

Web technology

Introduction

Web technology is a collection of tools, protocols, and frameworks that are used to develop and support websites. The field of web technology is rapidly increasing with new frameworks, standards, and languages.

Web: web is a collection of electronic resources is called web

Web is every things.

Web is vast.

Tim Berners-Lee, a British scientist, invented the World Wide Web (WWW) in 1989, while working at CERN. The Web was originally conceived and developed to meet the demand for automated information-sharing between scientists in universities and institutes around the world.

Internet

Internet is a global network that connects billions of computers across the world with each other and to the World Wide Web. It uses standard internet protocol suite (TCP/IP) to connect billions of computer users worldwide. It is set up by using cables such as optical fibers and other wireless and networking technologies. At present, internet is the fastest mean of sending or exchanging information and data between computers across the world.

Internet allow to access all type of information that is located on web.

Internet allow to communicate between users and devices for gathering information.

History of internet

The Internet, commonly referred to as "the Net," is a global wide area network (GWAN) or a network of networks that links computer systems all over the world. Generally, it is a worldwide system of computer networks that have different high-bandwidth data lines, which includes the Internet "backbone." Users at any computer can access information from any other computer via the internet (assuming they have authorization). It was known as the ARPANet for the first time, and in 1969, the ARPA, called Advanced Research Projects Agency, conceived the internet. Allowing communication between users and devices from any distance was the primary objective to create the network. You will need an Internet service provider (ISP) in terms of connecting to the Internet since they operate as a middleman between you and the Internet. Most Internet service providers provide you DSL, cable, or fiber connection to connect to the internet.

THE ORIGINS OF THE INTERNET

The origins of the internet are rooted in the USA of the 1950s. The Cold War was at its height and huge tensions existed between North America and the Soviet Union. Both superpowers were in possession of deadly nuclear weapons, and people lived in fear of long-range surprise attacks. The US realised it needed a communications system that could not be affected by a Soviet nuclear attack.

At this time, computers were large, expensive machines exclusively used by military scientists and university staff.

These machines were powerful but limited in numbers, and researchers grew increasingly frustrated: they required access to the technology, but had to travel great distances to use it.

To solve this problem, researchers started 'time-sharing'. This meant that users could simultaneously access a mainframe computer through a series of terminals, although individually they had only a fraction of the computer's actual power at their command. The difficulty of using such systems led various scientists, engineers and organisations to research the possibility of a large-scale computer network.

THE FIRST USE OF A COMPUTER NETWORK

In 1965, Lawrence Roberts made two separate computers in different places 'talk' to each other for the first time. This experimental link used a telephone line with an acoustically coupled modem, and transferred digital data using packets.

When the first [packet-switching network](#) was developed, Leonard Kleinrock was the first person to use it to send a message. He used a computer at UCLA to send a message to a computer at Stanford. Kleinrock tried to type 'login' but the system crashed after the letters 'L' and 'O' had appeared on the Stanford monitor.

A second attempt proved successful and more messages were exchanged between the two sites. The ARPANET was born.

THE LIFE AND DEATH OF THE ARPANET

President Dwight D. Eisenhower formed the Advanced Research Projects Agency (ARPA) in 1958, bringing together some of the best scientific minds in the country. Their aim was to help American military technology stay ahead of its enemies and prevent surprises, such as the launch of the satellite Sputnik 1, happening again. Among ARPA's projects was a remit to test the feasibility of a large-scale computer network.

Lawrence Roberts was responsible for developing computer networks at ARPA, working with scientist Leonard Kleinrock. Roberts was the first person to connect two computers. When the first [packet-switching network](#) was developed in 1969, Kleinrock successfully used it to send messages to another site, and the ARPA Network—or ARPANET—was born.

Once ARPANET was up and running, it quickly expanded. By 1973, 30 academic, military and research institutions had joined the network, connecting locations including Hawaii, Norway and the UK.

As ARPANET grew, a set of rules for handling data packets needed to be put in place. In 1974, computer scientists Bob Kahn and Vint Cerf invented a new method called transmission-control protocol, popularly known as [TCP/IP](#), which essentially allowed computers to speak the same language.

After the introduction of TCP/IP, ARPANET quickly grew to become a global interconnected network of networks, or 'Internet'.

The ARPANET was decommissioned in 1990.

Users of Internet

There are 5.18 billion internet users in the world today. The total number of internet users around the world grew by 147 million during the past 12 months. Globally, internet user numbers are growing at an annual rate of 2.9 percent, but year-on-year growth is much higher in many developing economies.

As of April 2023, there were 5.18 billion internet users worldwide, which amounted to 64.6 percent of the global population. Of this total, 4.8 billion, or 59.9 percent of the world's population, were social media users

Uses of Internet

The Internet carries many applications and services, most prominently the World Wide Web, including social media, electronic mail, mobile applications, multiplayer online games, Internet telephony, file sharing, and streaming media services.

The Internet is a global networking system that can be used on most devices nowadays and has become an essential part of our lives. In today's technological era, most of the companies are getting their operations done over the Internet. There are various uses of the Internet by which companies and individuals are making their daily tasks more productive and more comfortable.

1. Online Booking & Orders

The [Internet](#) has made it a lot easier for people to book tickets for buses, trains, flights (domestic and international) directly using their devices from anywhere. People can also book a taxi by choosing their current location, and they will be picked up or dropped at a

specified location. Now no one needs to wait in long queues for their turn to book tickets at the ticket counter.

Besides, people can order a wide variety of products at home using the Internet and devices. It can range from grocery products to ready to eat, fashionable clothes to medicines. Most items can be ordered at home and received directly at the door.

2. Cashless Transactions

Most countries are promoting cashless transactions and digital payments. This helps people not carry much cash. People can pay their bills through debit or credit cards using POS devices. These devices are connected to the payment gateway on the Internet. Besides, People can also use their smartphone and the Internet for processing transactions on [UPI \(Unified Payment Interface\)](#). It does not even require them to carry their cards. The UPI payment method is continuously evolving and is expected to cover most transactions in the near future.

3. Education

Most of the devices nowadays are connected through the Internet. The Internet has the availability of broad educational content on any topic with different types. People can study the relevant topic just by spending a couple of minutes over the Internet. Internet Search engines help people quickly find the relevant study material in multiple formats (such as images, videos, documents, etc.). This helps eliminate the need to go to the library to read several books to find the desired information.

Besides, the Internet has also enabled students to participate in their classes through video conferencing, where students can connect with their teachers or professionals anywhere in the world.

4. Online Banking & Trading

The way of banking has changed after the introduction of the Internet. The Internet has made banking online where people can manage their bank accounts while sitting at home or traveling abroad. Nowadays, most of the features of banking are right in people's hands. With the help of online banking, people can securely transfer the money from one account to another, change their [ATM](#) pins, apply for the physical or virtual credit cards, update credit card limits, enable or disable international transactions, track their transactions, and many more. Also, they can even raise an online complaint or contact to bank's support staff.

Apart from this, the Internet has made it a lot easier for people to trade in the Stock market from anywhere. People can easily buy, sell, or manage stocks online.

5. Research

The Internet is playing a significant role in the field of research. Before the use of the Internet, it was quite hard to look for information about anything. People had to go through hundreds of books for references to find the desired information. However, the Internet has made it a lot easier, and anyone can find the required information at some clicks only. In research, people can study about the success and failed research and work further for the improvements. Uses of the Internet in research have incredibly beneficial for the researchers.

6. Electronic Mail

Email or electronic mail is one of the first significant uses of the Internet. The email has enabled faster communication between people on the Internet. Using email, people can quickly share information, data files, such as images, audio, video, and other types of files. The use of email has significantly reduced paper use, which was the primary source of communication in the olden days. Anyone can have a free email address and can easily communicate with others. This has also reduced the load on the physical mail system, although it is still in use.

7. Job Search

Getting a job is a lot easier than before. Any person can view relevant job information using the Internet. Earlier, people had to go through each company individually to know if a position was vacant or not. However, the Internet has enabled people to find employment sitting at home to suit their interests. Many websites provide details about job availability. Once people submit their resumes, these websites keep informing about vacancies through email. Besides, each well-known company has its website, where the company posts about the vacancy opening. So, just sitting at home, people can search, apply for jobs and even give their interviews and see or know their results.

8. Social Networking

Social networking sites have connected people around the world. Social networking is an essential part of the Internet. With the help of the Internet, people have got the ability to form social groups where they can share information, thoughts and ideas about anything. The social networking platform is the largest source of content, covering everything from

informative content to entertainment. The best thing is that people don't have to pay anything to use these services. This helps businesses develop their community and promote their products.

9. Collaboration

Due to the Internet, communication has become easier and better. You can easily connect with anyone on the Internet, either texting, calling or video calling. It has created new cooperation opportunities for the people. There are several online chat software and websites that help people create group discussions or meetings. It helps businesses to have a hassle-free discussion. Therefore, people do not always need to travel long distances to attend meetings. This helps people avoid unnecessary travel and save time for productive use.

Besides, there are many cloud-based software and websites that offer people to work on the same project simultaneously at the same time. People from different places can easily connect and support their specialties using the Internet.

10. Entertainment

The Internet is the most effective means of entertainment. There are various options available on the Internet, which people can try, such as watching movies, playing online games, listening to songs, etc. The Internet has also made it easy for people to download entertainment items to their local storage. Using the Internet, people can also share their videos, songs, pictures online with others. Also, nowadays, people can watch live TV or sports on the Internet.

11. E-Commerce

The Internet is not just limited to ordering things; it can also be used to sell products. Many e-commerce websites allow businesses and individuals to sell their products. Products are purchased by these e-commerce companies, stored in their warehouses, packaged in their brand packaging, and distributed by themselves. E-commerce companies charge some commission to distribute goods to customers. Also, they offer great discounts and offers to customers. The best thing is that customers do not have to go to physical stores.

Besides, sellers can also create their website and list their products there. They can refer to all information about the product, answer customer questions and provide online payment options to their customers. All these things are possible on the Internet.

12. File Transfer

The Internet has made file transfer between systems or devices easier. With [FTP \(File Transfer Protocol\)](#), data can be securely exchanged over the Internet. [FTP](#) is mainly beneficial when large files need to be transferred because email allows sharing files with limited size. FTP is the best way to exchange information between two stakeholders. This method is still quite popular and in use.

13. Navigation

The navigation mechanism is one of the most beneficial uses of the Internet. Once a user put the location in the online maps (such as Google maps), it provides all the details about that location. Users can even find the best route to visit that particular location. The map also provides the distance between the locations. The best thing about navigation is that it will provide the shortest possible route with less traffic. One can also search for any specific place like the nearest hotel, restaurants, banks, ATM, etc. Apart from this, a person can share a live location with others using the Internet and the navigation technique.

14. Advertising

Because most people use the Internet, it is the best means of promoting something or advertising. There are options for paid promotion as well as free promotion. There are many advertising platforms on the Internet that help promote products or businesses online. These platforms advertise products on other related websites using banners, videos, email etc. They charge for these advertisements according to distance, keywords and audience etc. However, one can also use social media platforms to create online groups or communities and advertise freely.

15. Real-time updates

The Internet is helping people to keep up with what is happening around the world. Many news and information websites provide real-time updates on various categories, such as politics, history, news, geology, leisure, sports, technology, marketing, and more. One can easily select the category of interest and stay connected with updates. The presence of e-newspapers and magazines is updating people and helping to cut paper usage.

Internetworking

Internetworking started as a way to connect disparate types of computer networking technology. Computer network term is used to describe two or more computers that are

linked to each other. When two or more computer LANs or WANs or computer network segments are connected using devices such as a *router* and configure by logical addressing scheme with a protocol such as IP, then it is called as **computer internetworking**.

Internetworking is a term used by Cisco. Any interconnection among or between public, private, commercial, industrial, or governmental computer networks may also be defined as an internetwork or "**Internetworking**".

In modern practice, the interconnected computer networks or **Internetworking** use the Internet Protocol. Two architectural models are commonly used to describe the protocols and methods used in **internetworking**. The standard reference model for **internetworking** is Open Systems Interconnection (**OSI**).

Type of Internetworking

Internetworking is implemented in Layer 3 (Network Layer) of this model. The most notable example of internetworking is the [Internet](#) (capitalized). There are three variants of internetwork or **Internetworking**, depending on who administers and who participates in them:

Not important for exam.

- Extranet
- Intranet
- Internet

Extranet

An extranet is a **network of internetwork or Internetworking** that is limited in scope to a **single organization or entity** but which also has **limited connections** to the networks of one or more other usually, but not necessarily, trusted organizations or entities. Technically, an **extranet may also be categorized as a MAN, WAN**, or other type of network, although, by definition, an extranet cannot consist of a single LAN; it must have at least one connection with an external network.

Intranet

An intranet is a set of **interconnected networks or Internetworking**, using the **Internet Protocol** and uses **IP-based tools** such as **web browsers** and **ftp tools**, that is under the control of a **single administrative entity**. That administrative entity closes the intranet to the rest of the world, and allows only specific users. Most commonly, an intranet is the internal network of a company or other enterprise. A large intranet will typically have its **own web server** to provide users with browseable information.

Internet

A specific **Internetworking**, consisting of a **worldwide interconnection** of governmental, academic, public, and private networks based upon the Advanced Research Projects Agency Network (**ARPANET**) developed by ARPA of the U.S. **Department of Defense** also **home** to the **World Wide Web (WWW)** and referred to as the '**Internet**' with a capital 'I' to distinguish it from other generic internetworks. Participants in the Internet, or their service providers, use IP Addresses obtained from address registries that control assignments.

Information on Internet

The Internet is a global network of billions of computers and other electronic devices. With the Internet, it's possible to access almost any information, communicate with anyone else in the world, and do much more. You can do all of this by connecting a computer to the Internet, which is also called going online.

Students write **uses of internet** if it comes with 8 marks.

Requirements for connecting Internet

The world without the internet is unimaginable. That's why the importance of the internet should be discussed. Our daily life tasks, communication, and enjoyment depend chiefly on the internet. As per its definition, the internet connects users with different types of mobile phones and computer systems.

The sharing and exchanging of ideas, information, and news all need an internet connection. The internet connects computers and businesses, people, government schemes, lives, and stories worldwide.

Hardware Requirement for connecting to the Internet

The basic requirements for connecting to the Internet are a computer device. In addition, you need the following things, to connect to the Internet:

- (i) Modem
- (ii) Telephone wire
- (iii) Internet Service Provider (ISP)
- (iv) Internet connection
- (v) Web-browsing software

Modem (modulator-demodulator)

A modem is a device that enables a computer to transmit data over telephone or cable lines. Computer stored information digitally; information transmitted over telephone lines in the form of analog waves. A modem converts between these two forms.

A modem can be either internal or external. The internal modem is attached to a slot on the motherboard. The external modem can be placed anywhere outside the system unit and connected to the motherboard. An internal modem is a device that contained on an expansion board that plugs into the motherboard.



Telephone wire

Telephone wire provides a medium for the transport of signals. When you need to communicate with other computers on the Internet, use it. Modem converts the binary or digital signals to analog waves. The waves are then implemented by the telephone wires. If modems speed is faster than Internet speed will be faster.



Internet Service Provider (ISP)

This is a company that provides internet access. For a monthly fee, the service provider will give you an account. It includes a software package, username, password, and access phone numbers. Equipped with a modem, you can log onto the Internet.



Internet connection

You need an Internet connection to dial into the computer of the ISP. Without Internet connection, you can't access the Internet.



Web-browsing software

It is software or a program that let you visit pages, media, etc. that are available on the Internet. There are many browsers like Firefox (also known as Mozilla Firefox), Internet Explorer, Google Chrome and Safari etc.



Basic Internet terms

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1. Internet

One of the most important and **basic internet terminologies** is the Internet itself. The Internet is a worldwide network of computers, which provides a wide array of information that follows a standard communication protocol. This communication protocol is what we call as TCP (Transmission Control Protocol) or IP (Internet Protocol).

In 1969, the internet was known as ARPANET. It is coined by the Advanced Research Projects Agency of the United States of America. During that time, the Department of Defense was only using four computers to connect with each other. Today ARPANET is widely termed as the Internet.

2. World Wide Web

Another one of the **basic Internet terminologies** is the World Wide Web. World Wide Web or www is a collection of data stored and shared in the digital space. This collection of information form and connect into websites and divides into web pages. Tim Bernes-Lee in the CERN laboratory invented it in 1989.

The World Wide Web is accessible anywhere as long as there's an internet connection. You can use a wireless router, Wi-Fi or Ethernet cable to access www through the internet.

3. Host (Network)

A Network Host is usually a computer or any device that connects to a computer network. It provides information and facilities to other computers and their users. In addition, you can use the term host when there's two or more computer system that connects through a modem or other internet connection channels.

4. Domain Name

This is a friendly naming system for giving addresses to web pages and servers. It is a description of a computer's location on the Internet. Usually, a dot separates a domain name, for example, www.google.com or www.slashdigit.com.

In addition, Domain Names are part of the DNS (Domain Name System, a database of domain names and their corresponding IP addresses). Also, a domain name follows certain rules and algorithms in the DNS.

5. Web Browser

A web browser or browser is a software program that can access websites. Popular web browsers include Google Chrome, Apple's Safari, Internet Explorer and Mozilla Firefox. Each web browser has its own settings and works separately from each other. However, they have the same function and that is to serve as portals to the World Wide Web.

Moreover, web browsers allow you to surf, search any information from various websites on the internet. You also have a choice to pick your own web browser preference. If you like Chrome, you can stick with chrome or if you're an Apple user, Safari is the best browser for you.

6. IP Address

An IP (Internet Protocol) address is a unique set of numbers assigned to a computing device that uses the internet protocol. Also, IP address identifies a device on the Internet communication network. Furthermore, it allows a system to be acknowledged by other systems.

7. Homepage

A Homepage is the main page of a particular website. Usually, this is the first page you see when you open a website. Additionally, a home page can have one of several different filenames.

8. URL

URL or short for "Universal Resource Locator." From the name itself, it provides a way of locating a resource on the web. It also serves as a method of retrieving location on a computer network.

9. Search Engine

Search Engine is a software system that works to search information on the World Wide Web. Common examples of online search engines are Google, Yahoo, and Bing. These programs allow you to search keywords and phrases to locate information on the Internet.

What is World Wide Web?

World Wide Web, which is also known as a Web, is a collection of websites or web pages stored in web servers and connected to local computers through the internet. These websites contain text pages, digital images, audios, videos, etc. Users can access the content of these sites from any part of the world over the internet using their devices such

as computers, laptops, cell phones, etc. The WWW, along with internet, enables the retrieval and display of text and media to your device.



The building blocks of the Web are web pages which are formatted in HTML and connected by links called "hypertext" or hyperlinks and accessed by HTTP. These links are electronic connections that link related pieces of information so that users can access the desired information quickly. Hypertext offers the advantage to select a word or phrase from text and thus to access other pages that provide additional information related to that word or phrase.

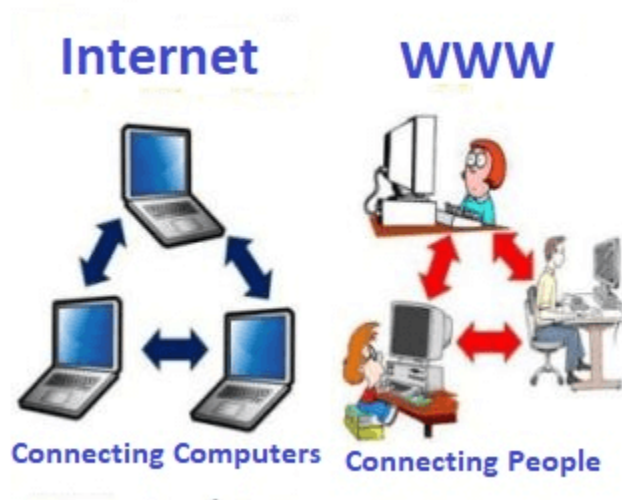
A web page is given an online address called a Uniform Resource Locator (URL). A particular collection of web pages that belong to a specific URL is called a website, e.g., *www.facebook.com*, *www.google.com*, etc. So, the World Wide Web is like a huge electronic book whose pages are stored on multiple servers across the world.

Small websites store all of their WebPages on a single server, but big websites or organizations place their WebPages on different servers in different countries so that when users of a country search their site they could get the information quickly from the nearest server.

So, the web provides a communication platform for users to retrieve and exchange information over the internet. Unlike a book, where we move from one page to another in a sequence, on World Wide Web we follow a web of hypertext links to visit a web page and from that web page to move to other web pages. You need a browser, which is installed on your computer, to access the Web.

Difference between World Wide Web and Internet:

Some people use the terms 'internet' and 'World Wide Web' interchangeably. They think they are the same thing, but it is not so. Internet is entirely different from WWW. It is a worldwide network of devices like computers, laptops, tablets, etc. It enables users to send emails to other users and chat with them online. For example, when you send an email or chatting with someone online, you are using the internet.



But, when you have opened a website like google.com for information, you are using the World Wide Web; a network of servers over the internet. You request a webpage from your computer using a browser, and the server renders that page to your browser. Your computer is called a client who runs a program (web browser), and asks the other computer (server) for the information it needs.

History of the World Wide Web:

Note: not important



The World Wide Web was invented by a British scientist, Tim Berners-Lee in 1989. He was working at CERN **European Organization for Nuclear Research** at that time. Originally, it was developed by him to fulfill the need of automated information sharing between scientists across the world, so that they could easily share the data and results of their experiments and studies with each other.

CERN, where Tim Berners worked, is a community of more than 1700 scientists from more than 100 countries. These scientists spend some time on CERN site, and rest of the time they work at their universities and national laboratories in their home countries, so there was a need for reliable communication tools so that they can exchange information.

Internet and Hypertext were available at this time, but no one thought how to use the internet to link or share one document to another. Tim focused on three main technologies that could make computers understand each other, HTML, URL, and HTTP. So, the objective behind the invention of WWW was to combine recent computer technologies, data networks, and hypertext into a user-friendly and effective global information system.

How the Invention Started:

In March 1989, Tim Berners-Lee took the initiative towards the invention of WWW and wrote the first proposal for the World Wide Web. Later, he wrote another proposal in May 1990. After a few months, in November 1990, along with Robert Cailliau, it was formalized as a management proposal. This proposal had outlined the key concepts and defined terminology related to the Web. In this document, there was a description of "hypertext

project" called World Wide Web in which a web of hypertext documents could be viewed by browsers. His proposal included the three main technologies (HTML, URL, and HTTP).

In 1990, Tim Berners-Lee was able to run the first Web server and browser at CERN to demonstrate his ideas. He used a NeXT computer to develop the code for his Web server and put a note on the computer "*The machine is a server. Do Not Power It DOWN!!*" So that it was not switched off accidentally by someone.

In 1991, Tim created the world's first website and Web Server. Its address was info.cern.ch, and it was running at CERN on the NeXT computer. Furthermore, the first web page address was <http://info.cern.ch/hypertext/WWW/TheProject.html>. This page had links to the information related to the WWW project, and also about the Web servers, hypertext description, and information for creating a Web server.

Evaluation of World Wide Web

NeXT computer platform was accessible by a few users. Later, the development of 'line-mode' browser, which could run on any system, started. In 1991, Berners-Lee introduced his WWW software with 'line-mode' browser, Web server software and a library for developers.

In March 1991, it was available to colleagues who were using CERN computers. After a few months, in August 1991, he introduced the WWW software on internet newsgroups, and it generated interest in the project across the world. Graphic interface for the internet, first introduced to the public on 6 August 1991 by Tim Berners-Lee. On 23 August 1991, it was available to everyone.

Becoming Global:

The first Web server came online in December 1991 in the United States. At this time, there were only two types of browsers; the original development version which was available only on NeXT machines and the 'line-mode' browser which was easy to install and run on any platform but was less user-friendly and had limited power.

For further improvement, Berners-Lee asked other developers via the internet to contribute to its development. Many developers wrote browsers for the X-Window System. The first web server, outside Europe, was introduced at Standard University in the United States in 1991. In the same year, there were only ten known web servers across the world.

Later at the beginning of 1993, the National Center for Supercomputing Applications (NCSA) introduced the first version of its Mosaic browser. It ran in the X Window System environment. Later, the NCSA released versions for the PC and Macintosh environments. With the introduction of user-friendly browsers on these computers, the WWW started spreading tremendously across the world.

Eventually, the European Commission approved its first web project in the same year with CERN as one of its partners. In April 1993, CERN made the source code of WWW available on a royalty-free basis and thus made it free software. Royalty-free means one has the right to use copyright material or intellectual property without paying any royalty or license fee. Thus, CERN allowed people to use the code and web protocol for free. The technologies that were developed to make the WWW became an open source to allow people to use them for free. Eventually, people started creating websites for online businesses, to provide information and other similar purposes.

At the end of 1993, there were more than 500 web servers, and the WWW has 1% of the total internet traffic. In May 1994, the First International World Wide Web conference was held at CERN and was attended by around 400 users and developers and popularly known as the "Woodstock of the Web." In the same year, the telecommunication companies started providing internet access, and people have access to WWW available at their homes.

In the same year, one more conference was held in the United States, which was attended by over 1000 people. It was organized by the NCSA and the newly-formed International WWW Conference Committee (IW3C2). At the end of this year (1994), the World Wide Web had around 10000 servers and 10 million users. The technology was continuously improved to fulfill growing needs and security, and e-commerce tools were decided to be added soon.

Open standards:

The main objective was to keep the Web an open standard for all rather than a proprietary system. Accordingly, CERN sent a proposal to the Commission of the European Union under the ESPRIT program "WebCore." This project's objective was to form an international consortium in collaboration with Massachusetts Institute of Technology (MIT), the US. In 1994, Berners-Lee left CERN and joined MIT and established the International World Wide Web Consortium (W3C) and a new European partner was needed for W3C.

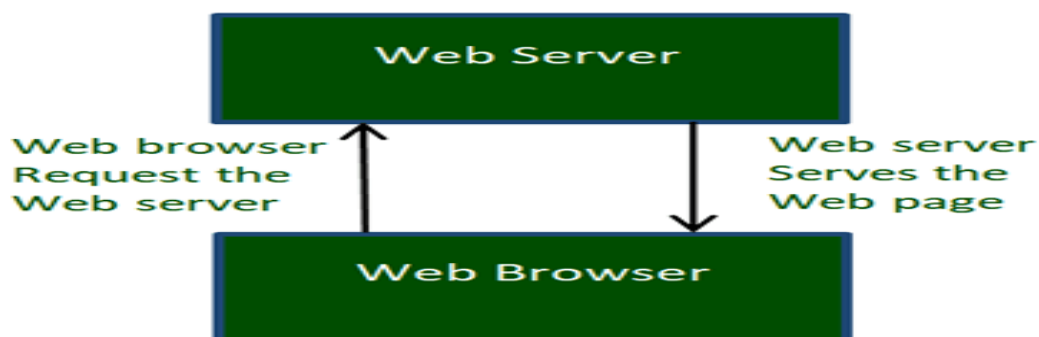
The European Commission approached the French National Institute for Research in Computer Science and Controls (INRIA), to substitute the CERN's role. Eventually, in April 1995, INRIA became the first European W3C host and in 1996 Keio University of Japan became another host in Asia.

In 2003, ERCIM (European Research Consortium in Informatics and Mathematics) replaced INRIA for the role of European W3C Host. Beihang University was announced as the fourth Host by W3C in 2013. In September 2018, there were over 400 member organizations around the world.

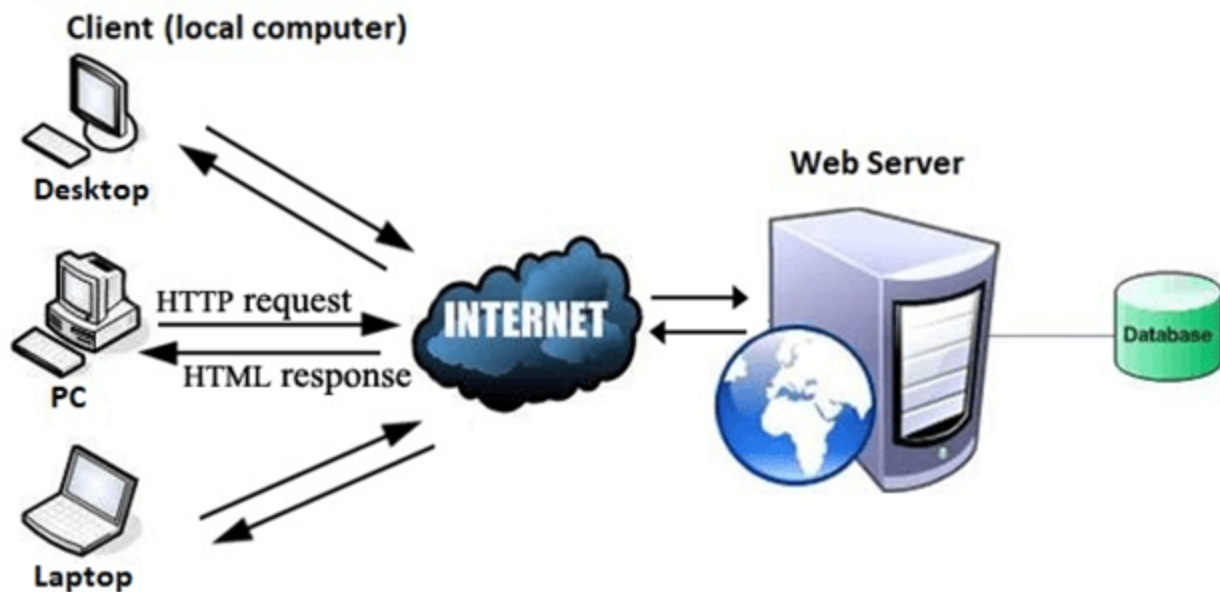
Since its inception, the Web has changed a lot and is still changing today. Search engines have become more advanced at reading, understanding, and processing information. They can easily find the information requested by users and can even provide other relevant information that might interest users.

How the World Wide Web Works?

Now, we have understood that WWW is a collection of websites connected to the internet so that people can search and share information. Now, let us understand how it works!



The Web works as per the internet's basic client-server format as shown in the following image. The servers store and transfer web pages or information to user's computers on the network when requested by the users. A web server is a software program which serves the web pages requested by web users using a browser. The computer of a user who requests documents from a server is known as a client. Browser, which is installed on the user's computer, allows users to view the retrieved documents.



All the websites are stored in web servers. Just as someone lives on rent in a house, a website occupies a space in a server and remains stored in it. The server hosts the website whenever a user requests its WebPages, and the website owner has to pay the hosting price for the same.

The moment you open the browser and type a URL in the address bar or search something on Google, the WWW starts working. There are three main technologies involved in transferring information (web pages) from servers to clients (computers of users). These technologies include Hypertext Markup Language (HTML), Hypertext Transfer Protocol (HTTP) and Web browsers.

Features of WWW:

- HyperText Information System
- Cross-Platform
- Distributed
- Open Standards and Open Source
- Uses Web Browsers to provide a single interface for many services
- Dynamic, Interactive and Evolving.

Components of the Web: There are 3 components of the web:

1. **Uniform Resource Locator (URL):** serves as a system for resources on the web.
2. **HyperText Transfer Protocol (HTTP):** specifies communication of browser and server.
3. **Hyper Text Markup Language (HTML):** defines the structure, organisation and content of a webpage.

What is a Browser?

A browser is a software program that is used to explore, retrieve, and display the information available on the World Wide Web. This information may be in the form of pictures, web pages, videos, and other files that all are connected via hyperlinks and categorized with the help of URLs (Uniform Resource Identifiers). For example, you are viewing this page by using a browser.

A browser is a client program as it runs on a user computer or mobile device and contacts the webserver for the information requested by the user. The web server sends the data back to the browser that displays the results on internet supported devices. On behalf of the users, the browser sends requests to web servers all over the internet by using [HTTP](#) (Hypertext Transfer Protocol). A browser requires a smartphone, computer, or tablet and internet to work.

History of Web Browser

The **WorldWideWeb** was the first web browser. It was created by W3C Director Tim Berners-Lee in **1990**. Later, it was renamed **Nexus** to avoid confusion caused by the actual World Wide Web.

The **Lynx** browser was a text-based browser, which was invented in **1992**. It was not able to display the graphical content.

Although, the first graphical user interface browser was NCSA Mosaic. It was the first most popular browser in the world, which was introduced in **1993**.

In **1994**, there were some improvements occurred in Mosaic and came to Netscape Navigator.

In **1995**, Microsoft introduced the **Internet Explorer**. It was the first web browser developed by Microsoft.

A research project started on Opera in **1994**. Later, it was publicly introduced in 1996.

Apple's Safari browser was introduced in **2003**. It was specifically released for Macintosh computers.

In **2004**, Mozilla introduced **Firefox** as Netscape Navigator.

In **2007**, a browser **Mobile Safari** was released as Apple mobile web browser.

The popular browser **Google Chrome** was launched in **2008**.

The fast-growing mobile-based browser **Opera Mini** was released in **2011**.

The Microsoft **Edge** browser was launched in **2015**.

Popular web browsers

1. Firefox
2. Google Chrome
3. Microsoft Edge
4. Apple Safari
5. Opera
6. Brave
7. Vivaldi
8. Duck Duck go
9. Chromium
10. UC Browser

Facts Check: According to Global stats, Chrome rules the browser market with 63.63% share, followed by Safari having 19.37%, Firefox 3.65%, Samsung Internet 3.49%, Edge 3.24%, & Opera 2.16% shares.

Features of web Browsers

A web browser is software that you use to browse the internet. A web browser has different features like:

HTML, CSS, and JavaScript are the three most important languages for developing websites.

HTML is used to create pages on your website using tags like <head>, <body> and <script>.

It defines how elements look on the web page by assigning different attributes such as font size, color, border, etc.

CSS is used to style and position elements of a webpage. JavaScript is used to add interactivity and animation effects to web pages.

So basically HTML and CSS are two parts of programming languages while JavaScript makes it interactive with your site.

There are various features of a web browser, which are given below.

- Home button
- Refresh button
- Address bar
- Bookmarks

Web Servers

A web server is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web. The main job of a web server is to display website content through storing, processing and delivering webpages to users. Besides HTTP, web servers also support SMTP (Simple Mail Transfer Protocol) and FTP (File Transfer Protocol), used for email, file transfer and storage.

Web server hardware is connected to the internet and allows data to be exchanged with other connected devices, while web server software controls

how a user accesses hosted files. The web server process is an example of the client/server model. All computers that host websites must have web server software.

Web servers are used in web hosting, or the hosting of data for websites and web-based applications -- or web applications.

How do web servers work?

Web server software is accessed through the domain names of websites and ensures the delivery of the site's content to the requesting user. The software side is also comprised of several components, with at least an HTTP server. The HTTP server is able to understand HTTP and URLs. As hardware, a web server is a computer that stores web server software and other files related to a website, such as HTML documents, images and JavaScript files.

When a web browser, like Google Chrome or Firefox, needs a file that's hosted on a web server, the browser will request the file by HTTP. When the request is received by the web server, the HTTP server will accept the request, find the content and send it back to the browser through HTTP.

More specifically, when a browser requests a page from a web server, the process will follow a series of steps. First, a person will specify a URL in a web browser's address bar. The web browser will then obtain the IP address of the domain name -- either translating the URL through DNS (Domain Name System) or by searching in its cache. This will bring the browser to a web server. The browser will then request the specific file from the web server by an HTTP request. The web server will respond, sending the browser the requested page, again, through HTTP. If the requested page does not exist or if something goes wrong, the web server will respond with an error message. The browser will then be able to display the webpage.

What is HTTP?

HTTP stands for **H**yper **T**ext **T**ransfer **P**rotocol

WWW is about communication between web **clients** and **servers**

Communication between client computers and web servers is done by sending **HTTP Requests** and receiving **HTTP Responses**

- HTTP stands for **HyperText Transfer Protocol**.
- It is a protocol used to access the data on the World Wide Web (www).
- The HTTP protocol can be used to transfer the data in the form of plain text, hypertext, audio, video, and so on.
- This protocol is known as HyperText Transfer Protocol because of its efficiency that allows us to use in a hypertext environment where there are rapid jumps from one document to another document.
- HTTP is similar to the FTP as it also transfers the files from one host to another host. But, HTTP is simpler than FTP as HTTP uses only one connection, i.e., no control connection to transfer the files.
- HTTP is used to carry the data in the form of MIME-like format.
- HTTP is similar to SMTP as the data is transferred between client and server. The HTTP differs from the SMTP in the way the messages are sent from the client to the server and from server to the client. SMTP messages are stored and forwarded while HTTP messages are delivered immediately.

What is URLs?

A URL is a type of uniform resource identifier and is address of a resource on the World Wide Web and the protocol used to access it. It is used to indicate the location of a web resource to access the web pages. For example, to visit the instagram website, you will go to the URL www.instagram.com, which is the URL for the instagram website. The URL sends users to a specific resource online such as video, webpage, or other resources. When you search any query on Google, it will display the multiple URLs of the resource that are all related to your search query. The displayed URLs are the hyperlink to access the webpages.

A URL (Uniform Resource Locator) contains the information, which is as follows:

- The port number on the server, which is optional.
- It contains a protocol that is used to access the resource.
- The location of the server
- A fragment identifier
- In the directory structure of the server, it contains the location of the resource.

What is Search Engine?

A search engine is a software program that helps people find the information they are looking for online using keywords or phrases.

Search engines are able to return results quickly—even with millions of websites online—by scanning the Internet continuously and indexing every page they find.

When a user enters a search term, the search engine looks at the website page titles, contents and keywords it has indexed and uses algorithms (step-by-step operations) to produce a list of sites—with the most relevant websites at the top of the list.

Companies use search engine optimization (SEO) to help search engines recognize their websites as highly relevant to particular searches. Popular search engines include Google, Bing and Yahoo.

How it's worked?

It's work based on three modules

1. Crawling
2. Indexing
3. Ranking

Categories of search engines

Crawler databases. The search engine sends out many 'crawlers' which trawl the Web randomly, following links and indexing page content as they go. Some common crawlers are the GoogleBot and MSNBot which power Google and Bing.

Human-edited directories. Directories are human-maintained indexes of websites organized into a comprehensive hierarchy. To add your site to a directory you must submit it to an editor who reviews it first. Many directories charge a fee for inclusion, but the Open Directory Project is a popular free service.

Sponsored links. Sponsored links give you a way to pay to have your site included in search results. When a user searches for one of your chosen keywords, your site will appear usually in a separate section from the main results. On Google these sites appear at the top of the list separated from the main results.

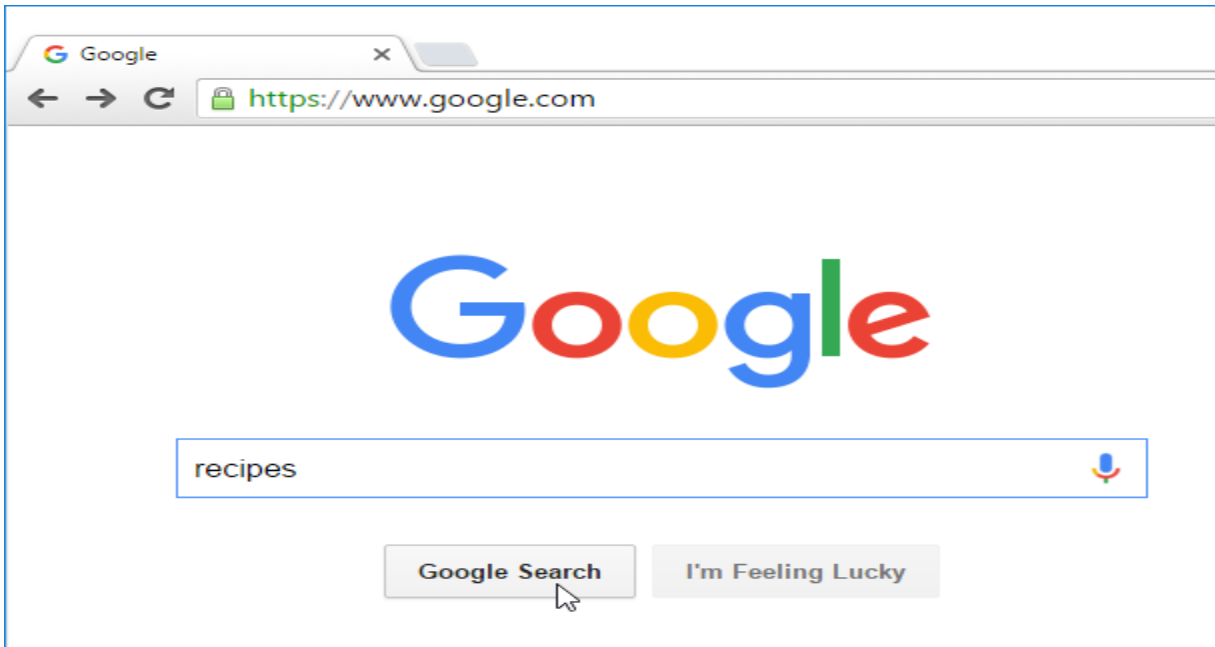
Using search engines

With billions of websites online today, there is **a lot** of information on the Internet. **Search engines** make this information easier to find. Let's look at the basics of using a search engine, as well as some techniques you can use to get **better search results**.

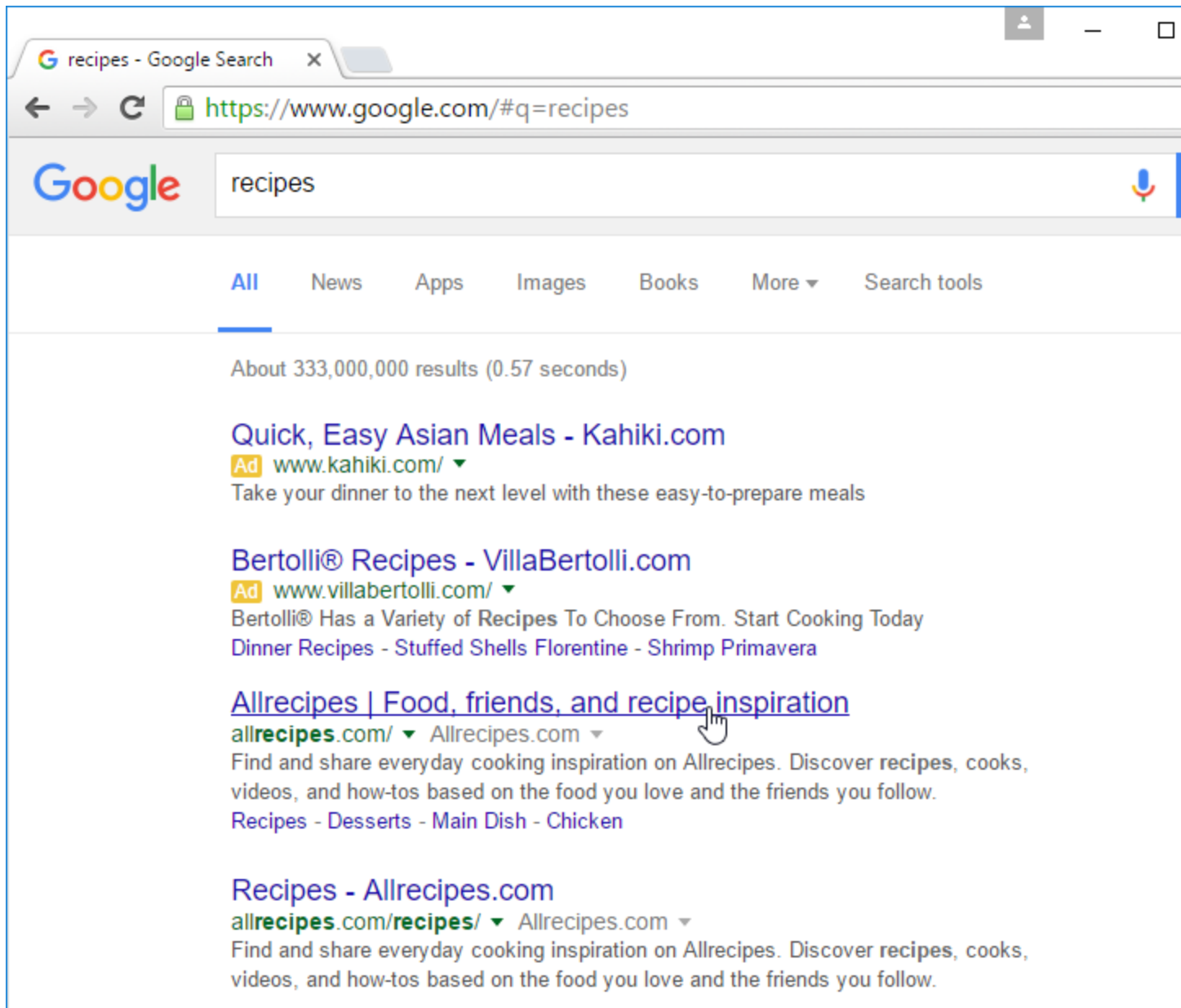
Watch the video below to learn more about searching the Web.

How to search the Web

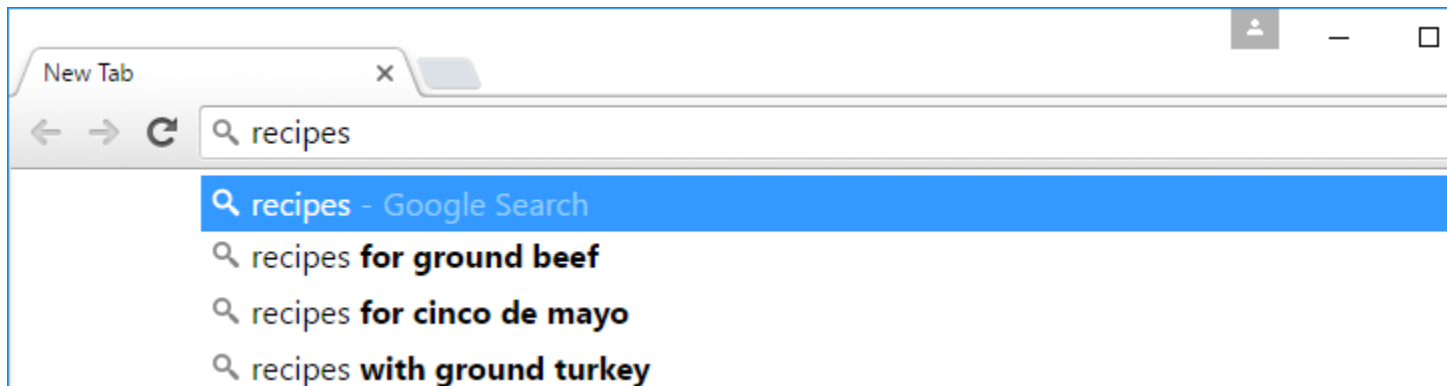
There are many different search engines you can use, but some of the most popular include **Google**, **Yahoo!**, and **Bing**. To perform a search, you'll need to navigate to a search engine in your web browser, type one or more **keywords**—also known as **search terms**—then press **Enter** on your keyboard. In this example, we'll search for **recipes**.



After you run a search, you'll see a list of **relevant websites** that match your search terms. These are commonly known as **search results**. If you see a site that looks interesting, you can click a link to open it. If the site doesn't have what you need, you can simply return to the results page to look for more options.



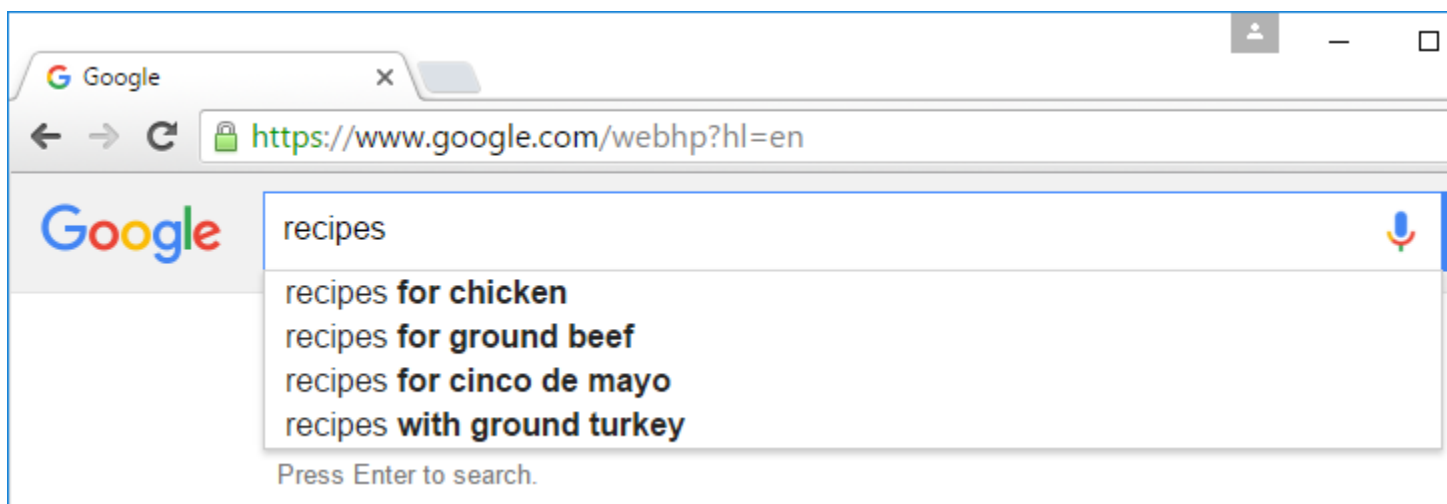
Most browsers also allow you to perform a web search directly from your **address bar**, although some have a separate **search bar** next to the address bar. Simply type your search terms and press **Enter** to run the search.



Search suggestions

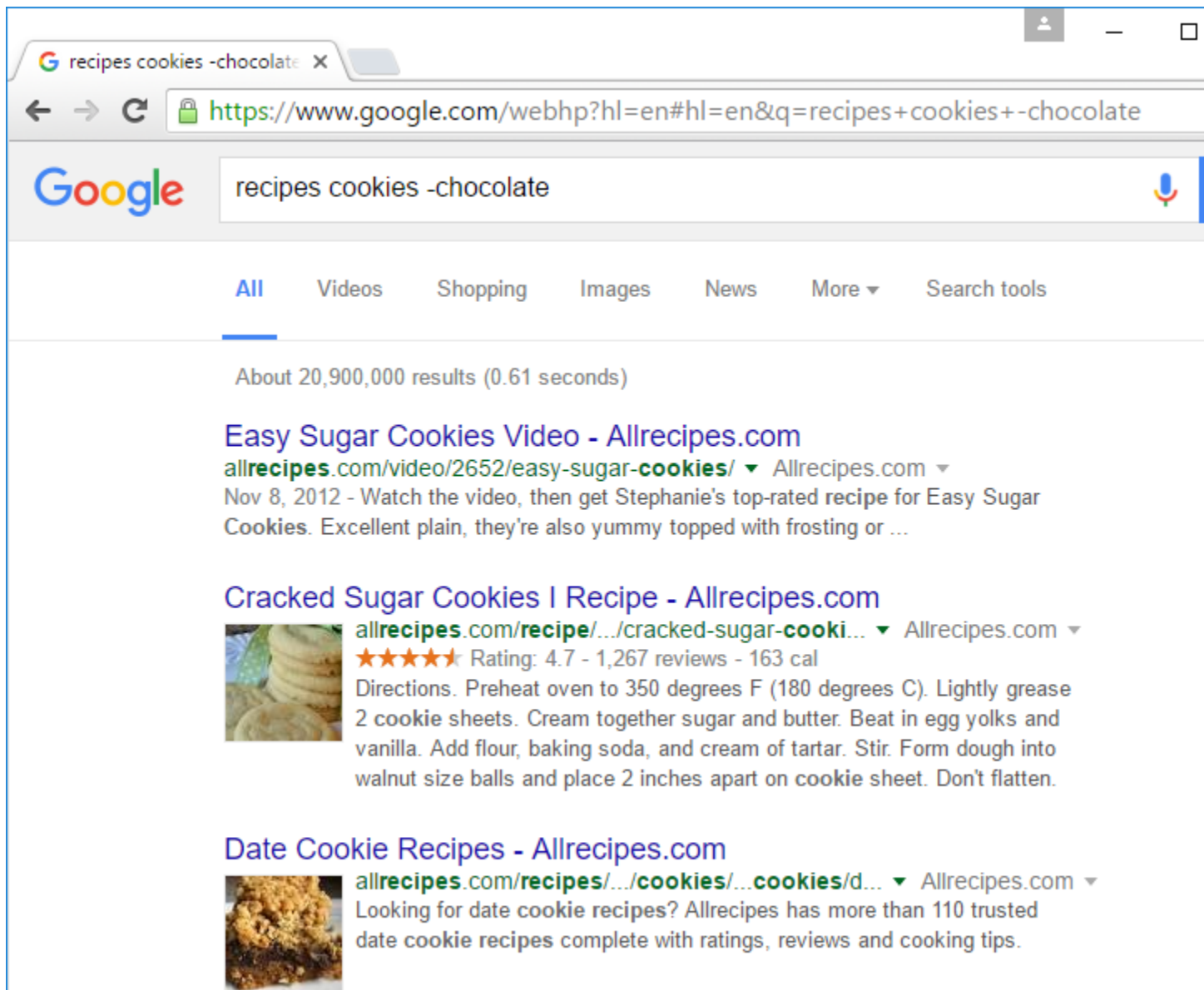
If you don't find what you're looking for on the first try, don't worry! Search engines are good at finding things online, but they're not perfect. You'll often need to **try different search terms** to find what you're looking for.

If you're having trouble thinking of new search terms, you can use **search suggestions** instead. These will usually appear as you're typing, and they're a great way to find new keywords you might not have tried otherwise. To use a search suggestion, you can click it with your mouse, or select it with the arrow keys on your keyboard.



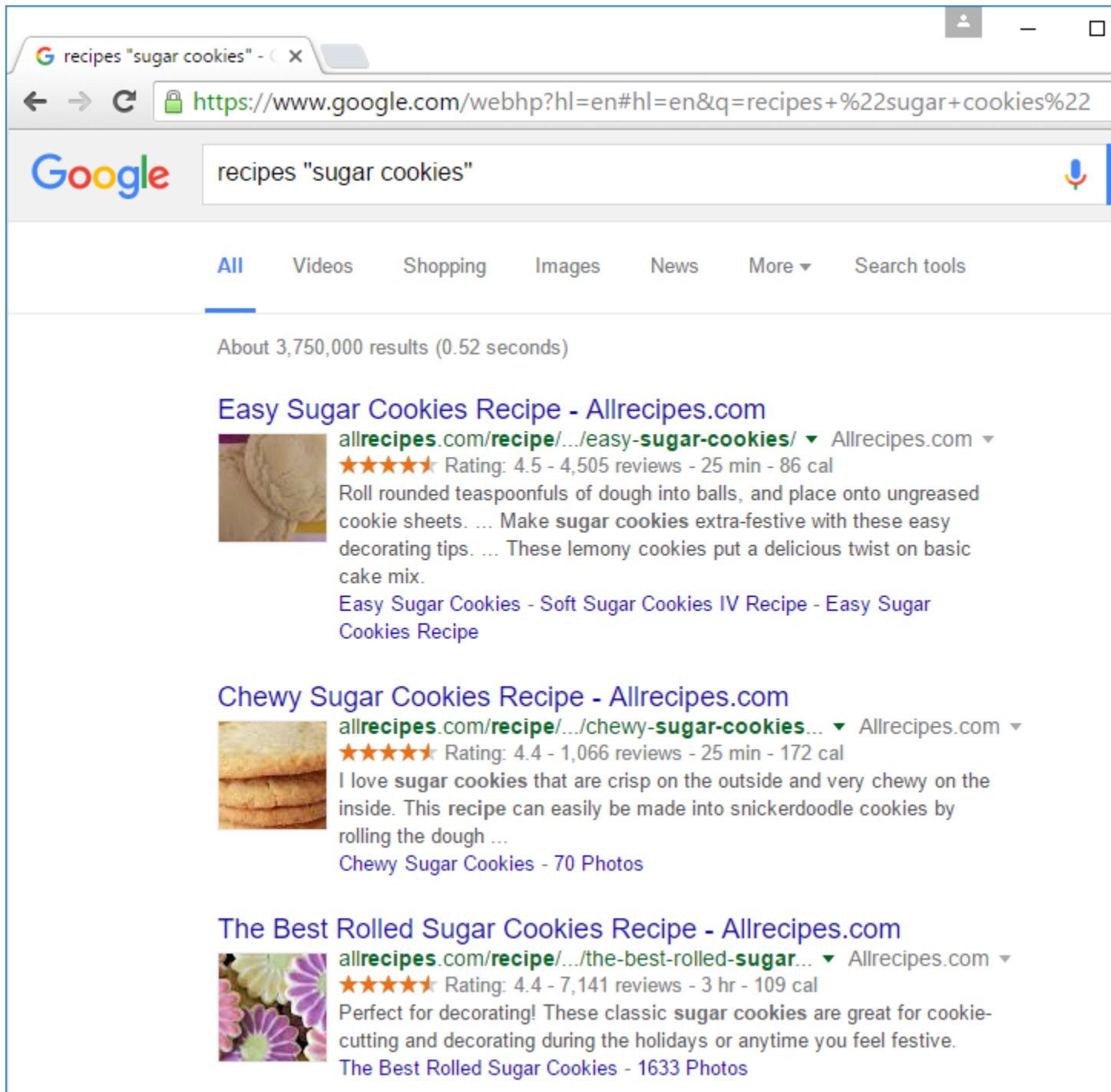
Refining your search

If you're still having trouble finding exactly what you need, you can use some special characters to help refine your search. For example, if you want to **exclude a word** from a search, you can type a **hyphen (-)** at the beginning of a word. So if you wanted to find cookie recipes that don't include chocolate, you could search for **recipes cookies -chocolate**.



You can also search for **exact words** or **phrases** to narrow down your results even more. All you need to do is place **quotation marks (" ")** around the desired

search terms. For example, if you search for **recipes "sugar cookies"**, your search results will only include recipes for sugar cookies, instead of any cookies that happen to use sugar as an ingredient.



The screenshot shows a Google search interface. The search bar contains the text "recipes 'sugar cookies'". Below the search bar, the results are displayed. The first result is "Easy Sugar Cookies Recipe - Allrecipes.com", which includes a small image of cookies, a star rating of 4.5, and a description. The second result is "Chewy Sugar Cookies Recipe - Allrecipes.com", which includes a small image of cookies, a star rating of 4.4, and a description. The third result is "The Best Rolled Sugar Cookies Recipe - Allrecipes.com", which includes a small image of decorated cookies, a star rating of 4.4, and a description.

Google recipes "sugar cookies"


https://www.google.com/webhp?hl=en#hl=en&q=recipes+%22sugar+cookies%22

Google recipes "sugar cookies"


All Videos Shopping Images News More Search tools

About 3,750,000 results (0.52 seconds)


Easy Sugar Cookies Recipe - Allrecipes.com

 [allrecipes.com/recipe/.../easy-sugar-cookies/](https://www.allrecipes.com/recipe/11947/easy-sugar-cookies/) Allrecipes.com
★★★★★ Rating: 4.5 - 4,505 reviews - 25 min - 86 cal
Roll rounded teaspoonfuls of dough into balls, and place onto ungreased cookie sheets. ... Make **sugar cookies** extra-festive with these easy decorating tips. ... These lemony cookies put a delicious twist on basic cake mix.
[Easy Sugar Cookies - Soft Sugar Cookies IV Recipe - Easy Sugar Cookies Recipe](#)

Chewy Sugar Cookies Recipe - Allrecipes.com

 [allrecipes.com/recipe/.../chewy-sugar-cookies...](https://www.allrecipes.com/recipe/11947/chewy-sugar-cookies...) Allrecipes.com
★★★★★ Rating: 4.4 - 1,066 reviews - 25 min - 172 cal
I love **sugar cookies** that are crisp on the outside and very chewy on the inside. This recipe can easily be made into snickerdoodle cookies by rolling the dough ...
[Chewy Sugar Cookies - 70 Photos](#)

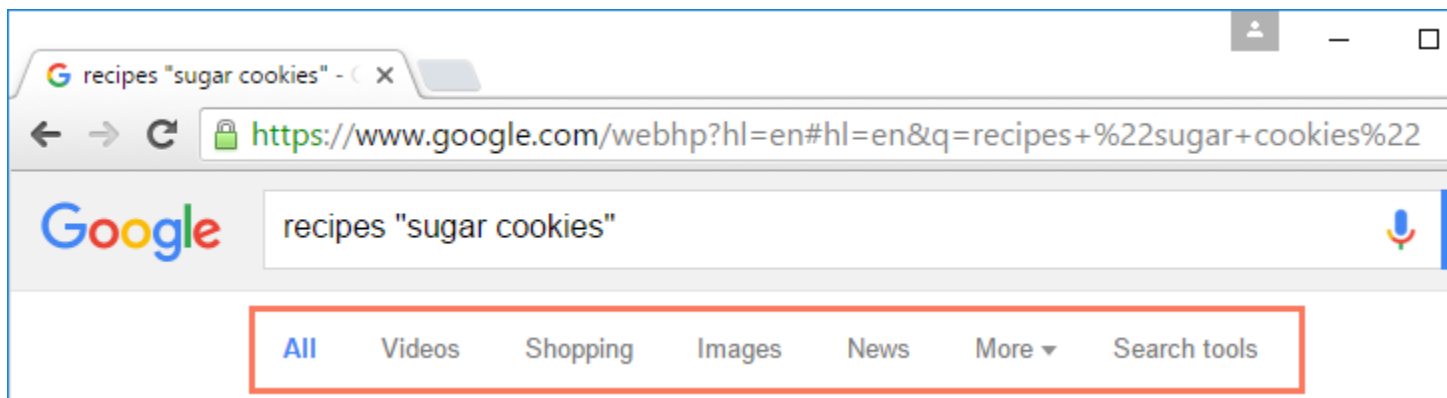
The Best Rolled Sugar Cookies Recipe - Allrecipes.com

 [allrecipes.com/recipe/.../the-best-rolled-sugar...](https://www.allrecipes.com/recipe/11947/the-best-rolled-sugar...) Allrecipes.com
★★★★★ Rating: 4.4 - 7,141 reviews - 3 hr - 109 cal
Perfect for decorating! These classic **sugar cookies** are great for cookie-cutting and decorating during the holidays or anytime you feel festive.
[The Best Rolled Sugar Cookies - 1633 Photos](#)

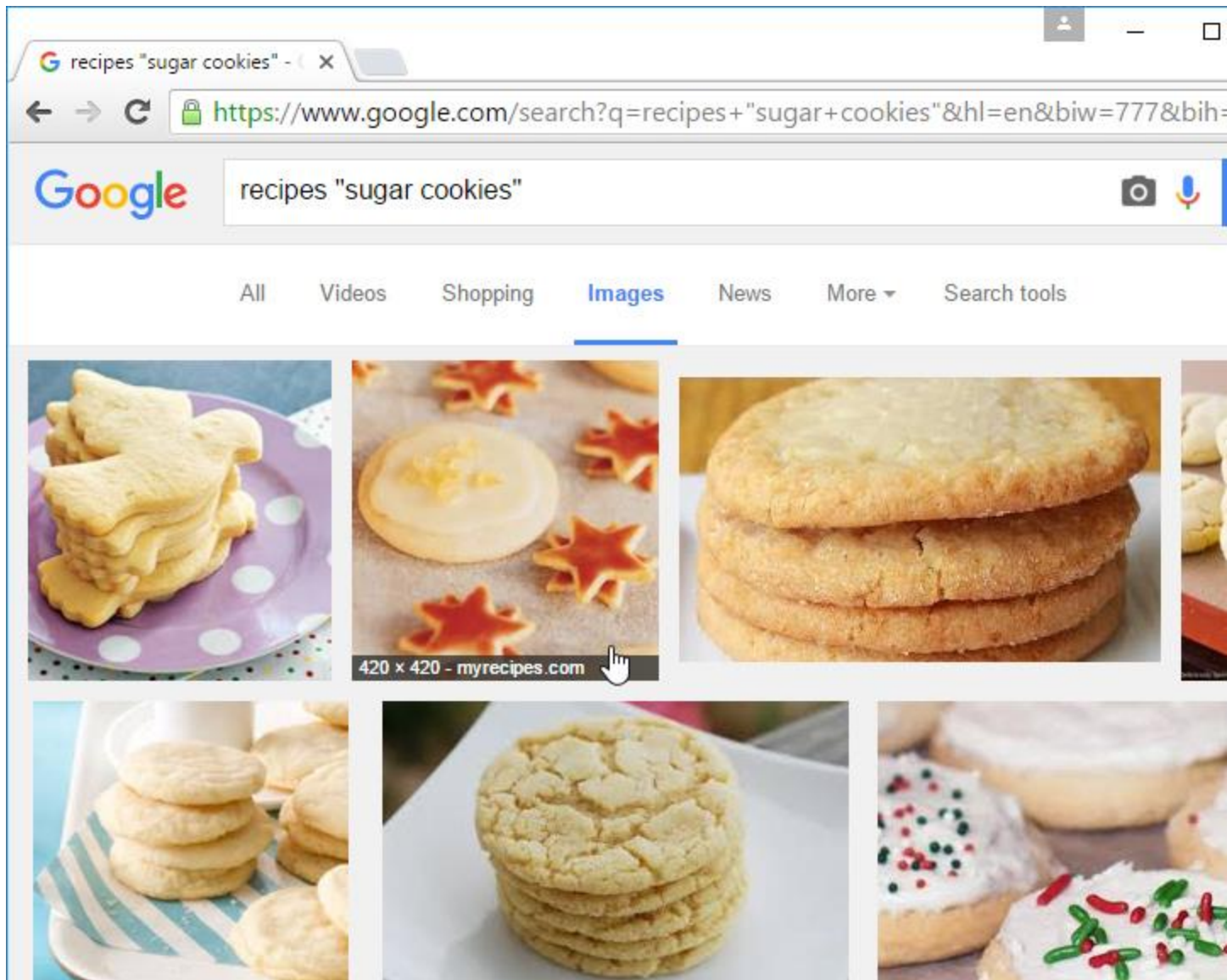
These techniques may come in handy in certain cases, but you probably won't need to use them with most searches. Search engines can usually figure out what you're looking for without these extra characters. We recommend trying a few different **search suggestions** before using this method.

Content-specific searches

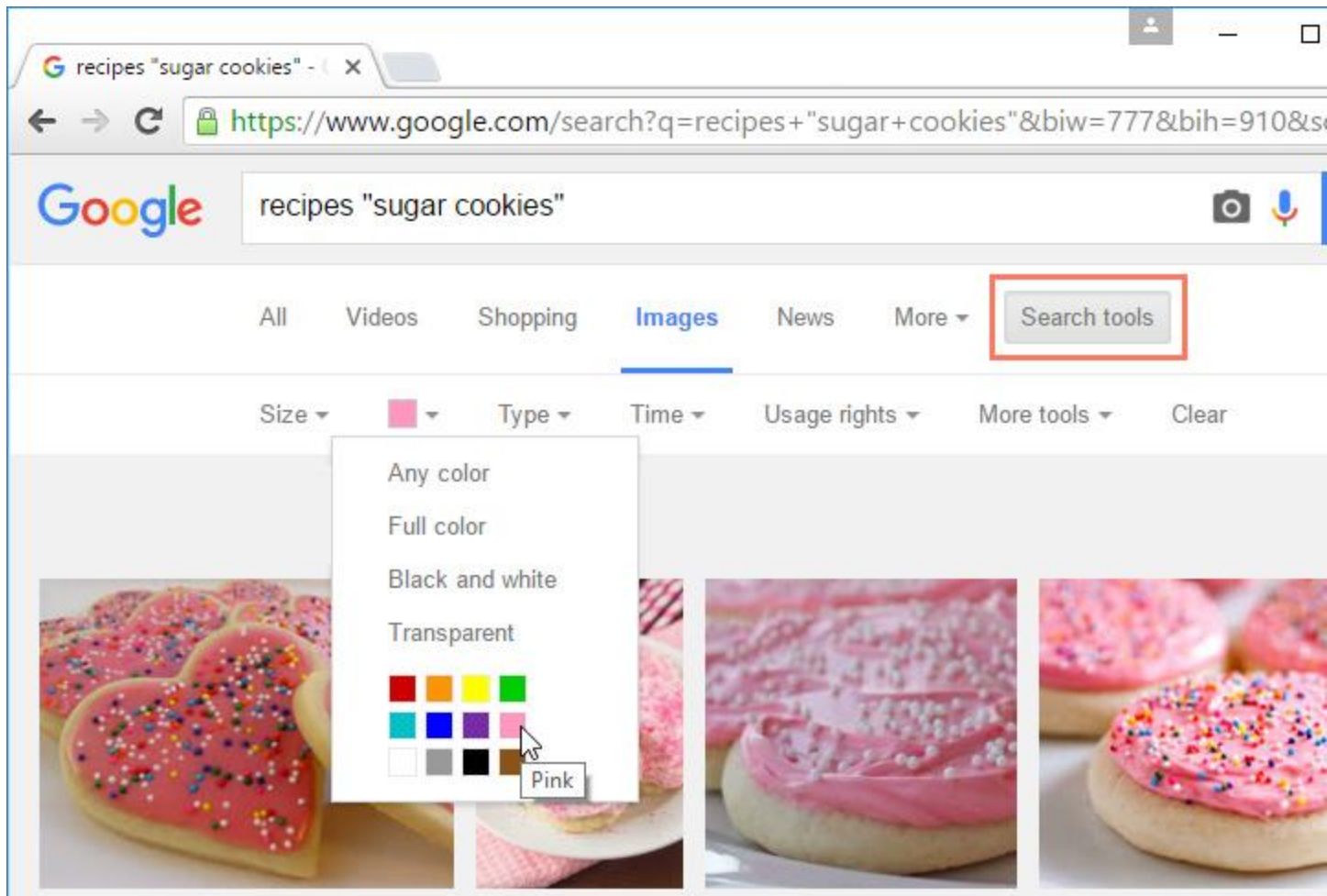
There may be times when you're looking for something more specific, like a **news article**, **picture**, or **video**. Most search engines have **links** at the top of the page that allow you to perform these unique searches.



In the example below, we've used the same search terms to look for **images** instead of websites. If you see an image you like, you can click to visit the website it originally came from.

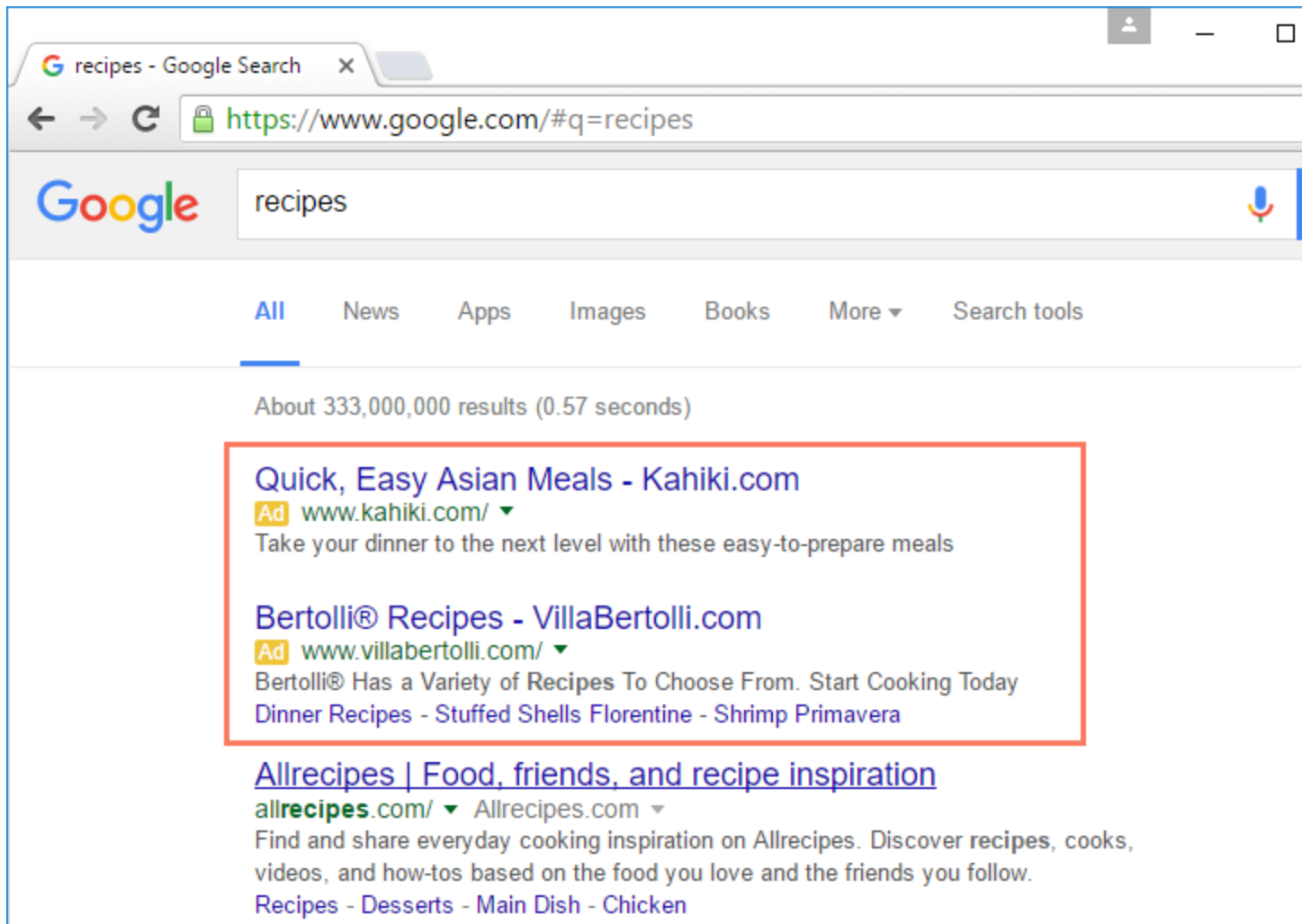


You can use the extra **search tools** to narrow down your results even more. These tools will change based on the type of content you're looking for, but in this example we can filter our images by **size**, **color**, **image type**, and more. So if you wanted to find cookies with pink frosting, you could search for images that are mostly pink.



Advertisements

One final thing to note: Most search engines include **advertisements** with search results. For example, you can see advertisements at the top of the search results below.



These ads are based on your search terms, and they often look similar to other search results. While they may be useful in some cases, it's usually more helpful to focus on the actual search results.

Search criterion

The search criterion defines the conditions that must be met for an object to be returned by a search query. The criterion consists of a search type and an optional object type. The search type is either **parsed string** or **structured**.

A parsed string search consists of a list of terms for which to search. The service parses the string into individual search terms. If any term matches the content of any field for an object, the object is considered a hit and is returned by the service.

In contrast to a string search, a structured search looks for matches using specific object fields. The search request specifies one or more conditions that the object fields must match to be considered a hit. The request defines whether objects classified as hits must match *all* the conditions, or if matching *any* suffices. See the topic Structured searches for more information.