ID: MSCA-19-DeRoover01

Discipline: Systems and Software Engineering

Title: Design of static or dynamic program analyses, and their application to problems in software engineering

Abstract: Members of the Software Languages Lab (department of Computer Science within the Faculty of Sciences and Bio-Engineering, VUB) are eager to collaborate with Marie-Curie fellows on the design of static or dynamic program analyses, and their application to problems in software engineering such as software maintenance and security vulnerability detection.

Within this broader theme, the following topics are of particular interest:

Analysis designs that improve precision and scalability for multi-threaded programs, such as the process-modular abstract interpretation developed by the group for concurrent actor programs.

Analysis designs that improve practical applicability within continuous integration pipelines, such as incremental analyses that scale in the size of a commit rather than the size of the analysed program.

Applications that narrow the scope to individual commits, such as the commit decomposition tool developed by the group for decomposing a large commit of unrelated edits into smaller commits of related edits.

Applications that broaden the scope to the entire development history of a project, such as the mining software repositories tool developed by the group for mining patterns of frequent edits.

Applications that embrace an entire software ecosystem as a source of already-proven solutions for recommendations about library selection, maintenance and migration.

Additional topics may also investigate the functional and dependently-typed programming and theorem proving as well as the secure compilation, object capabilities and capability machines.

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