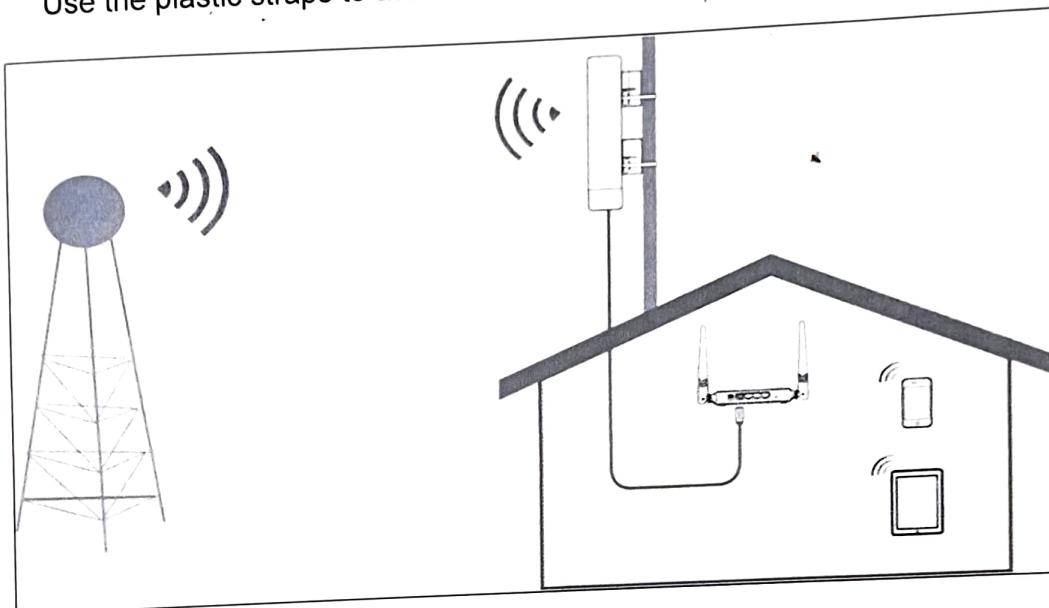


- (j) When LED1, LED2, and LED3 indicators of the device are blinking, the device is connected to your ISP hotspot successfully.

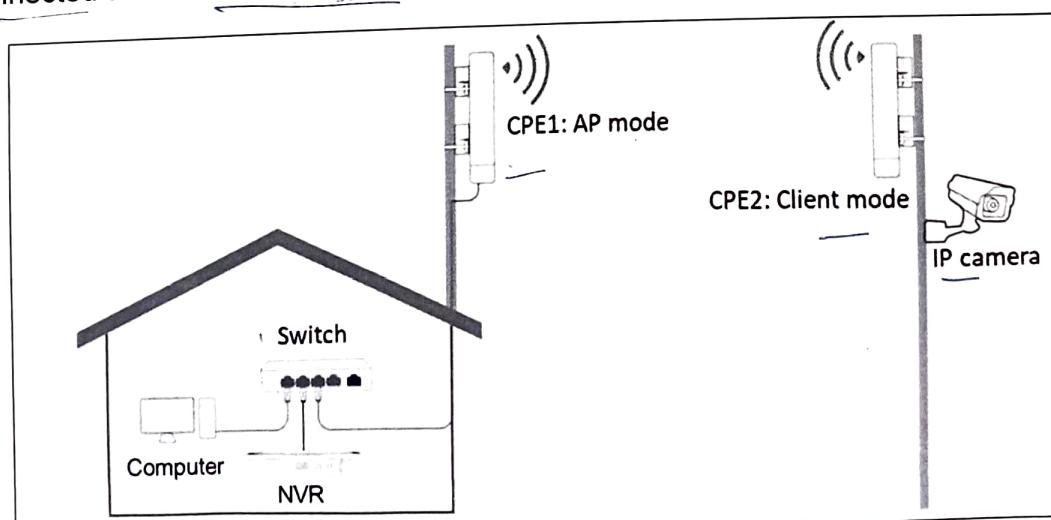
### Install the CPE

- Place the device at an elevated position in the open air.
- Uncover the housings of the device, and connect the **PoE/LAN/WAN** port of the device to the **WAN** port of your wireless router. The **LAN/WAN** LED indicator lights up.
- Adjust the device's direction or location on the selected pole until the **LED1**, **LED2** and **LED3** of the device light up.
- Use the plastic straps to attach the device to the pole.



### Installation

- The CPE (transmitter in AP mode) with LED1, LED2 and LED3 solid on should be connected to the switch connecting to a network video recorder (NVR).
- The CPE (receiver in Client mode) with LED1, LED2 and LED3 blinking should be connected to the switch connecting to a monitoring equipment.

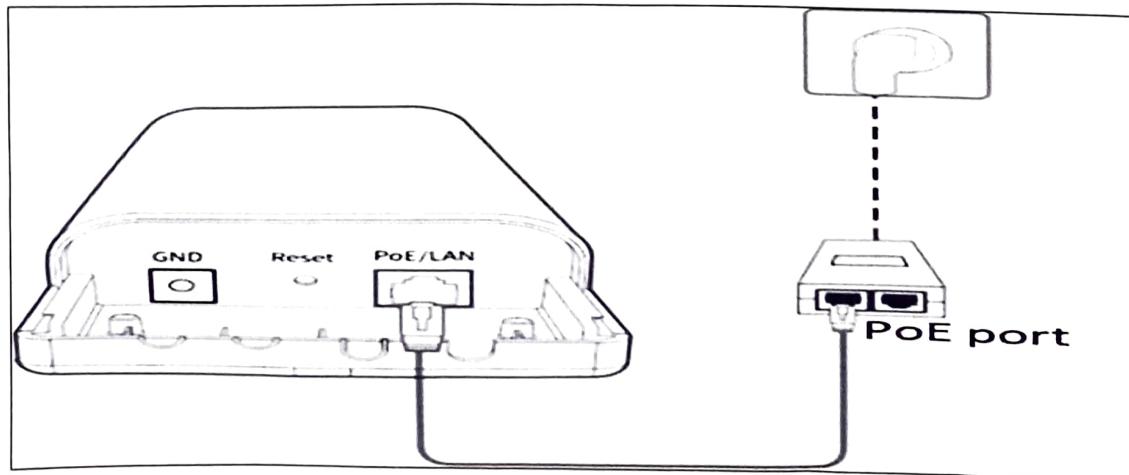


18. CPEs Installation

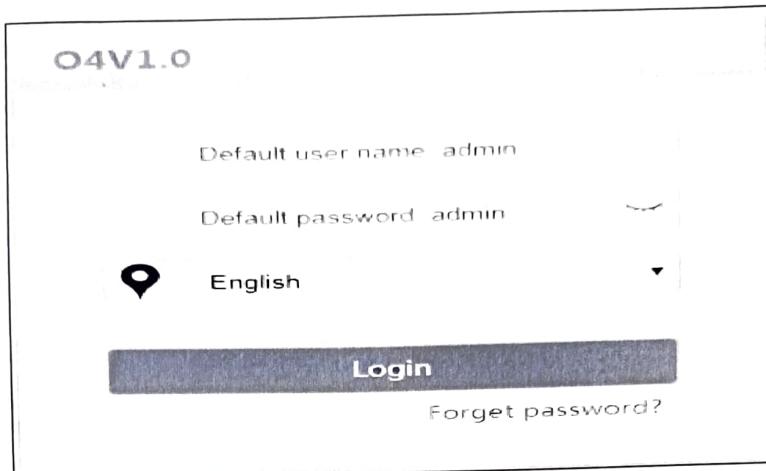
LED Indicator	Status	Description
LED1, LED2, LED3 (Received signal strength LED indicators)	Solid on/Blinking	<p>There is device connected to the CPE</p> <p>(aa) Solid on: The CPE may work in Repeater, P2MP or Router mode</p> <p>(ab) Blinking: The CPE may work in Client, Universal Repeater or WISP mode</p> <p>Each LED indicator corresponds to a received signal strength value. When the received signal strength of the CPE reaches the RSSI threshold, the corresponding LED indicator lights up. You can judge the connection quality based on the statuses of the LED indicators</p>
		<p>By default, the minimum signal strength of LED1, LED2 and LED3 are -90 dBm, -80 dBm and -70 dBm. You can change them on the Wireless &gt; Advanced page of the web UI of the CPE</p>
	OFF	<p>No device is connected to the CPE, or the received signal strength is less than the RSSI threshold (default: -90 dBm)</p>

19. Login CPEs. When you log in to the web UI at the first time or after the CPE is reset to factory settings, follow the steps below:-

- Connect the computer to the device.
- Uncover the housing of the device.
- Use an Ethernet cable to connect the **PoE/LAN** port of the CPE to the **PoE** port of the included PoE adapter.
- Use the included power adapter to connect the PoE adapter to a power source. The **LAN/WAN** LED indicator of the device lights up.
- Use an Ethernet cable to connect your computer to the **LAN** port of the PoE adapter.

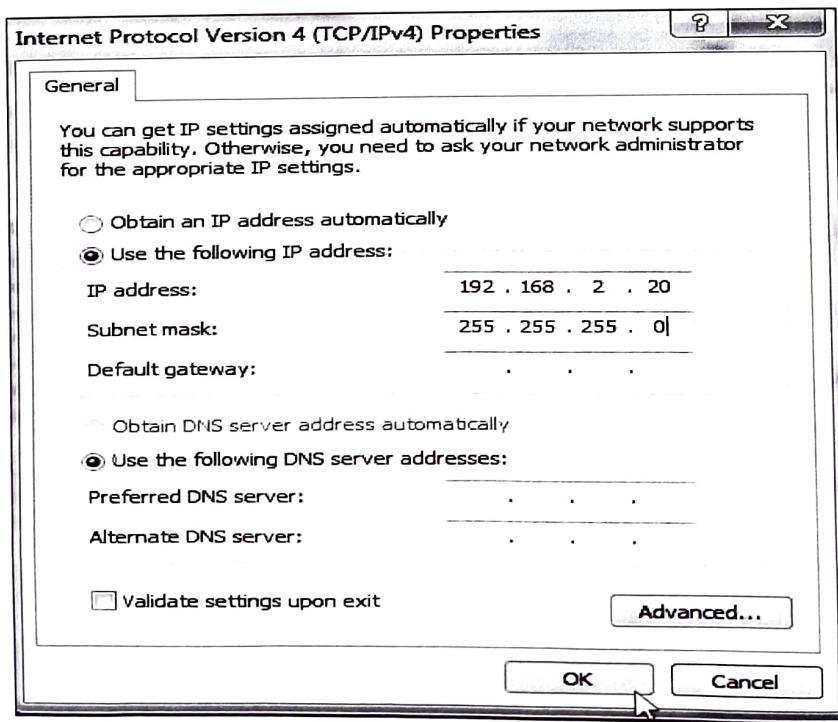


- (f) Start a web browser on your computer, and visit 192.168.2.1. Enter your user name and password (default: **admin**), and click **Login**.



20. Log In CPEs. Log in to the web UI after the CPE is set to AP mode, Client mode, Universal Repeater mode, Repeater mode or P2MP mode, follow the steps below:-

- Connect the computer to the CPE or the switch connected to the CPE.
- Set the IP address of the computer to an unused one belonging to the same network segment of the IP address of the CPE.
- For example, if the IP address of the CPE is 192.168.2.1, you can set the IP address of the computer to 192.168.2.X (X is an unused digit ranging from 2 to 254) and subnet mask to 255.255.255.0.



- Connect the computer to the CPE or the switch connected to the CPE.
- Check the gateway IP address of the computer, and we assume that it is 192.168.0.1 in this example.

(f) Start a web browser on your computer, and visit 192.168.0.1. Enter the log name and password, and click **Login**.

## 21. Future Trends and Technologies

- (a) 5G and Beyond: Next-generation cellular networks offering higher data rates, latency, and increased capacity for massive IoT deployment.
- (b) Wi-Fi 6 (802.11ax): Latest standard for Wi-Fi networks, providing improved performance, efficiency, and support for IoT devices.
- (c) Mesh Networking: Decentralized network architecture enabling self-configuring and self-healing wireless networks for extended coverage and reliability.
- (d) Edge Computing: Moving data processing closer to the source (e.g. IoT devices) to reduce latency and bandwidth usage in wireless communication.



## AIM

### TO ACQUAINT THE CLASS ABOUT DIGITAL MAPPING

Q. Digital mapping & paper mapping me between.

17. **Introduction**. Digital mapping (also called digital cartography) is the process by which a collection of data is compiled and formatted into a virtual image. The primary function of this technology is to produce maps that give accurate representations of a particular area, detailing major road arteries and other points of interest.

## 18. What is Digital Mapping?

- (a) Digital mapping involves the creation, manipulation, and visualization of geographic data using digital technology.
- (b) It provides a digital representation of spatial information, including maps, satellite imagery, and geographic data layers.

## 19. Evolution of Digital Mapping

- (a) Early digital mapping: Basic digitization of paper maps.
- (b) GIS (Geographic Information Systems): Emergence of computer-based systems for storing, analyzing, and visualizing spatial data.
- (c) Web mapping: Development of online platforms for interactive mapping and spatial analysis.
- (d) Mobile mapping: Integration of GPS technology with smartphones for navigation and location-based services.
- (e) Augmented reality (AR) mapping: Overlaying digital information onto the real world through devices like smartphones and smart glasses.

## Components of Digital Mapping

- (a) Geographic data: Information about the Earth's surface, such as terrain, land use, and infrastructure.
- (b) Software: Tools for creating, editing, analyzing, and visualizing geographic data (e.g., GIS software, mapping APIs).
- (c) Hardware: Devices for data collection (e.g., GPS receivers, drones, satellites).
- (d) Connectivity: Internet and communication technologies enabling access to and sharing of spatial data.

## Applications of Digital Mapping

- 21. (a) Navigation and routing: GPS-enabled maps for vehicle navigation, pedestrian guidance, and route optimization.
- (b) Urban planning and development: Analyzing land use, infrastructure, and demographic data to plan and manage cities.
- (c) Environmental management: Monitoring and modeling natural resources, ecosystems, and climate change.
- (d) Emergency response: Using real-time mapping to coordinate disaster response and assess affected areas.
- (e) Business intelligence: Location-based marketing, site selection, and logistics optimization for businesses.

## Benefits of digital maps

- (a) The database can be constantly updated and corrected →
- (b) The data can be classified by the user according to their own needs
- (c) Graphics symbols can be chosen to suit the job in hand
- (d) The map is dynamic and under the control of user  
*map-making and printing.*
- (e) Easy to use
- (f) strengthens technology skills
- (g) Provides a real world look
- (h) Allows visual exploration around the world
- (i) Great learning about the history and geography
- (j) Higher export resolution

## Web mapping platforms.

### (a) Google Maps Platform:

- (i) Offers a wide range of APIs and SDKs for embedding interactive maps into websites and applications.

- (ii) Features include geocoding, routing, and place search.
- (iii) Suitable for businesses of all sizes, from startups to large enterprises.
- (iv) Pricing is based on usage, with free usage quotas available.

(b)

### Map box

- (i) Provides customizable mapping tools and APIs for developers.
- (ii) Offers a variety of map styles and customization options.
- (iii) Supports real-time data visualization and geospatial analysis.
- (iv) Ideal for developers and businesses looking for flexibility and customization.
- (v) Pricing is based on usage, with free tiers available for smaller projects.

(c)

### Esri ArcGIS Online

- (i) Offers cloud-based mapping and GIS capabilities for organizations and individuals.
- (ii) Provides tools for creating, sharing, and analyzing maps and spatial data.
- (iii) Supports collaboration and integration with other Esri products and third-party applications.
- (iv) Suitable for industries such as government, natural resources, and utilities.
- (v) Pricing is subscription-based, with different plans available based on usage and features.

(d)

### Leaflet

- (i) An open-source JavaScript library for creating interactive maps.
- (ii) Lightweight and customizable, with a strong community and extensive plugin ecosystem.
- (iii) Suitable for developers looking for a simple and flexible mapping solution.
- (iv) Free to use and can be integrated with various mapping data sources.

(e)

### Carto

- (i) Offers a cloud-based platform for analyzing and visualizing spatial data.
- (ii) Provides tools for creating interactive maps, dashboards, and data-driven applications.
- (iii) Supports data import/export, geospatial analysis, and SQL-based queries.
- (iv) Suitable for businesses and organizations in industries such as retail, transportation, and urban planning.

(v) Pricing is subscription-based, with different plans available based on features and usage.

(f) **Open Street Map (OSM)**

- (i) An open-source mapping platform created and maintained by a community of contributors.
- (ii) Provides freely accessible map data that can be used for various purposes.
- (iii) Supports customization and integration with third-party tools and services.
- (iv) Suitable for developers, researchers, and organizations looking for open and collaborative mapping solutions.
- (v) Free to use, with contributions encouraged.

24. **Mobile Mapping Applications**

- (a) Examples: Google Earth, Google Maps, Deesha App, ArcGIS, MapIt, Locus and Waze
- (b) Mobile mapping applications enable data collection, GPS tracking, and field surveys using smartphones and tablets. They're commonly used in asset management, fieldwork, and infrastructure inspection.

25. **Difference between Paper Map and Digital Map**

V: Important

Activities	Digital Mapping	Paper Mapping
Preparation	Initial version tedious to prepare but quick and efficient to monitor	Start from scratch every time
Storage	Digital Database standardized and integrated, compact memory capacity	Different scales on different standards, voluminous and bulky
Retrieval	Quick retrieval	Paper maps and tables
Updating	Automatic search and replace by computer	Manual check and revision
Overlay	Systematically done faster integration of complex, multiple spatial and non-spatial data sets	Expensive and time consuming
Spatial Analysis	Faster	Time and energy consuming and slow
Display	Easier and faster to prepare better quality	Slow, tedious and time consuming

**Google Earth**

26. Google Earth is a computer program, formerly known as Keyhole Earth Viewer, that renders a 3D representation of Earth based primarily on satellite imagery. The program maps the Earth by superimposing satellite images, aerial photography, and GIS data onto a 3D globe, allowing users to see cities and landscapes from various angles. Users can explore the globe by entering addresses and coordinates, or by using a keyboard or mouse. The program can also be downloaded on a smartphone or tablet, using a touch screen or stylus to navigate. Recently Google has revealed that Google Earth now covers more than 98 percent of the world, and has captured 10 million miles of Street View imagery, a distance that could circle the globe more than 400 times.

## Why Google Earth

- (a) Free ✓ (l) Uses satellite imagery.
- (b) Easy to use (j) Allows user to "fly" around the globe.
- (c) Good for many subjects
- (d) Areas
- (e) Strengthens technology skills ✓
- (f) Provides a real world look ✓
- (g) Allows visual exploration around the world ✓
- (h) Great learning about the history and geography ✓

### 34. Key features of Google Earth include:

- (a) **Satellite Imagery:** Users can view high-resolution satellite imagery of various locations around the world, including cities, landscapes, and landmarks.
- (b) **3D Terrain:** Google Earth provides three-dimensional terrain views, allowing users to explore landscapes and geographical features in detail.
- (c) **Street View:** Users can access Google's Street View imagery directly within Google Earth, enabling immersive virtual tours of streets, neighborhoods, and cultural sites.
- (d) **Historical Imagery:** Google Earth offers historical imagery data, allowing users to view past satellite images of specific locations and observe changes over time.
- (e) **Layers and Data Visualization:** Users can overlay additional geographic data layers such as borders, roads, parks, and points of interest. These layers provide context and additional information for exploration.
- (f) **Tour Creation:** Google Earth allows users to create custom tours and presentations by recording and narrating their virtual explorations. This feature is particularly useful for educational and storytelling purposes.
- (g) **Water and Ocean** Introduced in Google Earth 5.0 in 2009, the Google Ocean feature allows users to zoom below the surface of the ocean and view the 3D bathymetry. Supporting over 20 content layers, it contains information from leading scientists and oceanographers.
- (h) **Google Sky** Google Sky is a feature that was introduced in Google Earth 4.2 on August 22, 2007, in a browser-based application on March 13, 2008, and to Android smartphones, with augmented reality features. Google Sky allows users to view stars and other celestial bodies.
- (i) **Google Mars** Google Mars is an application within Google Earth that is a version of the program for imagery of the planet Mars. Google also operates a browser-based version, although the maps are of a much higher resolution within Google Earth, and include 3D terrain, as well as infrared imagery and elevation data. There are also some extremely high-resolution images from the Mars Reconnaissance Orbiter's HiRISE camera that are of a similar resolution to those of the cities on Earth.

(k) **Google Moon** Originally a browser application, Google Moon is a feature that allows exploration of the Moon. Google brought the feature to Google Earth for the anniversary of the Apollo 11 mission on July 20, 2009

(l) **Flight Simulators** In Google Earth 4.2, a flight simulator was added to the application. It was originally a hidden feature when introduced in 2007, but starting with version 4.2 it was given a labeled option in the menu. In addition to keyboard control, the simulator can be controlled with a mouse or joystick. The simulator also runs with animation, allowing objects such as planes to animate while on the simulator.

(m) **Liquid Galaxy** Liquid Galaxy is a cluster of computers running Google Earth, creating an immersive experience. On September 30, 2010, Google made the configurations and schematics for their rigs public, placing code and setup guides on the Liquid Galaxy wiki.

35. Overall, Google Earth serves as a powerful tool for digital mapping, exploration, and visualization, offering users an immersive and interactive experience to learn about the world around them.

### 36. **Version History of Google Earth**

<u><b>Version history &amp; version</b></u>		
<u><b>Version</b></u>	<u><b>Release date</b></u>	<u><b>Changes</b></u>
1.0	June 10, 2001	
1.4	January 2002	
1.6	February 2003	
1.7.2	October 2003	
2.2	August 2004	
3.0	June 2005	The first version was released after Google acquired Keyhole, Inc.
4.0	June 2006	
4.1	May 2007	
4.2	August 2007	<ul style="list-style-type: none"> <li>Google Sky was introduced</li> <li>A flight simulator was added</li> </ul>
4.3	April 2008	<ul style="list-style-type: none"> <li>First release to implement KML version 2.2</li> <li>Google Street View was added</li> </ul>
5.0	May 2009	<ul style="list-style-type: none"> <li>Google Ocean was introduced</li> <li>Historical Imagery was introduced</li> </ul>
5.1	November 2009	<ul style="list-style-type: none"> <li></li> </ul>
5.2	July 2010	<ul style="list-style-type: none"> <li>Last version to support Mac OS X 10.4 Tiger (PPC &amp; Intel) and 10.5 Leopard (PPC)</li> </ul>
6.0	March 2011	<ul style="list-style-type: none"> <li>3D Trees were added</li> </ul>
6.1	October 2011	<ul style="list-style-type: none"> <li></li> </ul>

### 37. **Version of Google Earth**

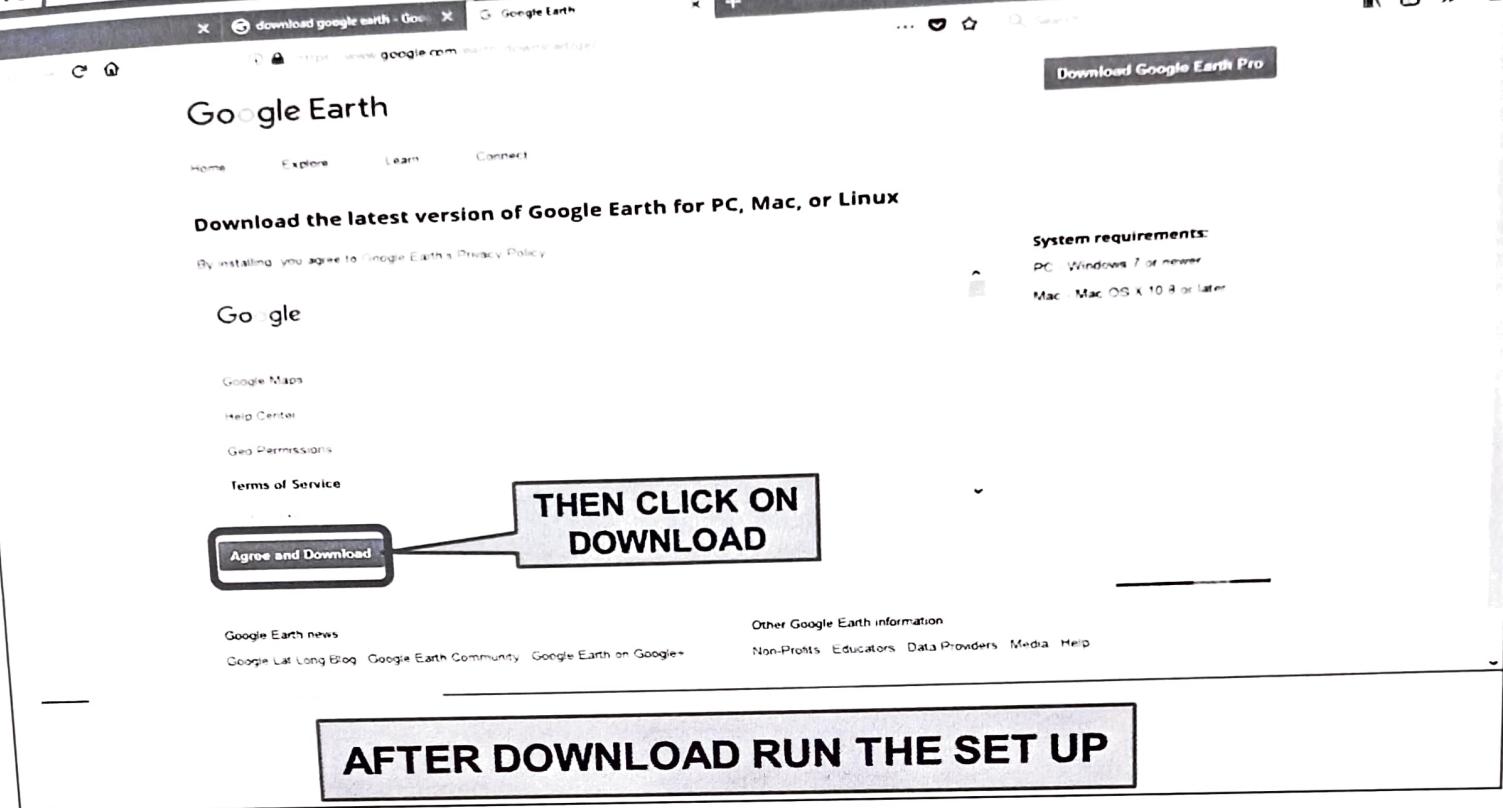
- Google Earth Pro
- Google Earth Plus
- Google Earth Enterprise
- Google Earth Studio
- Google Earth 9
- Google Earth Plug-in
- Google Earth VR

## Download Google Earth

**GO TO SITE**

**FIRSTLY**

<https://www.google.com/earth/download/ge/>



**AFTER DOWNLOAD RUN THE SET UP**

### 39. Open Google Earth

