

Project 2: Crypt-Arithmetic

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For Programming Languages

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We ran a Crypt-Arithmetic analysis of three problems:

1. EAT + THAT = APPLE
2. SEND + MORE = MONEY
3. CROSS + ROADS = DANGER

This gave us the results found below

```
Running: Project 2 - SEND + MORE = MONEY
Python Version
  SEND : 9567
+ MORE : 1085
-----
Total time: 43.22367763519287 sec

Running: Project 2 - CROSS + ROADS = DANGER
Python Version
  CROSS : 96233
+ ROADS : 62513
-----
= DANGER: 158746

Total time: 547.6758296489716 sec

Running: Project 1 - EAT + THAT = APPLE
Python Version
  EAT : 819
+ THAT : 9219
-----
= APPLE: 10038

Total time: 0.09138679504394531 sec

Running: Project 2 - SEND + MORE = MONEY
C++ Version
  SEND : 9567
+ MORE : 1085
-----
= MONEY: 10652

Total time: 3.926 sec

Running: Project 2 - CROSS + ROADS = DANGER
C++ Version
  CROSS : 96233
+ ROADS : 62513
-----
= DANGER: 158746

Total time: 63.547 sec

Running: Project 1 - EAT + THAT = APPLE
C++ Version
  EAT : 819
+ THAT : 9219
-----
= APPLE: 10038

Total time: 0.022 sec

Running: Project 1 - SEND + MORE = MONEY
Java Version
  SEND : 9567
+ MORE : 1085
-----
= MONEY: 10652

Total time: 1.261 seconds

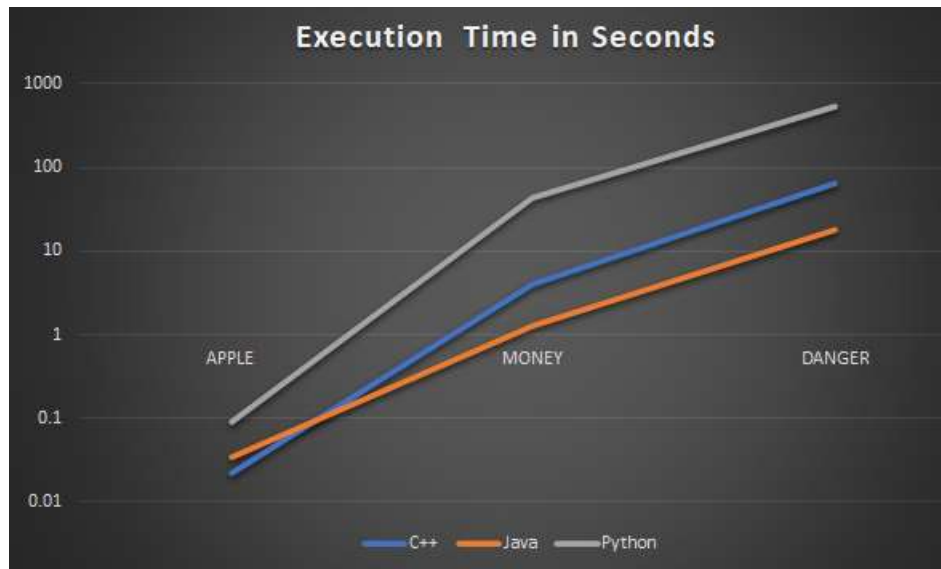
Running: Project 1 - CROSS + ROADS = DANGER
Java Version
  CROSS : 96233
+ ROADS : 62513
-----
= DANGER: 158746

Total time: 17.693 seconds

Running: Project 1 - EAT + THAT = APPLE
Java Version
  EAT : 819
+ THAT : 9219
-----
= APPLE: 10038

Total time: 0.034 seconds
```

Graphing our results gives us the graph



Surprisingly, this has shown that the algorithm performs best in its Java implementation. While it is no surprise that python is the worst performer in each instance, Java only lags behind in the most basic problem, suggesting that C++ only beat java due to overhead. Once the problem became complex enough, the margin caused by that overhead disappears and java outperforms C++.