

15-745: Graduate Compilers Project Milestone

SSAPRE in MLton

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Due: 14 Apr 2003

1 Milestone Report

Major Changes. No major changes that will affect the goals of the project.

What We've Accomplished. We've familiarized ourselves with the MLton SSA IR and the global common sub-expression elimination pass. We've discovered a few minor snags, but also reassured ourselves that PRE is feasible and likely to produce positive results.

We have developed a more thorough understanding of the SSAPRE algorithm and prepared a summary with implementation strategy (data structure notes) and a table of fields and flags. This will be a useful resource as we implement the algorithm this week.

We have discovered that the problem of converting MLton's SSA IR to a form appropriate for SSAPRE is more tricky than we thought. We've written pages of notes and discussion about how to do it. I think we have a correct declarative specification of what we need to do, but no efficient algorithm yet to do it. Fortunately, this allows us to develop that algorithm independently from the implementation of SSAPRE, which will allow us to work concurrently. If this algorithm turns out to be interesting, it may become a more significant part of our final project, and we may scale back the implementation (be lazy in places where we can, etc.) to compensate for this.

These results can be found at our web page as part of the unpolished document from when we thought the milestone report should be like 10 pages long.

Meeting Our Milestone. Except for the fact that we don't have a concrete algorithm for reconciling the variable versions issue, I believe we met our milestone. (That part turned out to be harder than we guessed.) We've also got a good reminder that we need to pick up the pace, which I suppose is the real purpose of the milestone.

Revised Schedule. Our schedule remains approximately the same. This week is for implementation: Tom will begin implementing the SSAPRE algorithm, while Brendan works out (and implements?) an algorithm for providing the appropriate inputs to SSAPRE. Next week, we benchmark, debug, and write the final report.