Suggesting Query Completions for Xapian

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Outline

1. Introduction
    - Xapian
    - Query Auto-completion
    - Query Expansion
    - Motivation
2. Design aspects and Modifications
    - Logs and Trie
    - Query Expansion
3. Concepts from theory
    - Flyweight pattern
    - Decorator pattern
    - Factory pattern
4. Learnings
5. Difficulties

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- Highly adaptable toolkit which allows developers to easily add advanced indexing and search facilities to their own applications.

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- The list of query candidates is generated according to the prefix entered by the user in the search box and is updated on each new key stroke.

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  - Fixing spelling errors and automatically searching for the corrected form or suggesting it in the results.
  - Re-weighting the terms in the original query.

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- To decrease the average time taken by a user to obtain a relevant search result.
- Query expansion gives us results that may be relevant to the user.

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Logs and Trie

- Modified the *Xapian::Database* class to log the queries.

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- Implemented *Xapian::Trie* classs for prefix matching.

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- Integrated WordNet for thesaurus support.

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Synonym based Query Expansion

- Stemming - Process for reducing inflected words to their stem, base or root form, generally a written word form. Used *Xapian::QueryParser* class.
- Stop-word removal - Remove words from a list of common English stop words. Extended *Xapian::SimpleStopper* to *Xapian::PopualatedSimpleStopper* class.
- Synonym Expansion - Expanding on Nouns. Implemented *Xapian::SynonymExpand* class.

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- The data member root is a pointer of type *struct trie_node* and points to the root of the trie tree.

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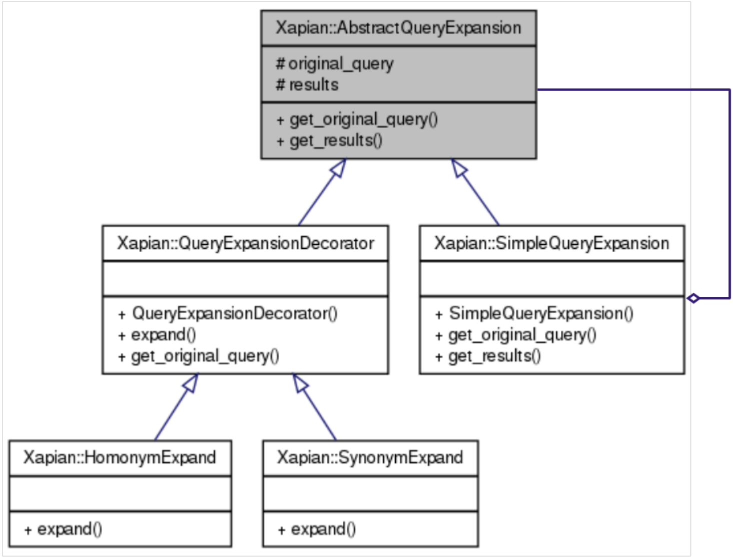
Decorator pattern



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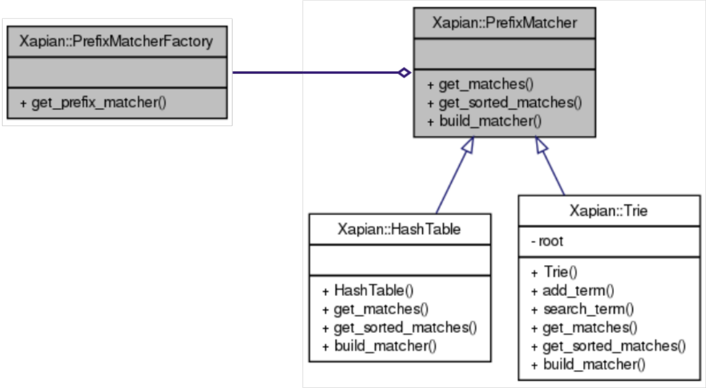
Factory pattern



Learnings

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- How to integrate two different projects.

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- To inspect the library from a users point of view, we adopted the role of a user.
- Interaction with the Open Source developer community.
- How to integrate two different projects.
- Tools like Doxygen, QtCreator etc.

Difficulties

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- Integrating two existing large-scale projects - WordNet and Xapian.
- Using the library we built from the point of view of the user.

References I

- Xapian
  Open Source Search Engine Library, http://xapian.org/.

- WordNet
  Lexical database of English,
  http://wordnet.princeton.edu/.

- Qt Project
  Cross-platform application and UI framework,
  http://qt-project.org/.

- Doxygen
  Tool for generating documentation,
  http://www.stack.nl/~dimitri/doxygen/.