UNIVERSITY OF ANBAR

Computer Sciences

University of Anbar
College of Pharmacy
2020 - 2021

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Chapter 2
Computer Networks

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Computer Networks

In this topic, we are going to discuss in detail about concepts like basics of computer networks, concept of internet, basics of internet architecture, services on internet, World Wide Web and websites, communication on internet, internet services, preparing computer for internet access, web browsing software, search engines, popular search engines/search for content, accessing web browser, using favorites folder, electronic mail.

1. Basics of Computer Networks

Computer network is an interconnection between two or more hosts/computers. The connectivity can be physical by using cables or virtual using wireless network. Different types of networks include LAN, WAN, MAN, etc., as shown below:
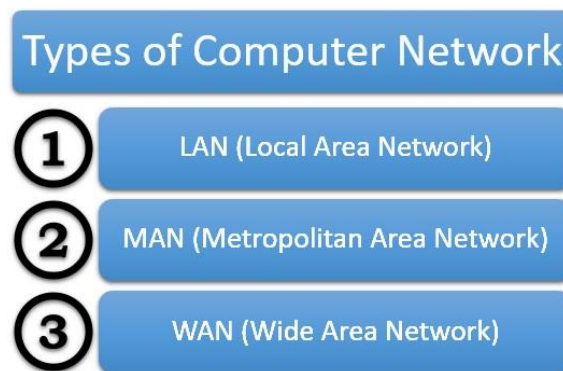

Figure 1: Types of networks

1.1   Local Area Network (LAN)

Local Area Network (LAN) provides data communication within shorter distance and connects several devices such as computers and printers. This type of network contains computers that are relatively closer and are physically connected with cables and wireless media. Any network that exists within a single building, or even a group of adjacent buildings, is considered as LAN. It is often used to connect separate LANs together so they can communicate and exchange data.
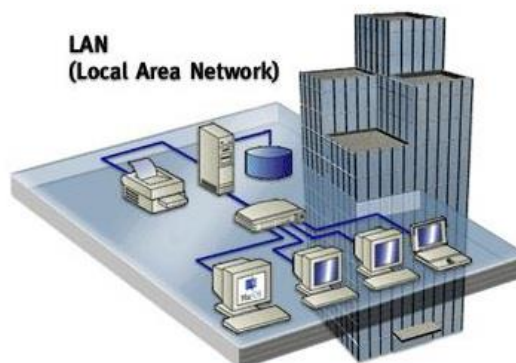

Figure 2: Local Area Network

1.2   Wide Area Network (WAN)

Wide Area Network is connecting two or more LANs together, generally across a wide geographical area.

Example

A company may have its corporate headquarters and manufacturing plant located in one city and marketing office in another city. Each site needs resources, data and programs locally, but it also needs to share data with other sites. To accomplish this, the company can attach devices that connect over public utilities to create a WAN.
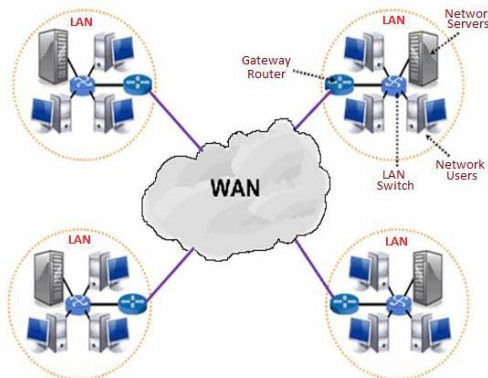

Figure 3: Wide Area Network

1.3   Metropolitan Area Network (MAN)

Metropolitan Area Network (MAN) is an extensive network that connects numerous corporate LANs together. Usually MANs are not owned by sole organization. Their communication devices and equipment are maintained by a group or single network provider that sells its networking services to corporate customers. MANs often take the role of high-speed network that allows sharing of regional resources. MANs also can provide a mutual connection to other networks using a WAN link.
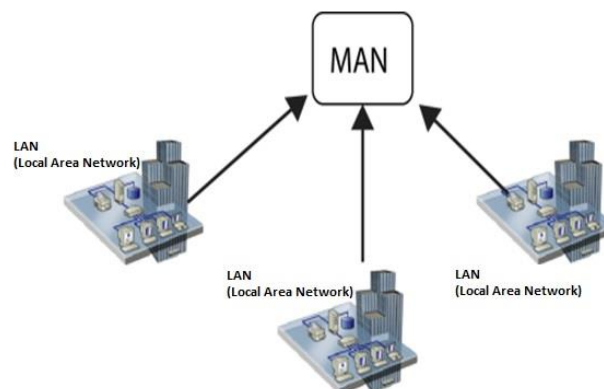

Figure 4: Metropolitan Area Network

2. Internet

Internet is a global communication system that links together thousands of individual networks. It allows exchange of information between two or more computers on a network. Thus, internet helps in transfer of messages through mail, chat, video and audio conference, etc. It has become mandatory for day-to-day activities: bills payment, online shopping and surfing, tutoring, working, communicating with peers, etc.

2.1   Internet Architecture

Internet architecture is a meta-network, which refers to a congregation of thousands of distinct networks interacting with a common protocol. In simple terms, it is referred as an internetwork that is connected using protocols. Protocol used is TCP/IP. This protocol connects any two networks that differ in hardware, software and design. TCP/IP provides end to end transmission, i.e., each and every node on one network has the ability to communicate with any other node on the network.

2.2   Communication on Internet

We shall discuss how communication happens through the use of Internet in this section −

1. **Email**

   Electronic mail or email is one of the key parts of e-revolution which is specially designed for communication purpose. Once you have an email account, you can start sending electronic messages to anyone if you have the recipient's email address. The format of an email address is "**username**, @ symbol, **domain name (yahoo.com, gmail.com, etc.)**". For example: **name@yahoo.com**.

2. **Internet Relay Chat (IRC)**

   IRC is a form of real-time internet chat or synchronous conferencing. It is mainly used for group communication in discussion forums called channels, also allows one-to-one communication via private message, and both chats and data transfers via Direct Client-to-Client protocol.

3. **Video Conference**

   A video conference is a telecommunication technology, which permits two or more people in different locations to interact via mutual video or audio transmission simultaneously. It is also called visual collaboration and is a type of groupware. Video conferencing uses telecommunication technology to bring people at different sites together for a meeting/conversation. This can be as simple as a conversation between two people in private offices, or involves several sites with more than two people. It can also be used to share documents, computer displayed information, whiteboards, etc.

4. Voice Over Telephony (VOIP)

VOIP stands for voice over IP, where IP refers to the Internet Protocol which is a base for all internet communications. This phenomenon began as an optional mutual voice extension to some of the instant messaging systems that took off around the year 2000. In recent years, VOIP systems are easy to use and as convenient as a traditional telephone. Voice quality can still differ from call to call but is often equal to and can even beat the traditional calls.

Figure 5: Voice Over Telephony

5. Instant Messaging

Instant Messaging (IM) is a process of transferring real-time messages between users. It facilitates private chat room atmosphere. IM alerts users when some of their peers are online, so the users can start chatting with them.

6. Remote access

Internet permits computer users to connect to other computers across the world and to store information effortlessly. This can be done with or without any security, authentication and encryption technologies depending on the requirements which encourages work from home culture.

7. File Sharing

A file or document can be e-mailed to anyone as an attachment. It can be uploaded to a website or FTP server, for users to download content easily. It can be put into a shared location or onto a cloud for instant use by colleagues.

8. Streaming media

Many existing radio and television presenters provide internet "feeds" of their live audio and video streams. An internet-connected device, such as a computer or something more specific, can be used to access on-line media in much the same way, as television or radio receiver.
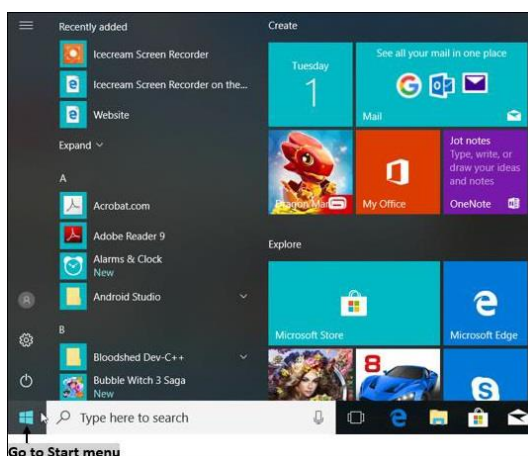
3. Web Browsing Software

"World Wide Web" or simple "Web" is the name given to all the resources of internet. The special software or application program with which you can access web is called "Web Browser".

- **Launching a Web Browser**

Web browser is an application that is located on a computer's disk. Once you have an internet connection, you can launch a web browser using the following methods −

Method 1

Step 1 − Go to "Start Menu".

Step 2 − From the menu opened, click on the web browser (Mozilla, Google Chrome, Internet Explorer).

Method 2 − Alternate way is to click the shortcut icon on the taskbar or desktop.

- ## **Popular Web Browsing Software**

The most popular web browsing software includes:

1. ### **Google Chrome**

   Google Chrome is a web browsing software developed in the year 2008 by Google Inc. First, it was designed for windows platform, and later adopted to Linux, Macintosh, and even Android. It is written using C++, Assembly, Python, and JavaScript.

2. ### **Mozilla Firefox**

   Mozilla Firefox is a web browsing software developed in the year 2002 by the Mozilla Foundation. It is designed to work on all operating systems like Windows, Macintosh, Linux, and Android. It is written using C++, JavaScript, Rust, C, CSS, XUL, and XBL.

3. ### **Opera**

   Opera is a web browsing software developed in the year 1995 by Opera Software. It is designed to work on all operating systems like Windows, Macintosh, and Linux and is written using C++ language.

4. ### **Internet Explorer**

   Internet Explorer is a web browsing software developed in the year 1995 by Microsoft. It is designed to work on all operating systems like Windows, Macintosh, Linux and Android and is written using C++ language.

- ## **Search Engines**

Search Engine is an application that allows you to search for content on the web. It displays multiple web pages based on the content or a word you have typed.

The most popular search engines are listed below.

1. ### **Google**

   Google is the most popular and robust search engine launched in the year 1997 by Google Inc. It was developed by Larry Page and Sergey Brin. It is written using C, C++ and Python. Beyond searching content, it also provides weather forecasts, sports score, temperatures, area codes, language translation, synonyms, etc. Now-a-days the advancement is still more, that it displays maps in a touch.
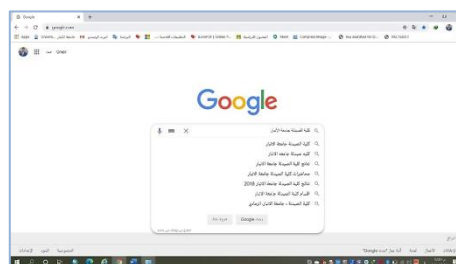
2. Bing

Bing is also a popular search engine launched by Microsoft in the year 2009. It is written using ASP .Net language. It is used to search web content, video, images, maps, etc.
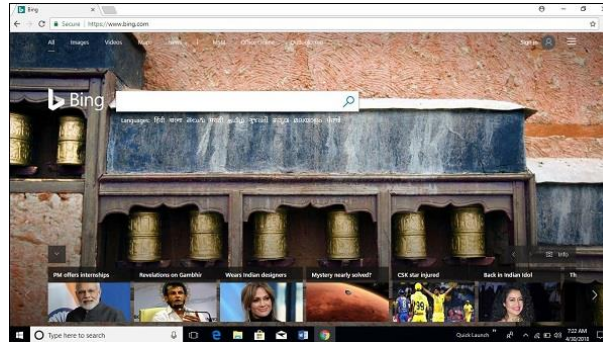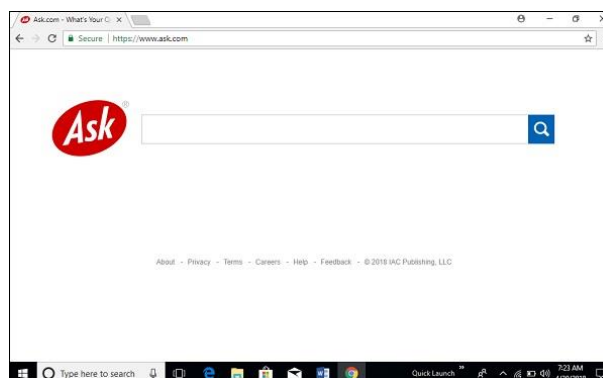

3. Yahoo

Yahoo is a common search engine launched by Yahoo in the year 1995. It is a multilingual search engine and written using PHP language.
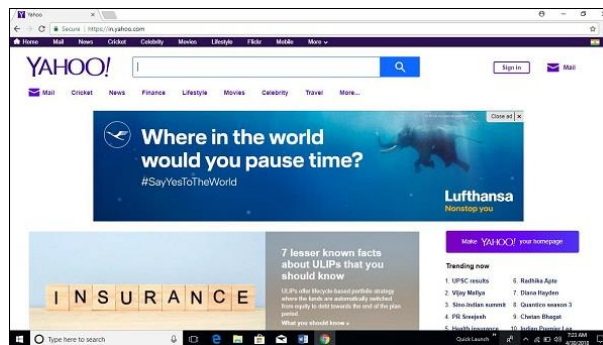
4. Ask

Ask is the most popular search engine and application for e-business which was launched by IAO in the year 1996. It was developed by Garrett Gruener, David Warthen, and Douglas Leeds.

- ### Search for The Content

Search Engine helps to search for content on web using the following steps.

Step 1 − Launch your web browser.

Select the shortcut icon on the task bar

Step 2 − In "Address bar/Location", type the search engine you want to use and press enter.

Enter the name of search engine here
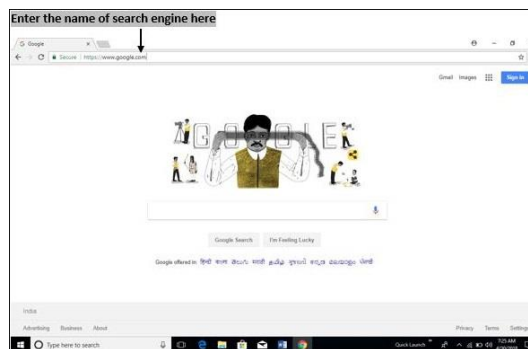
Step 3 − Type the content you want to search in the "search text box" and press enter.

Enter the content to be searched here
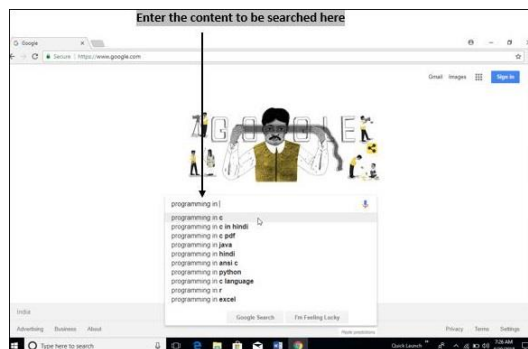
Step 4 − It displays a list of web pages from which you can select corresponding content/web page you want.

Web pages related to the search will be displayed
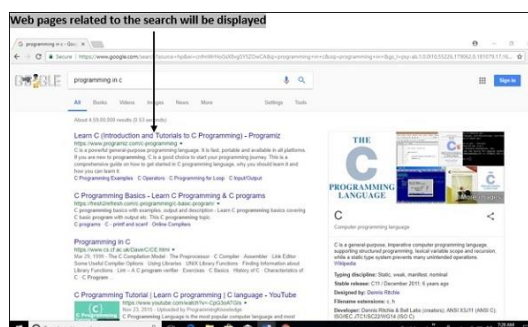
4. Mail

Electronic mail (email or e-mail) is a method of exchanging messages ("mail") between people using electronic devices. More plainly, e-mail is a message that may contain text, files, images, or other attachments sent through a network to a specified individual or group of individuals.

Email operates across computer networks, primarily the Internet. Today's email systems are based on a store-and-forward model. Email servers accept, forward, deliver, and store messages. Neither the users nor their computers are required to be online simultaneously.

- **Gmail**

Gmail is a free email service developed by Google. Users can access Gmail on the web and using third-party programs that synchronize email content through POP or IMAP protocols. Gmail started as a limited beta release on April 1, 2004 and ended its testing phase on July 7, 2009.

At launch, Gmail had an initial storage capacity offer of one gigabyte per user, a significantly higher amount than competitors offered at the time. Today, the service comes with 15 gigabytes of storage. Users can receive emails up to 50 megabytes in size, including attachments, while they can send emails up to 25 megabytes. In order to send larger files, users can insert files from Google Drive into the message. Gmail has a search-oriented interface and a "conversation view" similar to an Internet forum. By 2018, Gmail had 1.5 billion active users worldwide.
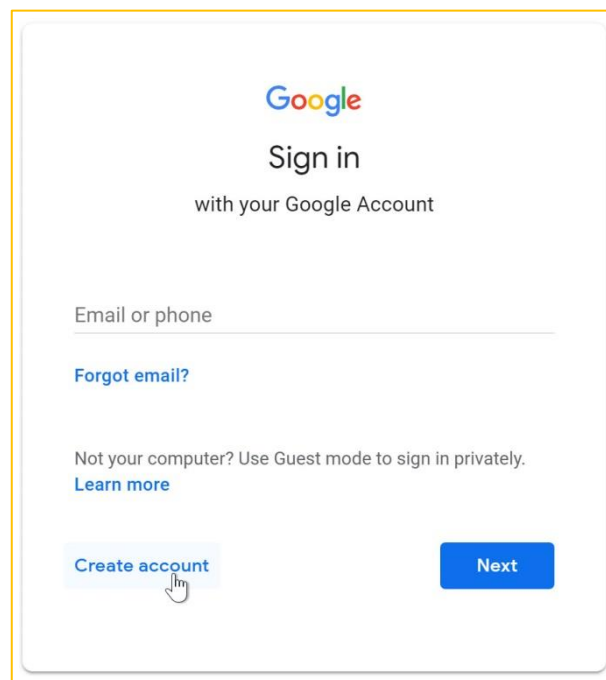
A. Setting up a Gmail account

To create a Gmail address, you'll first need to create a Google account. Gmail will redirect you to the Google account sign-up page. You'll need to provide some basic information like your name, birth date, gender, and location. You will also need to choose a name for your new Gmail address. Once you create an account, you'll be able to start adding contacts and adjusting your mail settings.

- **Create an account**
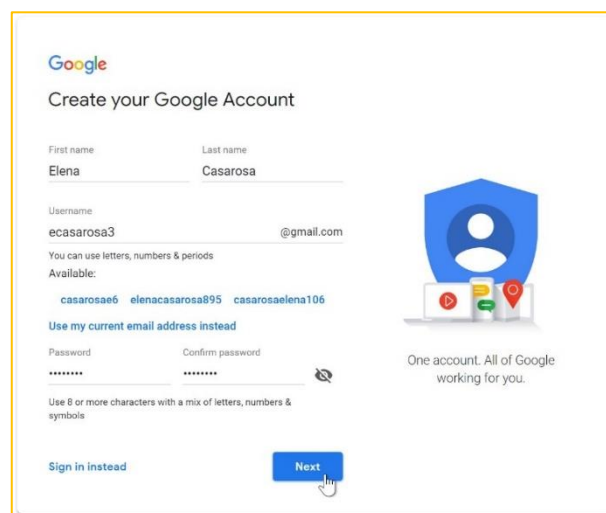
  To create an account:
  1. Go to **www.gmail.com**.
  2. Click **Create account.**
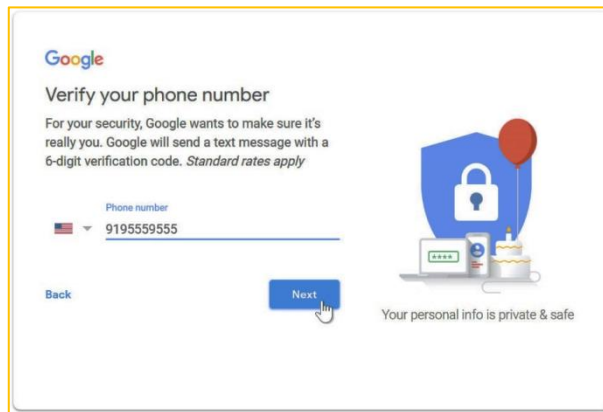
3. The **sign-up** form will appear. Follow the directions by entering the required information.

4. Next, enter your **phone number** to verify your account. Google uses a two-step verification process for your security.
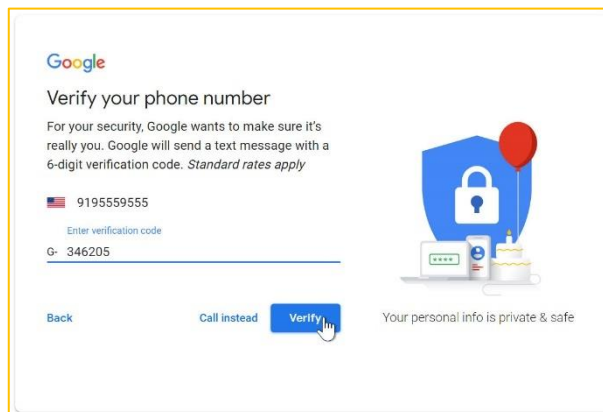
5. You will receive a text message from Google with a **verification code**. **Enter the code** to complete the account verification.

6. Next, you will see a form to enter some of your personal information, like your name and birthday.

7. Review **Google's Terms of Service** and **Privacy Policy**, then click **I agree**.
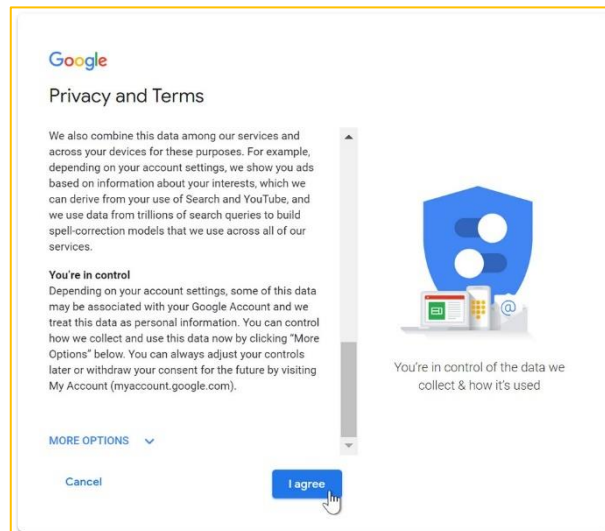
8. Your account will be created.
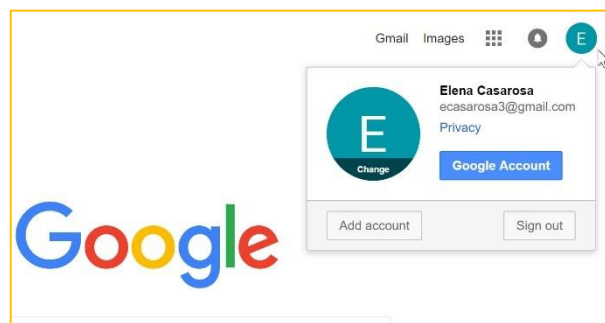
Just like with any online service, it's important to choose a **strong password**—in other words, one that is difficult for someone else to guess. For more information, review our lesson on **creating strong passwords**.

B. Signing in to your account

When you first create your account, you will be automatically signed in. Most of the time, however, you'll need to **sign in** to your account and **sign out** when you're done with it. Signing out is especially important if you're using a shared computer (for example, at a **library** or **office**) because it prevents others from viewing your emails.
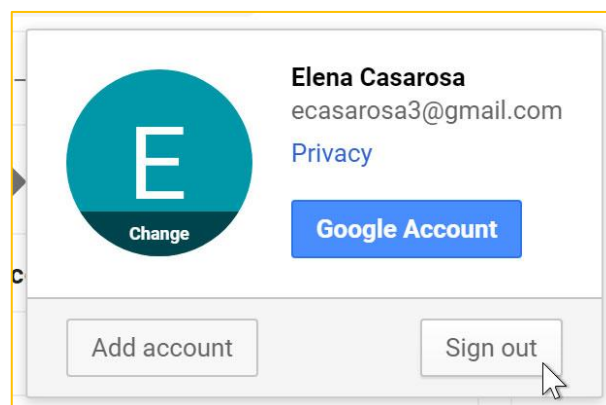
To sign in:

1. Go to **www.gmail.com**.
2. Type your **user name** (your email address) and **password**, then click **Next**.
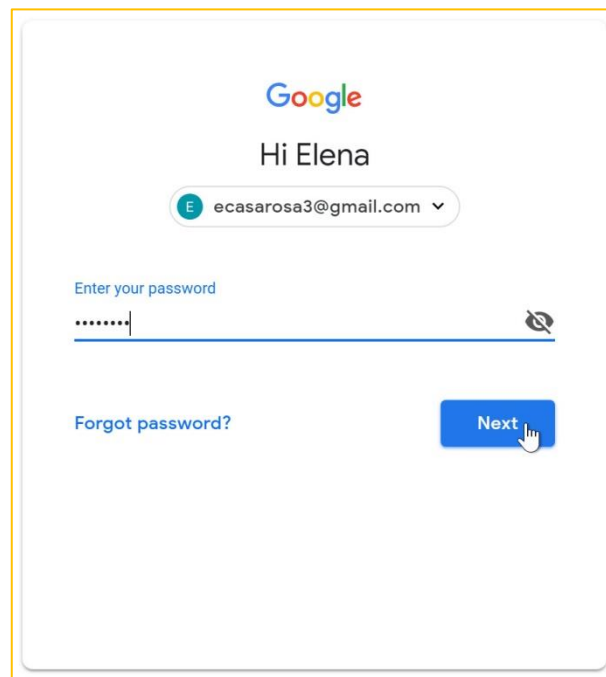
To sign out:

In the top-right corner of the page, locate the circle that has your first initial (if you've already selected an avatar image, it will show the image instead). To sign out, click the circle and select **Sign out**.


C. Sending email

When you write an email, you'll be using the **compose window**. This is where you'll add the **email address of the recipient(s)**, the **subject**, and the **body** of the email, which is the message itself. You'll also be able to add various types of **text formatting**, as well as one or more **attachments**. If you want, you can even create a **signature** that will be added to the end of every email you send.
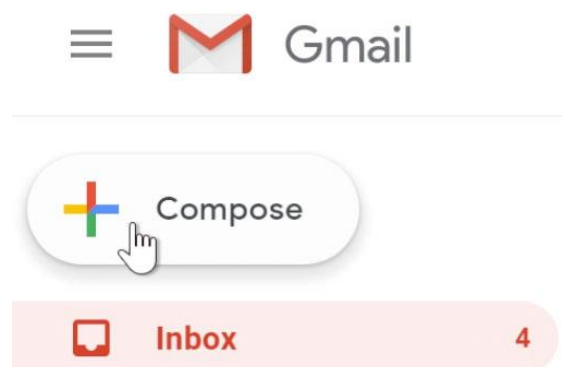
The compose window

Click the buttons in the interactive below to learn about the different parts of the compose window.
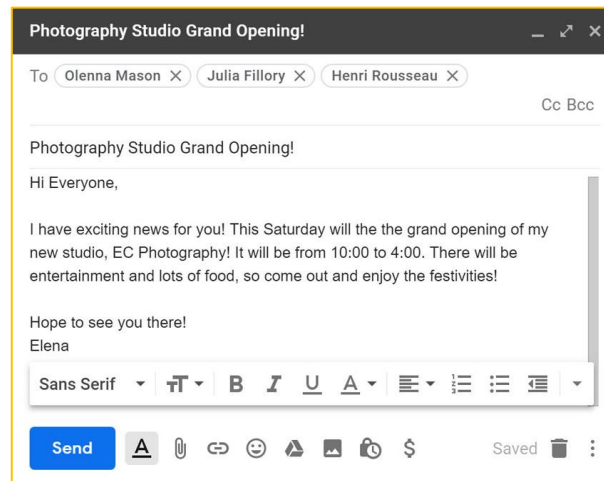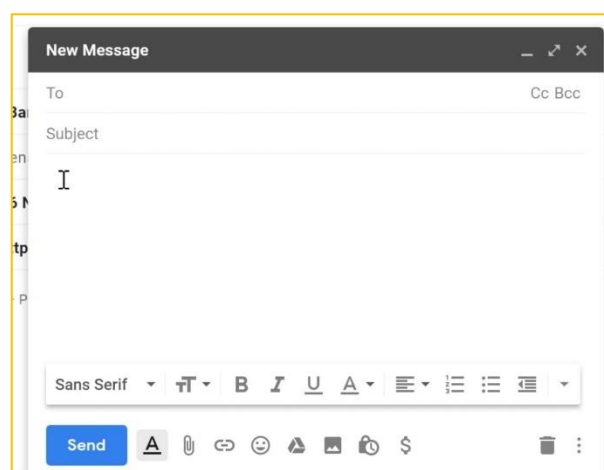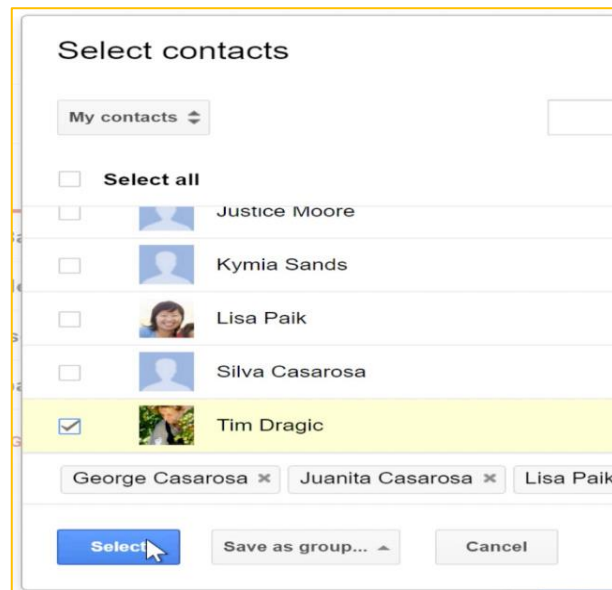

To send an email:

1. In the **left menu pane**, click the **Compose** button.

2. The **compose window** will appear in the lower-right corner of the page.

3. You'll need to add one or more **recipients** to the **To: field**. You can do this by typing one or more **email addresses**, separated by commas, or you can click **To** to select recipients from your **contacts**, then click **select**.

4. Type a **subject** for the message.

5. In the **body** field, type your message. When you're done, click **Send**.
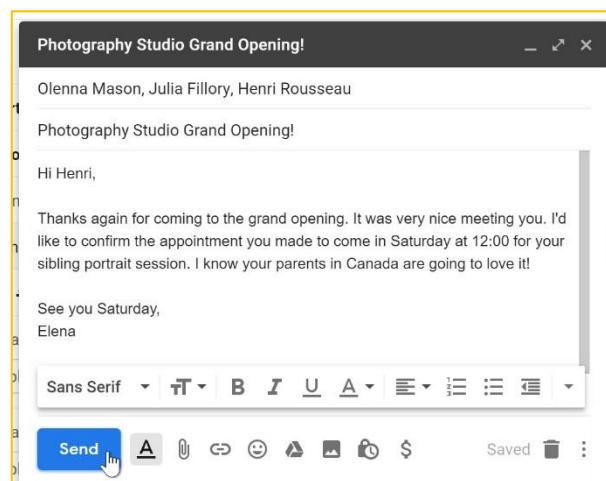
If the person you are emailing is already one of your contacts, you can start typing that person's **first name**, **last name**, or **email address**, and Gmail will display the contact below the **To: field**. You can then press the **Enter** key to add the person to the **To: field**.
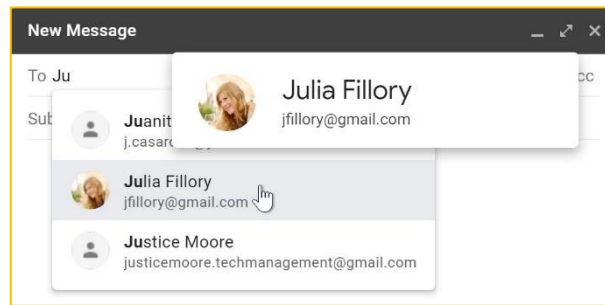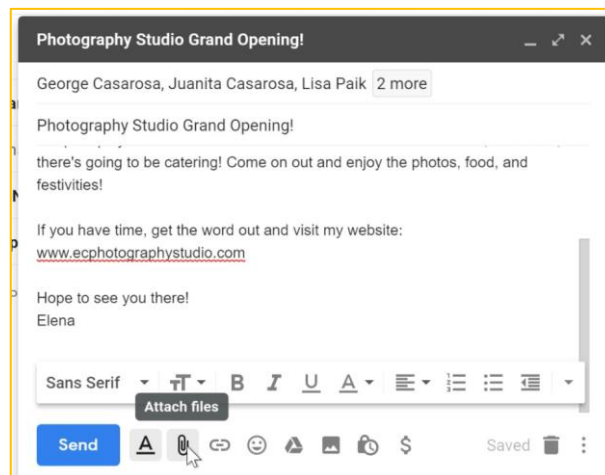
D. Adding attachments

An **attachment** is simply a **file** (like an image or document) that is sent along with your email. For example, if you are applying for a job, you might send your **resume** as an attachment, with the body of the email being the **cover letter**. It's a good idea to include a **message** in the body of your email explaining what the attachment is, especially if the recipient isn't expecting an attachment.
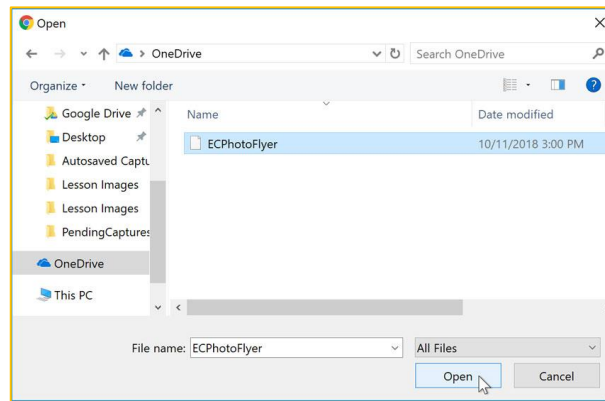
Remember to attach your file **before** you click **Send**. Forgetting to attach a file is a surprisingly common mistake.
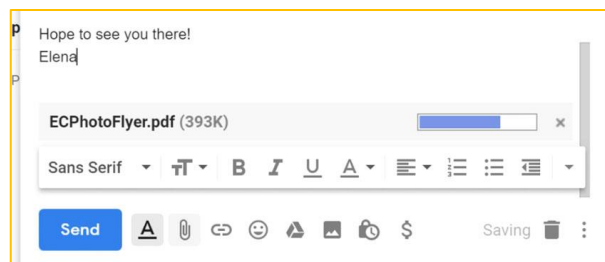
To add an attachment:

1. While composing an email, click the **paper clip icon** at the bottom of the compose window.

2. A **file upload dialog box** will appear. Choose the file you want to attach, then click **Open**.

3. The attachment will begin to upload. Most attachments will upload within a few seconds, but larger ones can take longer.


4. When you're ready to send your email, click **Send**.

You can click **Send** before the attachment finishes uploading. It will continue to upload, and Gmail will automatically send the email once it's done.
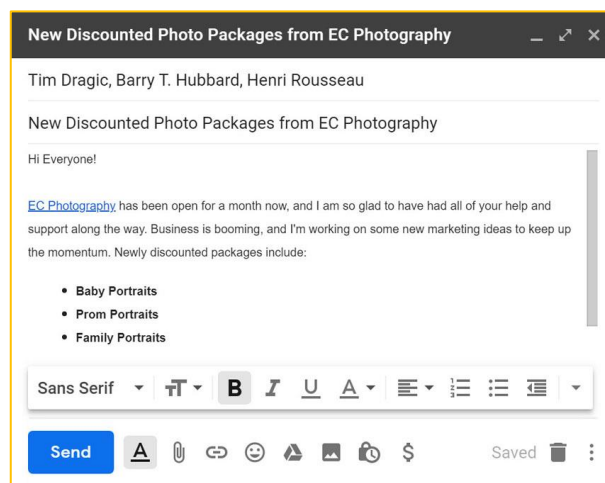
E. Email formatting

Gmail allows you to add various types of **formatting** to your text.

Click the **formatting button** at the bottom of the compose window to see different formatting options.
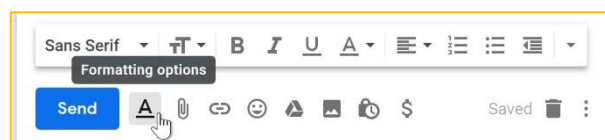

Click the buttons in the interactive below to learn about different formatting options in Gmail.

F. Reading email

By default, any email you receive will go to your **inbox**. You'll be able to tell which emails are **unread** because they'll be **bold**. You can also see the name of the **sender**, the **subject** of the email, and the first few words of the **email body**. This means even before you select an email, you can tell quite a few things about it.
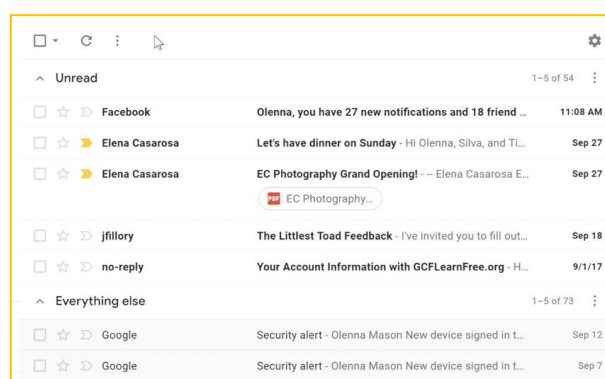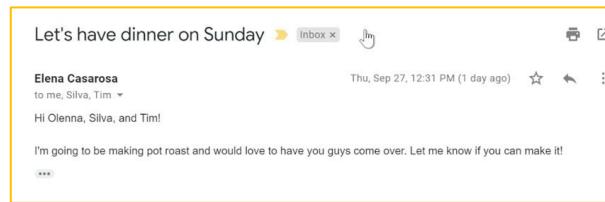

To read an email:

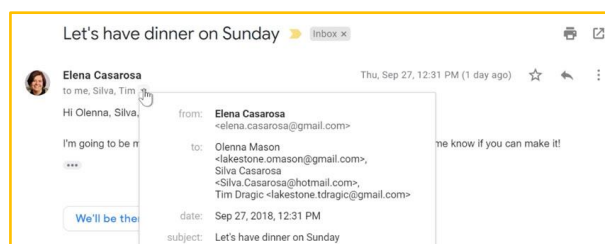1. From your **inbox**, click the email you want to read.
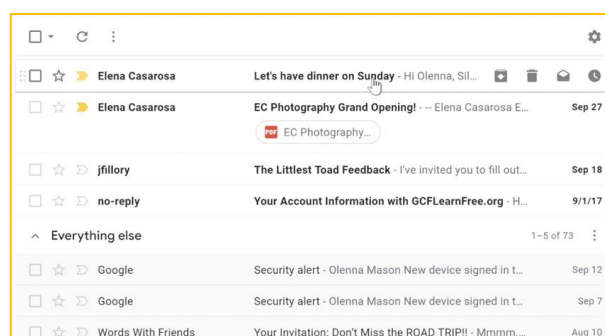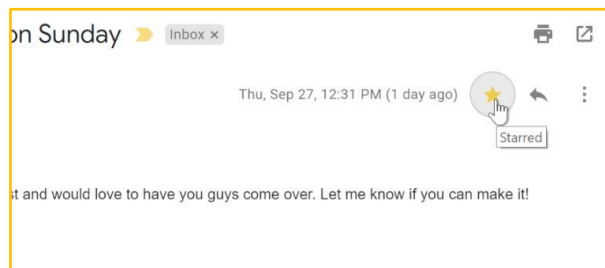

2. The email will open in the same window.

- *Reading options*

In addition to reading the email, you have several reading options.

- You can click **show details** to see the email addresses of the **sender** and any other **recipients**, as well as the **date** the email was sent.
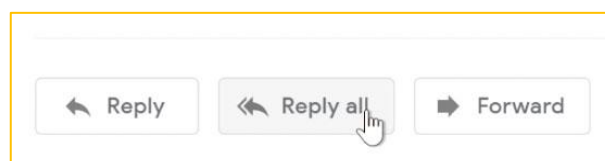

- You can click the **Star** next to the name of the sender to remind yourself to read the email later.
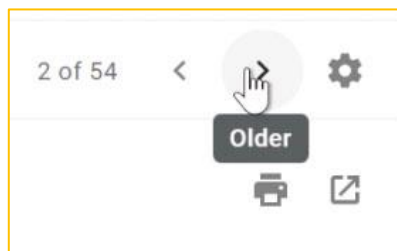

- You can also click the **More** button and select **Add star** from the drop-down menu.
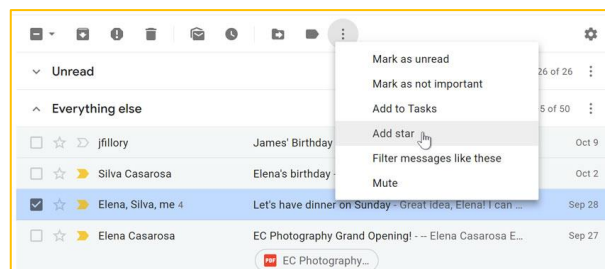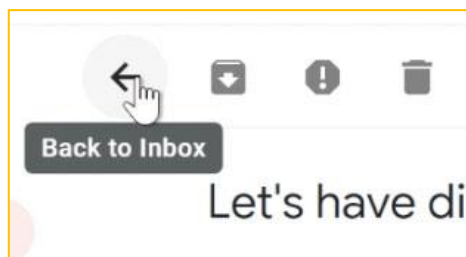

- You can **Reply**, **Reply to all**, or **Forward** the email to someone else.

- You can click **Newer** or **Older** on the right side of the window to view the next email (or previous one).


- You can go **Back to Inbox**.
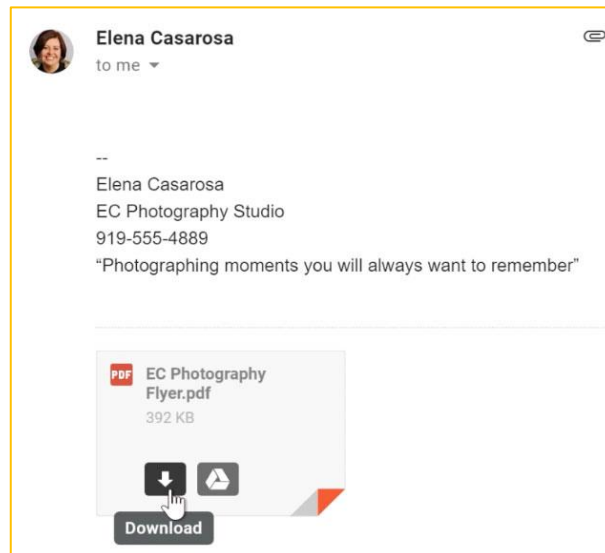

- *Opening attachments*

Sometimes you'll receive emails that contain **attachments**. Generally, you will need to **download** an attachment to view it. However, many common file types, like **Word documents** and **images**, can be viewed within a browser window. If the attachment is an image, you'll also see a smaller copy of the image—called a **thumbnail**—inside the body of the email. You can tell which emails contain attachments because they will have a **paper clip** icon to the right of the **subject**.

To open an attachment:

1. Open the **email message** that contains the attachment.
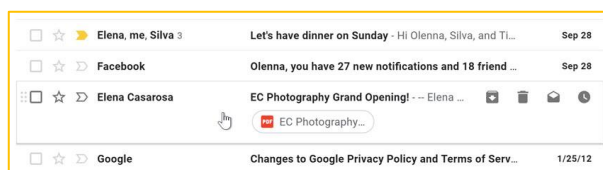
2. Click the **Download icon** to save the attachment to your computer. If your computer asks whether you want to **Open** or **Save** it, choose **Save**. You can then locate the file on your computer and double-click it to open it.

You should generally only open an attachment if it's from a trusted source. Some attachments can contain **viruses**, especially **.exe** files. If you don't recognize the sender—or if you don't know why someone is sending you the attachment—it's safest not to open it. For more information, read our lesson on **avoiding spam and phishing** from our **Internet Safety** tutorial.

G. Replying to emails

Most of the time, you will be **replying** to an email someone else sends you instead of composing a new message. When you **reply**, the recipient's email address will automatically appear in the **To:** field, so you won't need to worry about choosing the recipient.
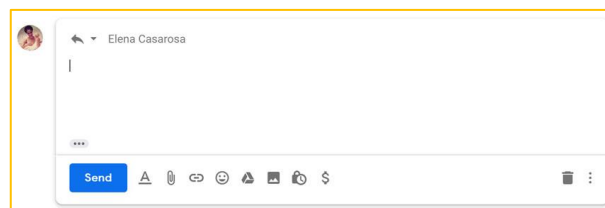

Sometimes you'll receive emails where you're not the only recipient, and you'll need to decide whether you want to **reply just to the person who sent the message** or **reply to all** (the sender and all recipients). For example, if you're collaborating with a group of people via email, you'll probably want to use the **Reply to all** option so everyone gets the message. However, if you want to send a more private message to the sender, you'll need to select the **Reply** option so the message stays between the two of you.
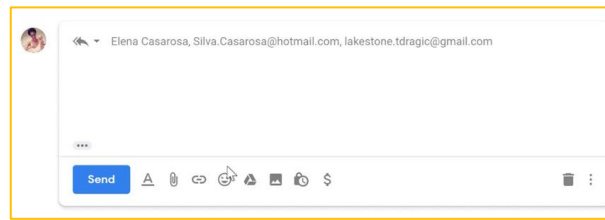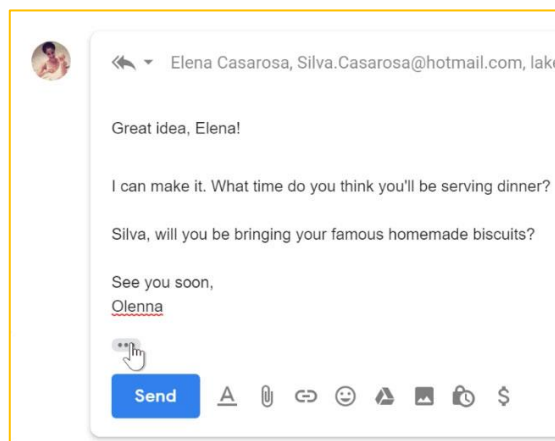
To reply to an email message:

1. While viewing the message, click **Reply** at the bottom of the message. If the message was sent to multiple recipients, you will also have the option to **Reply to all**. You can also click the **Reply arrow** to respond to the message.
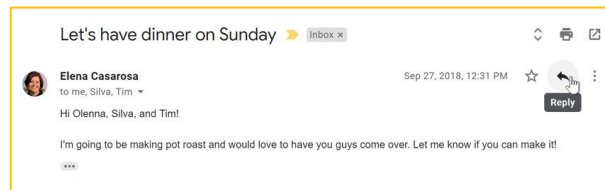
2. You may want to double-check the **To:** and **Cc:** fields to make sure you're sending your message to the correct people. If you are **replying to all recipients**, the additional recipients will appear in the **Cc:** field.

3. Type your message in the **Body** field, then click **Send**.
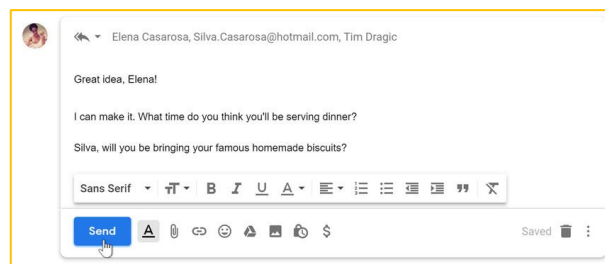
To see the text of the original email while you're replying, click the gray button in the lower-left corner of the window, right above the **Send** button.
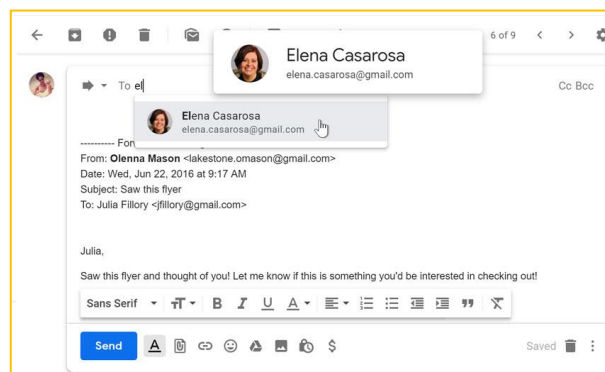
H. Forwarding emails

You can also choose to **forward** an email. This basically works the same as **replying**, but it's used to send the email to someone who wasn't one of the original recipients. Just like a reply, the original message will appear as a **quote**. It's usually a good idea to include a brief message of your own to explain why you're forwarding the email.

To forward an email message:

1. While viewing the message, click **Forward** at the bottom of the message. You can also select **Forward** from the More drop-down menu next to the Reply arrow.
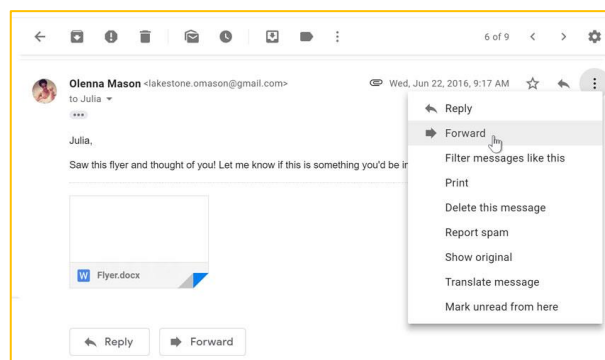
2. Type the recipient's email address in the **To: field**, or click **To** to choose a recipient from your contacts. If the person is in your contacts, you can start typing his or her name and that contact's email address should appear.

3. Type your message in the **Body** field, then click **Send**.