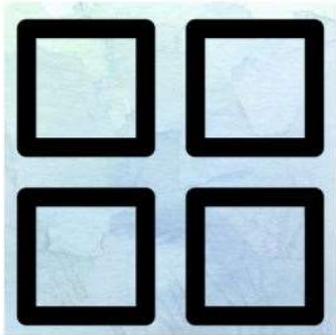**Hana Fusman**
Ogo Nwodoh
Hadiah Venner
Catherine Zhao

PIE-NUM

Matrix Based Image Processing Language
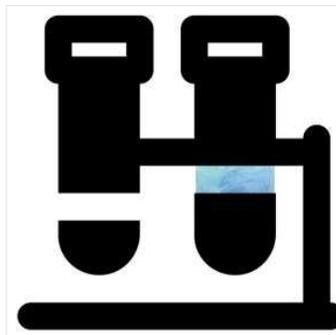
AGENDA

Overview

Let's eat!
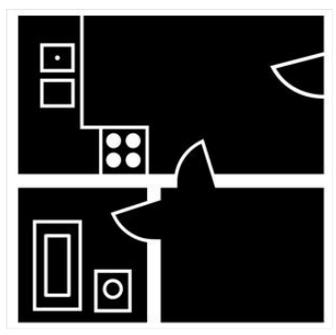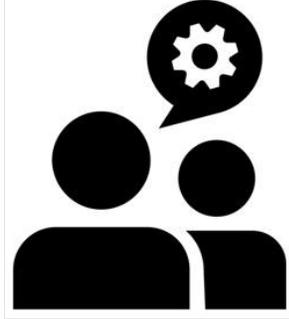Grandpa
_____
Let's eat
Grandpa

Syntax

Sample
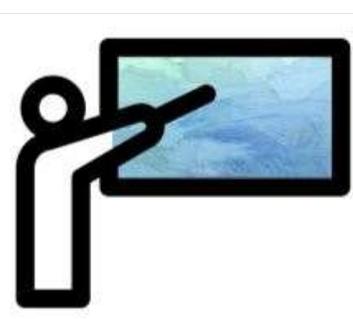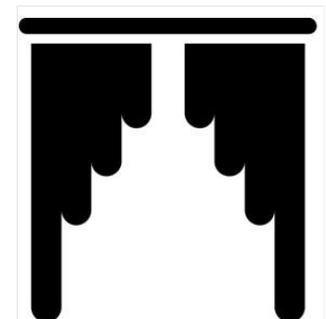
Architecture
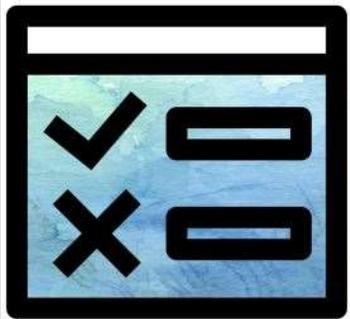
Testing

Management

Lesson Learned

Demo

PIENUM

Flexible across platforms

Python/Java like syntax

C Standard Library

PPM images → manipulate image

ROLES

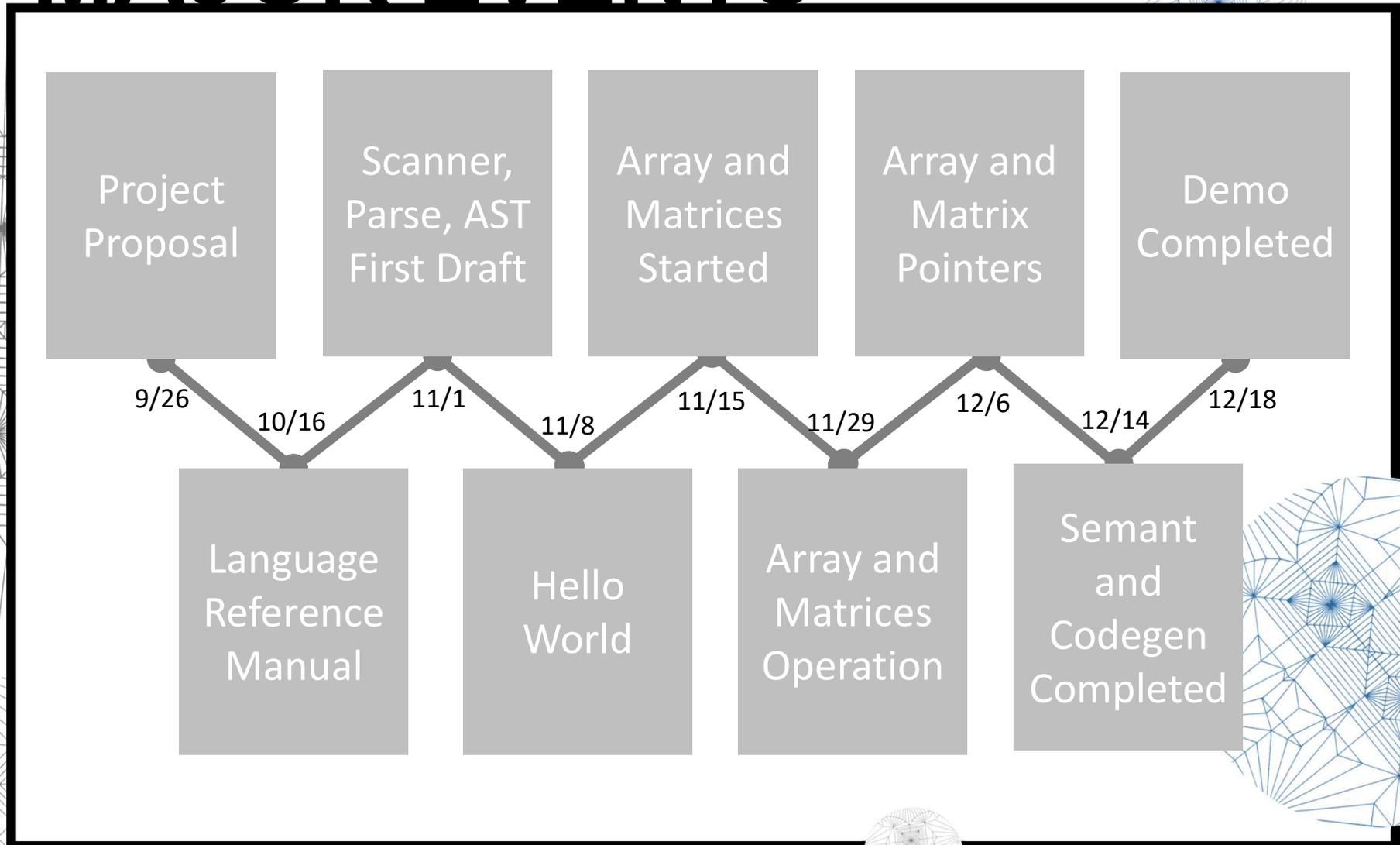**Hana**
Project Manager
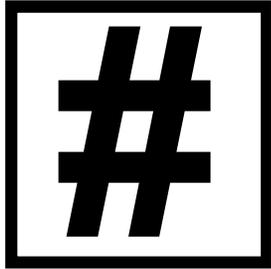
Ogo
System Architect

Hadiah
Language Guru

Catherine
Tester

MAJOR EVENTS

| Project Proposal | Scanner, Parse, AST First Draft | Array and Matrices Started | Array and Matrix Pointers | Demo Completed |

9/26 10/16 11/1 11/8 11/15 11/29 12/6 12/14 12/18

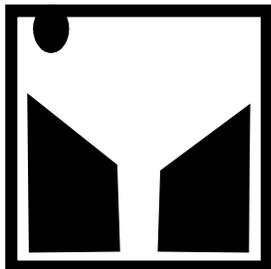| Language Reference Manual | Hello World | Array and Matrices Operation | Semant and Codegen Completed |

SYNTAX

Comment
This is a comment

Primitives
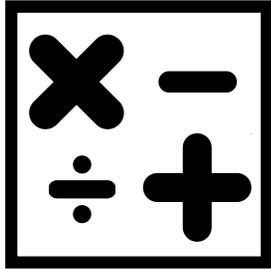int, float, Boolean, String, Mat, Arr, Img
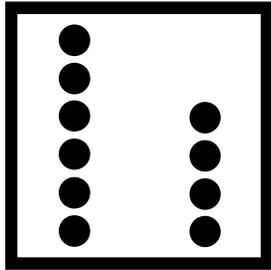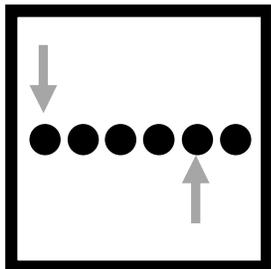
Control Flow
if, else, while, for, return

SYNTAX

Arithmetic
```
+, -, *, /, =, ++, --
```
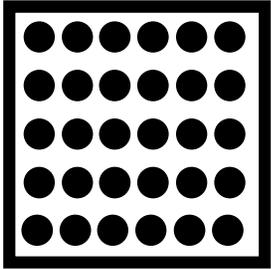
Conditional
```
==, !=, <, <=, >, >=
```

Array
```
Arr int[3] arr;
arr = [1,2,3];
```
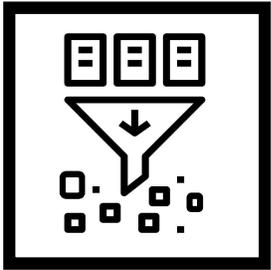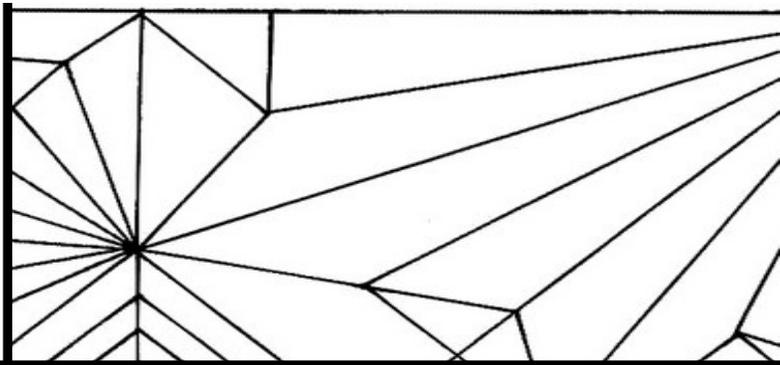
SYNTAX

Matrix

```
Mat int[2][2] mat;
mat = [[1,2],[3,4]];
```

Function

```
int function(a){
        return a;
}
```
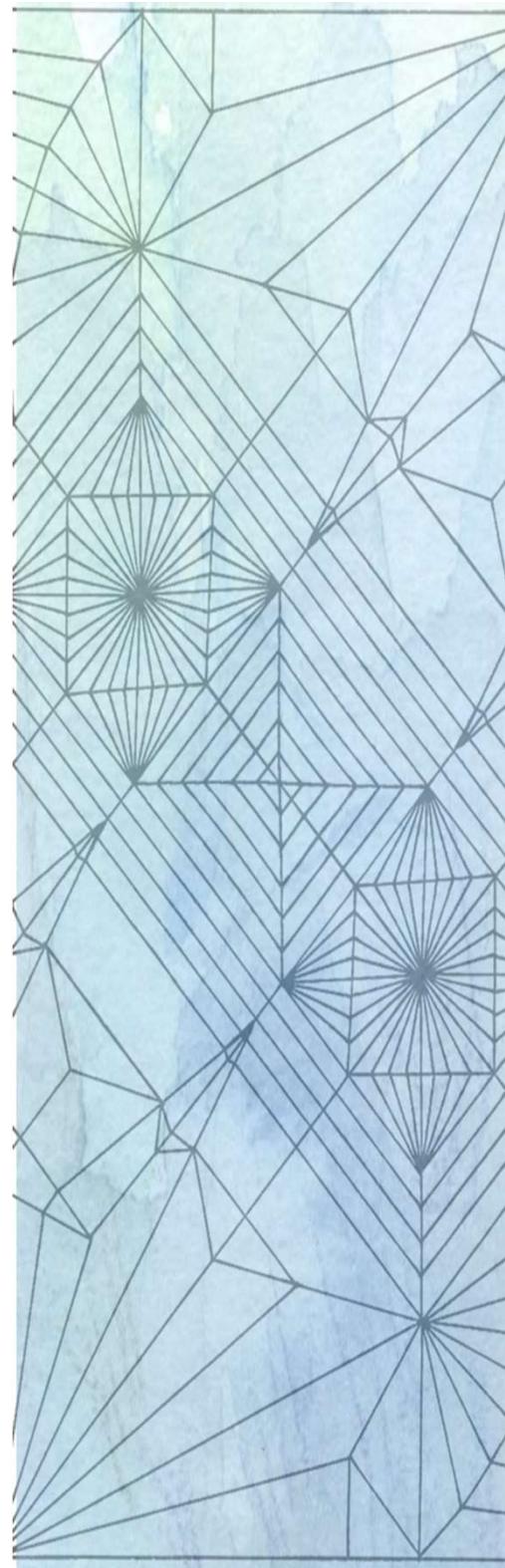
SAMPLE PROGRAM

- Open ppm
- Get length of ppm

```
int get_image_cols(String filename) {
    Img img; # img is an int* #
    int ncols;
    img = read_file(filename);
    ++img;
    ncols = &img;
    return ncols;
}

int main(){
    int val;
    val = get_image_cols("ogo.ppm");
    printi(val);
    return 0;
}
```

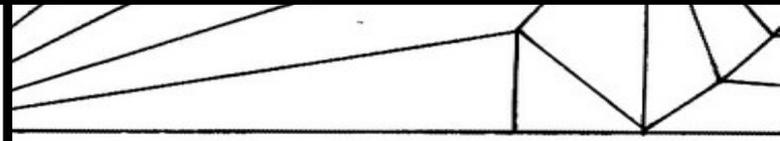# SAMPLE PROGRAM

```
int get_image_cols(String filename) {
    Img img;  # img is an int* #
    int ncols;
    img = read_file(filename);
    ++img;
    ncols = &img;
    return ncols;
}

int main(){
    int val;
    val = get_image_cols("ogo.ppm");
    printi(val);
    return 0;
}
```

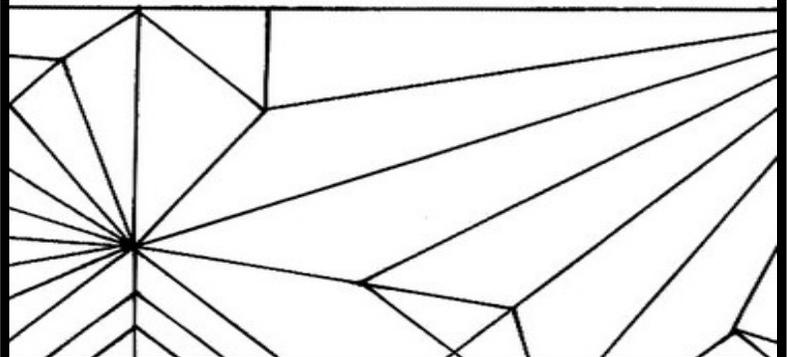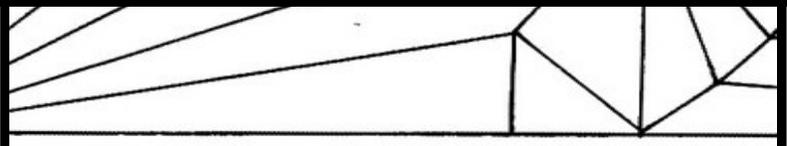**Comment**

SAMPLE PROGRAM

```
int get_image_cols(String filename) {
    Img img; # img is an int* #
    int ncols;
    img = read_file(filename);
    ++img;
    ncols = &img;
    return ncols;
}
```

→ **Function**

```
int main(){
    int val;
    val = get_image_cols("ogo.ppm");
    printi(val);
    return 0;
}
```
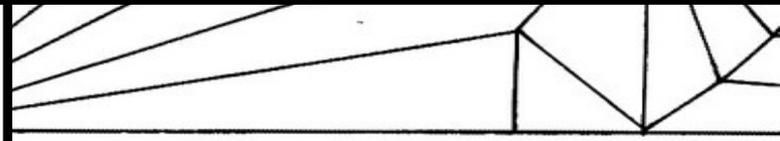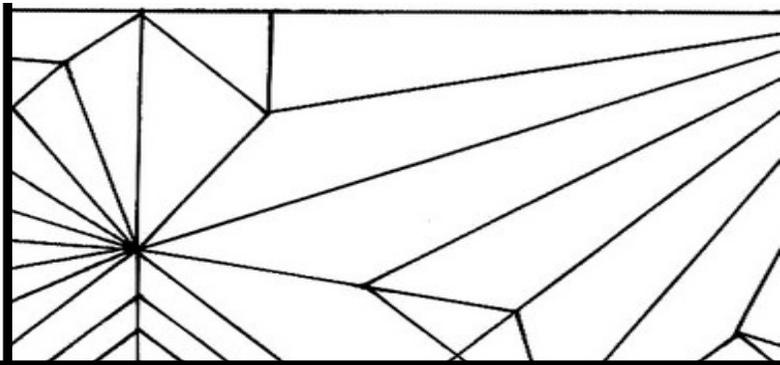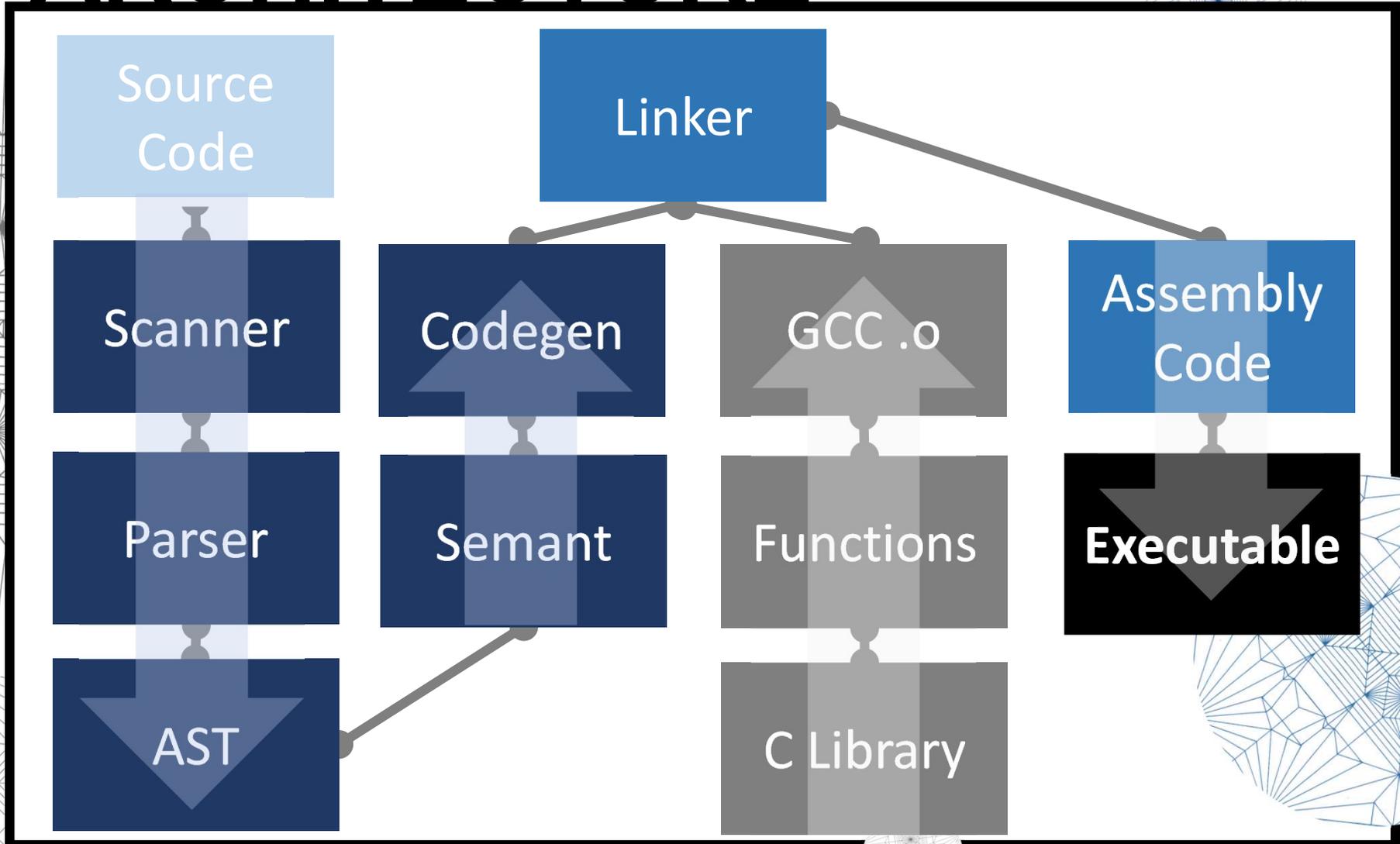
SAMPLE PROGRAM

```
int get_image_cols(String filename) {
    Img img; # img is an int* #
    int ncols;
    img = read_file(filename);
    ++img;
    ncols = &img;
    return ncols;
}

int main(){
    int val;
    val = get_image_cols("ogo.ppm");
    printi(val);
    return 0;
}
```

Primitives

ARCHITECTURE

TESTINGS

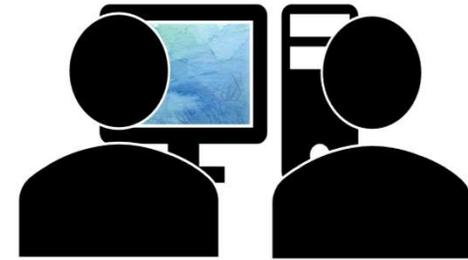**Compilation**

40 pass, 30 fail

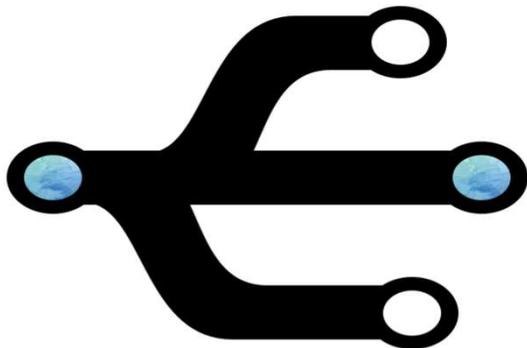**Scanner**

7 cases

Parser

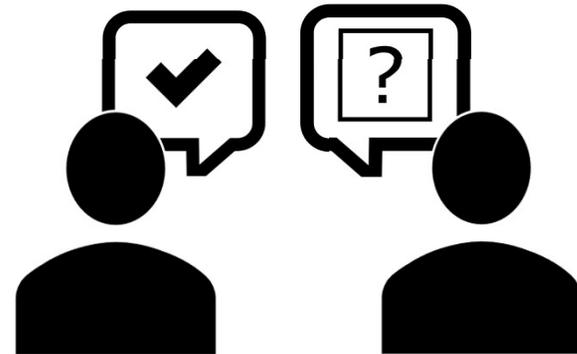5 cases

MANAGEMENT

Meetings!!!

Pair Programming

Branches
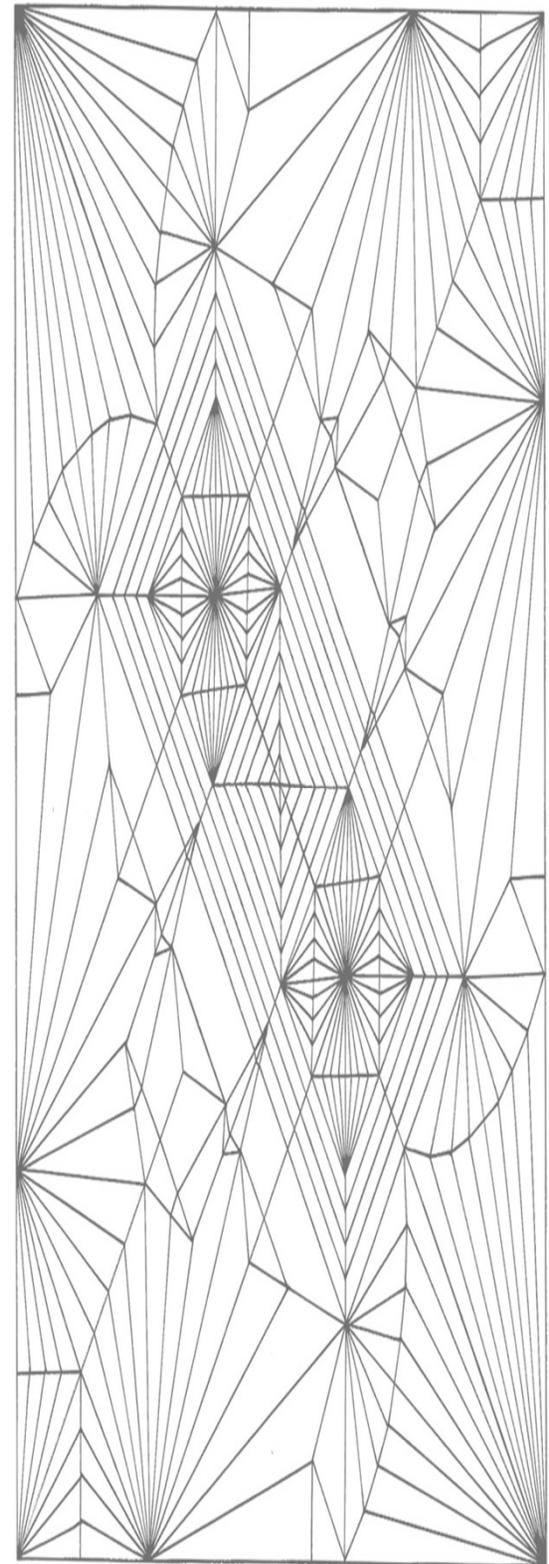

Meeting with TA

GITHUB PROGRESS

LESSONS LEARNED HANA

"**Communication** is key to success in a group project"

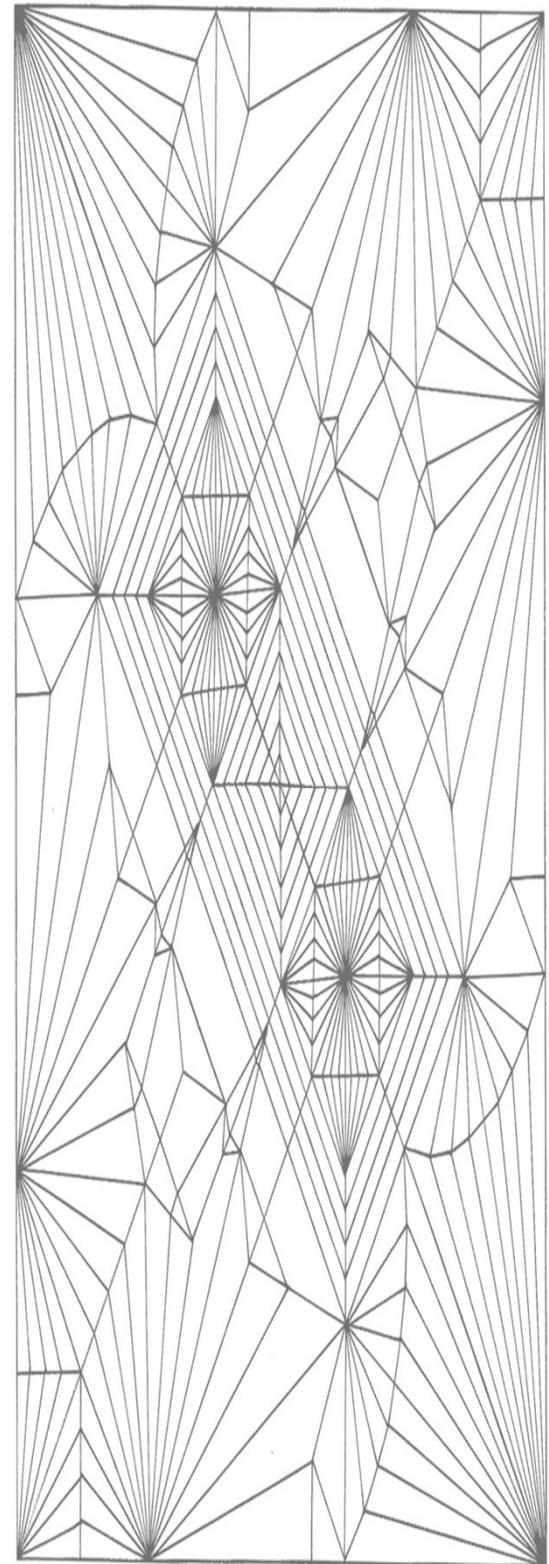"**Create goals** as a team and work until the goal's are achieved"

"**Learning** the theory in the beginning of the semester"

LESSONS LEARNED OGO

"You **can't just 'hack'** your way through"

"Learning curve for functional programming is steep! **Start early!**"
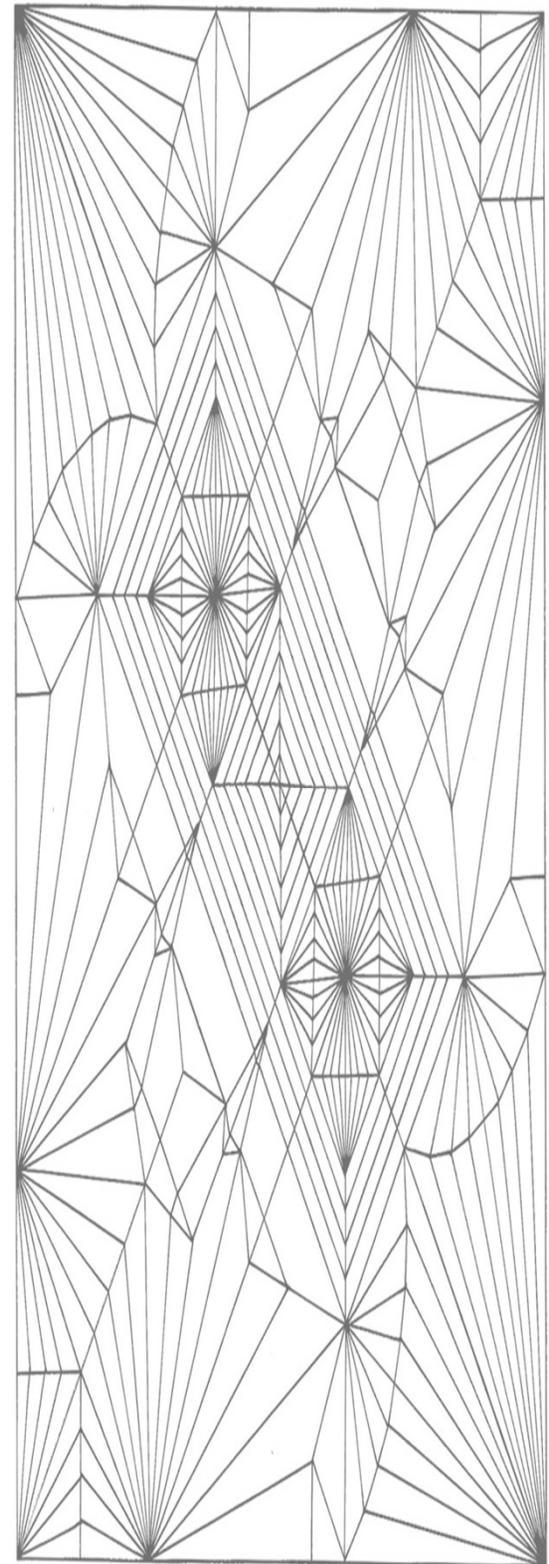
LESSONS LEARNED HADIAH

"Working on the semant file in a **separate** branch"

"**Maintain** weekly meeting times from early on in the semester"

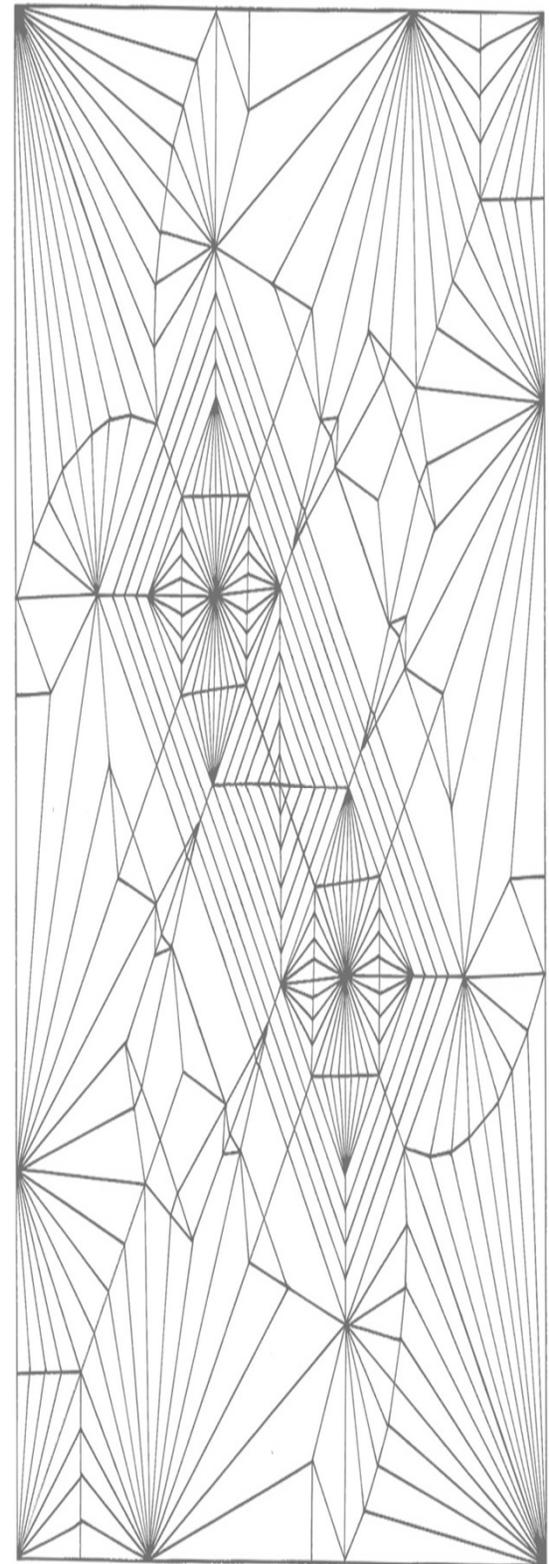"Sort through merge conflicts **as soon as possible**"

"**Speak** with TAs"

LESSONS LEARNED
CATHERINE

"Start testing **early**"

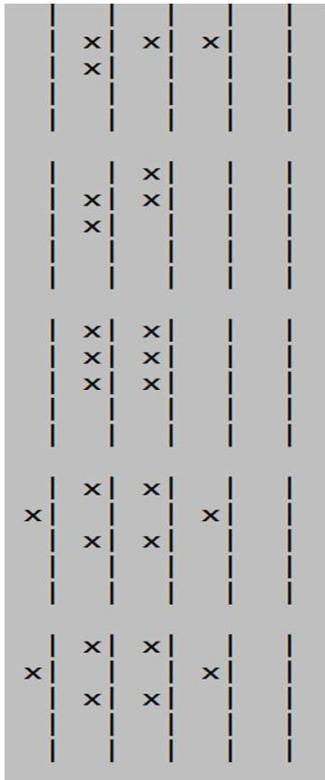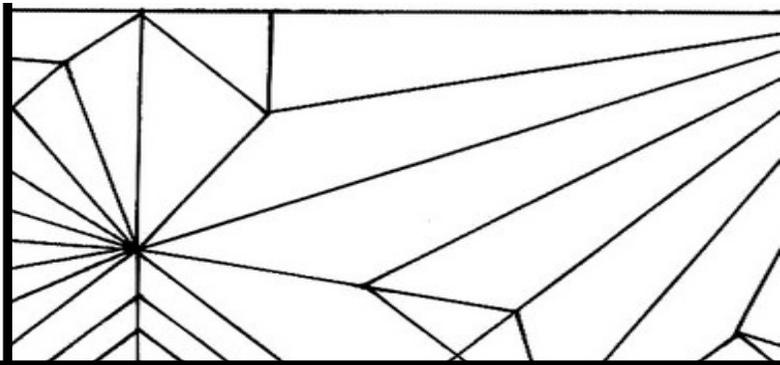"**Be flexible** with helping your teammates"
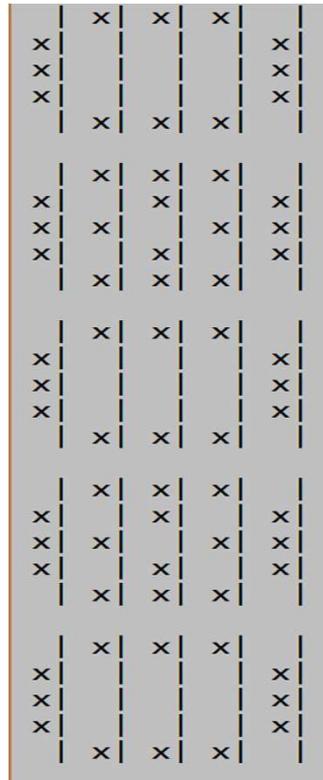
"Find group member with **similar work ethic**"
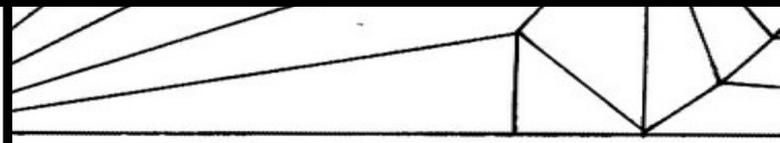
DEMO!!!

CONWAY'S GAME OF LIFE

Stable

Repeating

0 player game where cells are either dead or alive

IMAGE TRANSFORMATION

$$M_T(t) = M_A(1 - t) + M_B t$$

T = 0   T = 0.25   T=0.5   T=0.75   T=1