# 3.1 Web Information

You probably already know that you can find lots of information on the web. You’ve also probably had the experience of looking up something on Google and finding millions or billions of search results. How can you best take advantage of web searches to find information for your research without getting overwhelmed by the amount of information that’s available?

First, it’s important to have a good understanding of what you are looking for before you start searching. A research question that’s too broad can lead to an enormous number of search results, while a research question that’s too narrow can mean that you don’t find very much information at all. For example, the question [display question] “What are career prospects for engineers?” is quite broad, while a question like [display question] “What are the career prospects for software engineers in Canada?” is better defined as it provides limits around the specific area of engineering that you are interested in as well as a specific location to search for materials about. A well-defined research question will make it easier to choose effective search terms that help you focus your search so that your results are more relevant to your topic. It will also make it easier to decide which sources are worth reading and which are not going to be a good use of your time.

When you find a source, consider what type of source it is. Not everything is a web page. There are lots of other types of information you can find online, including lots of grey literature. The term [display definition]“grey literature” refers to literature published outside of traditional academic or commercial publishing venues. It includes things like technical reports, government reports, conference proceedings and presentations, theses, and dissertations. These are useful and important sources of information, and many of them are best found using a search engine. When you encounter a source, think about what kind of information source you are looking at as that will help you better understand what you are reading and how you might use it in your work.

Finally, remember that not all information on the web is created equal. You need to take a critical eye to the information you find and ask yourself some questions about every source before you decide if you should use it in your work. This will help ensure that you are using high-quality, credible evidence to inform your academic and professional work. Strategies for searching for relevant information and strategies for evaluating information will be explored in more detail in the following videos.

# 3.2 Advanced web searching techniques

Sometimes when you are using a search engine like Google to search the web, you might find that the basic search isn’t precise enough to find what you need. You might find that the results aren’t exactly what you were hoping for, or that you have to sift through a lot of irrelevant results. In this video we will discuss some advanced searching strategies to help you find sources on the web.

We will focus on Google, but there are similar advanced search options available for other search engines like Bing, Yahoo, and DuckDuckGo. If you use one of these, you can try searching for the name of the search engine and the phrase “advanced search” in your preferred search engine to learn more.

A great tool for creating a more precise search is the Google Advanced Search. You can access this at [google.ca/advanced\_search](https://www.google.ca/advanced_search). [Show “Find pages with…” section on <https://www.google.ca/advanced_search>] Here you can tell Google exactly what it is you are looking for and specify how it should treat your keywords. For example, you can search for an exact phrase. To do this, the search engine will put your keywords in quotes. You could search for the exact phrase [type **software engineering** in “this exact word or phrase” box] “software engineering”, which would find webpages that include the phrase “software engineering”, but not webpages that include the word “software” and the word “engineering” separately. You can also search for any of the words in a list or indicate which words you don’t want to see in your search results.

[Show “Then narrow your results by…” section on <https://www.google.ca/advanced_search>] There are filters available to narrow your search results by criteria such as language, region, last update, site or domain, and file type. We might only want to see results that were published in English, or published in Canada, or last updated in the past month. There is also an option to specify a particular site, such as mcmaster.ca, or a particular domain, such as .ca or .gov. These filters can help you to focus your search.

Let’s try using Google Advanced Search to look for information about careers in software engineering. [enter the word **careers** in the “all these words field”, and **software engineering** in the “this exact word or phrase” field] We’ll search for the term “software engineering” as a phrase. We can limit our results to just those published in Canada [choose **region: Canada**], to help us better understand opportunities within Canada. [show results, skip past the “Jobs” list] The search results show information from different Canadian organizations, including job sites, universities offering software engineering programs, and companies that are interested in hiring software engineers.

Next time you’re using a search engine, consider using some advanced search strategies to help you find the information you want more efficiently. It’ll definitely be worth your time!

# 3.3 Evaluating web information

An important part of being a researcher is being able to evaluate sources and use those that provide accurate and credible information. We’re going to talk about five criteria for evaluating information: [display the five criteria, highlight first letter of each] relevance, authority, date, appearance, and reason. Together these criteria make up what’s known as the RADAR framework. These are important things to consider for any source you’re looking at, and especially important for information you find online because there is such a range of quality of information available on the web.

We’ll start with **relevance**. First, you’ll want to make sure that a source is relevant to your research. In other words, does it help answer your research question or address the problem you are trying to solve? Is it at an appropriate level for the academic work you are trying to do?

Next is **authority**. Consider the author of the source. Who created the source and what are their credentials? If you’re not sure, take a minute to google the author and find out a bit more about them. Do they have education or experience that provides them with expertise on the topic that they’re writing about? Is the author affiliated with an institution, business, or other organization? What is the author’s point of view? Having a point of view doesn’t necessarily mean that an author is untrustworthy, but it can be an important factor to consider when you’re deciding if you’ll use a source.

Now let’s look at the **date**. It’s often easy to find out when a source was created or published, and in general, current sources are good. But how current your sources need to be really depends. Obviously, if you are looking for the state of the art or the latest technology, you’ll want to include some recent sources since technology can evolve rapidly. However, in some contexts, it makes sense to use a source that’s 10, 20, or 30 years old. When you’re deciding if a source is current enough, think about the information that you’re planning to use. Is this information still current or is it likely that this information has changed since the source was published?

Next is **appearance**. Consider what the appearance of the source tells you about what kind of source you have. Is this a journal article? A website? A government report? Does the source appear to be intended for a scholarly audience or for a general audience? You might be able to tell this from the type of language that is used, the use of images, and the presence of advertisements. And of course, does the source include citations? Citing sources is an effective way for an author to show where their claims are coming from and that they are based in evidence. Are their references appropriate and credible?

Finally, we have the **reason** that the information was created and published. Consider both why the source was created and who it was created for. Was it created to communicate results of a study to academic researchers? Was it created to inform the public about a topic? Is the author trying to persuade readers of their point of view or to motivate readers to do something? Or is the author just trying to entertain? Make sure you consider what the source is trying to achieve.

To summarize, the five criteria that can help you with evaluating sources are: Relevance, Authority, Date, Appearance, and Reason (RADAR). Now let’s practice evaluating a source using the criteria.

Imagine we are trying to answer the research question “What are the career prospects for software engineers in Canada?” and we’ve found a source entitled “Computer Software Engineer in Canada”.

[show webpage at <https://www.jobbank.gc.ca/marketreport/outlook-occupation/5485/ca>] The first thing we consider in the RADAR framework is relevance. This source provides job prospects for software engineers in each province in Canada, so it seems to be very relevant to our research question.

In terms of authority, this webpage is provided by the Government of Canada Job Bank resource. [show Google search for **Job Bank Canada**, then open **Canadian Job Bank** Wikipedia page] If we Google the Job Bank, we can see from its Wikipedia page that it is an employment website operated by a department of the Government of Canada focused on the Canadian labour market. We can assume that it is knowledgeable about this topic.

Next, we look at date. [show grey box near top of the page that tells us this was published in December 2019] This site tells us that this information was published in December 2021 based on information available at that time. [Show statistics under **Summary**] It highlights some employment statistics from 2018 and [show first paragraph under **Detailed Analysis**] makes predictions for the period between 2019-2028. Depending on how much time has passed since 2018, this may seem either reasonably current or a little bit out of date. For example, in 2021 or 2022 this information is probably fairly current and worth considering, but if we were looking at this in 2028, we might want to seek more up-to-date information as labour market conditions may shift in that time.

The appearance of this webpage tells us that it is being published by the Government of Canada, and that it is intended for a general audience. This isn’t scholarly information, but it is providing us with useful statistics and predictions. [show link to Canadian Occupational Projections System – ESDC] At the bottom of the page, there is a link to the source of the information that we can view if we would like to verify what is presented here.

Finally, we can consider the reason this information was published. It seems likely that this was created to inform students and professionals about future trends in employment for software engineers.

Altogether, an evaluation of this webpage using the RADAR framework indicates that this is a relevant and reliable source for helping us to answer our research question. Overall, RADAR is a helpful tool to evaluate sources so that you can be confident that the information you are finding is trustworthy and accurate.