**How Alexa works?**

1. [Alexa](https://www.quora.com/topic/Amazon-Alexa) is built based on [natural language processing](https://www.quora.com/topic/Natural-Language-Processing), a procedure of converting speech into sounds, words, and ideas.
2. [Amazon](https://www.quora.com/topic/Amazon-company) first records your speech. Because interpreting sounds takes up a lot of computational power, the recording of your speech is sent to Amazon’s servers to be analysed more efficiently.
3. Amazon breaks down what you said into individual sounds. It then consults a database containing various words' pronunciations to find which words most closely correspond to the combination of individual sounds.
4. It then identifies key words to make sense of the tasks and carry out corresponding functions. For example, if Alexa notices words like "weather" or "temperature", it would open the weather app.
5. Amazon’s servers send the information back to your device and Alexa may speak. If Alexa needs to say anything back to us, it would go through the same process described above, but in reverse order.

## How Search Engines Work: The Basics

A “search engine” is several interlinked mechanisms that work together to identify pieces of web content — images, videos, website pages, etc. — based on the words you type into a search bar. Site owners use [**Search Engine Optimization**](https://blog.alexa.com/what-is-seo/) to improve the chances that content on their site will show up in search results.

Search engines use three basic mechanisms:

* **Web crawlers**: Bots that continually browse the web for new pages. Crawlers collect the information needed to index a page correctly and use hyperlinks to hop to other pages and index them too.
* **Search index**: A record of all web pages online, organized in a way that allows association between keyword terms and page content. Search engines also have ways of grading the quality of content in their indexes.
* **Search algorithms**: Calculations that grade the quality of web pages, figure out how relevant that page is to a search term, and determine how the results are ranked based on quality and popularity.

Search engines try to deliver the most useful results for each user to keep large numbers of users coming back time and again.

## How Search Engines Crawl, Index, and Rank Content

Search engines look simple from the outside. You type in a keyword, and you get a list of relevant pages. But that deceptively easy interchange requires a lot of computational heavy lifting backstage.

The hard work starts way before you make a search. Search engines work round-the-clock, gathering information from the world’s websites and organizing that information, so it’s easy to find. This is a three-step process of first **crawling**web pages**, indexing**them, then **ranking** them with search algorithms.

### Crawling

Search engines rely on crawlers — automated scripts — to scour the web for information. Crawlers start out with a list of websites. Algorithms — sets of computational rules — automatically decide which of these sites to crawl. The algorithms also dictate how many pages to crawl and how frequently.

Crawlers visit each site on the list systematically, following links through tags like HREF and SRC to jump to internal or external pages. Over time, the crawlers build an ever-expanding map of interlinked pages.

#### Takeaway for Marketers

Make sure your site is easily accessible to crawlers. If bots can’t crawl it, they can’t index it, and that means your site won’t appear in search results. You can help guarantee crawler accessibility by implementing the following:

* **Logical site hierarchy**: Define a logical site architecture that flows from domain to category to subcategory. This lets crawlers move through your site more quickly, allowing the site to stay within its crawl budget.
* **Links**: Use internal on every page. Crawlers need links to move between pages. Pages without any links are un-crawlable and therefore un-indexable.
* **XML sitemap**: Make a list of all your website’s pages, including blog posts. This list acts as an instruction manual for crawlers, telling them which pages to crawl. There are plugins and tools—like Yoast and Google XML Sitemaps—that will generate and update your sitemap when you publish new content.

### Indexing

After finding a page, a bot fetches (or renders) it similar to the way your browser does. That means the bot should “see” what you see, including images, videos, or other types of dynamic page content.

The bot organizes this content into categories, including images, CSS and HTML, text and keywords, etc. This process allows the crawler to “understand” what’s on the page, a necessary precursor to deciding for which keyword searches the page is relevant.

Search engines then store this information in an index, a giant database with a catalogue entry for every word seen on every webpage indexed.

#### Takeaway for Marketers

Make sure crawlers “see” your site how you want them to; control which parts of the site you allow them to index.

* **URL Inspection Tool**: If you want to know what crawlers see when they land on your site, use the URL Inspection Tool. You can also use the tool to find out why crawlers aren’t indexing the page or request that Google crawl it.
* **Robots.txt**: You won’t want crawlers to show every page of your site in SERPs; author pages or pagination pages, for example, can be excluded from indexes. Use a robots.txt file to control access by telling bots which pages they can crawl.

Blocking crawlers from certain work-a-day areas of your site won’t affect your search rankings. Rather, it’ll help crawlers focus crawl budget on the most important pages.

### Ranking

In the final step, search engines sort through indexed information and return the right results for each query. They do that with **search algorithms**, rules that analyse what a searcher is looking for and which results best answer the query.

Algorithms use numerous factors to define the quality of the pages in their index. Many of the ranking factors used in these algorithms analyse the general popularity of a piece of content and even the qualitative experience users have when they land on the page. These factors include:

* Backlink quality
* Mobile-friendliness
* “Freshness,” or how recently content was updated
* Engagement
* [Page speed](https://blog.alexa.com/website-speed-optimization/)

#### Takeaway for Marketers

Search engines want to show the most relevant, usable results. This keeps searchers happy and ad revenue rolling in. That’s why most search engines’ ranking factors are actually the same factors that human searchers judge content by such as page speed, freshness, and links to other helpful content.

When designing and refreshing websites, optimize page speed, readability, and [keyword density](https://blog.alexa.com/keyword-density/) to send positive ranking signals to search engines. Working to improve engagement metrics like time-on-page and bounce rate can also help boost rankings.

## What Happens When a Search Is Performed?

Now we know about the three-step process search engines use to return relevant results. Crawling, indexing, and ranking allow search engines to find and organize information. But how does that help them answer your search query?

Let’s walk through how search engines answer queries step-by-step, from the moment you type a term in the search bar.

### Step 1: Search Engines Parse Intent

To return relevant results, search engines have to “understand” the [search intent](https://blog.alexa.com/marketing-research/search-intent/) behind a term. They use sophisticated language models to do that, breaking down your query into chunks of keywords and parsing meaning.

Search results also use “freshness” algorithms to understand searcher intent. These algorithms identify trending keywords and return newer pages. You’ll see this for terms such as “election results,” which return radically different SERP results during election time and non-election time.

### Step 2: Search Engines Match Pages to Query Intent

Once the search engine understands what kind of result you want to see, it needs to find matching pages. A series of factors help the search engine decide which pages are best, including:

* Title/content relevance
* Types of content
* Content quality
* Site quality and freshness
* Page popularity
* Language of query

Depending on the search intent, search engines may also show enriched results such as the knowledge graph or image carousel.

### Step 3: Search Engines Apply ‘Localized’ Factors

A number of individual factors come into play when search engines decide which results you see.

* **Location**: Some searches, like “restaurants near me,” are obviously location-dependent. But Google will rank results for local factors even in non-location-specific searches.
* **Search settings**: Search settings are also an important indicator of which results you’re likely to find useful, such as if you set a preferred language or opted into SafeSearch (a tool that helps filter out explicit results).
* **Search history**: A user’s search history also influences the results they see.