Quantitative Formal Methods
Modelling Speedoo

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Introduction

Speedoo, introduced in the article [...], is a tool designed to help software developers find optimization opportunities in large-scale programs. Instead of just outputting a list of methods that should be optimized, the core of the Speedooo solution lies on the concept of *optimization spaces*, each of which is a set of related methods that together provide one optimization opportunity.

For example, if two methods f and g are reasonably fast in isolation, a traditional tool might not suggest them as optimization opportunities. However, if f calls g multiple times during execution, f and g form an optimization space and should be analyzed by the developers together – perhaps there is a way of optimizing the number of calls to g within f.

Modelling Speedoo

To analyze Speedoo, a petri net was designed using the steps taken by the tool as a general guide of the places and transitions of the network. Figure 2 from the Speedoo article provides the steps, complemented by Table 8, also from Speedoo, which provides the performance overhead of each step.
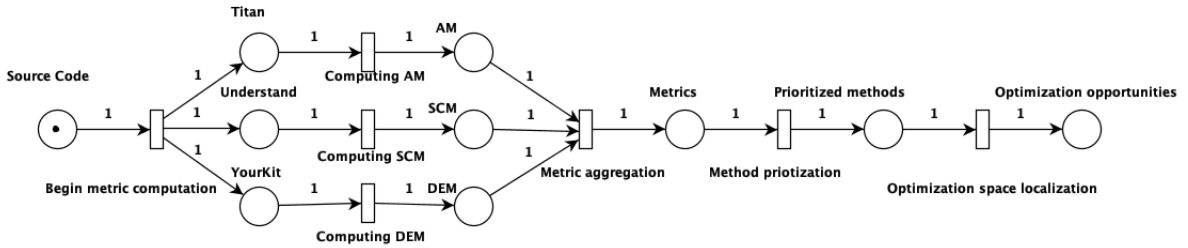

Figure 1: The shortest possible path in a 3x3 grid.

References

[1] Chen Z, Chen B, Xiao L, Wang X, Chen L, Liu Y, Xu B (2018), "Speedoo: Prioritizing Performance Optimization Opportunities Zhifei," *Proceedings of the 40th International Conference on Software Engineering - ICSE '18*.