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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.

SEMINAR REPORT
ON

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AS A PARTIAL REQUIREMENT FOR THE DEGREE

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CERTIFICATE

This is to certify that the seminar entitled i-Phone Technology

has been carried out by Mr./Ms. Khoni Alis Vimubhai

of Bachelor of Computer Application,

Semester VI Exam No. 2019021354 *towards*

fulfillment of the course, for the Academic Year 2021-22.

Mentor/Guide
Date: 11/04/2022

I/C. Principal
Date: 11/04/2022

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Examiners

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IPhone Technology

History

- Development of what was to become the iPhone began in 2004, when Apple started to gather a team of 1,000 employees led by hardware engineer Tony Fadell, software engineer Scott Forstall and design engineer Sir Jonathan Ive to work on the highly confidential "Project Purple".
- Apple CEO Steve Jobs steered the original focus away from a tablet (which Apple eventually revisited in the form of the iPad) towards a phone. Apple created the device during a secretive collaboration with Cingular Wireless (which became AT&T Mobility) at the time—at an estimated development cost of US$150 million over thirty months.
- According to Steve Jobs, the "i" word in "iMac" (and therefore "iPod", "iPhone" and "iPad") stands for internet, individual, instruct, inform, and inspire.
- Apple rejected the "design by committee" approach that had yielded the Motorola ROKR E1, a largely unsuccessful collaboration with Motorola. Among other deficiencies, the ROKR E1's firmware limited storage to only 100 iTunes songs to avoid competing with Apple's iPod nano.
- Cingular gave Apple the liberty to develop the iPhone's hardware and software in-house and even paid Apple a fraction of its monthly service revenue (until the iPhone 3G), in exchange for four years of exclusive U.S. sales, until 2011.
- Jobs unveiled the iPhone to the public on January 9, 2007, at the Macworld 2007 convention at the Moscone Center in San Francisco. The two initial models, a 4 GB model priced at US$499 and an 8 GB model at US$599 (both requiring a two-year contract), went on sale in the United States on June 29, 2007, at 6:00 pm local time, while hundreds of customers lined up outside the stores nationwide. The passionate reaction to the launch of the iPhone resulted in sections of the media dubbing it the 'Jesus phone'. Following this successful release in the US, the first generation iPhone was made available in the UK, France, and Germany in November 2007, and Ireland and Austria in the spring of 2008.

- Worldwide iPhone availability:
- iPhone available since its original release
- iPhone available since the release of iPhone 3G
- Coming soon

- On July 11, 2008, Apple released the iPhone 3G in twenty-two countries, including the original six. Apple released the iPhone 3G in upwards of eighty countries and territories. Apple announced the iPhone 3GS on June 8, 2009, along with plans to release it later in June, July, and August, starting with the US, Canada and major European

countries on June 19. Many would-be users objected to the iPhone's cost, and 40% of users had household incomes over US$100,000.

- First iPhone on display under glass at the January 2007 Macworld show
- The back of the original first-generation iPhone was made of aluminum with a black plastic accent. The iPhone 3G and 3GS feature a full plastic back to increase the strength of the GSM signal. The iPhone 3G was available in an 8 GB black model, or a black or white option for the 16 GB model. The iPhone 3GS was available in both colors, regardless of storage capacity.
- The iPhone 4 has an aluminosilicate glass front and back with a stainless steel edge that serves as the antennas. It was at first available in black; the white version was announced, but not released until April 2011, 10 months later.
- Users of the iPhone 4 reported dropped/disconnected telephone calls when holding their phones in a certain way. This became known as antennagate.
- On January 11, 2011, Verizon announced during a media event that it had reached an agreement with Apple and would begin selling a CDMA iPhone 4. Verizon said it would be available for pre-order on February 3, with a release set for February 10. In February 2011, the Verizon iPhone accounted for 4.5% of all iPhone ad impressions in the U.S. on Millennial Media's mobile ad network.
- From 2007 to 2011, Apple spent $647 million on advertising for the iPhone in the US.
- On September 27, Apple sent invitations for a press event to be held October 4, 2011, at 10:00 am at the Cupertino headquarters to announce details of the next generation iPhone, which turned out to be iPhone 4S. Over 1 million 4S models were sold in the first 24 hours after its release in October 2011. Due to large volumes of the iPhone being manufactured and its high selling price, Apple became the largest mobile handset vendor in the world by revenue, in 2011, surpassing long-time leader Nokia. American carrier C Spire Wireless announced that it would be carrying the iPhone 4S on October 19, 2011.
- In January 2012, Apple reported its best quarterly earnings ever, with 53% of its revenue coming from the sale of 37 million iPhones, at an average selling price of nearly $660. The average selling price has remained fairly constant for most of the phone's lifespan, hovering between $622 and $660. The production price of the iPhone 4S was estimated by IHS iSuppli, in October 2011, to be $188, $207 and $245, for the 16 GB, 32 GB and 64 GB models, respectively. Labor costs are estimated at between $12.50 and $30 per unit, with workers on the iPhone assembly line making $1.78 an hour.
- In February 2012, ComScore reported that 12.4% of U.S. mobile subscribers used an iPhone. By 2009, approximately 6.4 million iPhones were active in the U.S. alone.

Introduction of iPhone technology

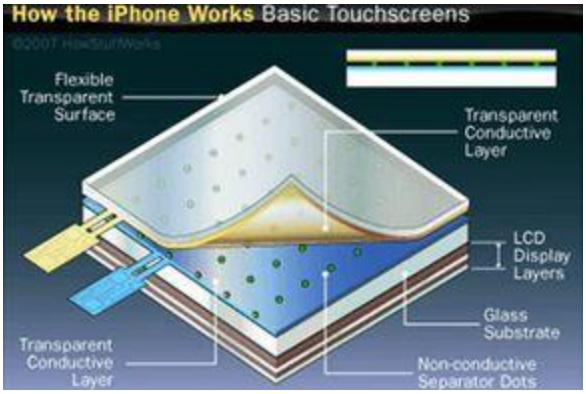
- On September 12, 2012, Apple announced the iPhone 5. It has a 4 inches (100 mm) display, up from its predecessors' 3.5 inches (89 mm) screen. The device comes with the same 326 pixels per inch found in the iPhone 4 and 4S. The iPhone 5 has the SoC A6 processor, the chip is 22% smaller than the iPhone 4S' A5 and is twice as fast, doubling the graphics performance of its predecessor. The device is 18% thinner than the iPhone 4S, measuring 7.6 millimetres (0.3 in), and is 20% lighter at 112 grams (4 oz).
- On July 6, 2013, it was reported that Apple was in talks with Korean mobile carrier SK Telecom to release the next generation iPhone with LTE Advanced technology.
- On July 22, 2013, the company's suppliers said that Apple is testing out larger screens for the iPhone and iPad. "Apple has asked for prototype smartphone screens larger than 4 inches (100 mm) and has also asked for screen designs for a new tablet device measuring slightly less than 13 inches (330 mm) diagonally, they said."
- On September 10, 2013, Apple unveiled two new iPhone models during a press event in Cupertino. The iPhone 5C, a mid-range-priced version of the handset that is designed to increase accessibility due to its price is available in five colors (green, blue, yellow, pink, and white) and is made of plastic. The iPhone 5S comes in three colors (black, white, and gold) and the home button is replaced with a fingerprint scanner (Touch ID). Both phones shipped on September 20, 2013.
- On September 9, 2014, Apple revealed the iPhone 6 and the iPhone 6 Plus at an event in Cupertino. Both devices had a larger screen than their predecessor, at 4.7 inches (120 mm) and 5.5 inches (140 mm) respectively.
- After the iPhone 6 and 6 Plus was released, some users started complaining about the 6 and 6 Plus bending from normal use. This trend became known as "Bendgate", which later started "Touch Disease." However, they released the iPhone 6S and 6S Plus, a more bend-resistant iPhone than the 6 and 6 Plus, to solve this issue.
- On September 7, 2016, Apple unveiled the iPhone 7 and 7 Plus, which added water and dust resistance, improved system and graphics performance, a new dual-camera setup on the Plus model, new color options, and featured the removal of the 3.5 mm headphone jack from the iPhone.
- On September 12, 2017, Apple officially unveiled the iPhone 8 and 8 Plus, which features a new glass design, camera improvements, a True Tone display, wireless charging, and improved system performance. It also unveiled the iPhone X, which features a near bezel-less design, a facial recognition feature dubbed "Face ID" with facial tracking used for Animojis, an OLED screen with the highest pixel density on an iPhone, a new telephoto lens which works better in low light conditions, and improved cameras for AR.
- On September 12, 2018, Apple officially unveiled the iPhone XS, XS Max and XR at the Steve Jobs theater at Apple Park. The XS and XS Max feature an improved Super Retina Display with Dolby Vision and HDR10 support with the XS Max featuring a larger 6.5 inches (170 mm) display, improved cameras with Smart HDR, and the A12 Bionic chip. The iPhone XS and XS Max are IP68 water, liquid, and dust resistant which allow the

devices to be submerged in up to 2 meters for a duration of 30 minutes, while iPhone XR retained the IP67 certification found in the first-generation iPhone X and also features an IPS LCD display instead of the OLED displays found in the higher-end models. The iPhone XS/XS Max's IP68 certifications were tested using various liquids such as chlorinated-water, saltwater, tea, wine, beer, and juices. Apple also announced the fourth generation of Apple Watch, the Apple Watch Series 4.

- On September 10, 2019, Apple officially unveiled the iPhone 11 at Steve Jobs Theater, along with the iPhone 11 Pro and the iPhone 11 Pro Max. All models gained a ultra-wide lens, allowing for a wider field of view. The Pro models gained a triple-lens camera arrangement, and a matte glass finish.
- The iPhone 12 and 12 Pro series were virtually announced on October 13, 2020, featuring a refreshed design, Super Retina XDR Displays across all models, and 5G connectivity. All models also feature MagSafe, allowing special magnetic accessories to easily snap on and off, while also allowing 15W wireless charging.
- The iPhone 13 and 13 Pro series were virtually announced on September 14, 2021, featuring improved cameras with sensor-shift stabilization for all models, a diagonal camera arrangement for the 13 and 13 mini, significantly larger camera sensors and an adaptive 120 Hz ProMotion display for the Pro models. All models also gained a battery size increase, and a reduction in width of the TrueDepth camera module.

How to works iPhone

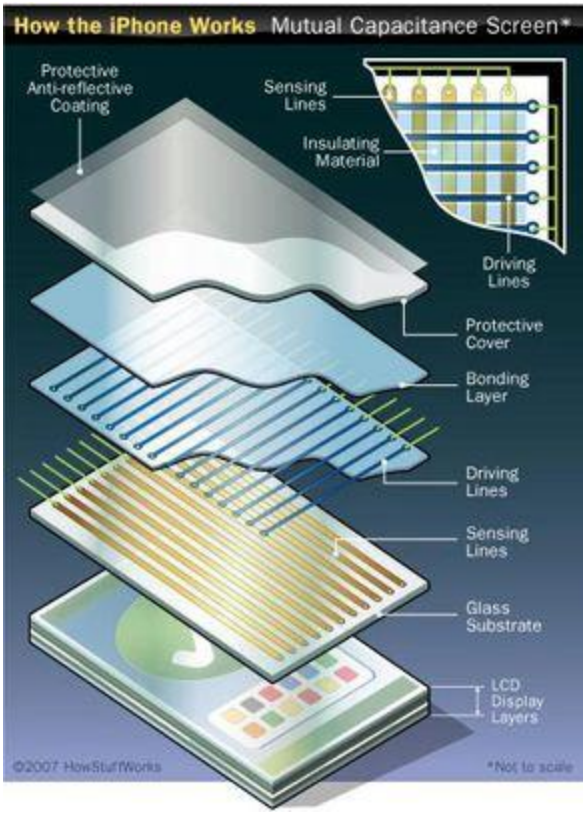
❖ iPhone Touch Screen



- The conductive layers in the iPhone's touch screen enable users to give the device commands with a simple swipe of the finger.
- Electronic devices can use lots of different methods to detect a person's input on a touch screen. Most of them use sensors and circuitry to monitor changes in a particular state. Many, including the iPhone, monitor changes in electrical current. Others monitor changes in the reflection of waves. These can be sound waves or beams of near-infrared light. A few systems use transducers to measure changes in vibration caused when your finger hits the screen's surface or cameras to monitor changes in light and shadow.
- The basic idea is pretty simple -- when you place your finger or a stylus on the screen, it changes the state that the device is monitoring. In screens that rely on sound or light waves, your finger physically blocks or reflects some of the waves. Capacitive touch screens use a layer of capacitive material to hold an electrical charge; touching the screen changes the amount of charge at a specific point of contact. In resistive screens, the pressure from your finger causes conductive and resistive layers of circuitry to touch each other, changing the circuits' resistance.
- Most of the time, these systems are good at detecting the location of exactly one touch. If you try to touch the screen in several places at once, the results can be erratic. Some screens simply disregard all touches after the first one. Others can detect simultaneous touches, but their software can't calculate the location of each one accurately. There are several reasons for this, including the following:
- Many systems detect changes along an axis or in a specific direction instead of at each point on the screen. Some screens rely on system-wide averages to determine touch locations. Some systems take measurements by first establishing a baseline. When you touch the screen, you create a new baseline. Adding another touch causes the system to take a measurement using the wrong baseline as a starting point.

- The Apple iPhone is different -- many of the elements of its multi-touch user interface require you to touch multiple points on the screen simultaneously. For example, you can zoom in to Web pages or pictures by placing your thumb and finger on the screen and spreading them apart. To zoom back out, you can pinch your thumb and finger together. The iPhone's touch screen is able to respond to both touch points and their movements simultaneously. We'll look at exactly how the iPhone does this in the next section.

❖ Multi-touch Systems

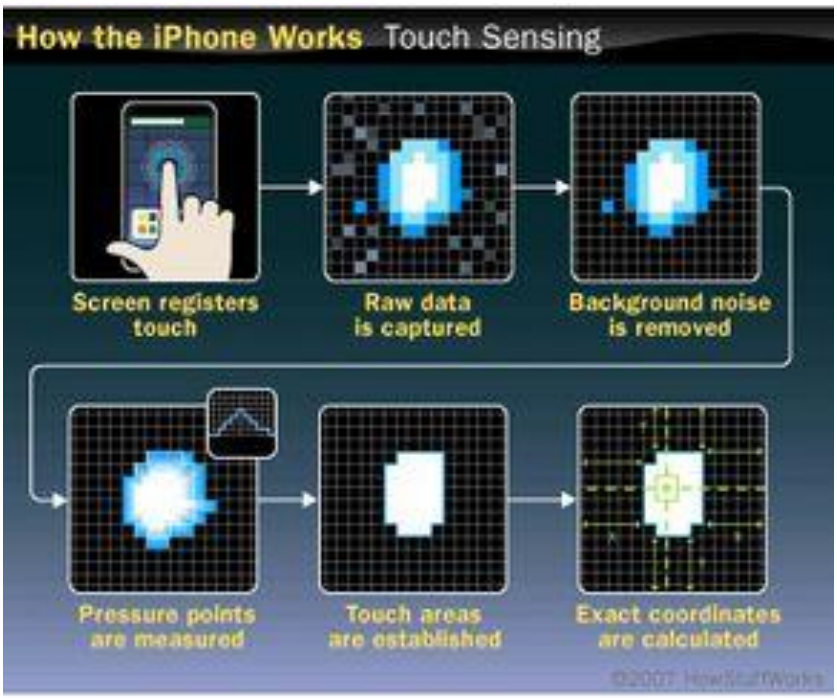


- To allow people to use touch commands that require multiple fingers, the iPhone uses a different arrangement of existing technology. Its touch-sensitive screen includes a layer of capacitive material, just like many other touch screens. However, the iPhone's capacitors are arranged according to a coordinate system. Its circuitry can sense changes at each point along the grid. In other words, every point on the grid generates its own signal when touched and relays that signal to the iPhone's processor. This allows the phone to determine the location and movement of simultaneous touches in multiple locations. Because of its reliance on this capacitive material, the iPhone works only if you touch it with your fingertip -- it won't work if you use a stylus or wear non-conductive gloves.
- The iPhone's screen detects touch through one of two methods: Mutual capacitance or self capacitance. In mutual capacitance, the capacitive circuitry requires two distinct

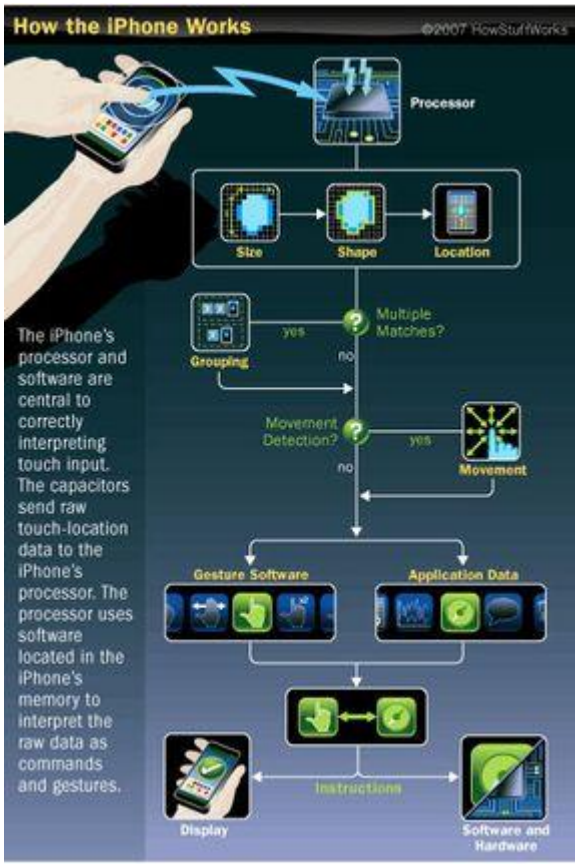
layers of material. One houses driving lines, which carry current, and the other houses sensing lines, which detect the current at nodes. Self capacitance uses one layer of individual electrodes connected with capacitance-sensing circuitry. Both of these possible setups send touch data as electrical impulses.

- The 2012 iPhone 5 replaced the previous touch screen with an in-cell touch screen that still uses capacitive multi-touch technology, but combines the capacitive touch sensing layer and the LCD display layer into one.

❖ iPhone Processor Touch Interpretation



- The iPhone's touch screen registers your touch and converts that raw data into precise coordinates.
- The iPhone's processor and software are central to correctly interpreting input from the touch screen. The capacitive material sends raw touch-location data to the iPhone's processor. The processor uses software located in the iPhone's memory to interpret the raw data as commands and gestures. Here's what happens:



- In the nanosecond between the time you touch the iPhone's screen and the display reacts, several calculations and signals are sent from the touch screen to the software.
- Signals travel from the touch screen to the processor as electrical impulses.
- The processor uses software to analyze the data and determine the features of each touch. This includes size, shape and location of the affected area on the screen. If necessary, the processor arranges touches with similar features into groups. If you move your finger, the processor calculates the difference between the starting point and ending point of your touch.
- The processor uses its gesture-interpretation software to determine which gesture you made. It combines your physical movement with information about which application you were using and what the application was doing when you touched the screen.
- The processor relays your instructions to the program in use. If necessary, it also sends commands to the iPhone's screen and other hardware. If the raw data doesn't match any applicable gestures or commands, the iPhone disregards it as an extraneous touch.

- All these steps happen in a nanosecond -- you see changes in the screen based on your input almost instantly. This process allows you to access and use all of the iPhone's applications with your fingers. We'll look at these programs and the iPhone's other

features, as well as how the iPhone's cost measures up to its abilities, in more detail in the next section.

❖ iPhone Features

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- The front surface of the Apple iPhone has only one button -- the Home button. Pressing the Home button takes you to the main screen of the iPhone's graphical user interface, where the pre-installed Apple applications are housed when you first get your phone. You simply swipe from right to left or vice versa to change pages and access additional apps. From any screen, you can also choose from the device's four primary functions using icons at the bottom of the screen. By default these are:
- Phone: This app allows you to add contacts, check voice messages and make calls via a host of networks including 3G, GSM or EDGE cellular phone service. Additional network capabilities have also been added to latest phones.
- Mail: The Mail app allows you to send and receive e-mail via POP and IMAP, and includes in-line picture, HTML and push e-mail capabilities. Since iPhone 4S, voice dictation is also included.
- Safari: This is the built-in Web browser that has come with all iPhone OSes.
- Music: Formerly called the iPod app. Despite the name, Music allows you to store and play not only music, but also audiobooks and podcasts from your playlists.
- You can swap other applications into these positions by pressing and holding any one of the above until all app icons begin to shake, sliding it onto the main screen and sliding something else into the bottom area in its place.
- You can open the iPhone's other applications from the upper portion of the Home screen. These include a calendar, calculator, notepad, and widgets, or mini-applications made specifically for the iPhone. Older iPhones include a 2.0- or 3.2-megapixel camera along with software you can use to organize your pictures -- the iPhone 5s model ups the stakes

with an 8-megapixel camera. You can also use an iPhone to check weather reports and stock quotes. Even though the iPhone doesn't support Flash, which YouTube's non-mobile site relies on, you can watch YouTube videos using the corresponding application. An Apple version of YouTube was built in prior to iOS 6. Now the iOS requires that you download either the Google YouTube app or another video search and play app that can access YouTube. The virtual keys and buttons you need to navigate each application appear only when you need them.

- The shape of the screen changes when you need it to as well -- you can shift the perspective from vertical to horizontal by tilting the phone. An accelerometer inside the iPhone lets the operating system know to change the orientation of the image on the screen. This means that you can scroll through long lists of music files on a long, narrow screen, and you can watch movies in a widescreen format. You can learn more about accelerometers in How the Wii Works.
- Other physical buttons and switches, aside from the Home button, are located around the edge of the phone. An on/off or sleep button is located at the top of the phone. A switch on the left side lets you set your phone from ringing to silent, and just below that are the volume buttons.
- The second generation of the iPhone introduced several new features. We'll take a closer look at those in the next section.

❖ 3G iPhone Applications and Problems

- In June 2008, Steve Jobs unveiled the 3G iPhone at a conference for application developers. Apple offered 8 and 16 GB options of the 3G edition of the iPhone. The phone's appearance only changed a little bit -- this model has a slightly sleeker design and its back isn't silver. Customers who bought the 16 GB model could choose between an iPhone with a black or white plastic back. The 8 GB model was only available in black.
- Perhaps the biggest announcement -- apart from the fact that the phone could take advantage of 3G network technology -- was that the 3G iPhone had a GPS receiver. One of the challenges of GPS devices is that they tend to drain batteries pretty quickly. That's because the device is constantly receiving signals from satellites orbiting the Earth.

- Another important addition to the iPhone was support for Microsoft Exchange. Microsoft Exchange support means users can now synchronize their iPhones with their Microsoft Outlook accounts. By adding this feature, the iPhone became more competitive with other enterprise smartphones -- the phones businesses use to keep executives and employees connected when out of the office.
- When it released the original iPhone, Apple didn't support third-party applications, though that didn't stop developers from writing them. But with the original iPhone, in order to even run a non-Apple application, an iPhone owner had to first jailbreak his or her phone. Jailbreaking just meant the owner could load and run third party applications. But it came with a risk -- if you tried to install official updates from Apple with a jailbroken phone, Apple could tell that some hanky panky was going on. But the 3G iPhone acts as an application platform, and Apple encourages developers to create content for it.
- The transfer to the 3G iPhone didn't go without a hitch. Instead of allowing customers to purchase phones and activate them at home, Apple wanted them to activate the phones inside the store. Unfortunately, Apple's systems suffered an overload, causing massive delays during the product launch. Most customers ended up having to activate at home anyway.
- Some of the new applications that became available when Apple opened up development for the iPhone take advantage of the device's accelerometer feature. Games like "Super MonkeyBall" let the player control the game character by tilting the phone in different ways. Could the iPhone become the next portable gaming platform? That's precisely what Apple claimed at its Sept. 9, 2009 press event. That brings us up to the iPhone 3GS.

iPhone Technology Example

❖ iPhone 5

- The iPhone 5 is a smartphone that was designed and marketed by Apple Inc. It is the 6th generation iPhone, succeeding the iPhone 4S and preceding both the iPhone 5S and 5C. It was formally unveiled as part of a press event on September 12, 2012, and subsequently released on September 21, 2012. The iPhone 5 was the first iPhone to be announced in September, and setting a trend for subsequent iPhone releases, the first iPhone to be completely developed under the guidance of Tim Cook and the last iPhone to be overseen by Steve Jobs. The iPhone 5's design was used three times, first with the iPhone 5 itself in 2012, then with the 5S in 2013, and finally with the first-generation iPhone SE in 2016. It had a 4-inch screen, similar to the iPhone 5C and iPhone 5S, and was released about ten months after Steve Jobs died.
- The iPhone 5 featured major design changes in comparison to its predecessor. These included an aluminum-based body which was thinner and lighter than previous models, a taller screen with a nearly 16:9 aspect ratio, the Apple A6 system-on-chip, LTE support, and Lightning, a new compact dock connector which replaced the 30-pin design used by previous iPhone models. This was the second Apple phone to include its new Sony-made 8 MP camera, which was first introduced on the iPhone 4S.
- Apple began taking pre-orders on September 14, 2012, and over two million were received within 24 hours. Initial demand for the iPhone 5 exceeded the supply available at launch on September 21, 2012, and was described by Apple as "extraordinary", with pre-orders having sold twenty times faster than its predecessors. While reception to the

iPhone 5 was generally positive, consumers and reviewers noted hardware issues, such as an unintended purple hue in photos taken, and the phone's coating being prone to chipping. Reception was also mixed over Apple's decision to switch to a different dock connector design, as the change affected iPhone 5's compatibility with accessories that were otherwise compatible with previous iterations of the line.

- The iPhone 5 was officially discontinued by Apple on September 10, 2013, with the announcement of its successors, the iPhone 5S and the iPhone 5C. The iPhone 5 has the joint second-shortest lifespan of any iPhone ever produced with only twelve months in production, breaking with Apple's standard practice of selling an existing iPhone model at a reduced price upon the release of a new model. This was broken by the iPhone X which only had ten-months in production from November 2017 to September 2018, and tied with the iPhone XS which had twelve-months from September 2018 to September 2019.
- It was replaced as a midrange and then an entry-level device by the iPhone 5C; the 5C internal hardware specifications are almost identical to the 5 albeit having a less expensive polycarbonate exterior shell. The iPhone 5 supports iOS 6, 7, 8, 9 and 10. iPhone 5 wasn't supported on iOS 11 due to it being 32-bit. The iPhone 5 is the second iPhone to support five major versions of iOS after the iPhone 4S.

❖ iPhone 13 Pro Max

- The iPhone 13 Pro and iPhone 13 Pro Max are smartphones designed and marketed by Apple Inc. They are the flagship smartphones in the fifteenth generation of the iPhone, succeeding the iPhone 12 Pro and iPhone 12 Pro Max. The devices were unveiled alongside the iPhone 13 and iPhone 13 Mini at an Apple Special Event at Apple Park in Cupertino, California on September 14, 2021, and became available ten days later, on September 24.

- Major upgrades over its predecessor include improved battery life, improved cameras and computational photography, rack focus for video in a new "Cinematic Mode" at 1080p 30 fps, Apple ProRes video recording, a new A15 Bionic system on a chip, and a variable 10-120 Hz display, marketed as ProMotion.
- The iPhone 13 Pro and iPhone 13 Pro Max were officially announced alongside the 9th generation iPad, 6th generation iPad Mini, Apple Watch Series 7, iPhone 13 and iPhone 13 Mini by a virtual press event filmed and recorded at Apple Park in Cupertino, California on September 14, 2021. Pre-orders began on September 17 at 5:00 AM PST. Pricing starts at US$999 for the iPhone 13 Pro and US$1099 for the iPhone 13 Pro Max, same as their respective previous generations.
- The iPhone 13 Pro and iPhone 13 Pro Max's design is mostly unchanged from its predecessor. However, the rear camera module now covers a larger area due to the larger lenses. The Face ID and camera module on the front display, or "notch", is now 20% smaller than previous generations.
- The iPhone 13 Pro and 13 Pro Max are available in five colors: Silver, Graphite, Gold, Sierra Blue, and Alpine Green. Sierra Blue is a new color replacing Pacific Blue.
- On March 8, 2022, at Apple's Special Event “Peek Performance”, Apple revealed a new Alpine Green color option which became available on March 18.
- The iPhone 13 Pro and Pro Max uses an Apple-designed A15 Bionic processor featuring a 16-core neural engine, 6-core CPU (with 2 performance cores and 4 efficiency cores), and 5-core GPU. The A15 Bionic also contains a next-generation image processor.
- More 5G bands are available to support more carriers, especially outside the US.
- The iPhone 13 Pro features a 6.1-inch 1170 x 2532 pixel display and the larger iPhone 13 Pro Max features a 6.7-inch 1284 x 2778 pixel display. Both models have the Super Retina XDR OLED display with improved typical brightness up-to 1000 nits, and max brightness up-to 1200 nits, and for the first time in an iPhone, a variable 10-120 Hz ProMotion display, which can also go as low as 10 Hz to preserve battery.
- Apple claims up to 1.5 more hours of battery life on the iPhone 13 Pro than its predecessor, and 2.5 more hours on the 13 Pro Max. Rated capacities are 11.97 Wh (3,095 mAh) on the 13 Pro, while the 13 Pro Max is rated at 16.75 Wh (4,352 mAh). Both models can charge with MagSafe up to 15 W, Qi wireless charging up to 7.5 W, and Lightning up to 20-27 W for the (Pro Max), 20-23 W For the (Pro).
- The iPhone 13 Pro features four cameras: one front-facing camera and three back-facing cameras, including a telephoto, wide, and ultra-wide camera. The back-facing cameras all contain larger sensors than the iPhone 12 Pro, allowing for more light-gathering. The wide and ultra-wide also have larger apertures to capture more light and increase low-light performance. The ultra-wide camera also has autofocus for the first time. The 77 mm telephoto has a smaller aperture than the 12 Pro's, but has the advantage of being able to use Night Mode for the first time. The larger telephoto also increases the digital zoom capability to 15x.

- The cameras use Apple's latest computational photography engine, called Smart HDR 4. Smart HDR 4 processes recognized faces in photos separately using local adjustments. Users can also choose from a range of photographic styles during capture, including rich contrast, vibrant, warm, and cool. Apple clarifies this is different than a filter, because it works intelligently with the image processing algorithm during capture to apply local adjustments to an image.
- The camera app contains a new mode called Cinematic Mode, which allows users to rack focus between subjects and create shallow depth of field using software algorithms. It is supported on the wide, telephoto and front-facing cameras in 1080p at 30 fps. Apple also added in iOS 15.1 the ability to record in Apple ProRes 4K at 30 fps for models with at least 256 GB of storage, however base models with 128 GB of storage will be limited to ProRes recording at 1080p 30 fps.
- The camera features a macro mode that can focus as close as 2 centimeters from a subject. It utilizes the autofocus from the ultra-wide camera, and is automatically enabled when close enough to a subject.
- See also: iOS 15
- iPhone 13 Pro and iPhone 13 Pro Max are preinstalled with iOS 15 at launch.
- iPhone 13 Pro and iPhone 13 Pro Max were praised by reviewers and journalists for its marked improvement in battery life, the improved camera, which has been repeatedly called the best camera in a smartphone, and the addition of ProMotion to the iPhone.

iPhone Technology Application

❖ App store

- An app store (or app marketplace) is a type of digital distribution platform for computer software called applications, often in a mobile context. Apps provide a specific set of functions which, by definition, do not include the running of the computer itself. Complex software designed for use on a personal computer, for example, may have a related app designed for use on a mobile device. Today apps are normally designed to run on a specific operating system—such as the contemporary iOS, macOS, Windows or Android—but in the past mobile carriers had their own portals for apps and related media content.
- App stores typically provide a way for users to give reviews and ratings. Those reviews are useful for other users, for developers and for app store owners. Users can select the best apps based on ratings, developers get feedback on what features are praised or disliked and finally, app store owners can detect bad apps and malicious developers by automatically analyzing the reviews with data mining techniques.
- Many app stores are curated by their owners, requiring that submissions of prospective apps go through an approval process. These apps are inspected for compliance with certain guidelines (such as those for quality control and censorship), including the requirement that a commission be collected on each sale of a paid app. Some app stores provides feedback to developers: number of installations, issues in the field (latency, crash, etc.).
- Researchers have proposed new features for app stores. For instance, the app store can deliver a unique diversified version of the app for sake of security. The app store can also orchestrate monitoring and bug fixing to detect and repair crashes in applications.
- The Electronic AppWrapper was the first commercial electronic software distribution catalog to collectively manage encryption and provide digital rights for apps and digital media (issue #3 was the app store originally demonstrated to Steve Jobs at NeXTWorld EXPO). While a Senior Editor at NeXTWORLD Magazine, Simson Garfinkel, rated The Electronic AppWrapper 4 3/4 Cubes (out of 5), in his formal review. Paget's Electronic AppWrapper was named a finalist in the highly competitive InVision Multimedia '93 awards in January, 1993 and won the Best of Breed award for Content and Information at NeXTWORLD Expo in May, 1993.

- A Screen Shot of Stone Design's 3DReality running on the Electronic AppWrapper, the first app store
- In 1999, NTT DoCoMo launched i-mode, the first integrated online app store for mobile phones, gaining nationwide popularity in Japanese mobile phone culture. DoCoMo used a revenue-sharing business model, allowing content creators and app providers to keep up to 91% of revenue. Other operators outside Japan also made their own portals after this, such as Vodafone live! in 2002. At this time mobile phone manufacturer Nokia also introduced carrier-free downloadable content with Club Nokia.
- Apple released iPhone OS 2.0 in July 2008 for the iPhone, together with the App Store, officially introducing third-party app development and distribution to the platform. The service allows users to purchase and download new apps for their device through either the App Store on the device, or through the iTunes Store on the iTunes desktop software. While Apple has been criticized by some for how it operates the App Store, it has been a major financial success for the company. The popularity of Apple's App Store led to the rise of the generic term "app store", as well as the introduction of equivalent marketplaces by competing mobile operating systems: the Android Market (later renamed to Google Play) launched alongside the release of the first Android smartphone (the HTC Dream) in September 2008, BlackBerry's App World launched in April 2009, as well as Nokia's Ovi Store and Microsoft's Windows Marketplace for Mobile both launching that year.

❖ iCloud Drive

- iCloud is a cloud storage and cloud computing service from Apple Inc. launched on October 12, 2011. As of 2018, the service had an estimated 850 million users, up from 782 million users in 2016.
- iCloud enables users to store data such as documents, photos, and music on remote servers for download to iOS, macOS or Windows devices, to share and send data to other users, and to manage their Apple devices if lost or stolen.
- Apple has eleven company owned and operated data centers supporting iCloud services. The company has six data centers in the United States, two in Denmark, and three in China. One of Apple's original iCloud data centers is located in Maiden, North Carolina, US.
- Beginning in 2011, iCloud is based on Amazon Web Services and Microsoft Azure (Apple iOS Security white paper published in 2014, Apple acknowledged that encrypted

iOS files are stored in Amazon S3 and Microsoft Azure[10]). In 2016, Apple signed a deal with Google to use Google Cloud Platform for some iCloud services.

- In October 2016, Bloomberg reported that Apple was working on project Pie which aims to improve the speed and experience of Apple's online services by being operated more directly by Apple.
- In June 2021, Apple introduced iCloud+, which introduced Private Relay, Hide My Email and custom email domains to paid users of the services, as well as an unlimited storage limit for video from cameras added through HomeKit Secure Video.

❖ **System requirements**

- iCloud account creation requires either an iOS device running iOS 5 or later or a Mac running OS X Lion v10.7.5 or later, as well as an internet connection and a compatible web browser. Also, certain features have their own minimum requirements of OS versions. For example, using iCloud Photo Sharing requires OS X Mavericks v10.9 or above on a Mac.
- Devices running older versions of macOS (before Mavericks) or iOS (below 7) may be unable to sign into iCloud after the iCloud password has been changed: the only resolution for this issue is to upgrade the OS, which may be impossible on a device that does not meet the newer OS minimum requirements.
- Synchronizing with a PC requires Windows 7 or later and using the iCloud Control Panel, and optionally Outlook 2007 or later or the built-in Windows 10 Mail and Calendar apps to sync Calendar, Contacts, and Reminders. Users must own an Apple device to set up iCloud for Windows.
- A class action lawsuit by customers unhappy over the transition from MobileMe to iCloud was filed in early-May 2012.
- In June 2019, iCloud was introduced to Windows 10 via the Microsoft Store.
- On June 7, 2021, Apple introduced an upgraded version of iCloud for users who paid for additional storage called iCloud+ during their 2021 Apple Worldwide Developers Conference. iCloud+ includes Private Relay, which allowed users to browse Safari without being tracked, Hide My Email, which allows users to sign up to websites and other apps with a private email address that forwarded messages to their main inbox, and updates to HomeKit Secure Video which allows iCloud+ users to add an unlimited number of HomeKit cameras that do not count against the storage limit.

❖ **Features**

- The cloud-based system allows users to store heterogeneous music, photos, applications, documents, bookmarks, reminders, backups, notes, Apple Books, and contacts and provides a platform for Apple's email servers and calendars. Third-party iOS and macOS app developers can implement iCloud functionality in their apps through the iCloud API.

  ❖ **Backup and restore**

  - iCloud allows users to back up the settings and data on iOS devices running iOS 5 or later. Data backed up includes photos and videos in the Camera Roll, device settings, app data, messages (iMessage, SMS, and MMS), ringtones, and Visual Voicemails. Backups occur daily when the device is locked and connected to Wi-Fi and a power source. In case of a malfunction of any Apple device, during the restoration process, iCloud

offers to restore all data along with App data only if the device was synced to iCloud and backed up.

- **Back to My Mac**
  - Back to My Mac, also previously part of MobileMe, is now part of iCloud. As before, this service allows users to log in remotely to other computers that have Back to My Mac enabled and are configured with the same Apple ID. On August 9, 2018, Apple updated a support document to note that Back to My Mac would not be part of the upcoming macOS Mojave (10.14) release.
- **Find My Friends**
  - Find My iPhone My Friends was added to iCloud alongside the launch of iOS 5, allowing users to share their current location with their friends or family. iOS 6 added location-based alerts to notify the user when a device arrives at a certain location.
  - On iOS 9 and 10, Find My Friends is built into iOS and cannot be removed. From iOS 11 onwards it is included, but can be deleted and then subsequently reinstalled from the iOS App Store.
  - In October 2015, Find My Friends was added to iCloud.com to view other "friends" locations.
- **Find My iPhone**
  - Find My iPhone, formerly part of MobileMe, allows users to track the location of their iOS device or Mac. A user can see the device's approximate location on a map (along with a circle showing the radius depicting the margin of error), display a message and/or play a sound on the device (even if it is set to silent), change the password on the device, and remotely erase its contents. The feature was first announced on June 10, 2009, and was included in the iOS 3.0 software update as a feature for paying MobileMe users.Find My iPhone was made free of charge with the iOS 4.2.1 software update on November 22, 2010, but only for devices introduced in 2010.
- **Find My**
  - Find My replaced Find my iPhone and Find My Friends, merging the two apps in iOS and iPadOS 14.
- **iCloud Keychain**
  - iCloud Keychain is a password manager developed by Apple that syncs passwords across devices and suggests secure ones when creating new accounts.
  - iCloud Keychain backups provide different security guarantees than traditional iCloud backups. This is because iCloud Keychain uses "end-to-end encryption", meaning that iCloud Keychain backups are designed so that the provider does not have access to unencrypted data. This is accomplished through the use of a novel "key vault" design based on a Hardware Security Module located in Apple's data centers.
- **Storage**
  - Since its introduction in 2011, each account has 5 GB of free storage for owners of either an iOS device using iOS 5.x or later, or a Mac using OS

X Lion 10.7 or later. Users can purchase additional storage for a total of 50 GB, 200 GB or 2 TB. The amount of storage is shared across all devices per iCloud Apple ID.

- Several native features of iCloud use each user's iCloud storage allowance, specifically, Backup and restore, and email, Contacts, and Calendars. On Macs, users can also store most filetypes into iCloud folders of their choosing, rather than only storing them locally on the machine. While Photo Stream uses the iCloud servers, usage does not come out of the user's iCloud storage allowance.

❖ **iCloud Drive**

- iCloud Drive is iCloud's file hosting service, that syncs files across devices running iOS 8, OS X Yosemite (version 10.10), or Windows 7 or later, plus online web app access via iCloud.com. Users can store any kind of file (including photos, videos, documents, music, and other apps' data) in iCloud Drive and access it on any Mac, iPad, iPhone, iPod Touch, or Windows PC, with any single file being a maximum of 50 GB in file size (earlier it was 15 GB). This allows users to start their work on one device and continue on another device.

❖ Safari

- Safari is a graphical web browser developed by Apple. It is primarily based on open-source software, and mainly WebKit. It succeeded Netscape Navigator, Cyberdog and Internet Explorer for Mac as the default web browser for Macintosh computers. It is supported on macOS, iOS, and iPadOS; a Windows version was offered from 2007 to 2010.
- Apple used a remotely updated plug-in blacklist license to prevent potentially dangerous or vulnerable plugins from running on Safari. In the Pwn2Own contest at the 2008 CanSecWest security conference, Safari caused Mac OS X to be the first OS to fall in a hacking competition. It received criticism for its approach to software distribution and its past limitations of ad blockers. The Safari Developer Program, which granted members the privilege to develop extensions for the browser was available for $USD 99 per year. As of September 2021
- Before the name Safari, a couple of others were drafted including the title 'Freedom'. For over a year, it was privately referred to as 'Alexander', which means strings in coding formats; and 'iBrowse' prior to Safari was conceived.
- **Safari 1**
- On January 7, 2003, at Macworld San Francisco, Apple CEO Steve Jobs announced Safari that was based on the company's internal KHTML rendering engine fork WebKit.[Apple released the first beta version exclusively on Mac OS X the same day. Later that date, several official and unofficial beta versions followed until version 1.0 was released on June 23, 2003. On Mac OS X v10.3, Safari was pre-installed as the system's default browser, rather than requiring a manual download, as was the case

with the previous Mac OS X versions. Safari's predecessor, the Internet Explorer for Mac, was then included in 10.3 as an alternative.

- **Safari 2**
- In April 2005, Engineer Dave Hyatt fixed several bugs in Safari. His experiment beta passed the Acid2 rendering test on April 27, 2005, marking it the first browser to do so.Safari 2.0 which was released on April 29, 2005, was the sole browser Mac OS X 10.4 offered by default. Apple touted this version as it was capable of running a 1.8x speed boost compared to version 1.2.4 but it did not yet featured the Acid2 bug fixes.
- **Safari 3**
- On January 9, 2007, at Macworld San Francisco, Jobs unveiled that Safari was ported to the newly-introduced iPhone within iPhone OS (later called iOS). The mobile version was capable of displaying full, desktop-class websites. At WWDC 2007, Jobs announced Safari 3 for Mac OS X 10.5, Windows XP, and Windows Vista. He ran a benchmark based on the iBench browser test suite comparing the most popular Windows browsers to the browser, and claimed that Safari had the fastest performance. His claim was later examined by a third-party site called Web Performance over HTTP load times.
- **Safari 4**

- Safari 4 was released on June 11, 2008. It was the first version that had completely passed the Acid3 rendering test.[38] It incorporated WebKit JavaScript engine SquirrelFish that significantly enhanced the browser's script interpretation performances by 29.9x. SquirrelFish was later evolved to SquirrelFish Extreme, later also marketed as Nitro, which had 63.6x faster performances. A public beta of Safari 4 was experimented in February 24, 2009.
- **Safari 6**

- Safari 6 ceased support for Windows users, and it was subsequently removed from Microsoft's browser-choice menu (pictured).
- Safari 6.0 was previously referred to as Safari 5.2 until Apple changed in WWDC 2012. The stable release of Safari 6 coincided with the release of OS X Mountain Lion on July 25, 2012, and was integrated within OS. As a result, it was no longer available for download from Apple's website or any other sources. Apple released Safari 6 via Software Update for users of OS X Lion. It was not released for OS X versions before Lion or for Windows. The company later quietly removed references and links for the Windows version of Safari 5.Microsoft had also removed Safari from its browser-choice page.
- **Safari 7**

- Safari 7 was announced at WWDC 2013, and it brought a number of JavaScript performance improvements. It made uses of Top Site and Sidebar, Shared Links, and Power Saver which paused unused plugins. Safari 7 for OS X Mavericks and Safari 6.1 for Lion and Mountain Lion were all released along with OS X Mavericks in the special event on October 22, 2013.
- **Safari 10**

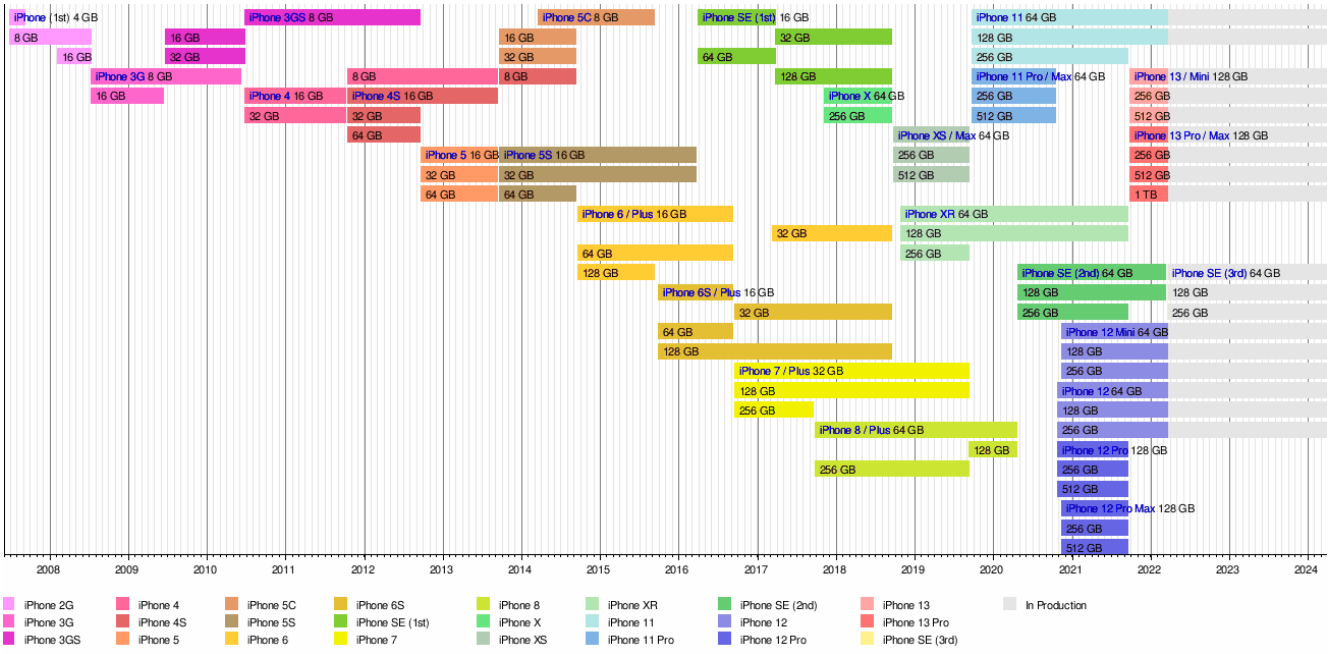
- Safari 10 was released within OS X Yosemite and OS X El Capitan on September 20, 2016. It had a redesigned Bookmark and History views, and double-clicking will centralized focus on a particular folder. The update redirected Safari extensions to be saved directly to Pocket and Dic Go. Software improvements included Autofill quality from the Contrast card and Web Inspector Timelines Tab, in-line sub-headlines, bylines, and publish dates. The ut tracks and re-applies zoomed level to websites, and legacy plug-ins were disabled by default in favor of HTML5 versions of websites. Recently closed tabs can be reopened via the History menu, or by holding the "+" button in the tab bar, and using Shift-Command-T. When a link opens in a new tab; it is now possible to hit the back button or swipe to close it and go back to the original tab. Debugging is now

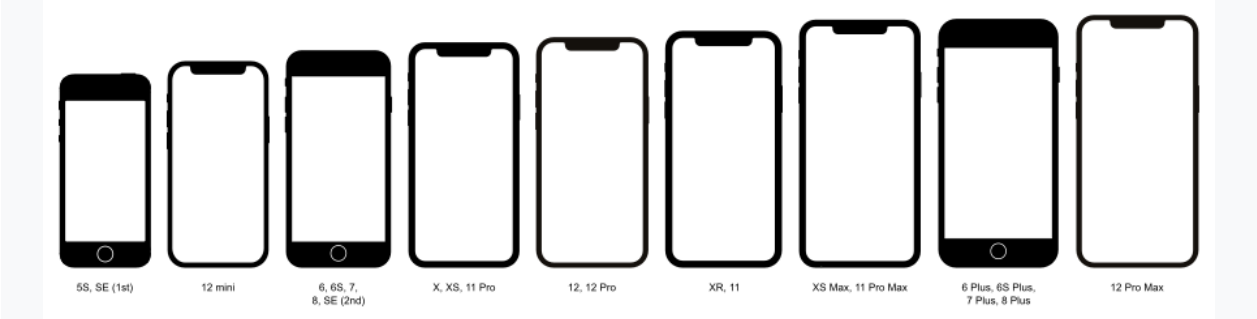
supported on the Web Inspector. Safari 10 also includes several security updates, including fixes for six WebKit vulnerabilities and issues related to Reader and Tabs. The first version of Safari 10 was released on September 20, 2016, and the last version (10.1.2) was released on July 19, 2017.

- **Safari 12**

- Safari 12 was released within macOS Mojave on September 17, 2018. It was also available to macOS Sierra and macOS High Sierra on September 17, 2018. Safari 12 included several new features such as Icons in tabs, Automatic Strong Passwords, and Intelligent Tracking Prevention 2.0. Safari version 12.0.1 was released on October 30, 2018, within macOS Mojave 10.14.1, and Safari 12.0.2 was released on December 5, 2018, under macOS 10.14.2. Support for developer-signed classic Safari Extensions has been dropped. This version would also be the last that supported the official Extensions Gallery. Apple also encouraged extension authors to switch to Safari App Extensions, which triggered negative feedbacks from the community.
- **Safari 15**
- Safari 15 was released within macOS Monterey and was also available for macOS Big Sur and macOS Catalina on September 20, 2021. It featured a redesigned interface and tab groups that blended better into the background. There was also a new home page and extension supports on the iOS and iPadOS editions.
- **Safari Technology Preview**
- Safari Technology Preview was first released alongside OS X El Capitan 10.11.4. Safari Technology Preview releases include the latest version of WebKit, which included Web technologies in the future stable releases of Safari so that developers and users can install the Technology Preview release on a Mac, test those features, and provide feedback.
- **Safari Developer Program**
- The Safari Developer Program was a program dedicated for in-browser extension and HTML developers. It allowed members to write and distribute extensions for the browser through the Safari Extensions Gallery. It was initially free until it was incorporated into the Apple Developer Program in WWDC 2015, which cost $99 a year at the time, but has since increased 3-fold. The charges prompted frustrations from developers[citation needed]. Within OS X El Capitan, Apple implemented the Secure Extension Distribution to further improve its security, and it automatically updated all extensions within the Safari Extensions Gallery.

iPhone Technology Diagram and Figures





Advantages and Disadvantages

❖ **Advantages of iPhone**

- **Apple Ecosystem**
  - iPhone is the ideal phone if you have other Apple devices such as MacBooks, Apple Watch, or iPads. Connecting one device with another is seamless and very convenient. This is really handy if you have to transfer files or photos from your phone to your laptop or vice versa. Apple IOS and macOS have developed to the level where you can start a movie in your phone and continue it later on your laptop.
- **Something for Everyone**
  - Two years back, a new iPhone would cost you up to $1200 which is crazy for a phone. However, things have changed a lot now. You can get the new iPhone SE for $400 or a new iPhone 11 for $700 or a new iPhone 11 pro for $900 and they all come with the same A13 bionic processor. This gives you various options to choose from and you will not have to break your bank to buy a phone.
- **iCloud**
  - iCloud is a cloud storage service from Apple. When turned on, it can automatically save all your files and photos to the cloud as a backup in case your device gets lost or stolen. Also, you can access it with your email anywhere with internet access. This is really helpful and you won't need your pen-drive or any secondary storage device as everything's backed up in the cloud.
- **Easy User Interface**
  - iPhones have a simple interface and the similarity of the UI between the apple devices make it really easy to operate. The iPhone ensures all apps and functions are being performed the way Apple intends them to which allows for simple user experience. While android has more freedom and choices, users find it comparatively difficult to use.
- **Faster Processor**
  - Let's compare Samsung Galaxy S20 Ultra with iPhone X, the best android phone available in the market right now, and almost a 3-year-old iPhone. The geek-bench score for a single core of iPhone is equal to that of Samsung.
  - Tech experts say that iPhone's processor will always be two steps ahead of android. The newest iPhone has a single-core geek bench score of 1337, 432 more than the S20. This proves that iPhones have better, faster processors than their competitors.
- **Fewer Security Breaches**
  - While you have the freedom of customization on an Android, it might be costly. Android phones are easy to access and hackers can corrupt your files or even steal your personal information. With the iPhone, things like this are very rare as everything has to first go through Apple's firewall. However, you should always check before downloading anything from a third party.
- **iPhone Privileges**
  - Getting an iPhone also means you'll be able to use various Apple only features like Apple pay, Apple Car play, FaceTime, iMessage and so on. The popularity of

the iPhone has increased priority to the IOS apps. There are many apps like Apollo and Drafts which are not available to Android.

❖ **Disadvantages of iPhone**

- **Apple Ecosystem**
  - The Apple Ecosystem is both a boon and a curse. Once you get in, it's really difficult to get out. The ecosystem is essentially there to make consumers purchase more Apple products. You're likely to purchase a MacBook if you have an iPhone rather than a windows laptop. This way you won't be able to see if other brands have better devices and you'll have to wait until Apple makes one or updates the previous model.
- **Overpriced**
  - While the products are very beautiful and sleek, prices for apple products are way too high. Brands like One Plus are really pushing hard on making amazing affordable phones that you feel cheated for paying an Apple premium.
- **Less Storage**
  - iPhones do not come with SD card slots so the idea of upgrading your storage after buying your phone is not an option. So, you most likely have to buy an expensive higher internal storage version.

Conclusion

- Apple and the IPhone is a great example of a corporation making what the consumer wants in a global market. With limited companies competing, competition for the best phone on the market is at an all-time high. With the iPhone you get better quality and better security when dealing with your personal information. Innovation and technological advancements have keep the iPhone and Apple ahead of its competitors in this tight notch market. With the iPhone being so popular and in high demand, estimated shortages are suspected

- With the development of the Internet and the the evolution from desktop computers to mobile internet devices, smartphones have become attached to people. Specifically, the iPhone is a powerful object because it has remediated Apple into a networked product. The combination of Internet with the Mac and music within the iPod into a mobile communication device (the iPhone) has made product that connects to other Apple products, software, and applications. Because of this, Apple created a commodity for people that improves with consumption. While individuals purchase more Apple products, the products become more 'valuable' making the network of Apple a spectacle. The iPhone is not viewed an object, but a concept of networking with Apple products and other users. Furthermore, this network establishes a mobile virtual window within the multitude of embedded screens that are always accessible to the user. Because the iPhone can be used however the user wishes, it can be considered a constant simulation maintaining an aura through the virtual window. Because the user engages with the device, the iPhone's interface engulfs a virtual window producing endless false realities through simulation.

- No phone is perfect, let alone an iPhone. But the smartphone you buy should be acing the things that matter the most to you. And this is what the iPhone 12 was doing for this reviewer for the good chunk of the last four months

- First, it is so easy to switch to a new iPhone thanks to iCloud (or iTunes) backups. Just type your account and password, and everything will be as you left it on your old iPhone - call log, messages, notifications, installed apps and the app data, music, saved accounts. And we mean it - everything - it's like you've never changed your phone. We have to admit - we can't live without this feature; we just can't.

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