Lab6 Report: Fault-localization

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Ant output

```
Buildfile: /home/arthur/work/se/fault-localization/build.xml

init:

compile:
    [javac] Compiling 2 source files to /home/arthur/work/se/fault-
localization/bin

run.tarantula:
     [java] For program: triangle/Triangle.java
     [java] line 3: ratio: -1.000000, brightness: -1.000000
     [java] line 4: ratio: -1.000000, brightness: -1.000000
     [java] line 5: ratio: 1.000000, brightness: 0.034483
     [java] line 6: ratio: 1.000000, brightness: 0.034483
     [java] line 7: ratio: -1.000000, brightness: -1.000000
     [java] line 8: ratio: -1.000000, brightness: -1.000000
     [java] line 9: ratio: -1.000000, brightness: -1.000000
     [java] line 10: ratio: -1.000000, brightness: -1.000000
     [java] line 11: ratio: 0.500000, brightness: 1.000000
     [java] line 12: ratio: 1.000000, brightness: 0.344828
     [java] line 13: ratio: 0.395833, brightness: 1.000000
     [java] line 14: ratio: 0.395833, brightness: 1.000000
     [java] line 15: ratio: 0.171429, brightness: 0.500000
     [java] line 16: ratio: 0.395833, brightness: 1.000000
     [java] line 17: ratio: 0.408163, brightness: 0.250000
     [java] line 18: ratio: 0.395833, brightness: 1.000000
     [java] line 19: ratio: 0.171429, brightness: 0.500000
     [java] line 20: ratio: 0.395833, brightness: 1.000000
     [java] line 21: ratio: 0.452830, brightness: 0.500000
     [java] line 22: ratio: 0.408163, brightness: 0.500000
     [java] line 23: ratio: -1.000000, brightness: -1.000000
     [java] line 24: ratio: 1.000000, brightness: 0.068966
     [java] line 25: ratio: 0.325581, brightness: 0.500000
     [java] line 26: ratio: 0.171429, brightness: 0.500000
     [java] line 27: ratio: 1.000000, brightness: 0.137931
     [java] line 28: ratio: -1.000000, brightness: -1.000000
     [java] line 29: ratio: 1.000000, brightness: 0.137931
     [java] line 30: ratio: 1.000000, brightness: 0.034483
     [java] line 31: ratio: 1.000000, brightness: 0.103448
     [java] line 32: ratio: -1.000000, brightness: -1.000000
     [java] line 33: ratio: 1.000000, brightness: 0.103448
```

```
BUILD SUCCESSFUL
Total time: 0 seconds
```

Python visualization code

```
import matplotlib.pyplot as plt
import re
import colorsys as cs


def get_rgb_color(ratio, bright):
    if ratio == -1 and bright == -1:
        return 'w'
    h = ratio / 3
    s = 1
    v = bright*4 / 5 + 1/5
    return cs.hsv_to_rgb(h, s, v)


def format_color(color, length):
    print(color)
    out = [['w', 'w'] for i in range(length)]
    for i in range(len(color)):
        out[color[i][0] - 1][1] = color[i][1]
    return out


pattern = re.compile(r'\[java\] line (\d+): ratio: (-?\d+\.\d*),
brightness: (-?\d+\.\d*)')

color = []
with open('data.txt', 'r') as f:
    for line in f.readlines():
        line = line.strip()
        data = pattern.findall(line)
        if data:
            line_no, ratio, bright = pattern.findall(line)[0]
            color.append((int(line_no), get_rgb_color(float(ratio),
float(bright))))

code = []
count = 1
with open('Triangle.java', 'r') as tri_f:
    for line in tri_f.readlines():
        code.append([count, line.strip('\n')])
        count += 1
color = format_color(color, len(code))
print(color)

fig, ax = plt.subplots()
# hide axes
```

```
fig.patch.set_visible(False)
ax.axis('off')
ax.axis('tight')

tb1 = ax.table(cellText=code[:], cellColours=color[:], cellLoc='left',
loc='center')
tb1.auto_set_column_width(0)
tb1.scale(0.9, 0.8)

plt.savefig("fault.png", dpi=1000)
plt.show()
```

Result

1	package triangle;
2	
3	public class Triangle {
4	
5	public enum Type {
6	INVALID, SCALENE, EQUILATERAL, ISOSCELES
7	};
8	
9	public static Type classify(int a, int b, int c) {
10	int trian;
11	if (a <= 0 || b <= 0 || c <= 0)
12	return Type.INVALID;
13	trian = 0;
14	if (a == b)
15	trian = trian + 1;
16	if (a == c)
17	trian = trian + 2;
18	if (b == a) //inserted bug: should be b == c
19	trian = trian + 3;
20	if (trian == 0)
21	if (a + b <= c || a + c <= b || b + c <= a)
22	return Type.INVALID;

```
23                  else
24                      return Type.SCALENE;
25              if (trian > 3)
26                  return Type.EQUILATERAL;
27              if (trian == 1 && a + b > c)
28                  return Type.ISOSCELES;
29              else if (trian == 2 && a + c > b)
30                  return Type.ISOSCELES;
31              else if (trian == 3 && b + c > a)
32                  return Type.ISOSCELES;
33              return Type.INVALID;
34          }
35      }
```