



Proposal bachelor thesis

Title: Advanced JavaScript Code Completion

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Includes preparation course: Yes

Context

There already exist quite a number of JavaScript IDEs, but in terms of supporting the programmer they focus more on syntax and the static structure of programs.

Functions like code completion are either absent, or limited in capabilities.

For example, in Eclipse Orion, when requesting completion at the final dot, the list of propositions does not contain `x`.

```
var o = {x:3};  
var p = Object.create(o);  
p.
```

Yet programmers expect correct and relevant code completion, especially when comparing to what editors like Eclipse have to offer for Java for example.

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Your goal is to equip CodeMirror, a versatile web editor implemented in JavaScript, with advanced code completion for JavaScript.

The information you need for code completion is offered by a static analysis that turns a JavaScript program into a state graph.

When the user requests code completion, the graph needs to be queried to obtain the required information.

Using short programs, you will demonstrate that your solution offers correct and relevant solutions.

To prove that you outperform the competition, you will compare your solution to a couple of other major JavaScript IDEs, including IntelliJ IDEA and Eclipse Orion.

An important obstacle to overcome is to obtain a parser that is error-tolerant: code completion is usually invoked when the program is syntactically invalid.

Preparatory course bachelor thesis

The state graph is built by abstractly interpreting the input program, which amounts to running the program with abstract values instead of concrete primitive values (e.g., Num instead of 3). During the preparatory phase you will get acquainted with abstract interpreters, and how they are used in static program analysis.

You will also look out for a suitable error-tolerant parser. Through experimentation you will determine if it can handle the most common “syntactic scenarios” that arise when code completion is requested.