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## Bachelor's Thesis

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### An Instrumentation-based Reference

#### Implementation for Ant Tracks:

#### Instrumentation

Allocations and garbage collection (GC) can have considerable impact on application performance. However, tracing all allocations and deallocations in order to track down memory-related performance degradations usually impose severe overheads. Thus, state-of-the-art tools usually perform statistical analyses on heap dumps or instrument every allocation site and do not track deallocations at all.

*Ant Tracks (Accurate and Efficient Object Tracing for Java Applications, Lengauer et al., ICPE'15, Post Mortem Memory Profiling for Java Applications, Bitto, Master's Thesis, JKU)* is a new tool that solves this problem rigorously by building the tracing mechanism directly into the Hotspot Java Virtual Machine. It thus achieves a (yet unreached) very low overhead and level of detail. This project should build a reference implementation providing functionality as close as possible to Ant Tracks and that is purely built on instrumentation.

The goal of this thesis is to develop the instrumentation component for the agent that instruments all allocation sites to fire proper events. Furthermore, deallocation events must be fired as well. In order to do this, several mechanisms (for comparison) should be implemented (including at least Phantom References and Finalizers). It is not the goal of this thesis to develop the underlying agent infrastructure.

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