Introduction to Search Engine Optimization

What do you do if you want to learn new information? For example, you want to know what the biggest breed of cat is. Of course, you would look in the Internet but unless you are a serious cat enthusiast, you probably would not know which website has the answer. So you go to Google, search for "biggest cat breed" and click the first search result that you see. By the way, the biggest breed of domesticated cat is the Maine Coon

Now, imagine that you own a website about cats. If someone searches for "biggest cat breed", there is a chance that Google will include your website in the search result. However, there are many other websites about cats so your website will probably not be on the top of the list. This is a problem because as you may already know from experience, most people just click the top results. When was the last time you went to Google's page 2?

Screenshot from google.com

The good news is there are things that you can do to make your website rank higher in search engine results. These things are collectively known as Search Engine Optimization.

Objectives:
07_Obj01: Define important terms such as Search Engine Optimization, Search Engine, Web Traffic, Conversion, Crawler Bots, PageRank
**07_Obj02:** Identify steps how Search Engine work
07_Obj03: Identify how a ranking system works
07_Obj04: Rank web page representations based on page rank rules
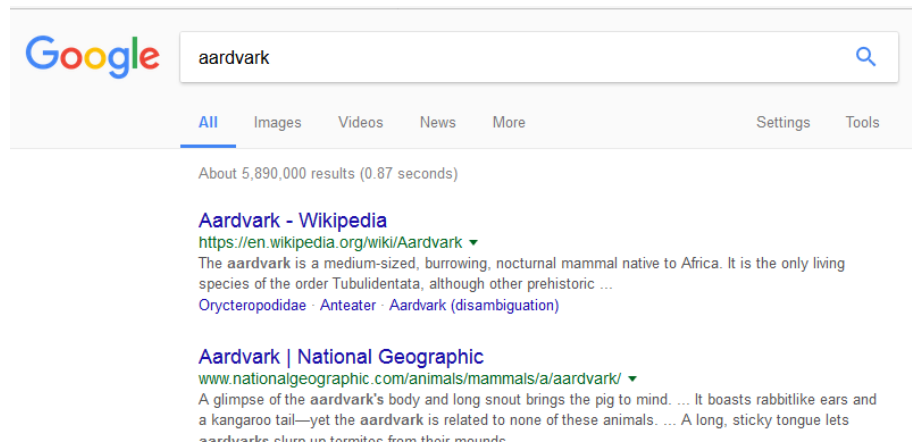
What is a Search Engine?

First of all, what is a search engine? A *web search engine* is a software system that is designed to look for information on the Internet. There are many web search engines such as Bing, Yahoo, and Ask.com but in this module, we will explore Google simply because it is what most people use.

Source: https://www.statista.com/statistics/216573/worldwide-market-share-of-search-engines/
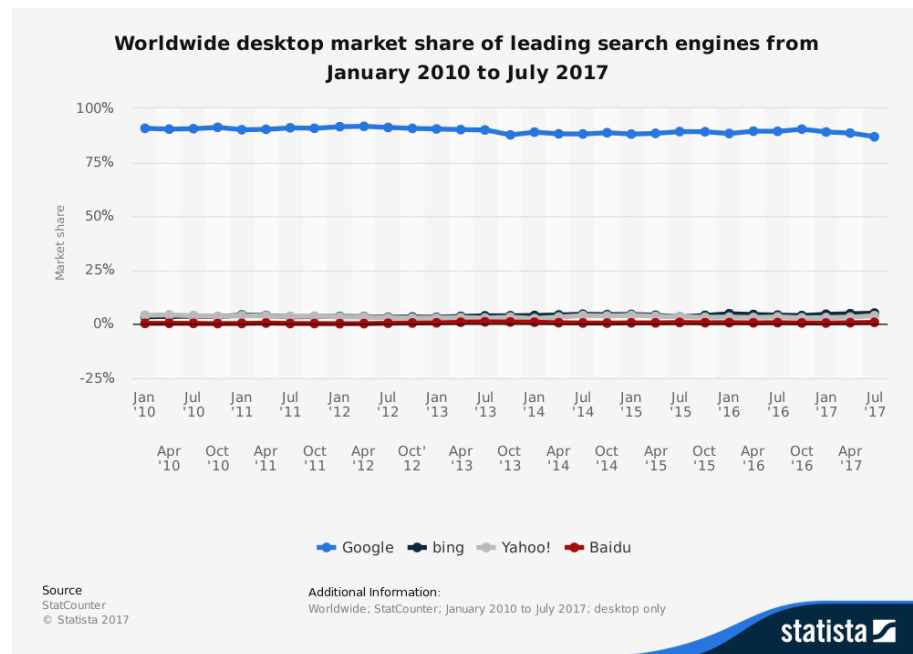
Google is currently the most popular search engine in the world. As of July 2017, it has 86.83% market share. That means 86.83% of search engine users in the world use Google.

How does a search engine work?

Screenshot from https://www.google.com/search?q=aardvark

Before we talk about actual SEO, first we have to figure out how search engines work. As you may already know, search engines do not have the actual information that you need. What they do have are the locations of the information which are presented to the user in list form.

Search engines present web pages that match the criteria set by the user. In *basic search* or simple search, the criteria can be as simple as a couple of keywords like "biggest cat breed". This is what most of us do. Major search engines also offer *advanced search* where we can add more search criteria such as number ranges, language, region, etc.

Crawling
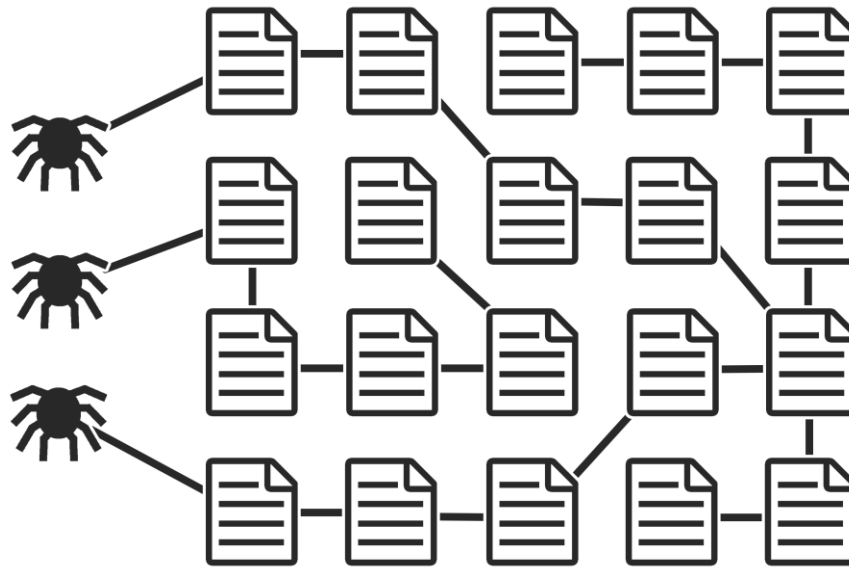
Before you even enter your keywords, search engines have already done most of the work. It starts with *crawling* which is a process used by search engines to find information in the Internet. This is done by *bots* which are software applications that run automated tasks. A *crawler bot* or *spider* would visit a web page and follow the links in that page to find other pages. Along the way, crawler bots collect data about the web pages that they visit.
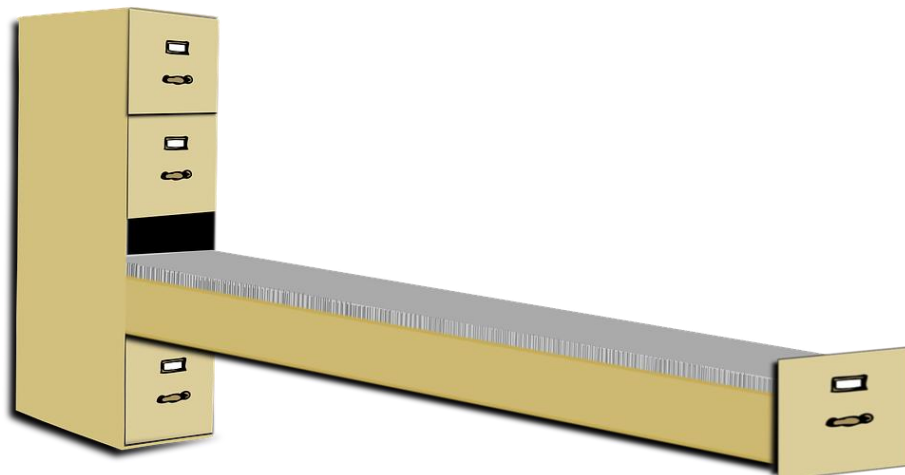
Indexing

Source: pixabay.com Royalty free image

Indexing is the process used by search engines to organize information about websites. The data returned by crawlers are used to create an index of the Internet. When a user searches for something, the search engine doesn't actually search the web. It searches its own index.

Source: unsplash.com Royalty Free Image

Think of the Internet as a library. If you want to borrow a book (website) but don't know where to find it, you go to the librarian (search engine) and you give him some details about the book (keywords). The librarian doesn't run into the library and come back with the book. He checks the library's card catalogue (index) and tells you where to find the book.

What is SEO?

Search Engine Optimization or SEO is the name given to practices that aim to improve the ranking of a website in search engine results.
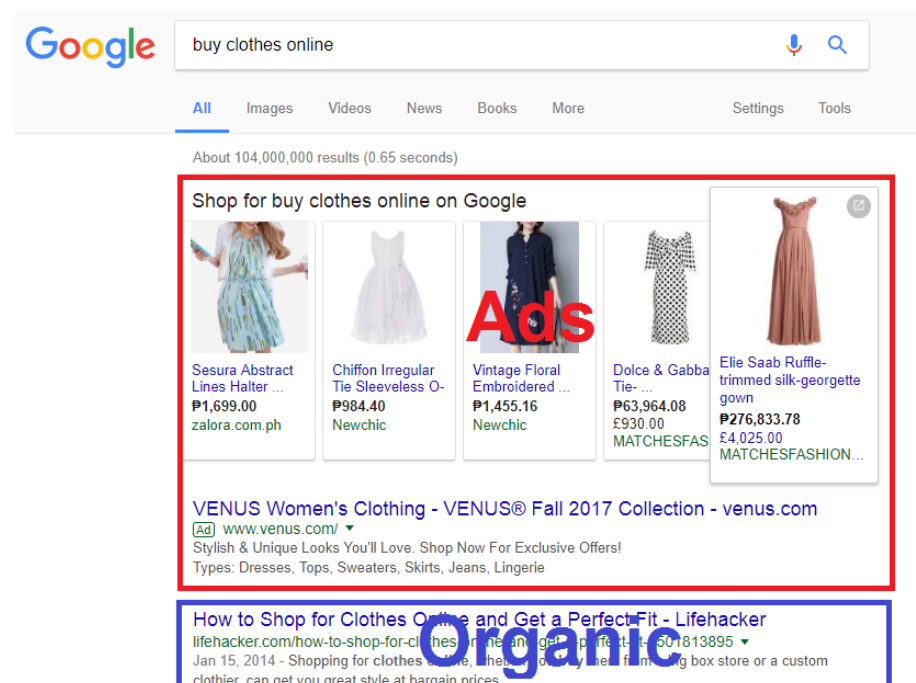
Web traffic

Web traffic refers to the number of users that visit a website. Web traffic can be used to measure the effectiveness of web pages and web content and the popularity of websites.

Quantity vs. Quality

Getting a lot of web traffic means that the website is popular but it doesn't not necessarily mean that the website is successful. A website may be getting a lot of traffic but 80% of the visitors stay for only a few seconds. This means that most people don't actually use your website. They just look around for a while and leave.

This is why in most cases, conversion rate is more important than web traffic. *Conversion* refers to the instance when a website visitor performs a desired action. For example, if a website is an online store, conversion is when someone buys something. SEO can primarily boost your web traffic but more importantly it can make your website more visible to people who actually want to buy your product, use your service, or listen to what you have to say.

Organic Search Results

SEO only affects *organic search results* which are the actual results based on the user's search terms. On the other hand, Google also

displays paid ads on top of the search results. It is easy to differentiate between organic search results and ads because Google always labels the later with "ad" or "sponsored"

How does the ranking system work?

SEO is basically a quest to get your website to the top of the search results list so it is important to understand how a search engine ranks web pages.

Algorithms

In the general sense, an algorithm is a procedure or formula for solving a problem. A *search engine* algorithm is a computer process that is used to determine which web pages in a search engine's index are the most relevant. Algorithms are used to rank web pages.

Google uses a lot of algorithms and they do not disclose complete information about them to the public. What we do know is that they use more than 200 algorithms which are updated about 500 times every year.

PageRank

PageRank is the first algorithm used by Google. It is also the most well known. It is still used to day along with the 200 other algorithms. It was named after Larry Page who is a co-founder of Google. Here is Google's description of PageRank:

"PageRank works by counting the number and quality of links to a page to determine a rough estimate of how important the website is. The underlying assumption is that more important websites are likely to receive more links from other websites."

A link is an object usually in text form that contains a web address. It is used by websites to connect to other websites. For example, if your website uses information from another website, it is customary to add a link that leads to that website. Besides the number of links, PageRank also determines the quality of links. This means that a link from a popular website has more weight than a link from an unknown website.
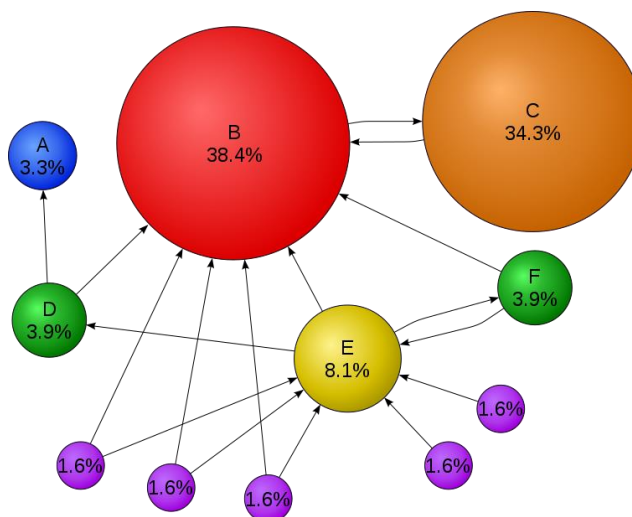
Source https://commons.wikimedia.org/wiki/File:PageRanks-Example.svg
public domain

The image above is a simplified representation of how PageRank works. Each circle represents a web page and their sizes represent their importance. Here's a simple analysis of each page. Note that it is ordered from least important to most important, not alphabetically

- The purple circles have no incoming links so they get the lowest score.
- Page A only has one link so it gets a PageRank of 3.3%
- Pages D and F also have one link each but the page that links to them is more important than the one that links to Page A so they get a higher PageRank
- Page E has a lot of links. However, the links come from unpopular websites so Page E doesn't get a very high score.
- Page B gets the highest PageRank because it has the most number of links, some of which are from the most popular web pages.
- Page C is an interesting case. It only has one link but that that link comes from the most important web page so C gets a high **PageRank**.

Glossary of Terms

WEB SEARCH ENGINE – is a software system that is designed to look for information on the Internet

CRAWLING – is a process used by search engines to find information in the Internet

CRAWLER BOT – collect data about the web pages that they visit

INDEXING – is the process used by search engines to organize information about websites

SEO – or Search Engine Optimization is the name given to practices that aim to improve the ranking of a website in search engine results

WEB TRAFFIC – refers to the number of users that visit a website

CONVERSION – refers to the instance when a website visitor performs a desired action

ALGORITHM – is a procedure or formula for solving a problem

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