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System Architecture

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Testing

Who here takes Selfies?

Do you also use Instagram?

- Filters, how do you use them?
- There’s only like 15, boring, right?
- Define our own filters

Buzzwords + Usability

Current

Efficient

Readable

Functional

Interactive

Cocoon v.s. Java

- Significant reduction in code length
- Much more readable
- Inspired by simple Python + Java Syntax, so easy to learn

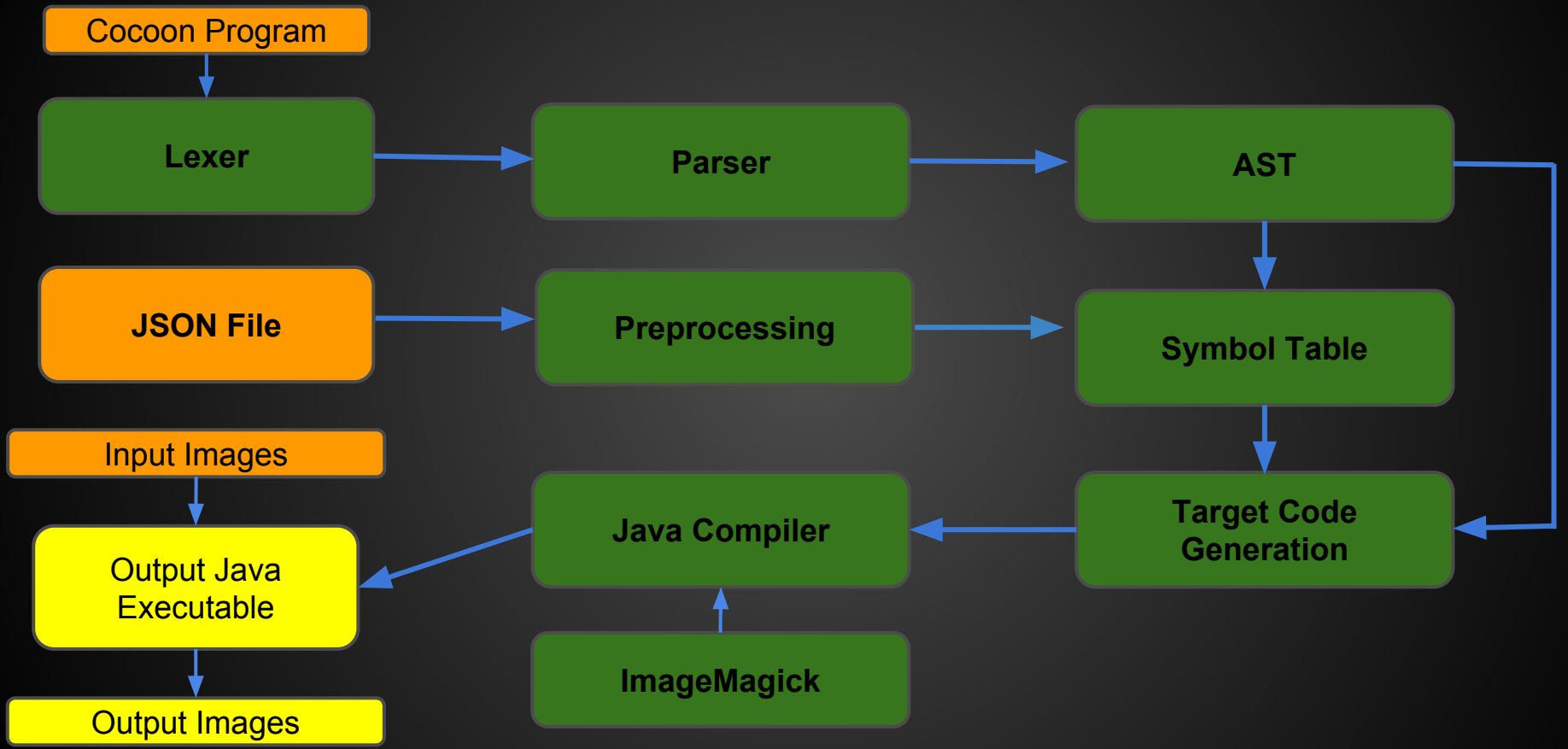
Java

```
try {
        BufferedImage master = ImageIO.read(new
        File("/path/to/file.bmp"));
        BufferedImage gray = ImageIO.read(new
        File("/path/to/file.bmp"));
        for (int x = 0; x < gray.getWidth(); x++) {
                for (int y = 0; y < gray.getHeight();
                  y++){
                        Color color = new
                          Color(gray.getRGB(x, y));
                        int red = color.getRed();
                        int green = color.getGreen();
                        int blue = color.getBlue();
                        red = green = blue = (int)(red *
                          0.299 + green * 0.587 +blue *
                          0.114);
                        color = new Color(red, green,
                          blue);
                        int rgb = color.getRGB();
                          gray.setRGB(x, y, rgb);
}
        }
        BufferedImage grayScale =
          ImageIO.read(new
        File("/path/to/file.bmp"));
} catch (IOException ex) { }
```

Cocoon

```
main() {
  img f;
  f = batch[i]
  greyscale(f);
  sysout(f);
}
```

System Architecture



Design Issue : Specification of Batch

Option 1 : Using directory structure

PROS :

- Straightforward for the user

CONS

- More complex implementation
- Environment dependent
- Requires to define some ordering within directory files which may bring done usability

Option 2 : Using a description file

PROS :

- Easier implementation
- Environment independent

CONS

- Slightly intimidating for the layman
- Simpler implementation
- Requires additional parsing

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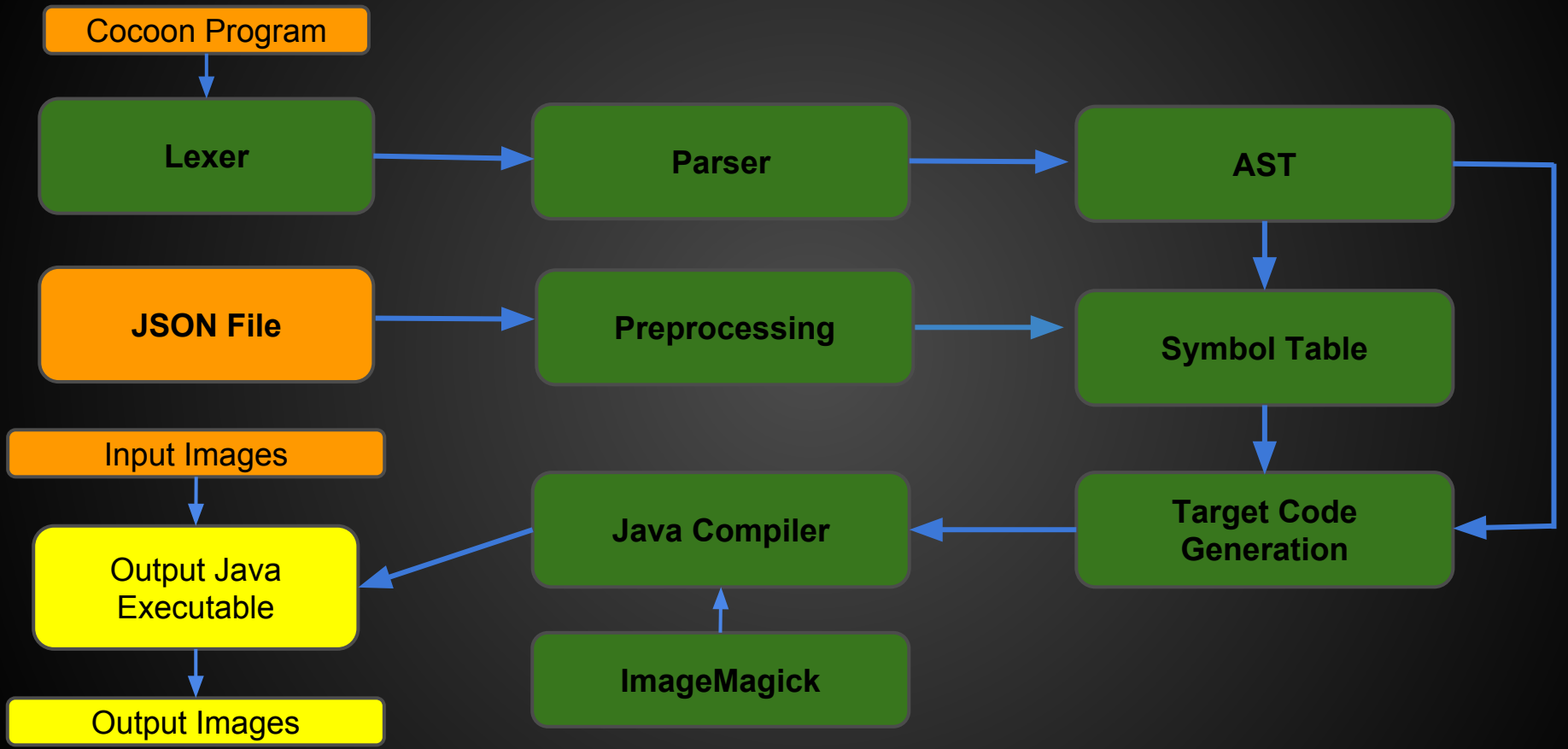
Configuration JSon File

```
{
    'batch1'    :   {
                        'folder_label':'D:\\spring_break_pics'
                    },
    'roses'     :   {
                        'image_label1':'./output/test.jpg',
                        'image_label2':'./output/test2.jpg'
                    },
    'batch3':       {
                        'image_label3':'D:\\Columbia_pics\\11_20_111.jpg'
                    }
}
```

System Architecture



Symbol Table

Key Value mapping used to perform:

1. Type checking
2. Type Compatibility of Operators
3. Handles declaration in a given scope.
4. Performs necessary checks for existence of declared identifiers in the scope.

Data Types + Functions

DATA TYPES:

Image - *URL hidden in symbol table

Batch - Collection of Images, JSON-encoded, defined in preprocessing step

FUNCTIONS:

Sysout- Output the filtered image in the output folder.

Filter - standard library functions

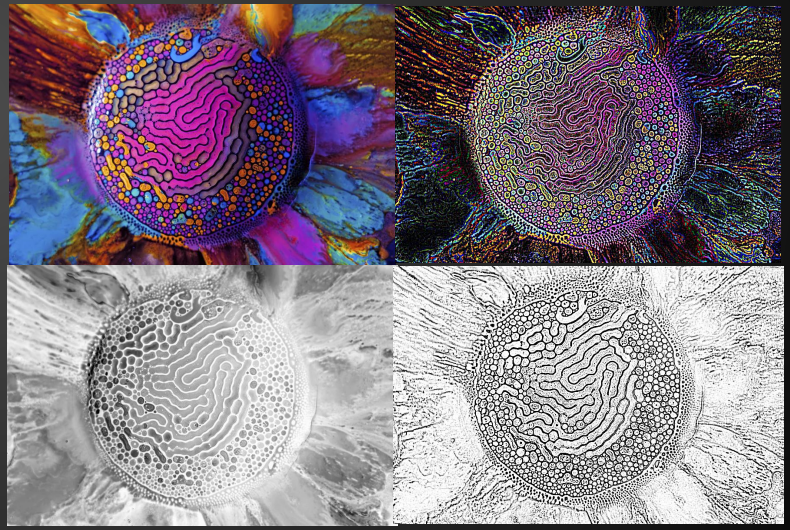
Pipe - sequential collection of filters / other pipes

Sample Program

```
main {
    img m;
    img m1;
    img m2;
    m = roses[0];

    m1 = solarize(m);
    sysout(m1);
    m2 = greyscale(m);
    sysout(m2);
}
```

```
package output;import java.util.*;
import util.*;
import magick.*;


public class CocoonRunner{
    private static ArrayList<String> batch1;
    private static ArrayList<String> roses;
    private static ArrayList<String> batch3;
    static{
        batch1=new ArrayList<String>();
        roses=new ArrayList<String>();
        batch3=new ArrayList<String>();
        roses.add("./output/test.jpg");
        roses.add("./output/test2.jpg");
        batch3.add("D:\\Columbia_pics\\11_20_111.jpg");
    }

    public static void main(String args[]){
        try{
            Image  m;
            Image  m1;
            Image  m2;
            m=new Image(roses.get(0));
            m1=m.solarize();
            m1.getMgkImg().writeImage(m1.getInf());
            m2=m.setGrayscale();
            m2.getMgkImg().writeImage(m2.getInf());
        }catch(MagickException e){
            e.printStackTrace();
        }
    }
}
```

Results



How to Compile and Run

- **make compileall**

  Compiles AST, Parser, ST, Preprocessor, and CG

- **make run**

  Runs Parser.java on <input_program>.silk and generates CocoonRunner.java

- **make runCocoon**

  links libraries and runs Cocoon program

Testing

- Unit Testing

  Testing of individual component at every step by each team member.

- Integration Testing

  We wanted to build an automated test suite to perform regression testing however due to the delay in completion of the project we could not implement this, we did manual tests with various input programs to check if all modules were functioning well.

Demo

```
1  main {
2      img m;
3      img m1;
4      m=roses[0];
5      m1 = greyscale(m);
6      sysout(m1);
7  }
8
```

Lets start with a HelloWorld program:

This is a basic program in Cocoon to convert a color image to grayscale.

Demo 2

```
main {
    img m;
    img m1;
    img m2;
    img m3;
    img m4;
    m = roses[0];
    m1 = greyscale(m);
    sysout(m1);
    m2 = newspaper(m);
    sysout(m2);
    m3 = edge(m);
    sysout(m3);
    m4 =solarize(m);
    sysout(m4);
}
```

This program applies the greyscale, newspaper,edge and solarize filters on the image m.

Demo 3

```
1  main {
2      img m;
3      img m1;
4      img m2;
5      img m3;
6      m = roses[0];
7      m2 = roses[1];
8      pipe p;
9      pipe p1;
10     p = solarize(20000%) | edge(10%) ;
11     p1 = newspaper(10%) | solarize(15000%);
12     m1 = p(m);
13     sysout(m1);
14     m3 = p1(m2);
15     sysout(m3);
16 }
17
```

This demo shows an application of a pipe which is a bunch of filters to an image.

Lessons Learned

- Meet often (even if its just for a coffee :))
- A good makefile goes a long way
- Code early, code often!
- Breaking down the project into smaller modules helps a lot!
- Watching your compiler run and the generated code run is a very satisfying experience!


Sublime Text


Apache Commons™
http://commons.apache.org/


Image Magick


github
SOCIAL CODING


eclipse


Hangouts

Tools


JFlex


json


BYACC/Java


Google docs


WhatsApp

Questions?