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Master's Thesis

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Assigning Precise Allocation Data to a Sampled Call Context Tree

Managed memory, i.e., garbage collected memory, has gained wide-spread use because it relieves the programmer from freeing heap objects manually and allows for fast allocations. However, these advantages come at the cost of a difficult to understand memory manager and garbage collector. Therefore, searching for memory-related performance degradations is a tedious task because the reasons for slow allocations, a large garbage collection pause, or a high garbage collection frequency might not be obvious.

The goal of this thesis is to extend DuckTracks, a tool that is able to track allocations by efficient instrumentations, by periodically sampling the stack and associating allocations with specific locations in the resulting call context tree.

DuckTracks records allocation sites and types for every allocation. However, the allocation site is often not enough to detect the root cause, especially if the allocation site is a frequently used API method. When stack traces are sampled and merged into a call context tree, and the allocation counters are sampled as well, they can be associated with specific locations in the call context tree.

The master thesis must be submitted not later than 1.9.2017.

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