# Improvements to OOPSLA-128

## A. Overall improvements as promised

We use >  to indicate what we had promised,
We use  ***  to indicate what we have done

> Expand Section 2 to better explain scoped invariants (RA), and illustrate the Hoare logic in proving external calls (RC).

> We will ensure that all terms are explained before use -- either informally, with a definition, or through application to an example -- including terms such as path, frame, access, external state, current call, step, object reachable, state reachable, and pointer semantics.

** We have enhanced section 2, to better illustrate the problem as well as our approach. We included a heap diagram on page 3, illustrating the problem. We added state diagrams in Fig. 1, illustrating “current point of execution”, and added further diagrams in Fig. 2, illustrating “protection”. Moreover, for ease of understanding, throughout the paper, all illustrative examples are based on the example on page 3, or Fig. 3 -- except for the very specific matters on lines

** We have included definitions of the terms direct access, indirect access, frame

** We have all read through the paper checking all key terms are defined before use

> Provide more examples and motivation e.g., discuss how reasoning about access allows us to reason about internal fields;

** We have added explanations, motivation, and example as follows

** Motivations
- 165 - 188: motivation for “protected” and for scoped invariants
- 240-247: motivation for “protected” and for scoped invariants

- 265-284  reasoning about access allows us to reason about internal fields
- 409-416  reasoning about access allows us to reason about internal fields

- 646-560  design alternative for protection