

Internship

Building object-centric debuggers and evaluating object-centric debugging scenarios.

RMoD team, 2022

Inria Lille - Nord Europe, France

The objective of this internship is to identify and to evaluate the debugging scenarios that are the most likely to benefit from object-centric debugging. The intern will interrogate real developers about object-centric debugging scenarios, then implement prototypes and evaluate them empirically with developers to validate these scenarios.

Keywords : Object-Centric Debugging, Object-Oriented Programming, Software Engineering

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Requirements : Master 1 or 2 student

Duration : 6 months.

Language : Français/English.

This internship is an introductory work for a PhD offer¹ and can possibly be immediately followed by the PhD.

This internship takes place within the ANR project OCRE.

1 Description of the project

Debugging is difficult and costly. Object-centric debugging is a young technique arguing that focusing the scope of debugging on specific objects considerably eases the tracking and the understanding of hard bugs in Object-Oriented Programs (OOP). But it lacks fundamental bricks to be applicable in practice. Therefore, it has never been empirically evaluated. The objectives of the OCRE project are to study the fundamental and practical limits that hinder the implementation, the evaluation, and the adoption of object-centric debugging.

We propose to build the first generation of object-centric debuggers, in order to identify and evaluate its real benefits to OOP debugging. We argue that these debuggers have the potential to drastically lower the cost (time and effort) of tracking and understanding hard bugs in OOP.

2 Problems

While object-centric debugging is promising, it is :

1. <https://jobs.inria.fr/public/classic/fr/offres/2021-04101>

- - Hard to implement,
- - unknown in which case it would be the most effective.s to debug among thousands or millions, especially when such objects are not directly available when we observe the program ?

There are many different object-centric debugging concepts and tools, and because of the two problems mentioned above it is hard to know which technique is suited to which case.

Therefore, we ask ourselves the following questions :

- - What are the scenarios in which developers think object-centric debugging is the most effective ?
- - Which object-centric debugging technique is the most suited for each scenario ?

3 Tasks

- Study the literature,
- discuss with our team's developers to understand and characterize the scenarios of object-centric debugging,
- build object-centric debugger prototypes (with the Pharo language) and evaluate them for each debugging scenario.

4 References

1. J. Ressia, A. Bergel, and O. Nierstrasz. Object-centric debugging. In Proceeding of the 34rd international conference on Software engineering, ICSE '12, 2012.
2. S. Costiou. Unanticipated behavior adaptation : application to the debugging of running programs. Theses, Université de Bretagne occidentale - Brest, Nov. 2018.