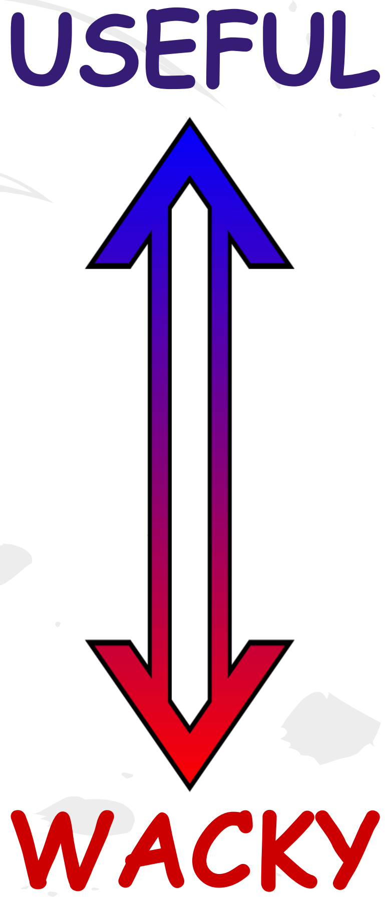
Video -> image



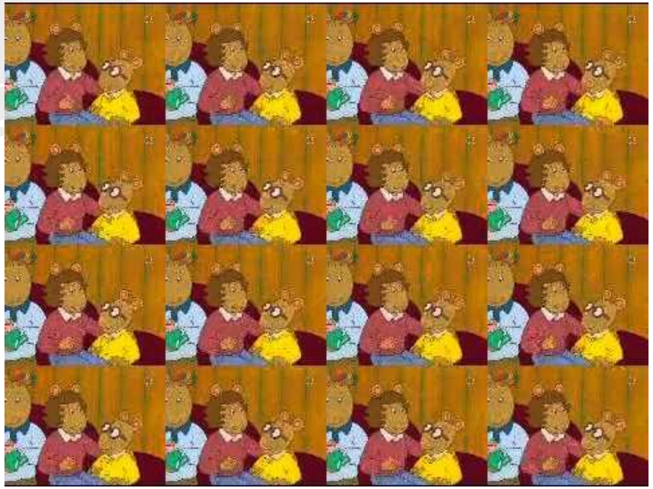
Interoperability

The result of an operation is the same type as its **left** operand.

- Video * number speeds up or slows down the video by a factor
- Sound + number raises the sound's pitch by an amount
- Image / Image overlays two images
- Video / number tiles the video



$$\xrightarrow{*\ 3\ /\ 4}$$



$$\xrightarrow{\text{sound * string}}$$

JUST BEING HONEST

Then what?

If you want to use arthur as a **tool for editing pictures, sounds, and videos**

-> Just scoop up the media files from the outputs folder

If you want to **watch something crazy and cool**

-> Open and deploy the target program, an HTML5 Canvas application

Putting it all together

Arthur programs have three main parts:

1. **Initialize** media variables from file names and literals and **manipulate** them as you please
2. Choreograph the **presentation** of media variables within the canvas application
3. Set up event handlers for real-time **user interaction** with the canvas application

2 and 3 are optional, of course

Program structure

void *init*() {...} //initialize and manipulate media (backend - Java) & add it to the canvas

    void *loop*() {...} //alter canvas in real-time (backend - JavaScript)

        void *key*() {...} //make canvas react to key events

        void *click*() {...} //and mouse click events

        void *move*() {...} //and mouse move events!

Language bits

```
add(media, frame optional, num optional)
//adds media object to arthur canvas
ms() // easy call to current time in ms, returns num
frame(x,y,w optional, h optional)
//add media to specific location on canvas, w/ specific size
cooler() // return a pretty random color
num * { block } // intuitive for-loop
```

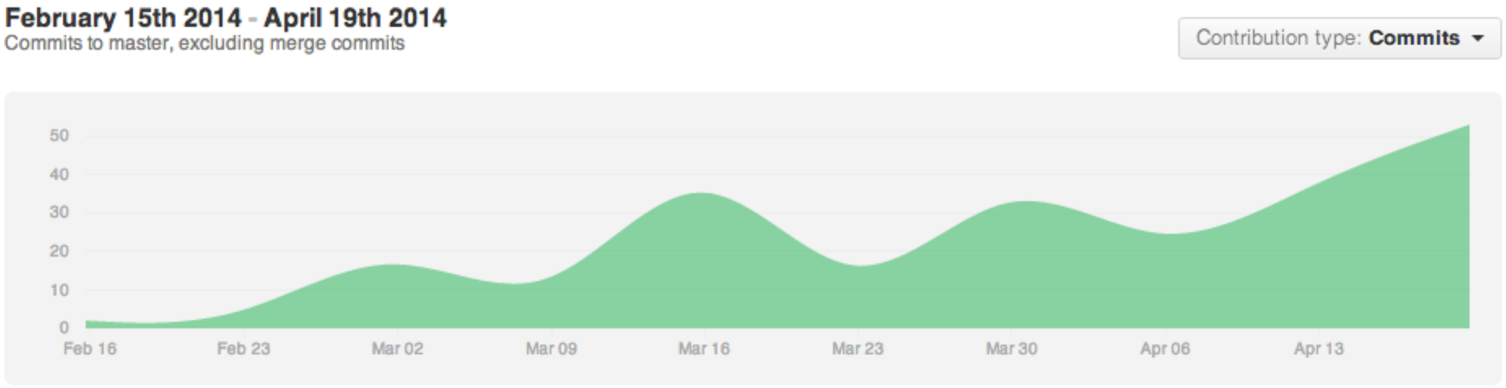
The making of arthur

meet a lot

github SOCIAL CODING

writeLaTeX

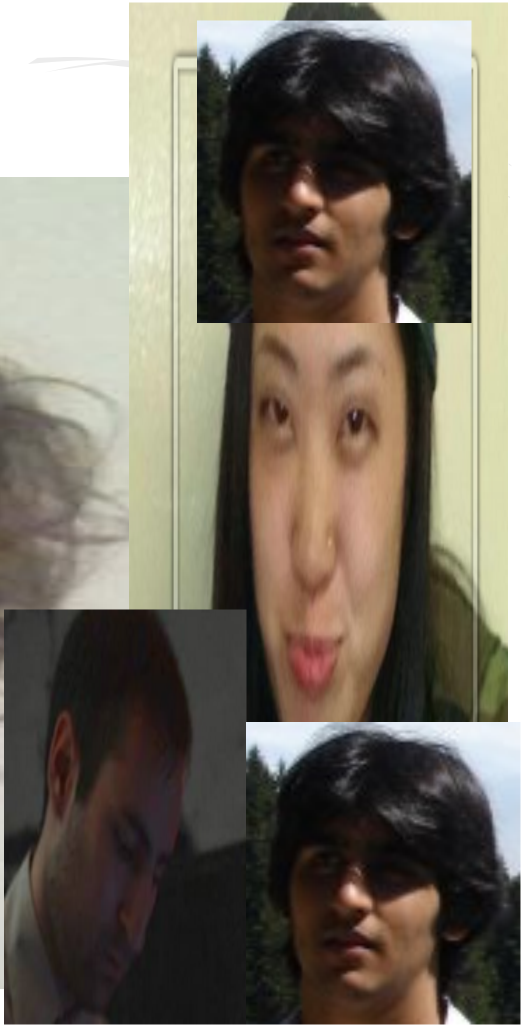
groupme


February 15th 2014 - April 19th 2014
Commits to master, excluding merge commits

Contribution type: **Commits**

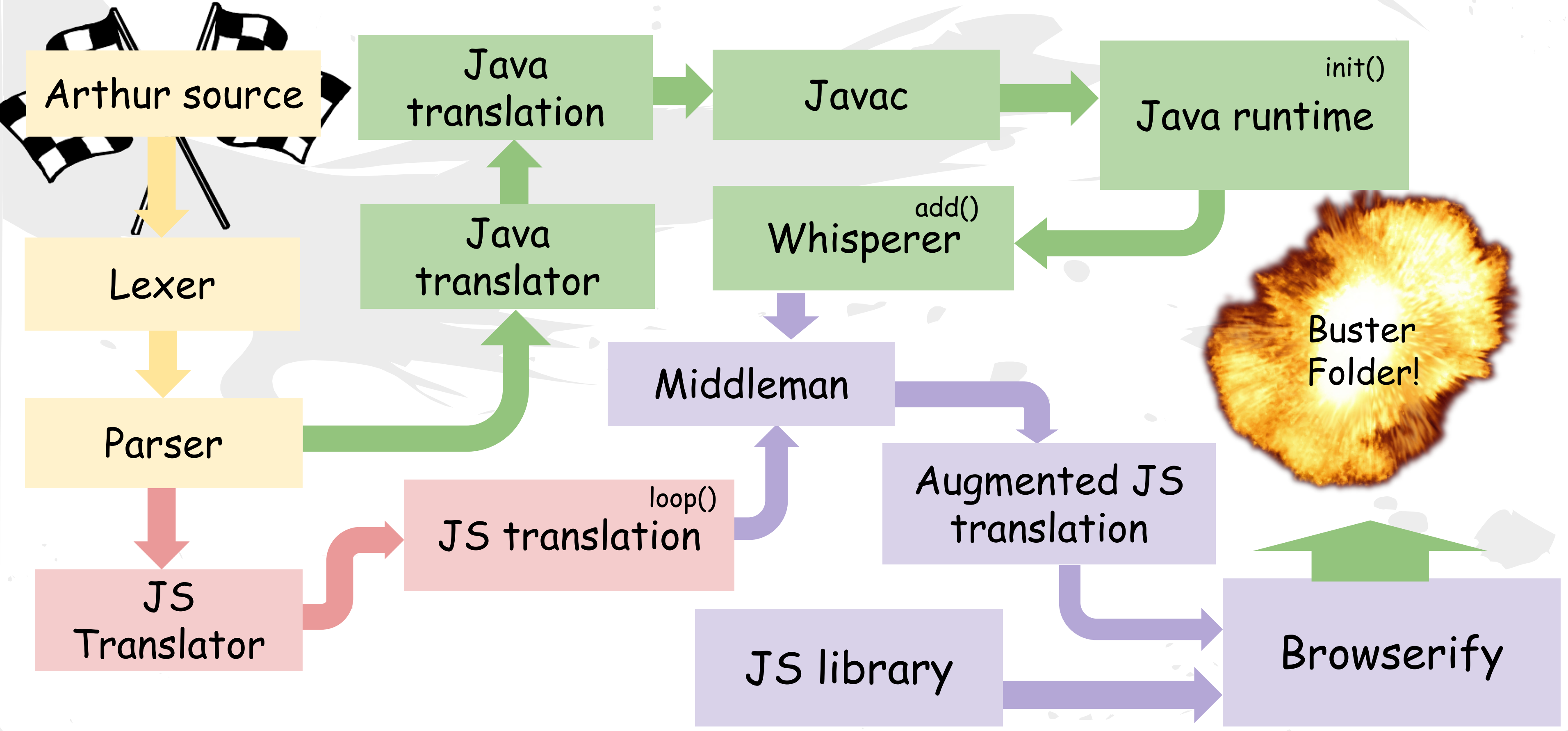
spriiiing breaaaaaaaaak

THE TEAM



interpreted,, compiled,,
and fun

Translator Architecture



Sample time

http://kevin-roark.github.io/arthur/

What have we learned?

- Nothing
- Something

Just kidding!

- The state of media encoding is a mess
- There are lots of libraries out there -- don't reinvent the wheel, make it better!!!! (*but start with the right wheel*)
- Demystification of a "compiler"
- Making stuff robust against failure is hard
- You can make whatever you want