

Using Search Engines

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Lecture Notes for <i>degaokaolization discussion group</i>
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1 Introduction

Following the college entrance examination, we have experienced a significant transformation in the way we acquire information. Instead of passively receiving information from teachers and parents, we have taken the initiative to actively comprehend various pieces of information. Now, let's explore some intriguing methods that enhance the efficiency and simplicity of our information retrieval process.

2 Situation when the Internet was first invented

After people gained access to the Internet, it became necessary to input specific web addresses in order to visit the websites they were familiar with. In their quest for a better browsing experience, people devised the following tricks:

- Certain valuable websites will be placed into bookmark bars, facilitating convenient access for users.
- There are online communities that enable us to share intriguing links with one another.
- Numerous websites have incorporated their own integrated search tools, allowing users to easily search for specific content within their platform.

Users leverage their own proactiveness, personal networks, and meticulously curated resource collections to make the process of information retrieval even more seamless and efficient.

One suggestion is that: Is it feasible to devise a method for aggregating all this content into a single platform?

Question 1. If you were someone aiming to integrate all the available information at that time, how would you go about designing it?

The aspiration at that time was to have a single keyword that could connect all the knowledge together. Therefore, they needed a text-matching method to locate the relevant content from the existing resources. For example, let's assume the document library contains the following text:

Setting breakpoints

Breakpoints are set with the break command (abbreviated b). The gcc debugger convenience variable '\$bpnum' records the number of the breakpoint you've set most recently; see section Convenience variables, for a discussion of what you can do with convenience variables.

You have several ways to say where the breakpoint should go ...

Therefore, when using a search engine, it becomes crucial to differentiate keywords effectively. This way, searching for "gcc set breakpoints" would have a higher probability of being accurately matched. Now, you can understand the importance of properly distinguishing keywords in the context of using a search engine.

Even though our search engines have become remarkably advanced, to the point where some can engage in natural language conversations, we can still achieve relatively satisfactory results by employing basic and straightforward operations.

3 One step Further

Although the aforementioned methods are commendable, there are instances where they may not entirely fulfill our requirements. For instance, when using a tool on Linux, which is considered a relatively niche operating system compared to Windows, performing a keyword search may yield a plethora of results related to how the tool is used on Windows. This is not the desired outcome. Is there a method to address this issue?

- There is a need to specify the inclusion or exclusion of certain keywords when conducting searches.
- It is important to have the ability to restrict searches to a specific domain name.

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Indeed, modern search engines today have already incorporated such features and functionalities.

Remark 1. Many reasonable and feasible functionalities have likely already been implemented in search engines. Therefore, the key is to find out where they are and use them straightforwardly!

During idle moments, it can be beneficial to explore the links on credible homepages. These links have the potential to pleasantly surprise you with unexpected discoveries.

4 Example 1: Choosing College for the College Entrance Examination

In the month of June, every year, the entire nation gears up for the national college entrance examination. Following this significant milestone, a multitude of students will enter the realm of higher education. Certainly, during this transitional phase, I encourage everyone to reflect upon this everlasting question:

Question 2. Let's take a moment to review the questions you have previously asked. Are there any questions that, from a fresh perspective, could provide new insights or perspectives? For example, questions such as "Why is learning important?" or others alike.

However, choosing a college major for the college entrance examination is perhaps the first significant life decision for many students (excluding those who have already made important choices, such as competitive students). As Mr. Zhu Fuhai once said, "Some argue that China's education system focuses on teaching but lacks cultivation. Schools merely impart tangible knowledge to children's minds rapidly, yet this knowledge fails to internalize as their inner qualities and abilities."

¹ Indeed, this aspect is fully demonstrated when it comes to making choices. Now, let's approach this matter as we would solve any ordinary problem.

Here, we assume that everyone already has a clear idea of their desired college major. However, it is worth noting that in the current highly competitive environment, answering this question has become increasingly challenging. Therefore, if one doesn't have a definitive answer, it may require further exploration in the future. Taking the Henan province college entrance examination as an example, it allows candidates to select multiple parallel choices. So, what exactly are parallel choices?

When conducting a search on Baidu using relevant keywords, you will indeed come across various interpretations and explanations regarding parallel choices. However, the question of whether to trust these sources or not requires careful consideration. To enhance credibility, it is advisable to gather more information from reliable sources and consult trusted websites such as the Ministry of Education or the official website of the Chinese government. (One approach is to add a word to make the source more authoritative.)

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Alternatively, you can refine your search by including specific domain names associated with trustworthy sources. This helps filter out less reliable information and prioritize content from reputable websites.

Here, we can refer to this link([@ 高考生, 你最关心的问题集锦来了](#)) followed from the procedure above. ²

However, there is still a lot of information within the document. In such cases, you can use the **Find function** by pressing **Ctrl-F**. In the pop-up search box, enter "平行志愿." This way, all instances of "平行志愿." will be highlighted in yellow, making them easier to locate.

¹ In the article "[Family Education in Primary and Secondary Schools](#)" featured in the public account "数林广记", the topic is discussed thoroughly. I recommend giving it a read.

² The content highlighted in red indicates external links. You can click on the red text using a PDF reader on your computer to access the linked pages. If you use the middle mouse button (pressing the scroll wheel downwards), the linked page will open in a new window, which is quite convenient as you won't have to open the document again.

Remark 2. Certainly, the majority of the current resources are sufficiently advanced to allow for “random reading” , that is focusing on specific points of interest without being constrained by a strict linear progression. In the event that you encounter something unfamiliar, you can easily refer back to previously mentioned concepts or contextual information for further comprehension. This approach not only saves unnecessary trouble but also promotes efficient knowledge acquisition.

After obtaining information from various sources, you now have an understanding of the college admission process. At this point, you may start estimating your scores and determining which school to attend. However, it’s important to note that this process, while it may seem discouraging, won’t be of much help beyond satisfying curiosity. Attending university doesn’t mean you can slack off and play all day; in fact, the academic workload in university can easily surpass that of three years in high school within a single academic year (or a single semester for some majors).

Therefore, you patiently wait for the provincial rankings to be released. In reality, each university has different admission plans for each region every year. This information is usually available in the publication “招生考试之友” (Admissions Examination Companion). However, as for the specific rankings, it’s difficult to determine.

To address this issue, there was a popular app at that time called “Quark Search.” It claimed to provide information on the lowest provincial rankings for a specific major in recent years. The data used by the app was sourced from the Ministry of Education. It was like having a search engine specifically for this purpose.

Once we have the lowest scores from the past few years and the enrollment information from “Enrollment and Examination Companion,” we can explore the future development trends. Our knowledge of linear regression from high school can be of some assistance here, but we can leverage modern spreadsheet software such as Excel to make predictions and analyze the data more effectively.

Looking back, are there any areas where improvements can be made? This skill is essential and necessary because similar processes may be re-

quired in the future when choosing courses in university using the academic management system. To confidently face future challenges, take the time to fully experience and understand this process.

(On a side note: back then, I also referred to the website [大学生生活质量指北](#) for guidance. I hope it can be helpful. But the greater help is in sharing how this idea came about, so that gradually you can come up with new ideas on your own.)

5 Example 2. Save inaccessible Webpages

This story also takes place after the college entrance examination. After completing the exam, AUGPath found themselves with some free time at home and decided to revisit some topics in high school that they had always wanted to understand better. While casually browsing the internet, they stumbled upon the homepage of Professor [Yanyan Jiang](#) and clicked on a course titled "Combinatorics" by Professor [Yitong Yin](#). However, to their disappointment, the server hosting the course content was no longer functional. Determined to find a solution, they reached out to fellow students at Nanjing University and discovered that the professor had stopped teaching the course, and the server had been taken down. Now, the question was, how should they proceed in such a situation?

Try googling

Webpage past states

This demand is reasonable since it allows most people to access the content they wanted to see before. Naturally, we received a clue: the "Internet Wayback Machine." With this tool, we can find lecture notes and materials from around 2015 when the course was taught.

However, the good news is that Professor Yin Yitong will be teaching "Combinatorics" again this year! ([Course Home](#))

Teacher Yin Yitong has a very profound insight into education issues. This earnest attitude towards work and his professional academic level truly deserve the title of master. Here's a quote:

我们的作业周五才截止。同学们还是尽量自己多花时间想一想，写好了再提交。作业和考试是两个性质的，作业的主要任务不是考核，而是作为一种训练。期末考试是有时间限制的，需要在有限时间内检测出一个人的水平。而这门课不应该是所有的训练内容，都是在有限时间内以“力所能及”的方式就能顺理成章完成的，不然就成了完成一些 routine tasks 了。“问题求解”能力的提升，势必需要对思维有一定程度的考验和挑战，尽量做出一些思维上的创新，克服一定的非平凡性 (nontriviality) 才可以。大家还是不要老是觉得，所有的任务都应该是可以 routinely 完成的。这尤其在 AI 已经大行其道的今天，是一种不可取的态度了。-尹一通

Takeaway-message

- Anything that makes people feel uncomfortable, there is always a better process to help us;
- A part of the previous knowledge is not only for learning, but also for using. Learning more broad things, when facing more extensive decisions, can also be more or less reflected;
- The process of understanding something is gradual, don't expect to understand it completely at once. It's better to be patient.

人生其实有一门课，就是不断地发掘自己，认识自己，看看什么事情可以让自己愿意花时间和精力去做，做的过程是快乐的，做完后是欣慰满足的。很多时候兴趣的养成，是命因缘际遇碰到了，你花时间去发现自己并不排斥，然后一路做下来，越来越专业，受到越来越多来自他人的正向反馈与自我的肯定，也就越来越愿意花时间去，由此进入了正向的福环。但是需要注意的是，这个“因缘际遇”碰到的事情，不一定是你大学学的专业。很多时候，我们被生活推着走，貌似 18 年的努力就是为了能上一个好大学，选择一个好专业。但是什么是好专业？大家眼中的好专业，就是好专业吗？现在的人学教育培养更多的是专业技能，缺失了很多能够让人自省、自察、自悟的人文关怀，社会的浮躁也多源于此，我曾在《浅谈国内高校编程语言教育》一文中写到：“这此对兴趣的专注和纯粹本应该是大学生在自己专业上该有的年轻的、百舸争流的样貌，如今却被年薪、房价和社会的物化价值观所左右。如果连我们国家顶大大学的教育都摆脱不了物欲横流的浮躁，又如何完成国家民族集体人格的进一步塑造？”我真心希望大家最终都能找到自己心中的“兴趣”，哪怕你现在学看计算机，以后却只想开一家奶茶店。这也许需要很长的一段时间，但是这一切却又很值得，寻找它的路上，你会更加了解自己，更加怡然自得，因为你一直在修改着自己幸福的定义。

-李槌 (南京大学程序设计语言方向教师)

Further Discussion

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