

# Cloud Computing Technology and Applications

Dr. Ammar Kamel

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College of Medicine - Mustansiriyah Univ.



# WHAT IS THE CLOUD?

## Vocabulary Words to Know

**Upload** – Take a file from a local machine and send it “up” to cloud storage

**Download** – Take a file from cloud storage and bring it “down” to your local machine

**Server** - A computer that responds to requests over a computer network

The **cloud** is simply a network of computers. It refers to a network of computers owned by one person or company, where other people or companies can store their data. On your personal machine, everything is stored on one physical storage device – your hard drive.

## Types of Cloud Computing

Clouds come in different versions, depending on your needs. There are three primary deployment models of cloud:

1. **Public Cloud:** refers to the cloud computing model with which the computing services are delivered across the Internet.
2. **Private Cloud:** refers to the cloud solution dedicated for use by a single organization, institution or company.
3. **Hybrid Cloud:** refers to the cloud infrastructure environment that is a mix of public and private cloud solutions. Most organizations use a combination of private computing resources (data centers and private clouds) and public services as a hybrid environment.

## Storing data in file

A computer's memory doesn't just store numbers and characters. Many more types of data can be stored, including music, pictures, and video. But how is this data stored? And how can it be found again?

### How is data stored?

When data is saved to be used later, it is put into a file. This file can be given a name that will make it easy to find again. Files can be stored on a hard-drive, memory stick, or even online (**Cloud Storage**) – so data is safe even when a computer is switched off

**EXPERT TIPS**

### File sizes

Files are essentially collections of data in the form of binary digits (bits). File sizes are measured in the following units:

- Bytes (B)**  
1 B = 8 bits (for example, 10011001)
- Kilobytes (KB)**  
1 KB = 1,024 B
- Megabytes (MB)**  
1 MB = 1,024 KB = 1,048,576 B
- Gigabytes (GB)**  
1 GB = 1,024 MB = 1,073,741,824 B
- Terabytes (TB)**  
1 TB = 1,024 GB = 1,099,511,627,776 B

### FILE PROPERTIES

<b>name</b>	groove
<b>file type extension</b>	mp3
<b>opens with</b>	Music Player
<b>full directory path</b>	/Users/Jack/Music
<b>size</b>	50 MB

The file name should be memorable

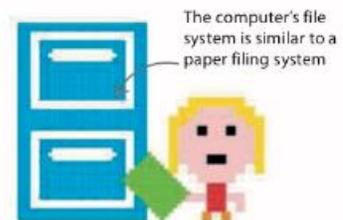
What type of file it is, typically in three characters

The program that can handle the file's data

The location of the file on the computer

The file size (see the box on the left)

There is more to a file than just its contents. File properties tell the system everything it needs to know about a file



## Cloud storage

It refers to a virtual storage area that can span across many different physical storage devices. When you use cloud storage, some of your files may be on a physical server in New York while other files are on a physical server in California. Since most users do not know where their physical files are, using cloud storage can be thought of as a vague, untouchable thing – much like a cloud itself!

Most data you access via the internet that is not stored on your personal computer is part of the cloud. For example, if you use an internet-based email service like **Gmail, Yahoo, or Live**, you can access your email anywhere you have an internet connection. This is because the data is stored on servers owned by the respective e-mail providers, not your local machine. Your email is in the cloud.

Although the cloud is more like an idea than something you can physically touch, the computers that make up the “**cloud**” require physical space. The facilities that store the physical equipment used by the cloud are called **data centers**. Sometimes you may also hear the term **server farm**. Data centers can be anywhere in the world. They are generally in warehouses that have complex cooling systems to keep the computers from overheating.

## Advantages of the Cloud

### **1. Syncing**

Many cloud storage services offer syncing services. When you set up the cloud application on your local machine, it will create a special folder on your computer and any changes made to the files in that folder will be automatically synced to your cloud storage as long as your computer is connected to the internet. When you access your cloud storage from a different computer, you will see the same files that are in that folder on your

personal computer. Also, any files you **upload** to your cloud storage from a different computer will be synced to that same cloud storage folder.

## **2. Convenience**

One of the biggest benefits of using the cloud is that your data can be accessed from multiple devices. Cloud storage services can usually be accessed from any device with an internet connection. You can check your email, read your documents, view your online photos, or listen to your online music from any computer, tablet, or internet-enabled cell phone.

## **3. Online Backups**

One advantage to using a cloud service is that it can serve as an online backup for important files in case your computer stops working. If your computer crashes or you accidentally delete pictures from your hard drive, you can simply login to the cloud service and download your files again. Some cloud storage services may prompt you to automatically add files to the synced folder as soon as you add them to your computer to serve as a backup.

## **Disadvantages of the Cloud**

### **1. Internet Connection Required**

Since data stored on the cloud is on a third party's computer, you will need an internet connection to access it. If you do not have access to the internet, you will not be able access the network of computers that store your data.

### **2. Bandwidth Costs**

**Bandwidth** refers to the amount of data that can be carried over the internet from one point to another. Some internet service providers give users a monthly bandwidth allocation. By transferring data to and from the cloud,

you will be using part of the allocation and may have to pay overage charges if you go over that allocation.

### 3. Privacy

One downside of the cloud is potential privacy issues. Make sure you read the terms of service and privacy policy of any cloud storage service closely. You want to make sure that you are not agreeing to anything that you are uncomfortable with.

### Cloud Storage Services and Applications

There are many cloud storage services available and many offer a free plan for a limited amount of space. Depending on your needs, a free plan might be plenty for you. This is a list of just a few available cloud storage services.

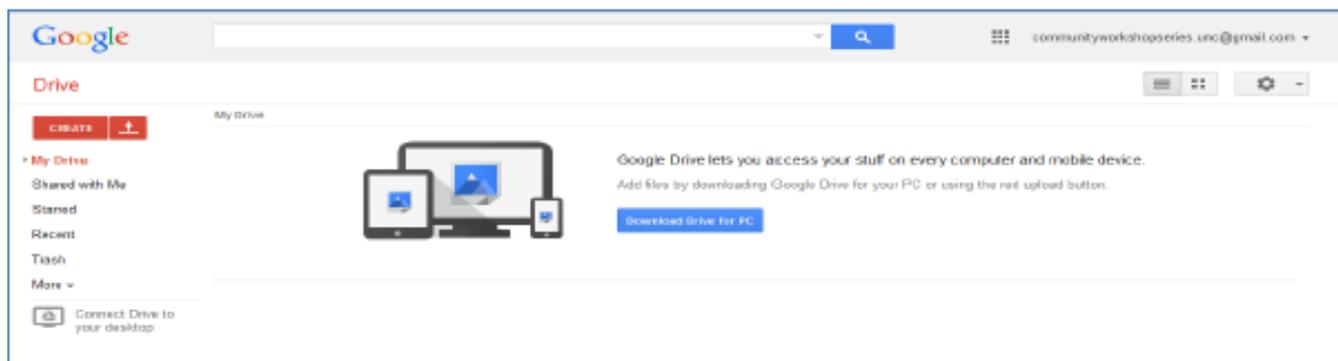
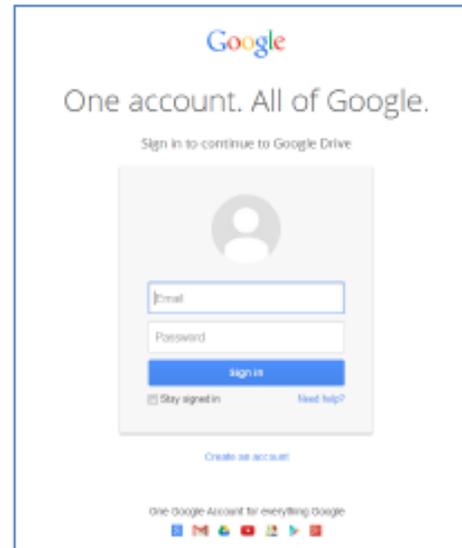
<b>SERVICES AND APPLICATIONS</b>	<b>FREE STORAGE</b>
Google Drive	15 GB
Box	10 GB
OneDrive	5 GB – 1TB for Students
Apple iCloud	5 GB
Amazon Cloud Drive	5 GB
Drobox	5 GB
Google Photo	Unlimited photo storage

# GETTING SETUP WITH GOOGLE DRIVE

Open an internet browser and navigate to [drive.google.com](https://drive.google.com)

If you do not have a Google account or Gmail address, you can click 'create an account' to get a Google account. If you already have a Google account, enter your email address and password.

After logging in, you will see the Google Drive introductory screen. If you click 'Download Drive for PC', it will create a Google Drive folder on your computer that will sync to your online Google Drive account. **Do not do this now if you are on a library computer!**



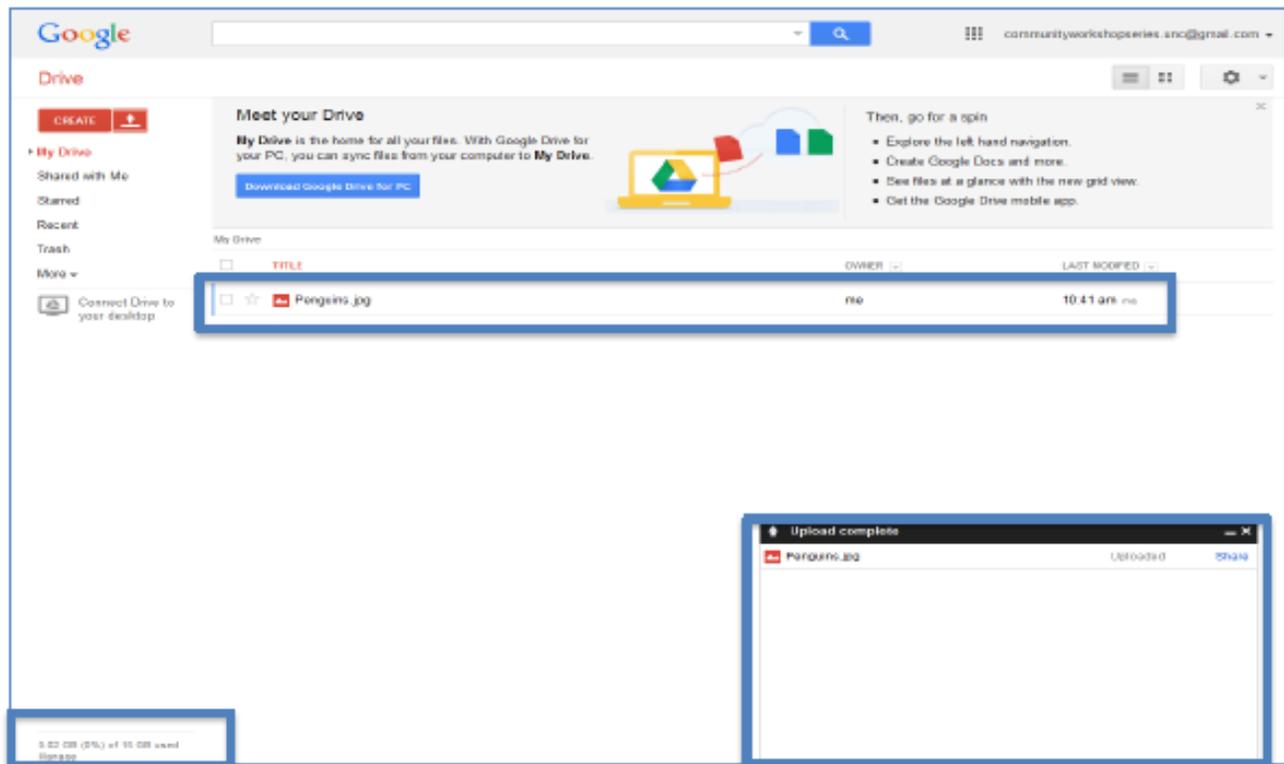
## Uploading Files to Google Drive

To upload files to Google Drive, click the red up arrow.



When you select a file to upload, an upload window will appear at the bottom right of the screen to show the progress of the upload. Once the file is completely uploaded, it will appear on your list of files.

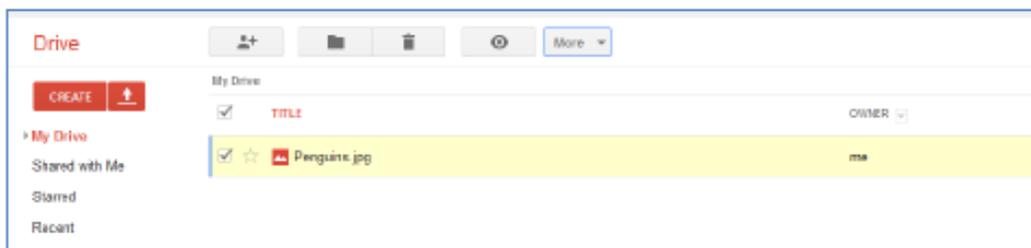
The amount of space you have left on Google Drive appears in the bottom left-hand corner of the screen.



## Sharing/Unsharing Files with Google Drive

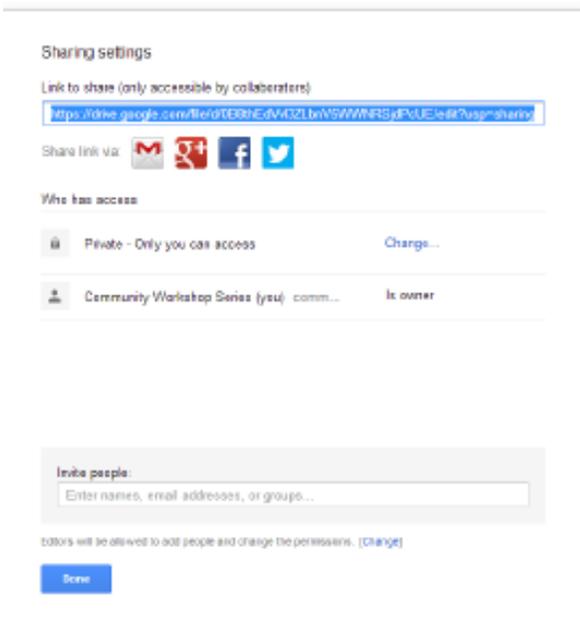
To start sharing a file, select it by clicking the check box to the left of the filename. When you select a file, options appear at the top of the screen. These options allow you to share files, move files to different folders, delete files, or preview files. To work with multiple files at once, you can click on multiple boxes next to the file names.

Click on the icon that looks like a person with a plus sign next to it to share. That will open a Sharing settings window.



### Sharing with other Google users

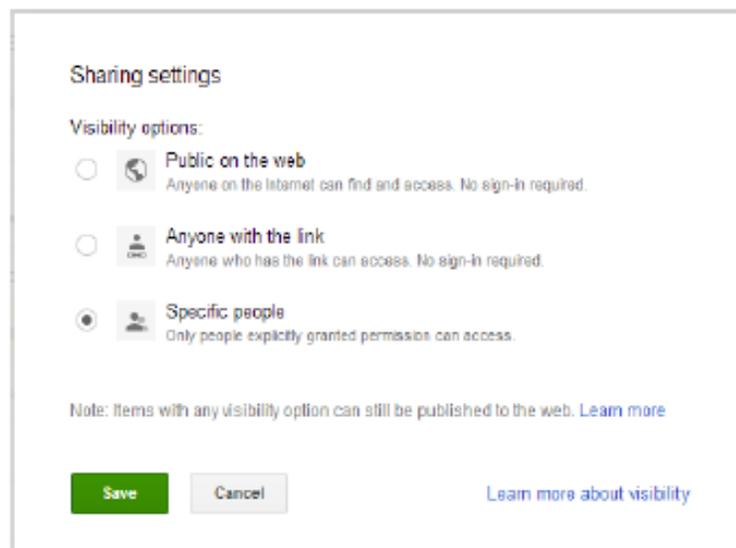
In the “Invite people” box, you can add multiple email addresses separated by commas. If you want to add people or groups that are in your Gmail contacts, you can simply type their name or group name. As you type, the possible names, groups, and email addresses that are in your Gmail contacts will appear and you can select them.



Once you have entered an email address, a “Send” button will appear and you can click it to send an email to people letting them know you shared a file with them. The specific people you have named will need to login using a Google account before they can view or edit the file.

### Sharing with non-Google users

If you do not want people to have to sign into a Google account to view or edit the file, click the “Change” link under “Who has access.” You will get another window with some some different sharing options.



Public on the web – Only use this option if you do not mind anyone on the internet being able to access your file. The default option will be that anyone will be able to view the file, but only you will be able to edit it.

Anyone with the link – with this option, you can send the file link to certain people you want to give access to. They will not have to sign-in with a Google account to view it. However, if they send the link to other people, the other people

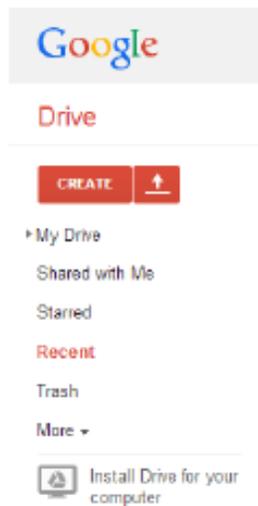
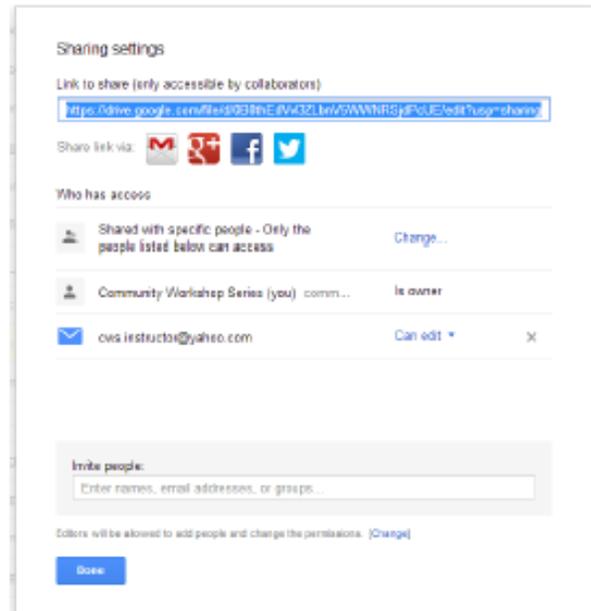
will also be able to view the file. Think carefully before using this option!

### Unsharing Files

To unshare a file, go back to your list of files and select it by clicking the check box to the left of the filename. Click on the icon that looks like a person with a plus sign next to it to share. That will open a Sharing settings window.

If you have shared with specific users, the users that currently have access to the file will be listed. You will have to click the "x" next to each person's name to unshare the file and prevent them from accessing it any further. Click the "Save Changes" button to confirm the changes in access.

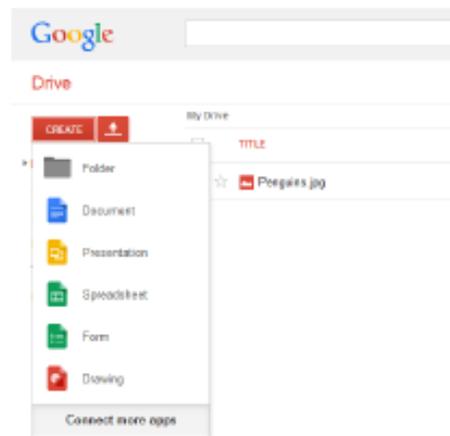
If you have shared with the public or anyone with the link, you can click the "Change" link and simply select "Specific people" and save it. This will cut off the public and link access.



If other users have shared files with you, you can see these files by clicking **Shared with Me** in the left navigation pane.

### Creating Google Drive Files

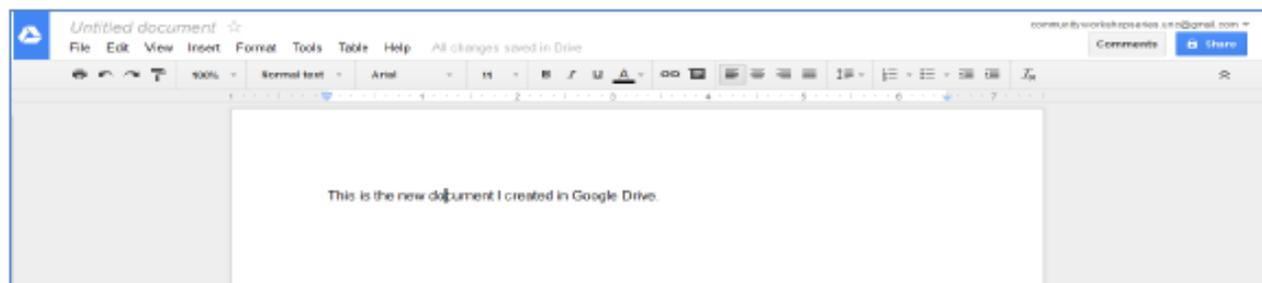
One feature in Google Drive that separates it from other cloud storage services is that you can actually create files directly in Google Drive. You can create documents, presentations, spreadsheets, forms, and drawings. These files use a format that can only be read by Google Drive. This means that you can only access them when you are connected to the internet. However, once you have created these files in Google Drive,



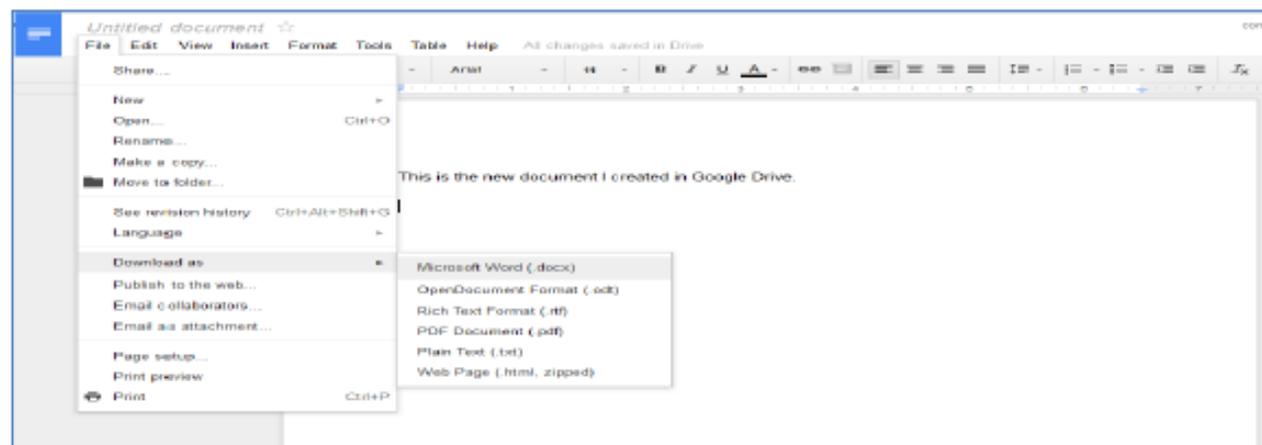
you can download the files in different formats that other programs can open.

Here is an example of how to create a Google Document and then export it to Microsoft Word.

Go to CREATE > Document. Once a document page appears, type in "This is the new document I created in Google Drive."



Navigate to File > Download as > Microsoft Word (.docx). This will give you the opportunity to put the file on your local machine. Once it is on your local machine, you can open it in Microsoft Word and edit it as you would edit any other Microsoft Word document.

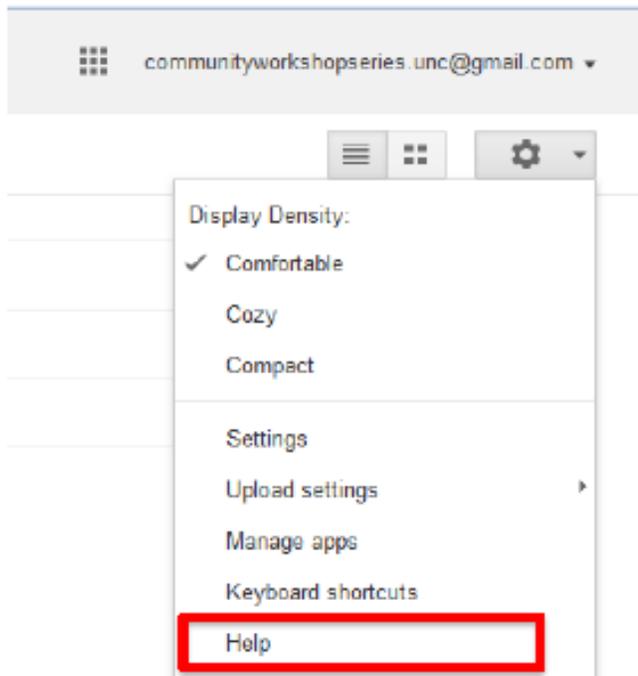


One word of caution, if you want to access files from the internet that are not in Google's format, you will not be able to. For example, you will be able to view a Word Document online but not edit it directly. If you want to edit something like a Word Document and you are on your home computer, you can open it from the Google Drive folder on your machine and edit it from there. If you are not on your home machine, you will have to download the file, edit it offline, and then upload the new version back to your Google Drive.

Also note that you can have files with the same name in Google Drive. For example, you can have multiple documents titled "Sales" in your Google Drive. Be sure to provide descriptive file names so you can tell them apart without having to open each one!

### **Getting More Help**

For additional help for Google Drive, click the gear icon near the top right-hand corner of your screen. Choose Help from the menu.



# 10101 Binary numbers

NUMBERS ARE COMMONLY WRITTEN USING THE DECIMAL SYSTEM, BUT NUMBERS CAN BE WRITTEN IN ANY NUMBER BASE.

## What is a binary number?

The decimal system uses the digits 0 through to 9, while the binary system, also known as base 2, uses only two digits—0 and 1. Binary numbers should not be thought of in the same way as decimal numbers. For example, 10 is said as "ten" in the decimal system but must be said as "one zero" in the binary system. This is because the value of each "place" is different in decimal and binary.

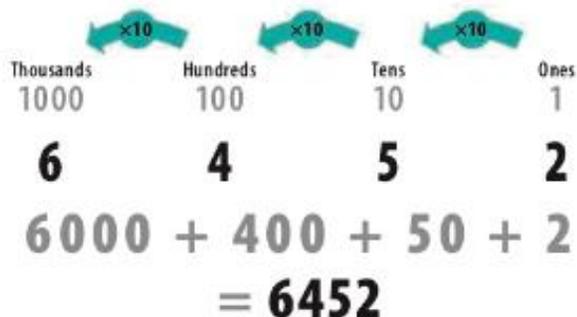


## Binary numbers



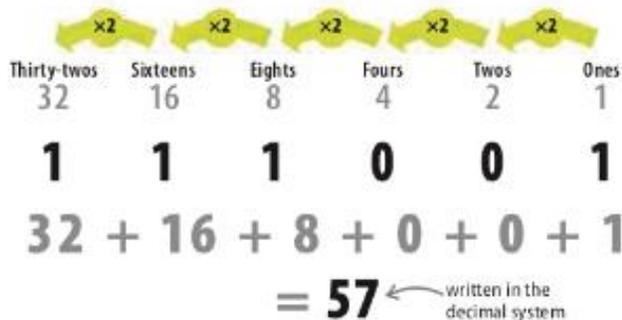
## Counting in the decimal system

When using the decimal system for column sums, numbers are written from right to left (from lowest to highest). Each column is worth ten times more than the column to the right of it. The decimal number system is also known as base 10.



## Counting in binary

Each column in the binary system is worth two times more than the column to the right of it and, as in the decimal system, 0 represents zero value. A similar system of headings may be used with binary numbers but only two symbols are used (0 and 1).



Decimal	Binary
0	0 0
1	1 1 one
2	1 0 1 two
3	1 1 1 two + 1 one
4	1 0 0 1 four
5	1 0 1 1 four + 1 one
6	1 1 0 1 four + 1 two
7	1 1 1 1 four + 1 two + 1 one
8	1 0 0 0 1 eight
9	1 0 0 1 1 eight + 1 one
10	1 0 1 0 1 eight + 1 two
11	1 0 1 1 1 eight + 1 two + 1 one
12	1 1 0 0 1 eight + 1 four
13	1 1 0 1 1 eight + 1 four + 1 one
14	1 1 1 0 1 eight + 1 four + 1 two
15	1 1 1 1 1 eight + 1 four + 1 two + 1 one
16	1 0 0 0 0 1 sixteen
17	1 0 0 0 1 1 sixteen + 1 one
18	1 0 0 1 0 1 sixteen + 1 two
19	1 0 0 1 1 1 sixteen + 1 two + 1 one
20	1 0 1 0 0 1 sixteen + 1 four
50	1 1 0 0 1 0 1 thirty-two + 1 sixteen + 1 two
100	1 1 0 0 1 0 0 1 sixty-four + 1 thirty-two + 1 four

# Binary and bases

## SEE ALSO

Symbols **184-185** >  
and codes

Logic gates **186-187** >

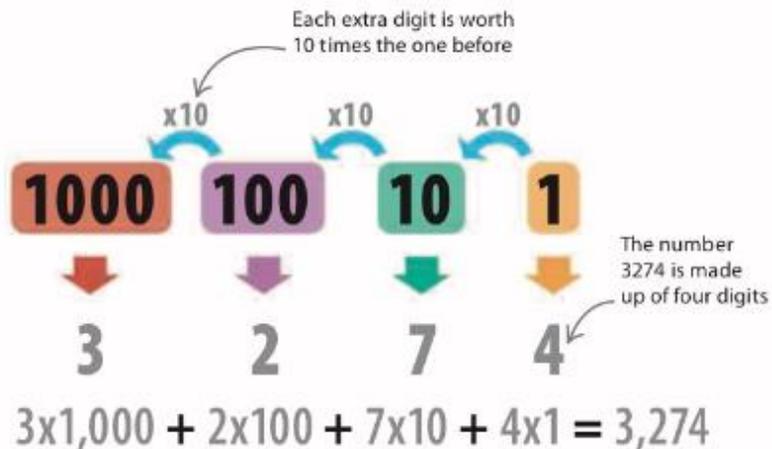
How can computers solve complex calculations when all they understand is electrical signals? Binary numbers are used to translate these signals into numbers.

## What is a base number?

A "base" is the number of values that can be shown using only one digit. Each extra digit increases the number of values that can be shown by a multiple of the base.

### ▷ Decimal system

The decimal system is the most familiar counting system, and has a base of 10. It can show 10 values with one digit, 100 values with two digits, and 1,000 with three digits.



## Binary code

At the most basic level, computers only understand two values: electrical signals that are "on" and "off". Because there are only two values, computers deal with numbers using a base of two, or "binary". Each digit is either a 1 or a 0, and each extra digit in the number is worth two times the previous digit.

### ▷ 1 and 0

A wire with electrical signal "on" is a 1. A wire with electrical signal "off" is a 0.

