Title: Composing A Review Paper on "one type of superconducting circuit qubit, Flux qubit" --Demonstrating one open, cross-platform, and scalable article organization and research scheme

project descriptions: Its objective is to compose a review paper on my selected topic "flux qubit" in PHYS 533. Based on at least 2 papers from the recent literature, the completed article should not only paraphrase them but emphasize my own understandings. To achieve this task, I aim to deeply explore the brilliant ideas presented by those articles for possibilities of developing my own ideas, convey a global view of this topic to readers, and also search for seamless connections between article organizations and daily research tasks. Research Strategies are presented as follows.

Step 1: Seeking "Entrance": Wikipedia and other introductory web pages and books in the shelves for intuitive understandings, key properties of flux qubit and active research groups.

I first search Wikipedia and other web sites to help me be fast involved with "flux qubit". Although with a strong theoretical background in it, the Wikipedia website shown in Fig. 1 still presents a good summary of flux qubit with intuitive images and discussions to convince newbies which is also what I want to learn from this project. More useful, it also presents links to active groups on this topic. In this case, I browse the website of one group in TU Delft, which shows basic configurations, realizations and measurements of flux qubit. More important is that they also highlight references to prestigious papers related to flux qubit as a practical entry to begin my research. In this step, I also read books to broaden my views on this topic, the details of which is omitted here.

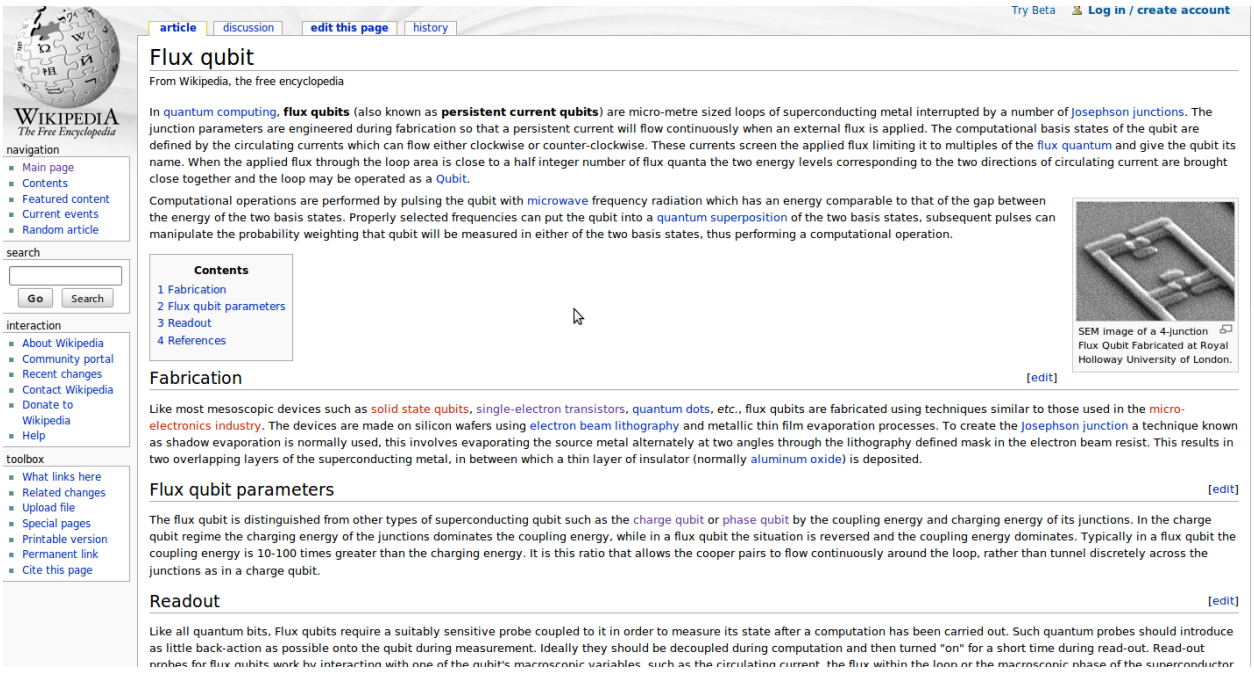

Fig.1, Description of "flux qubit" in the Wikipedia.

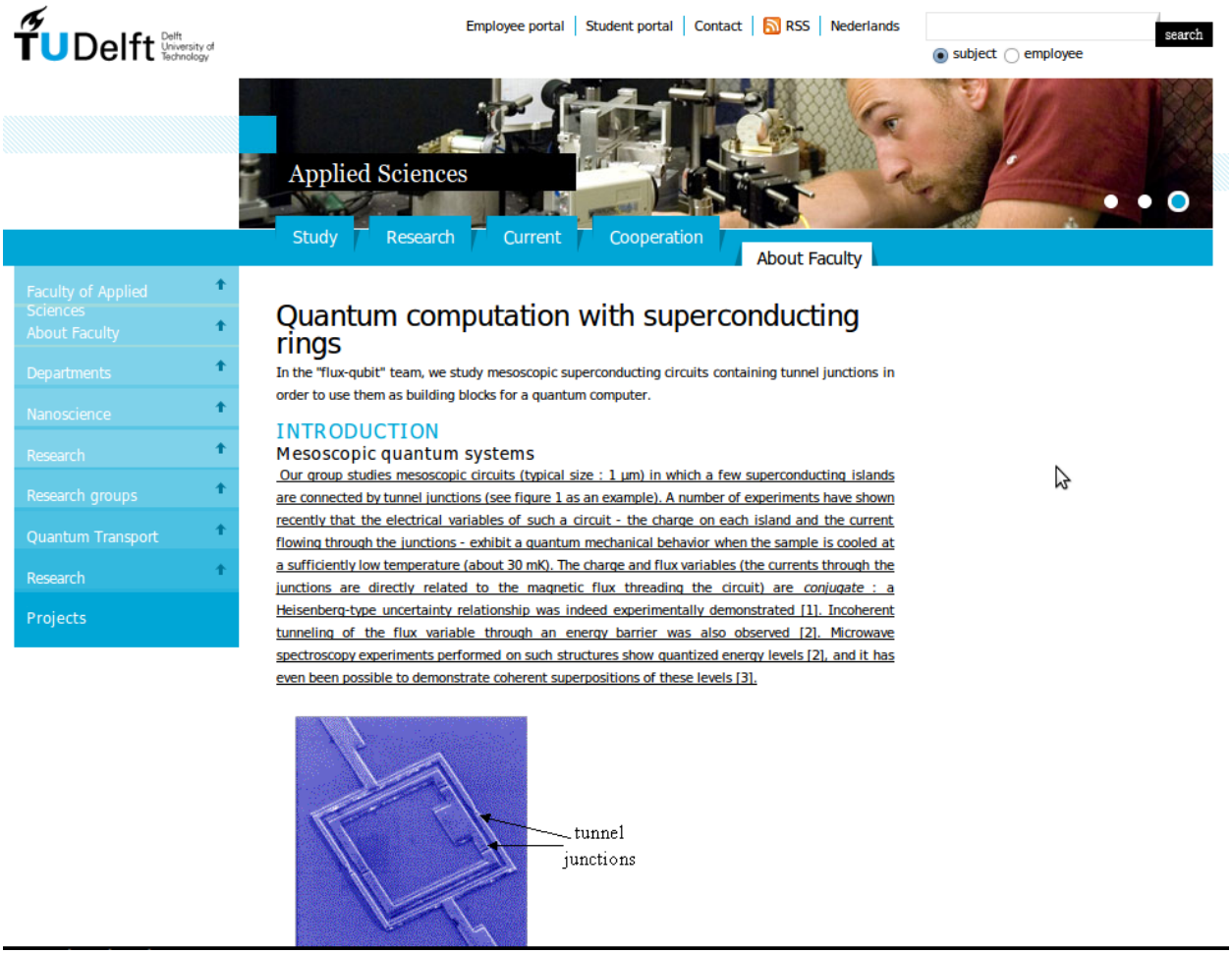

Fig.2, Website of one group in TU Delft working in flux qubit. The "original link" in Wikipedia is moved to a new one.

Step 2: Web of Science, a web reference website, coping with Zotero, a local article database.

Web of Science almost possesses all of the articles published in the world. Yet, one big problem is how we spend limited time to track thousands of papers to do our own research. In my opinion, even illuminated by the citation mapping tool shown in fig. 3, this search engine only endows us informations of articles in static and non-interactive style, lacking a method to manipulate each article collected manually which can be provided by Zotero.

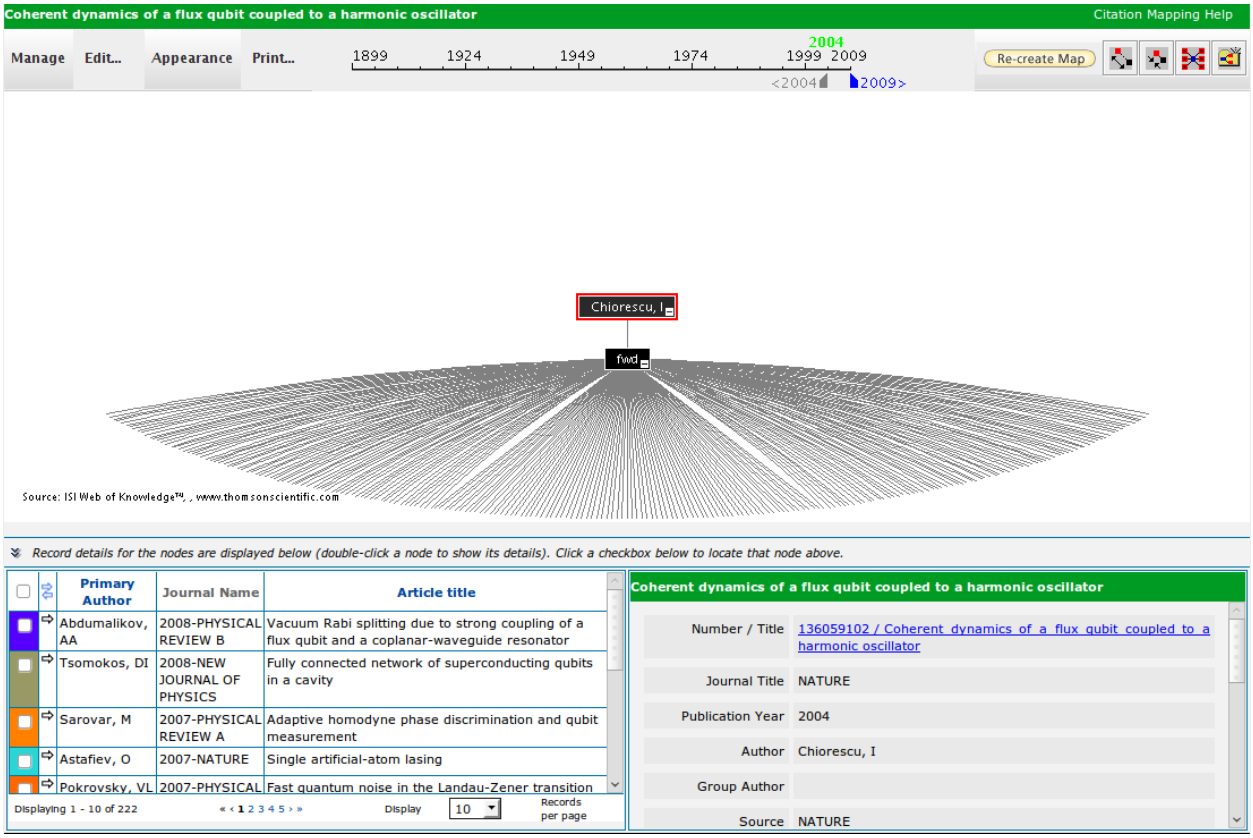

fig.3, Citation mapping tool in Web of Science

Zotero, as a local paper database, is based on firefox, a cross-platform web browser. Besides noting or other useful tools, it provides one solution for me to treat one article as a unique entity in different contexts. Three categories "Groups", "Topics" and "Journals"("Magazine") shown in fig.4 are created to trace back "who" publish "what" in "which journal" for each article which only holds one copy of the corresponding ".pdf" file in the entire database. A tag "nano-final-term" selected by typing "nano-" indicates the related articles in "My Library" including web pages and articles. In Fig. 5, the category "Magazine:Science" with the tag "nano-final-term" demonstrates all of the papers published in this magazine. There should be a limited number of entities in one category; if one category holds too many articles, I always consider to break down it into several sub-categories because I find that I cannot dedicate myself into a large amount of items when one inspiration coming out forces me to search for some familiar articles. It is worth noting that unlike finding out items via typing key words this kind of "active" searching style coherent with our minds maintains a more efficient way to figure out the relationships between different articles. Therefore, the categories and tags evolve dynamically with my understanding of this topic, which solidate my knowledge and present more clear impressions of those articles in my brain.

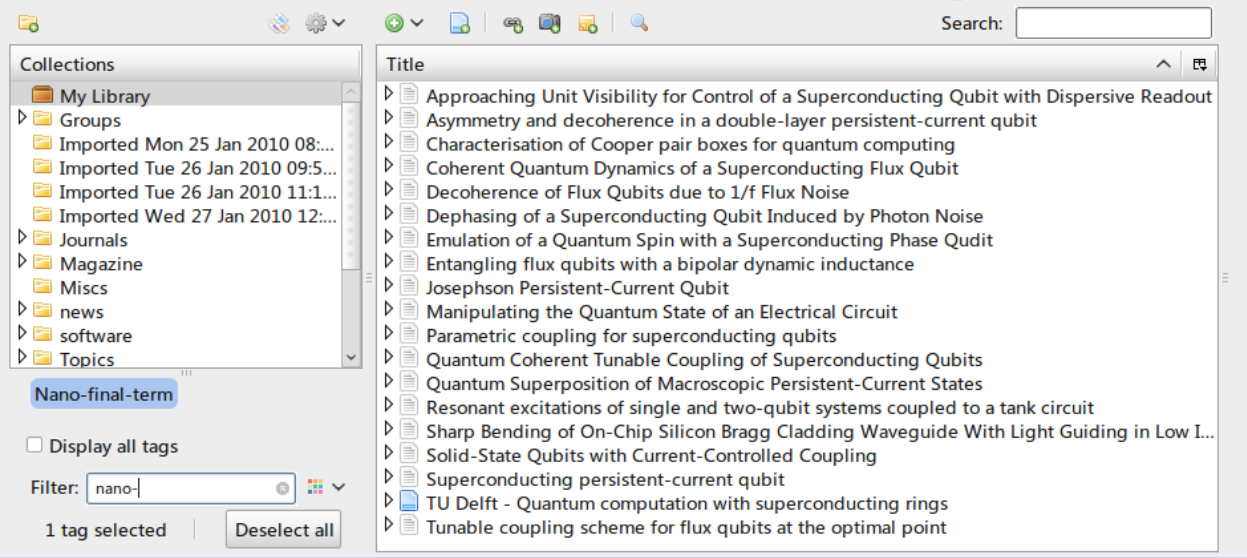

fig.4, Tags and Filters in Zotero.

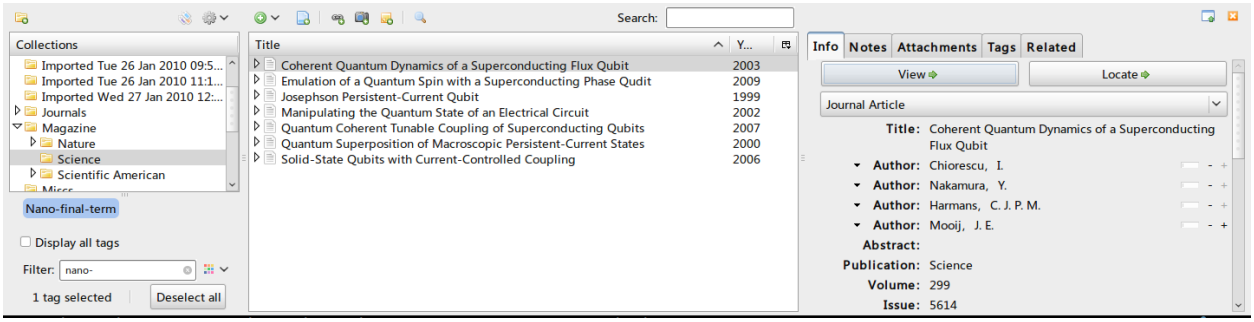

fig.5, Collections in Zotero

Zotero hosts a sqlite database (a handy but almost complete rational database) background to record all of the entities which I can write SQL scripts to interact with. It is demonstrated in fig. 6. Due to the efficiency of Sqlite3 database, Zotero is scalable for manipulating more than tens of thousands of articles which I think is enough for one person's research career. Cooperating with Dropbox, a web service for file storage, I utilize the same Zotero in all of my Computers running different operating systems. Another well-known solution for organizing articles is to record articles with Endnote or other softwares, to save the contents of those files in one directory of one file-system and to search for useful informations via using google desktop. Yet, this solution is hard to be shared in different platforms. Another big problem is that users should be responsible for how one record in Endnote refers to its physical file in users' disks, which may totally mess up the article organization system sometimes.

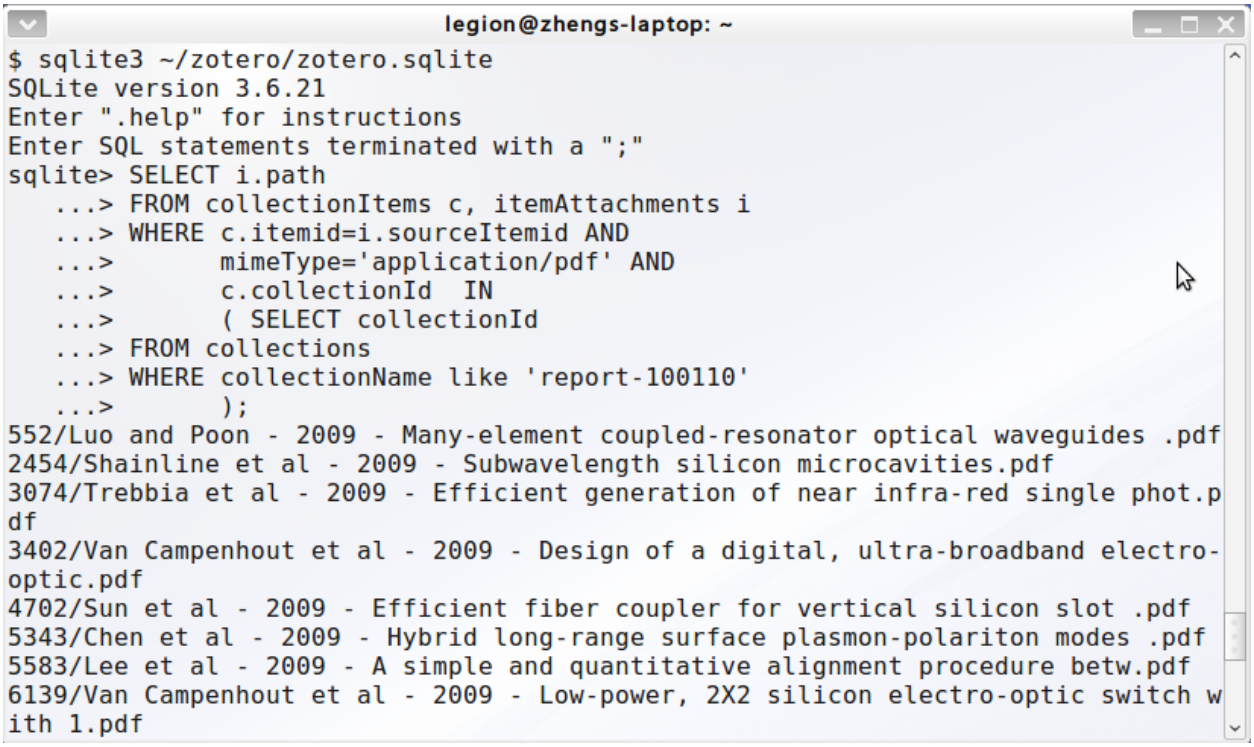

fig.6, Executing SQL inquiries to Zotero's sqlite3 database.

Here I only demonstrate some simple but practical ways of how to organize articles to complete this project. Further developments on Zotero may expand its functionalities such as smarter automatic collections.

Step 3: Link all of the informations and complete the task in the help of Zotero and a paper notebook.

Since Zotero provides dynamical tags/categories to organize the collected papers, reading, taking notes of and digest the related articles emerge. Originally I prefer mind mapping softwares, and highlighting words in the corresponding ".pdf" files. However, compared with the traditional paper-and-pen noting, the latter one renders a more convenient way for me and those writings can also be scanned and recorded in Zotero, although this project only cites less than 30 articles and no extra-intense note is required to help me figure out the relationships between different articles.

Summary:

Online searching from Wikipedia to Web of Science may be the main resources to obtain the informations of the related articles, and Zotero provides a cross-platform, scalable and interactive tool to help us develop our own ideas. Finally, writing and noting in papers still stands as the most convenient way to finish the final assignment in my opinion.