A fast algorithm to compute heap memory bounds of Java Card applets

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Abstract: We present an approach to find upper bounds of heap space for Java Card applets. Our method first transforms an input bytecode stream into a control flow graph (CFG), and then collapses cycles of the CFG to produce a directed acyclic graph (DAG). Based on the DAG, we propose a linear-time algorithm to solve the problem of finding the single-source largest path in it. We also have implemented a prototype tool, tested it on several sample applications, and then compared the bounds found by our tool with the actual heap bounds of the programs. The experiment shows that our tool returns good estimation of heap bounds, runs fast, and has a small memory footprint. © 2008 IEEE.
Index Keywords: Clustering algorithms; Computer programming languages; Computer software; Java programming language; Software engineering; Applets; Control Flow graphs; Directed Acyclic graphs; Fast algorithms; Prototype tools; Small memory footprints; Time algorithms; Upper bounds; Formal methods

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