

Overview of the Programming Assignments

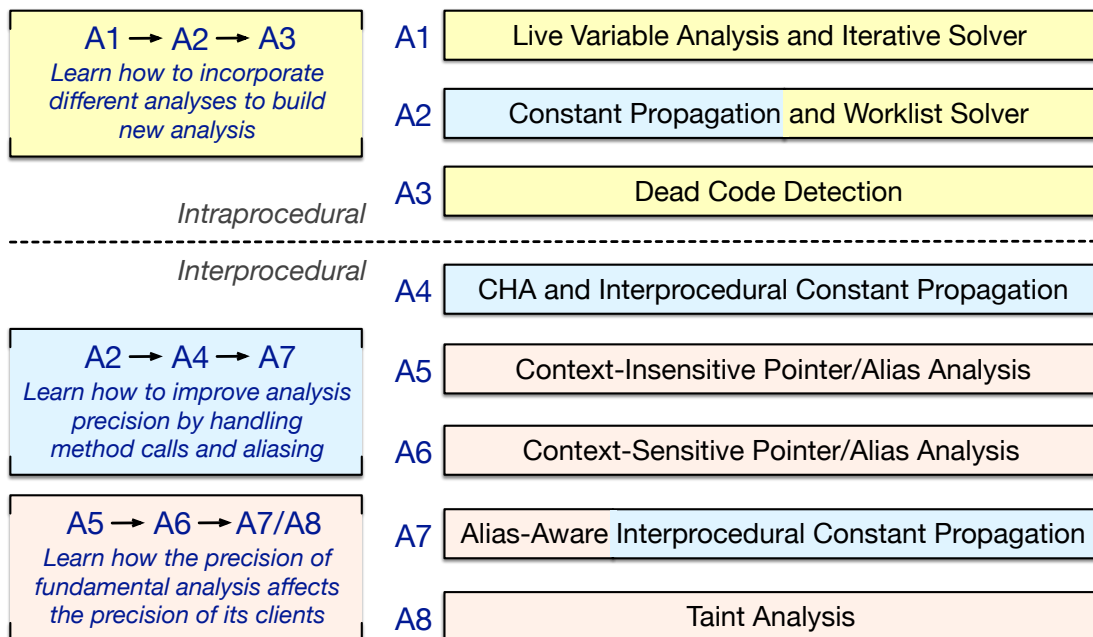
Course “Static Program Analysis” @Nanjing University
Assignments Designed by Tian Tan and Yue Li

纸上得来终觉浅，绝知此事要躬行。

——《冬夜读书示子聿》，陆游

A key goal of this course is to let students comprehend practical program analysis techniques, and to accomplish this target, we have designed and implemented a new and easy-to-learn program analysis framework called Tai-e (太阿) for real-world Java programs, and on top of Tai-e, eight programming assignments are provided to cover different program analysis topics introduced in the lectures. The assignments include program analyses for compiler optimization (e.g., live variables analysis, constant propagation, dead code detection), fundamental program analyses (e.g., call graph construction, context-insensitive and various kinds of context-sensitive pointer/alias analyses), and client analysis for program security (e.g., taint analysis).

Compared with existing popular program analysis frameworks for Java, such as Soot and Wala, Tai-e is easier to learn and understand. It offers concise IR, clean and easy-to-extend interfaces, plentiful and well-organized analysis algorithms, intuitive framework structure, and instructive documentation. We expect students to benefit not only from the assignments themselves, but also from the related framework code of Tai-e, for understanding how program analysis techniques are implemented in practice; in addition, more knowledge (algorithms and skills) that are not covered in the lectures will be introduced in the assignments. The overview of the assignments is as follows.



Overview of the programming assignments and their relations.