GSoC Report: Clang Integration in KDevelop

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History of KDevelop

- Issues with current C++ Support
  - **Custom parser** living inside KDevelop code base
  - Over **50 000 LOC**
  - **Hard to maintain**, even harder to extend
    - Hint: C++11, C++14, ...
  - Lots of issues with non-trivial C/C++ code
    - (designated initializers, ...)
  - Not possible to disambiguate between C vs. C++, or separate C++ standard versions
  - ...

Clang to the rescue!

- C/C++/ObjC language frontend for LLVM
- Features
  - Expressive diagnostics
  - Allows tight integration with IDEs
    - (fuzzy parsing, incremental compilation)
  - BSD-licensed
  - Highly active community
  - Stable API via **libclang**

Clang Integration in KDevelop

- Our hopes
  - No need to maintain a custom C++ parser
  - Let Clang handle parsing + semantic analysis
  - Get refactoring tools for free
  - Get ObjectiveC support for free

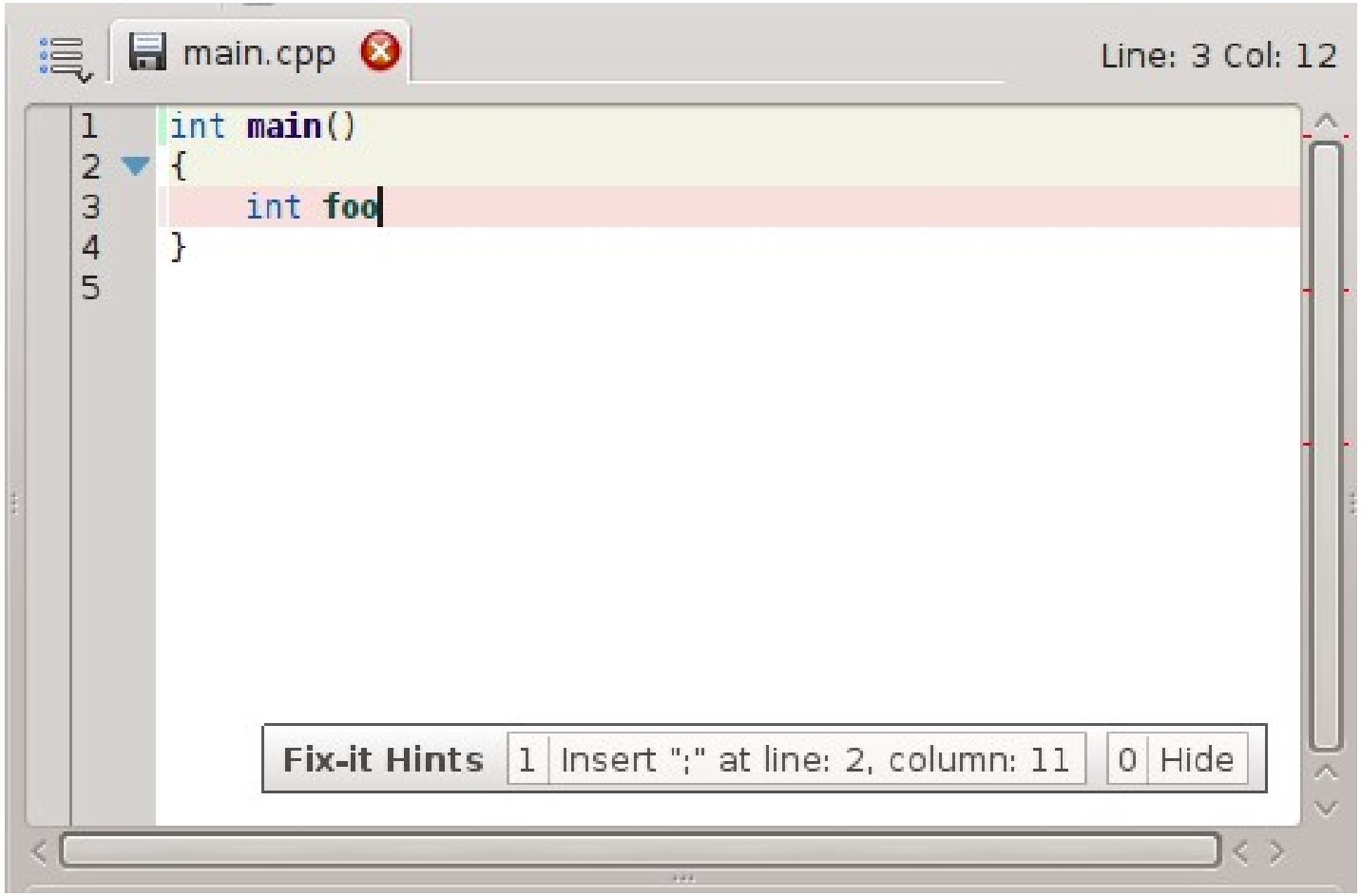
- Our intend
  - Enables us to focus on **improving the IDE**, not **the parser**!

GSoC Work: Outline

Screenshots!

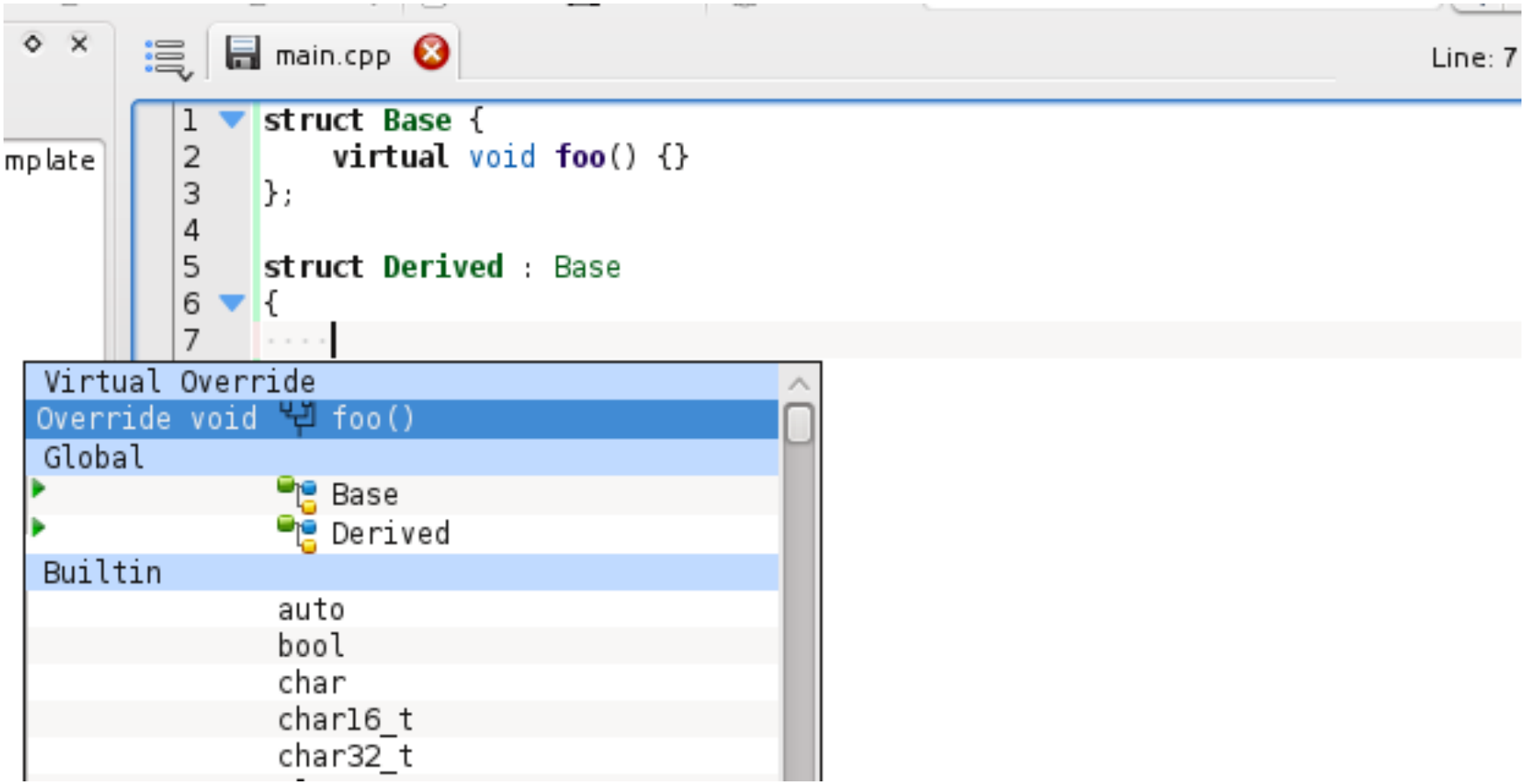
GSoC Work: Assistants

- Providing diagnostics/fixits from Clang



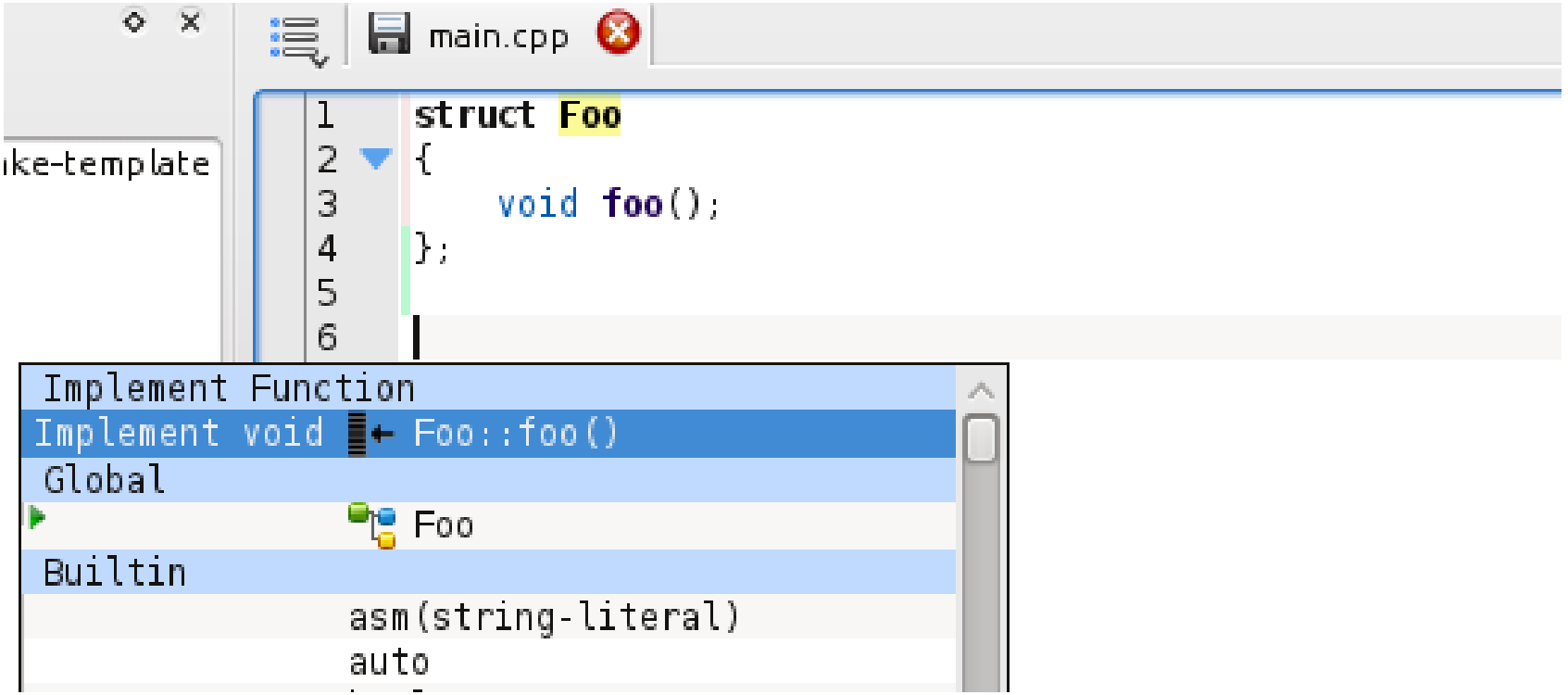
GSoC Work: Code completion

- Virtual override completion [ported]



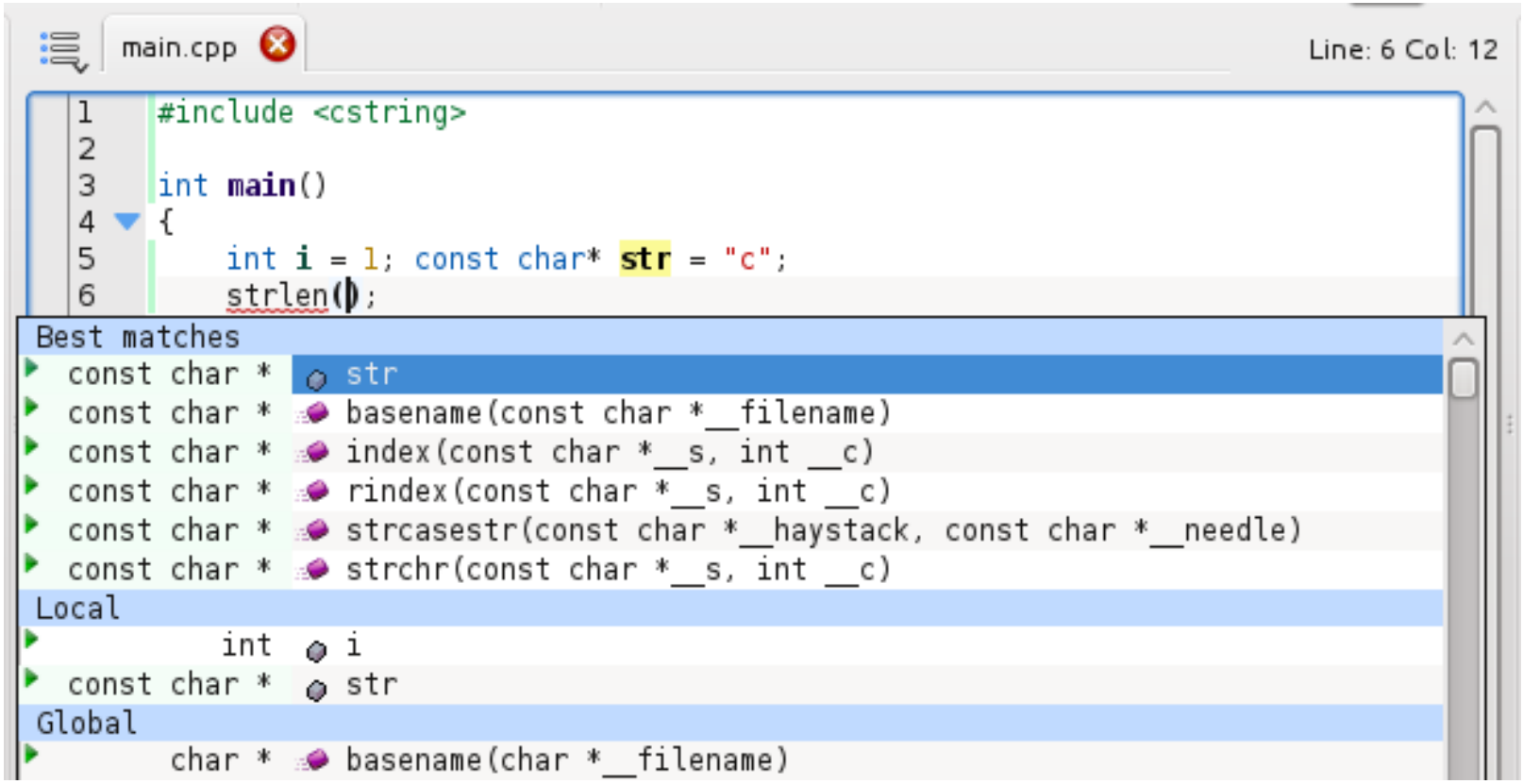
GSoC Work: Code completion

- Implement Function Helper [ported]



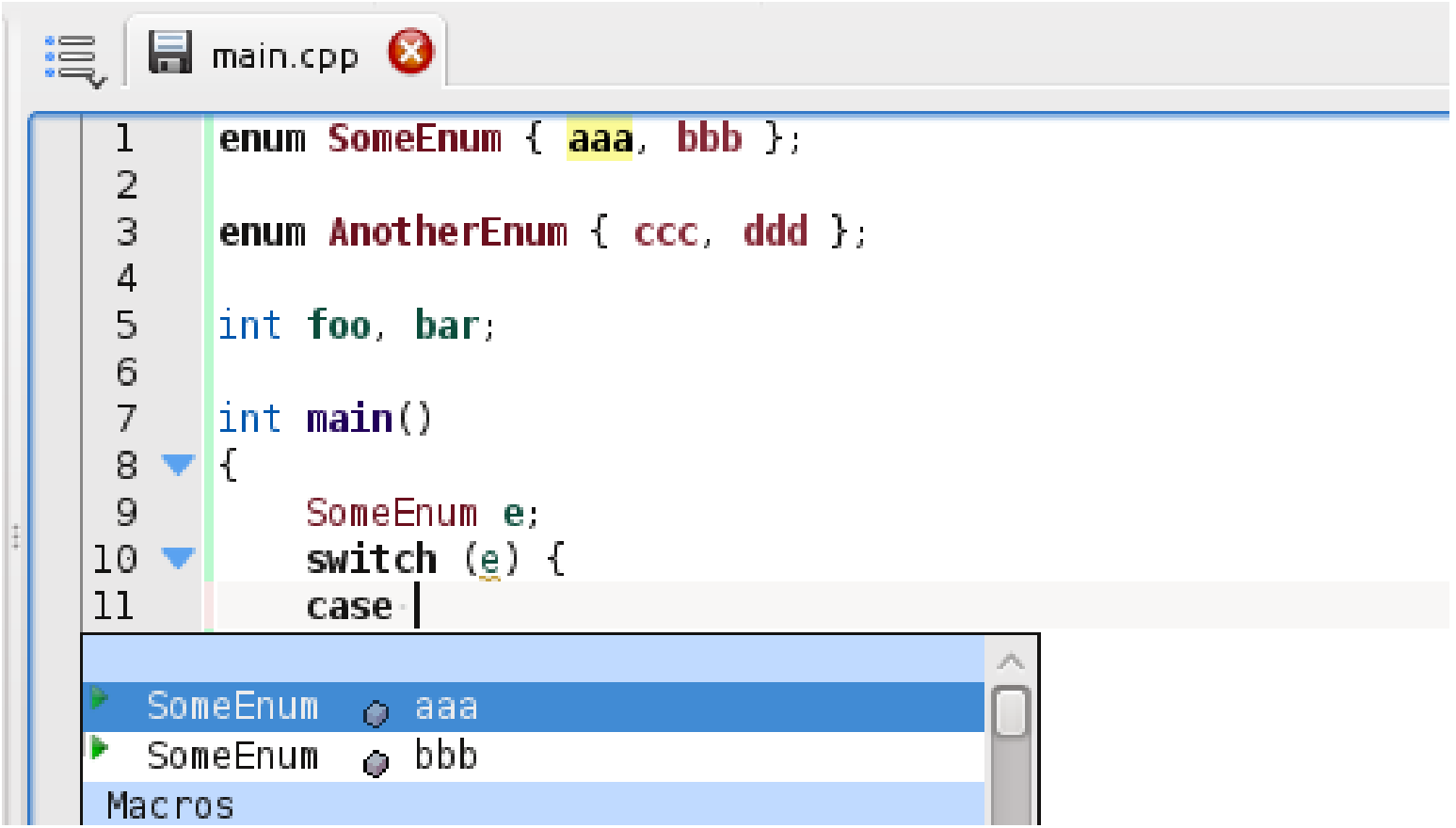
GSoC Work: Code completion

- Show viable expressions for current context



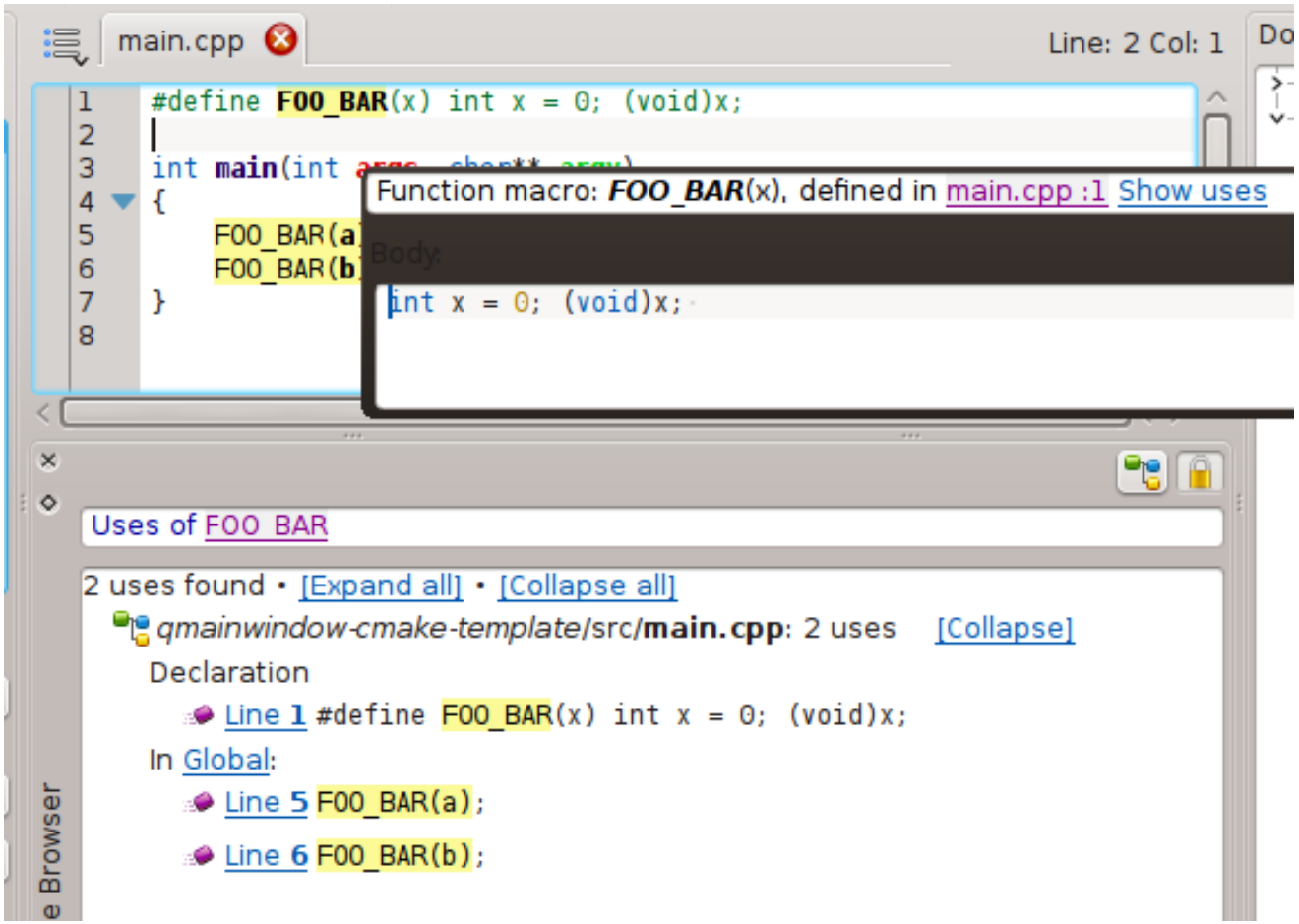
GSoC Work: Code completion

- Special completion: Enum-case labels



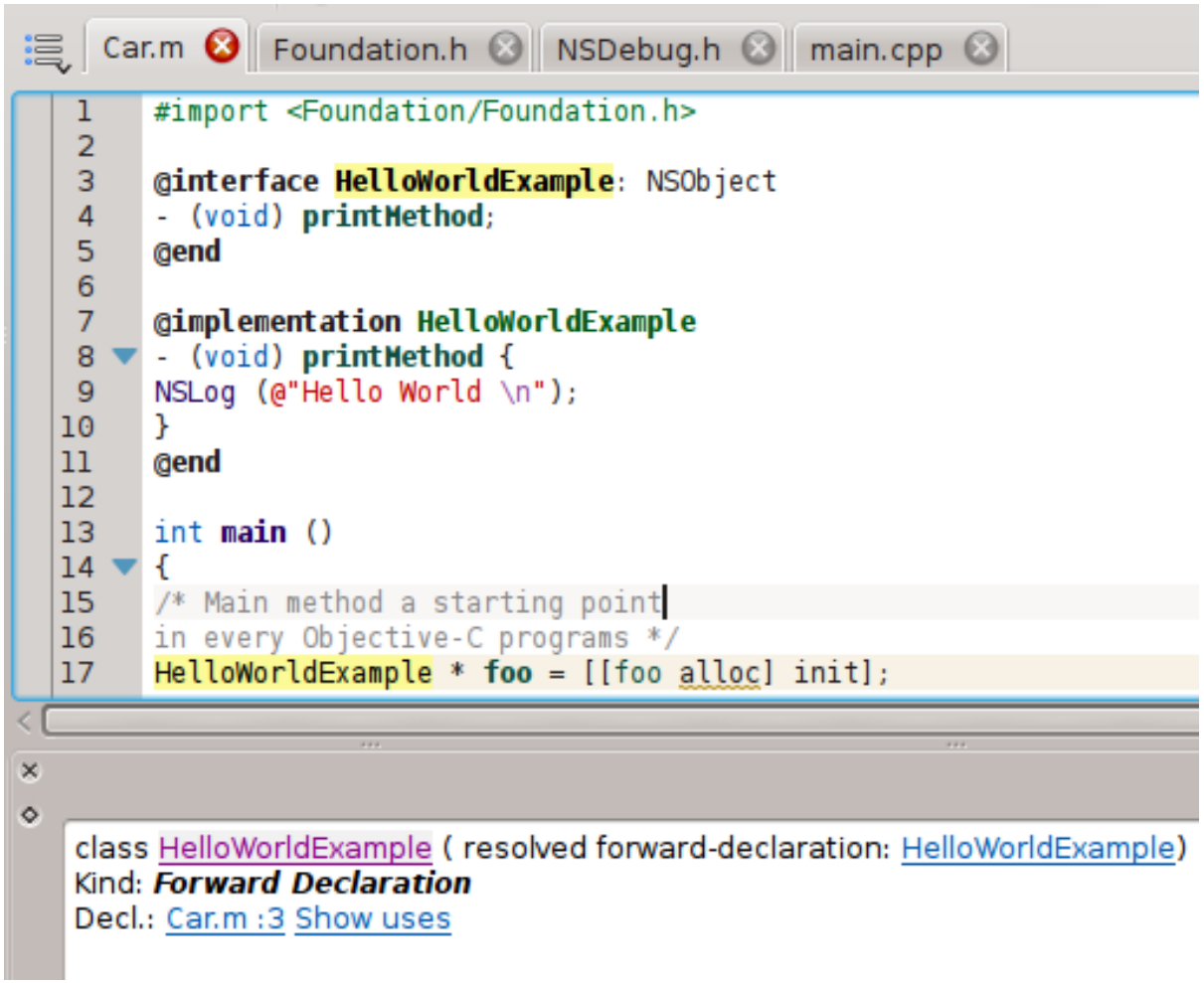
GSoC Work: Macro navigation

- Show definition text and uses of Macro definitions



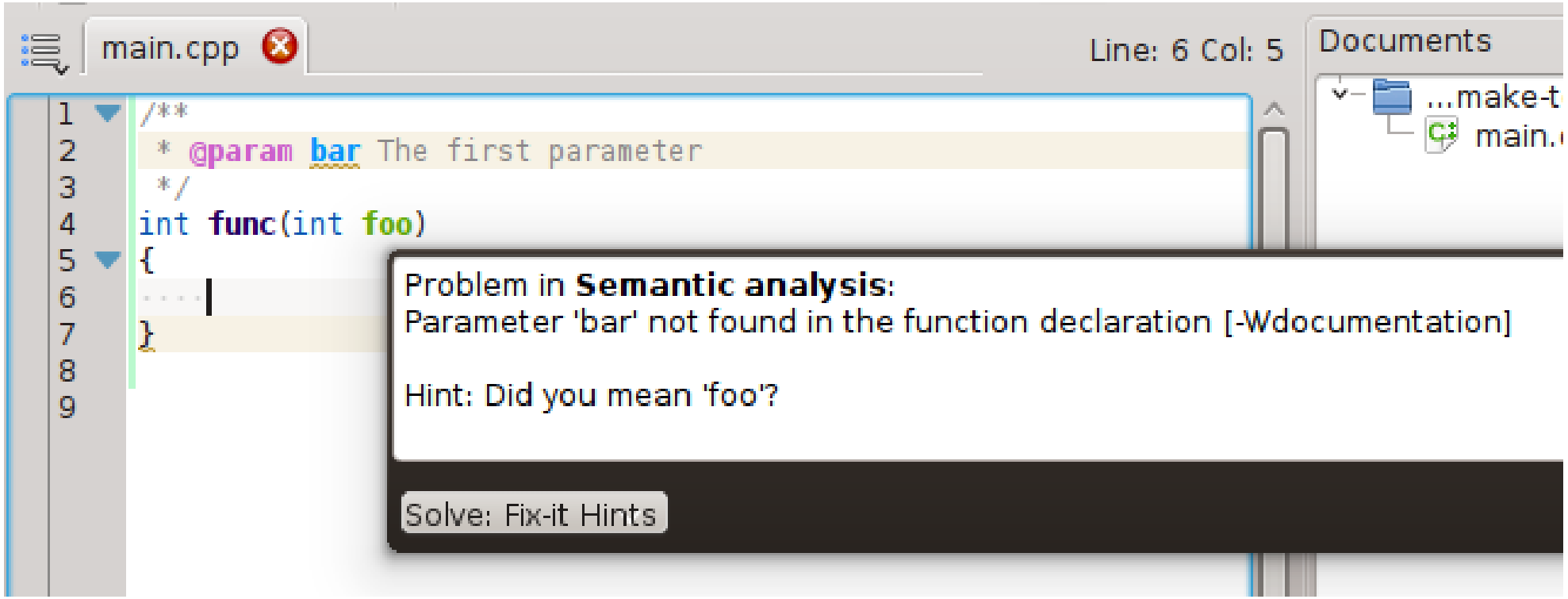
GSoC Work: Objective-C

- A little bit of Objective-C support (patches welcome!)



GSoC Work: More assistants

- Clang parses Doxygen-style comments!



GSoC Report

- TODOs
  - **General tasks:** Polish completion features (e.g. appending a “(“ when completing a function call)
  - **Qt integration:** Support completion inside QObject::connect statements, Q_PROPERTY macros, …
  - **Refactoring tools:** Investigate Clang refactoring tools (libtooling)
  - **Windows support:** Test kdev-clang on Windows (Clang front-end itself works just fine on Windows)

    We're working on it!

Thanks!

References

- **Introduction to libclang:**
  http://clang.llvm.org/clang_video-05-25-2007.html

- **C interface to Clang:**
  http://clang.llvm.org/doxygen/group__CINDEX.html

- **GSoC: Clang Integration in KDevelop:**
  http://kfunk.org/2014/04/28/gsoc-2014-improving-the-clang-integration-in-kdevelop/
  (+ follow-up posts)

- **Try it out yourself:**
  http://milianw.de/blog/katekdevelop-sprint-2014-let-there-be-clang
  [Section: Take my Code]