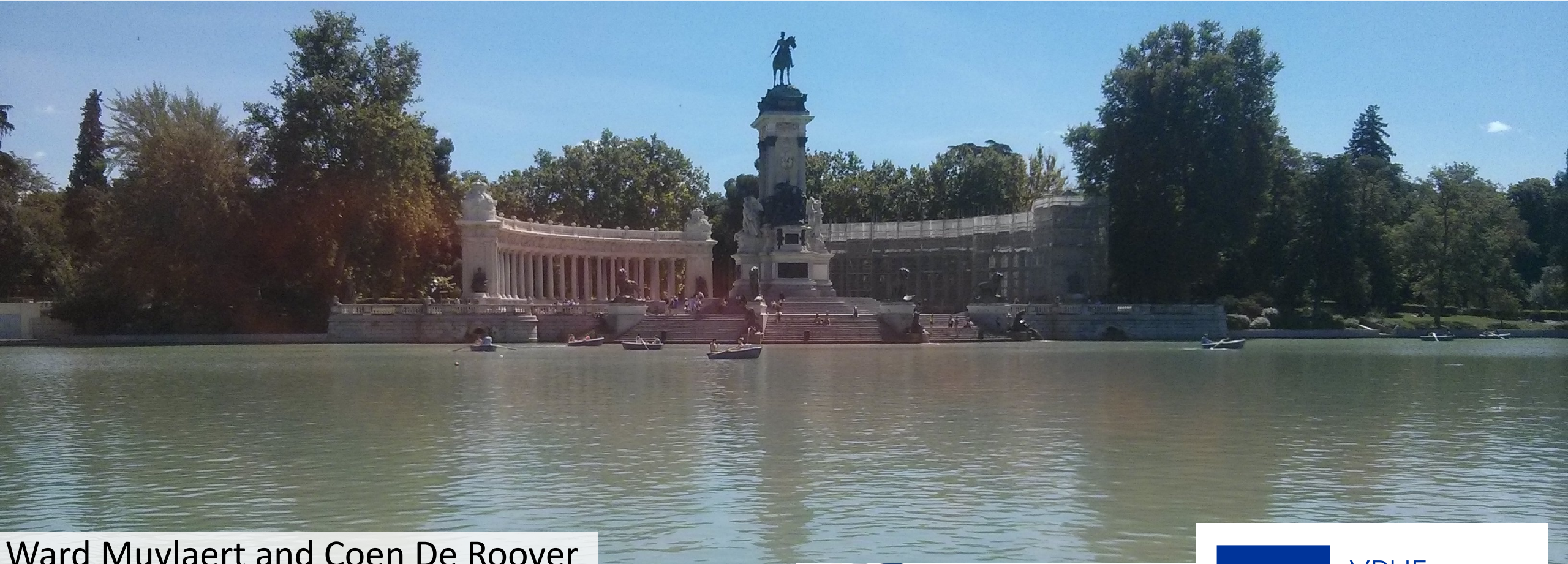


Automated Categorisation of Breaking Merge Commits *work in progress*



Ward Muylaert and Coen De Roover
@wardmuylaert and @oniroi
SATToSE 2017.

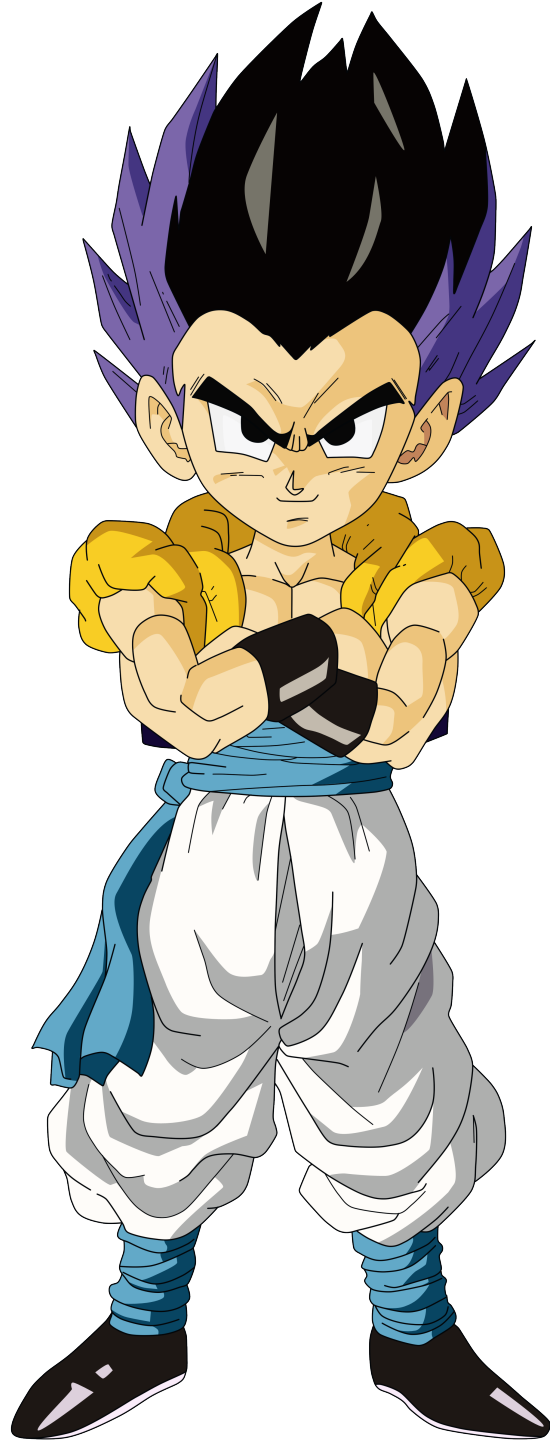


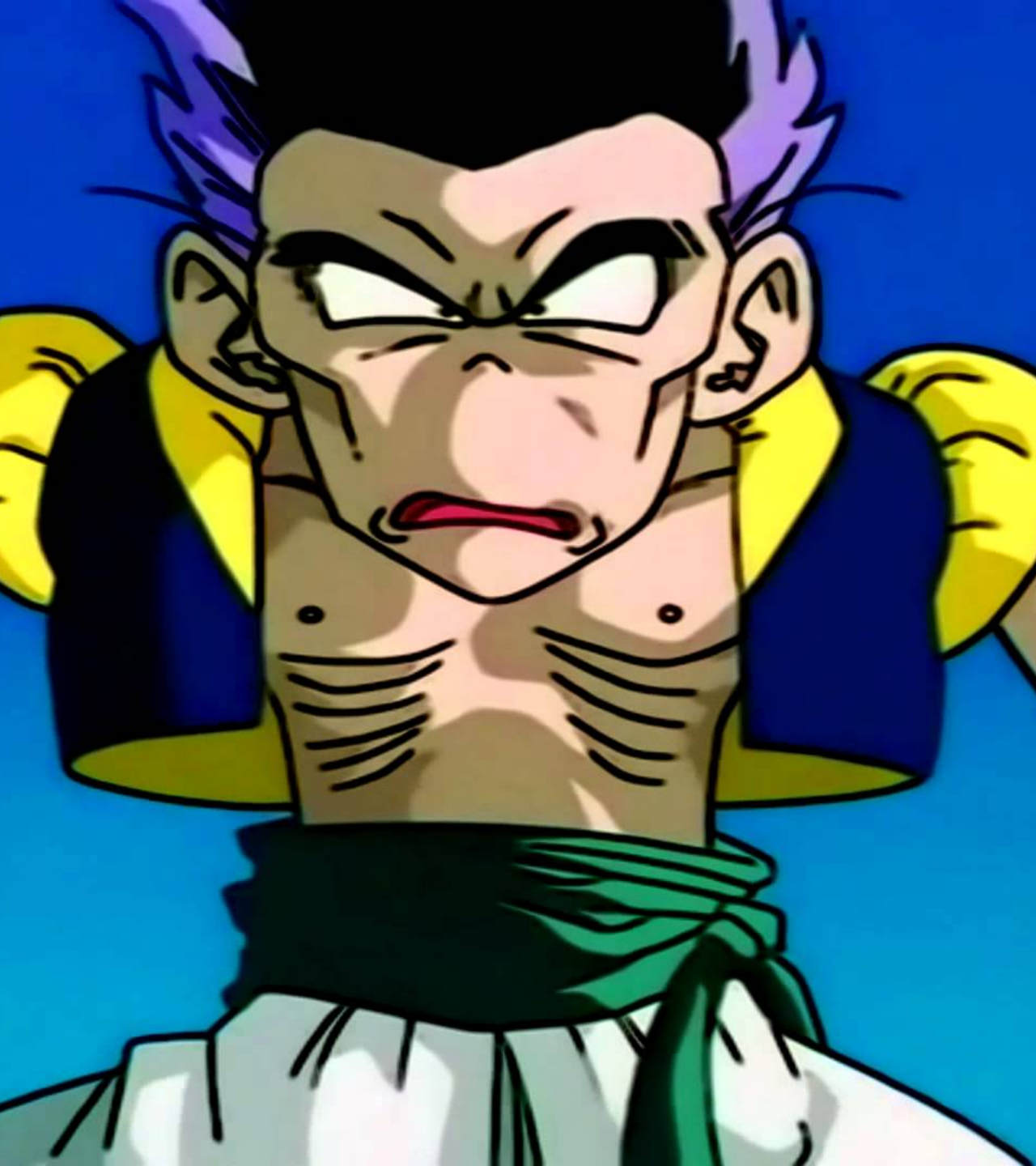
Automated Categorisation of Breaking Merge Commits *work in progress*

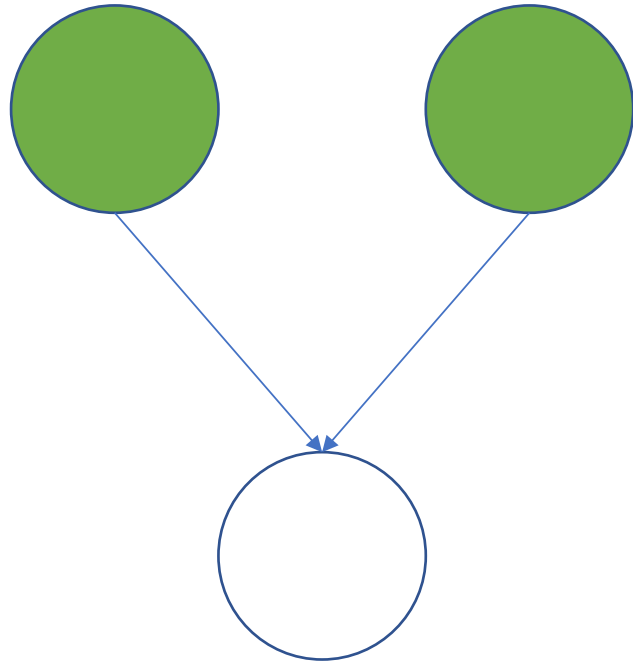
Ward Muylaert and Coen De Roover
@wardmuylaert and @oniroi
SATToSE 2017.

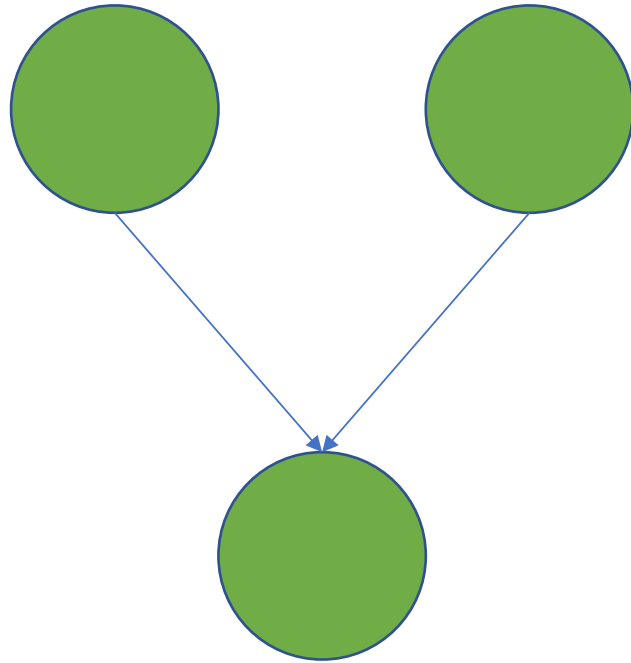












✓ **5-1-stable** **CRON** Merge pull request #29187 from r

#43854 passed

Remove requirement on mathn

🕒 Ran for 24 min 23 sec

🕒 Total time 5 hrs 56 min 40 sec

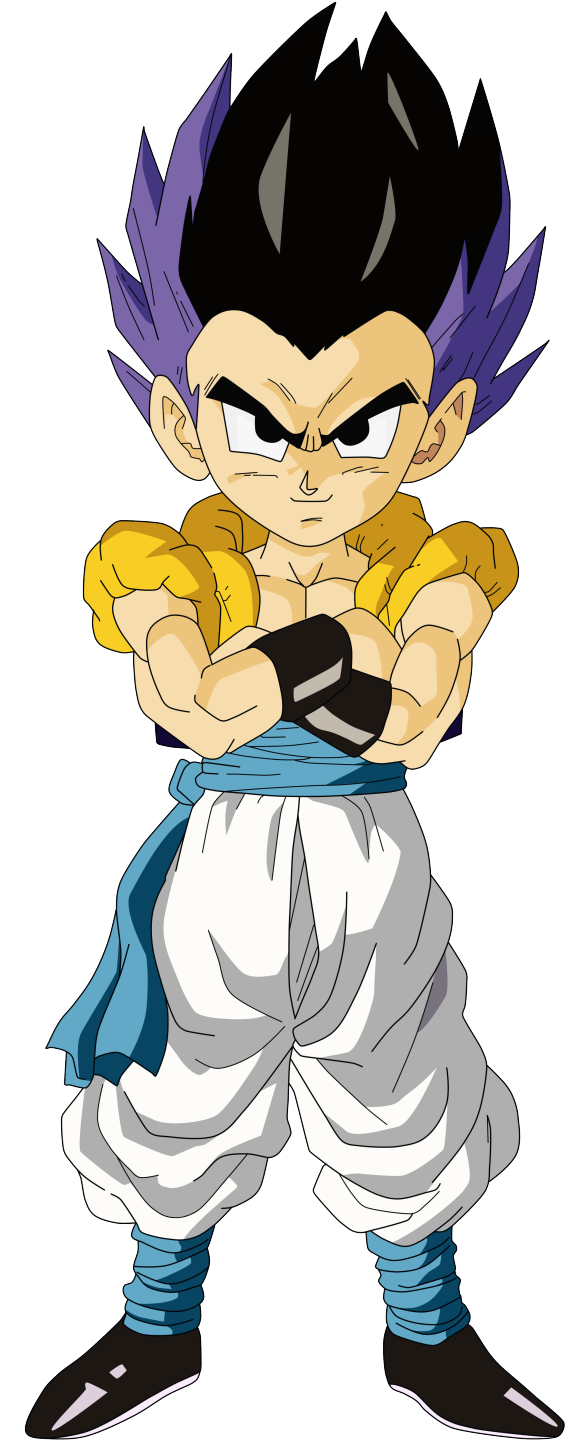
🐱 Commit 8daef52

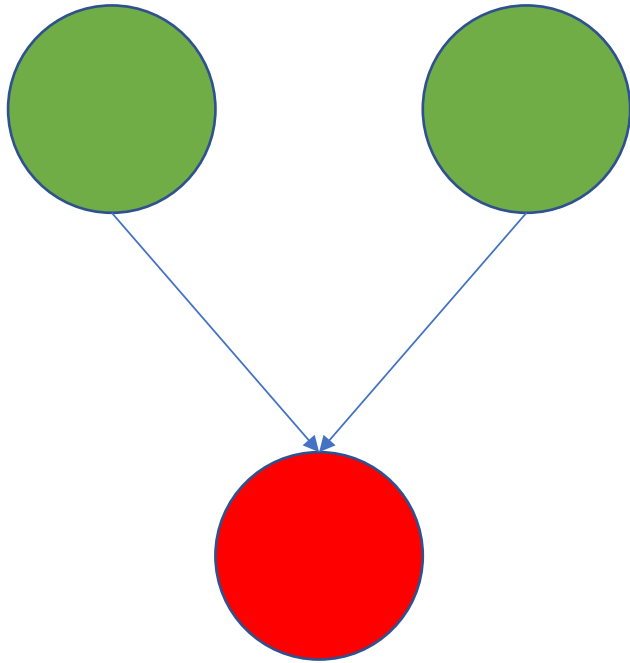
🐱 Branch 5-1-stable

📅 27 about 18 hours ago

👤 Rafael França authored
committed

🇮🇳 Matthew Draper





✗ **5-0-stable** Merge pull request #29293 from kamipo/fb

-o- #43799 failed

Fix ``default_scoped`` with defined ``default_scope`` on STI model

🕒 Ran for 21 min 24 sec

🕒 Total time 4 hrs 34 min 6 sec

👤 Commit ef39964

👤 Compare 0769f1c..ef39964

👤 Branch 5-0-stable

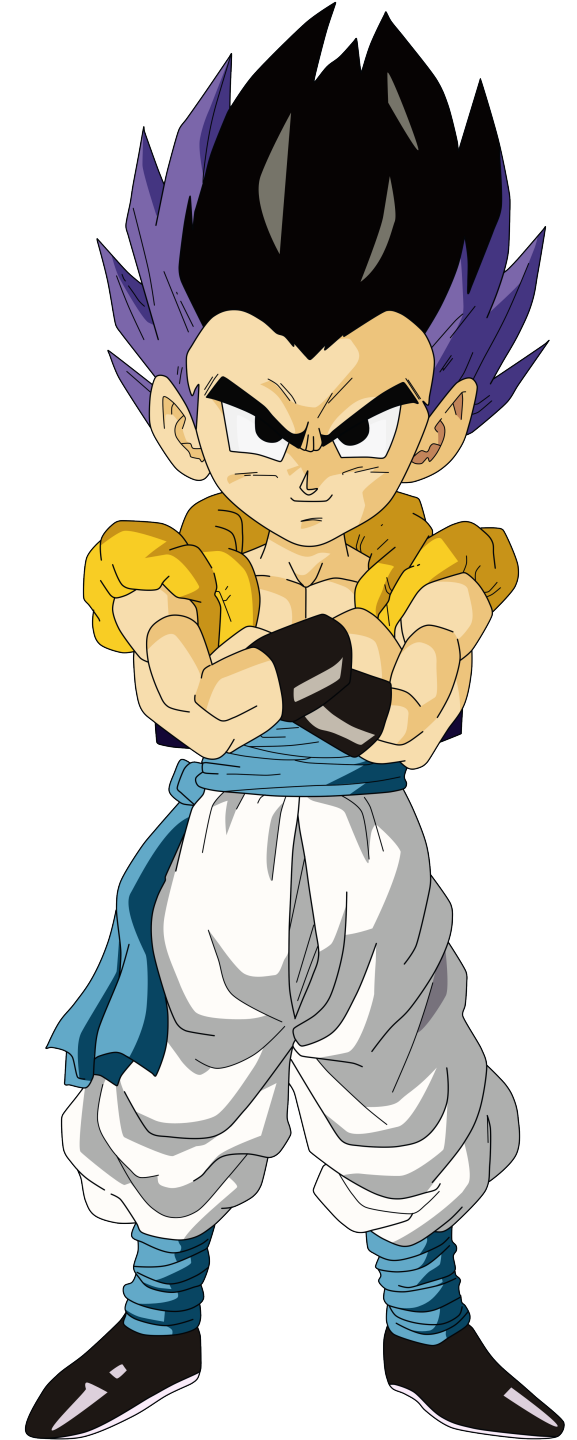
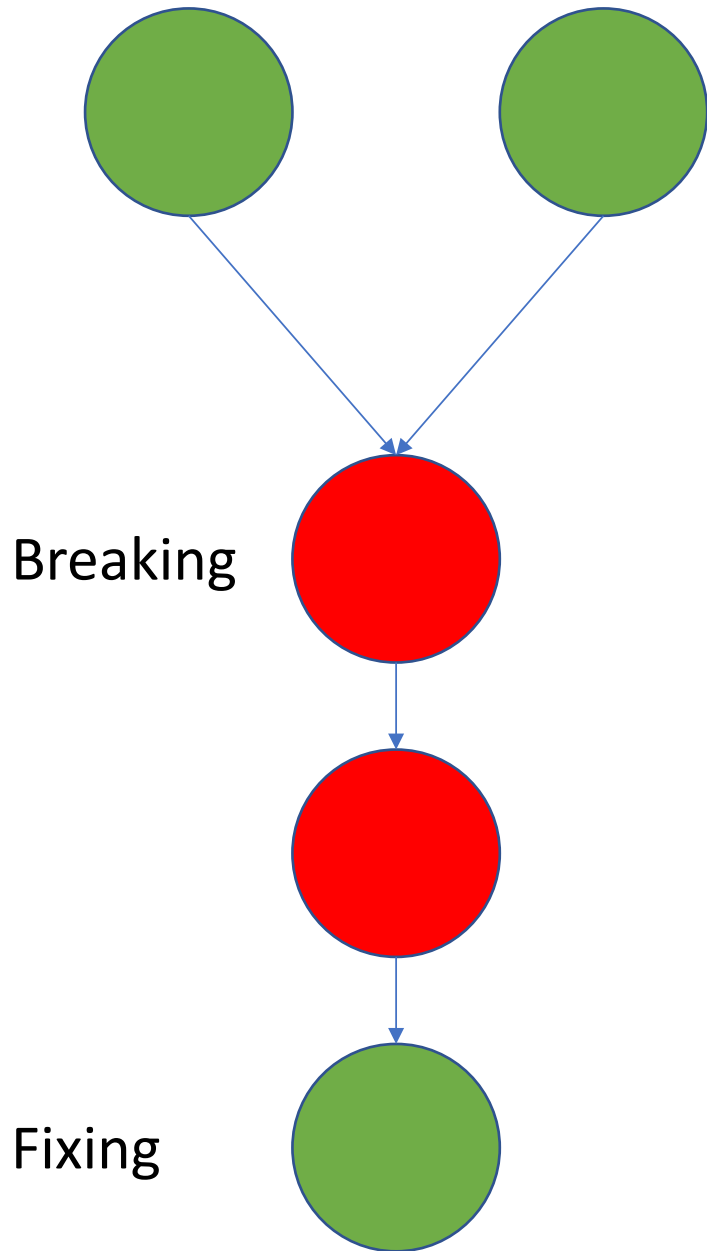
📅 3 days ago

👤 Matthew Draper authored and committed

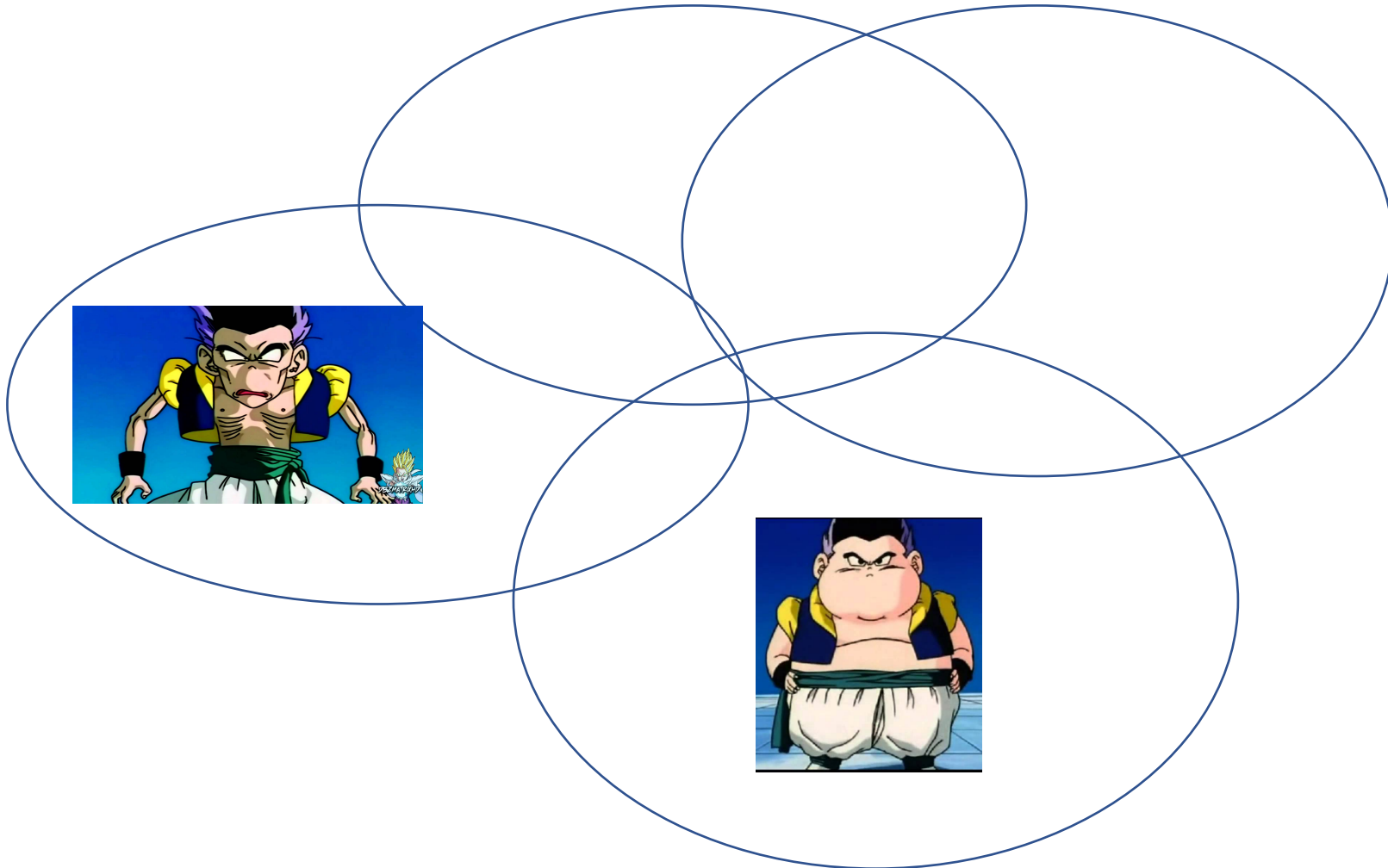
Different Kinds of Integration Conflicts

Conflict			Merges?	Runs?	Correctly?
Textual	<pre>-if (5 > x) { +if (5 == x) {</pre>	<pre>-if (5 > x) { +if (5 < x) {</pre>	✗	✗	✗
Syntactic	<pre>if (5 > x) { return 10; }</pre>		✓	✗	✗
Semantic	<pre>+if (freezes(temp)) { + ... +}</pre>	<pre>def freezes(y) { - return y < 0; + return y < 100; }</pre>	✓	✓	✗

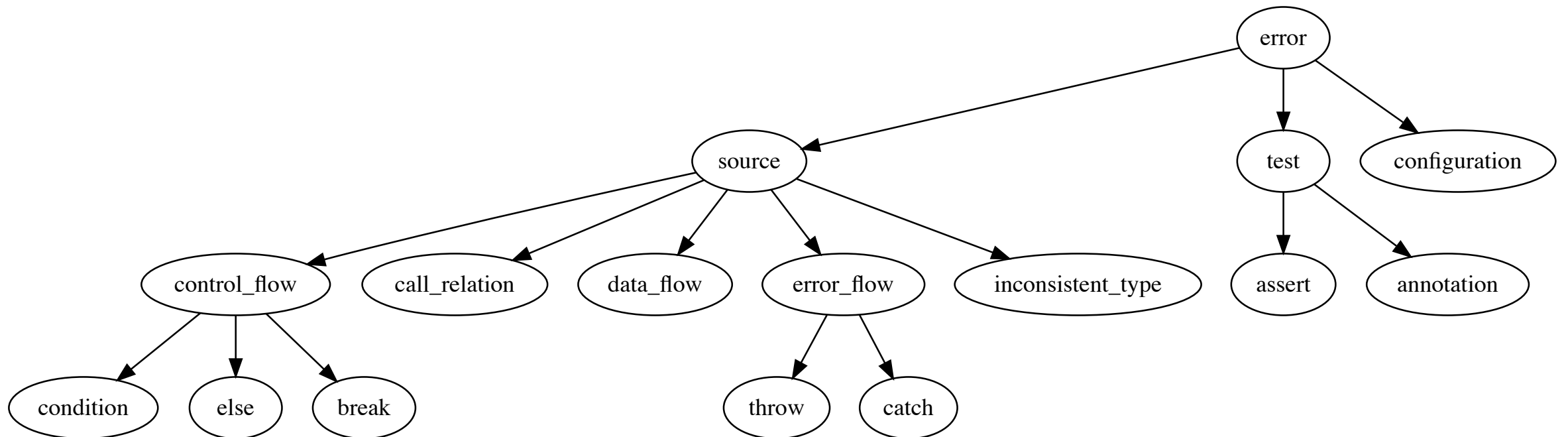
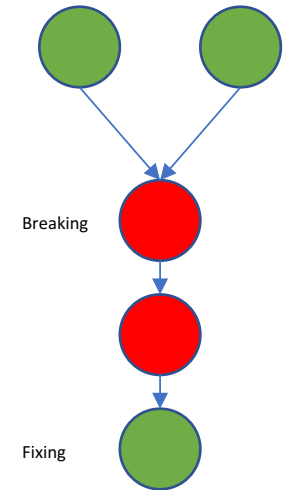




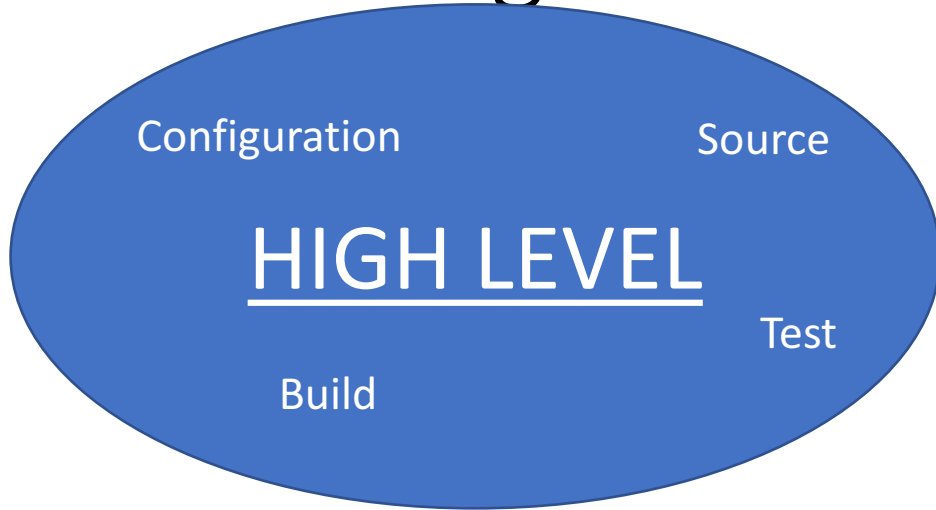
Goal: Categorisation



Goal: Categorisation



Goal: Categorisation

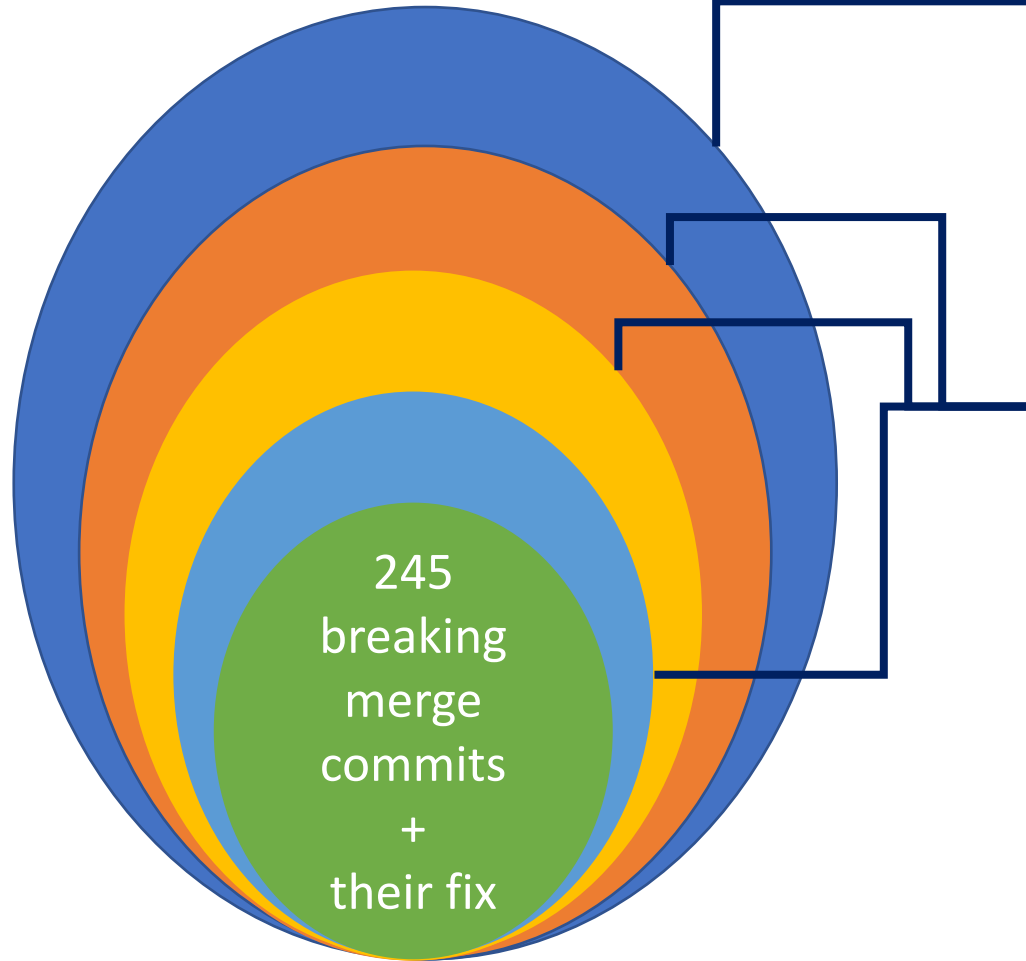


Steps

- Dataset
- Manual analysis
- Declarative specifications
- Automatic categorisation



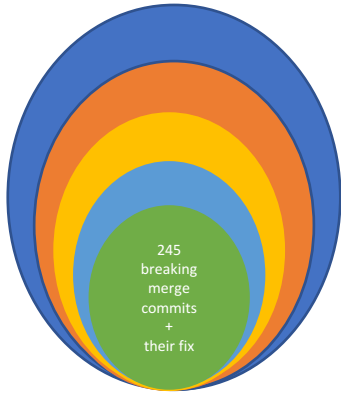
Dataset



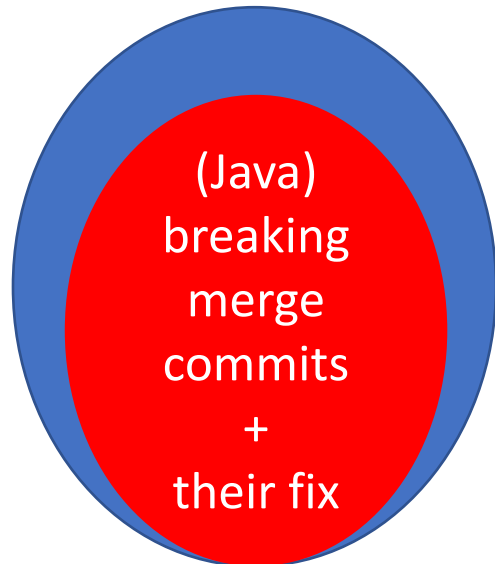
Beller, M., Gousios, G., & Zaidman, A. (2017). TravisTorrent: Synthesizing Travis CI and GitHub for Full-Stack Research on Continuous Integration. In International Conference on Mining Software Repositories (MSR).

Quality filtering

Dataset



- Manual analysis
- Test ground for queries



- Automated categorisation

Low Level Categorisation

```
class Freezing {  
    public void howDoesItFeel(int temp) {  
        if (temp < 0) {  
            System.out.println("Cold!");  
        }  
        else {  
            System.out.println("I'll manage.");  
        }  
    }  
}
```

```
class Freezing {  
    public void howDoesItFeel(int temp) {  
        if (temp < 30) {  
            System.out.println("Cold!");  
        }  
        else {  
            System.out.println("I'll manage.");  
        }  
    }  
}
```


Declarative Specification

```
(defn ast|if-statement [node ?parent]
  (jdt/ast-parent+ node ?parent)
  (jdt/ast :IfStatement ?parent))
```

Is a node an if statement?

```
(defn if-statement|expression [node statement]
  (jdt/ast-parent node statement)
  (jdt/has :expression statement node))
```

Does a node have an expression?

```
(defn change-if-statement-expression [change]
  (logic/fresh [?node ?statement ?value]
    (change-node|affects change ?node)
    (ast|if-statement ?node ?statement)
    (if-statement|expression ?node ?statement)))
```

Does a change affect the expression of an if statement?



Special Categorisation: Example

```
for (int i = 0; i < 10; i++) {  
    for (int j = 0; j < 10; j++) {  
        // ...  
    }  
}
```

```
for (int i = 0; i < 10; i++) {  
    for (int j = 0; j < 10; j++) {  
        if (5 == 5)  
            continue;  
        // ...  
    }  
}
```

```
for (int i = 0; i < 10; i++) {  
    // ...  
}
```

```
for (int i = 0; i < 10; i++) {  
    if (5 == 5)  
        continue;  
    // ...  
}
```



Steps

- Dataset
→ OKish
- Manual analysis
→ Redo
- Declarative specifications
→ Done for High/Low
- Automatic categorisation
→ Boilerplate done

