Chapter 1.

Introduction

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COMP7506 Smart Phone Apps Development

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Agenda

- Mobile Operating Systems
- Why Mobile Apps?
- Key Principles of Mobile User Experience Design
- UX Constraints of Mobile Apps
- Types of Mobile Apps
- Implication of Mobile Apps to Economy
- Mobile App Development Trends

Popular Operating Systems

Sort by name…

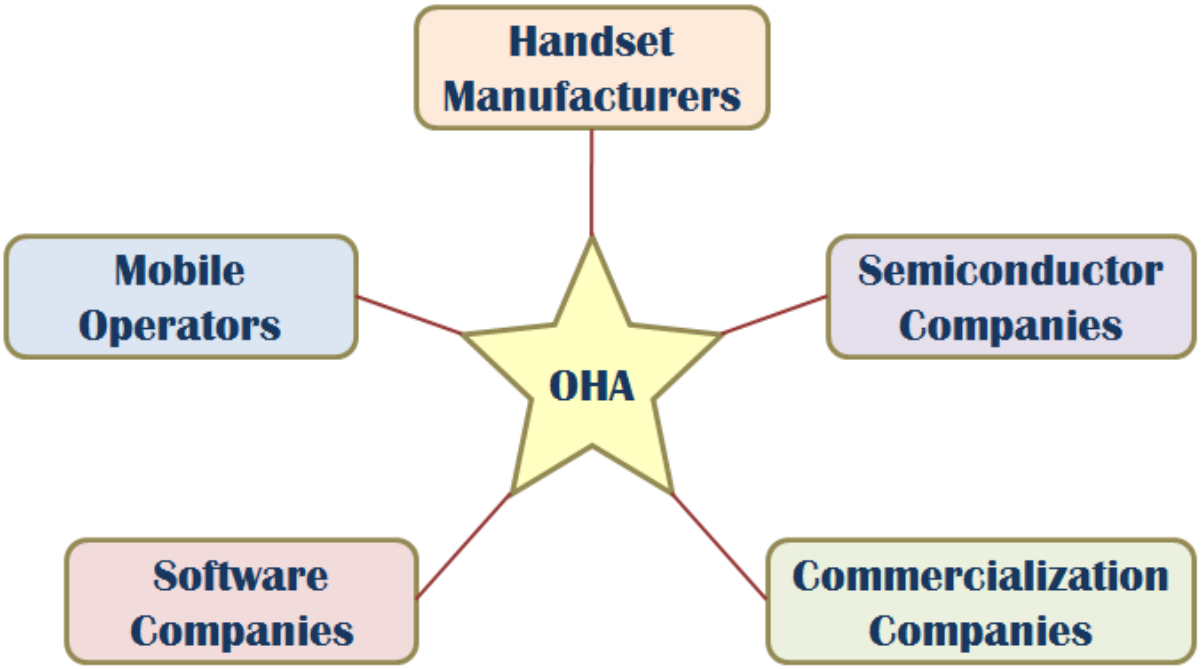
- Android OS (Google Inc.)
- Bada (Samsung Electronics)
- BlackBerry OS (Research In Motion)
- iPhone OS / iOS (Apple)
- MeeGo OS (Nokia and Intel)
- Palm OS (Garnet OS)
- Symbian OS (Nokia)
- webOS (Palm/HP)
- Windows Mobile / Windows Phone (Microsoft)

Android

- A software platform and operating system for mobile devices.
- Based on the Linux kernel.
- Developed by Google and later the Open Handset Alliance (OHA).

Open Handset Alliance (OHA)
[開放手機聯盟]

A business alliance consisting of 84 (up to 2023) technology and mobile companies to develop open standards for mobile devices.



https://www.openhandsetalliance.com/index.html

Android

- Android uses Linux for its device drivers, memory management, process management, and networking.
- The next level up contains the Android native libraries. They are all written in C / C++ internally, but you'll be calling them through Java / Kotlin interfaces. In this layer you can find the Surface Manager, 2D and 3D graphics, media codecs, the SQL database (SQLite), and a native web browser engine (WebKit).
- Dalvik Virtual Machine (before Android 5.0) / Android Runtime (ART) (since Android 5.0): Managed runtime used by applications and some system services on Android.

Android

- Security:
  - Android is a multi-process system, in which each application (and parts of the system) runs in its own process. Most security between applications and the system is enforced at the process level through standard Linux facilities, such as user and group IDs that are assigned to applications.
  - Additional finer-grained security features are provided through a "permission" mechanism that enforces restrictions on the specific operations that a particular process can perform, and per-URI permissions for granting ad-hoc access to specific pieces of data.
- Programming languages:
  - Java / Kotlin – officially supported
  - C / C++ – as native library that Gradle can package with APK (using build tool CMake), and being called by Java / Kotlin program via Java Native Interface (JNI)

Android

Cupcake
Android 1.5

Donut
Android 1.6

Eclair
Android 2.0/2.1

Froyo
Android 2.2.x

Gingerbread
Android 2.3.x

Honeycomb
Android 3.x

Ice Cream Sandwich
Android 4.0.x

Jelly Bean
Android 4.1.x

KitKat
Android 4.4.x

Lollipop
Android 5.0

Marshmallow
android 6.0

Nougat
android 7.0

Oreo
Android 8.0

Pie
Android 9.0

Q
Android 10.0

R
Android 11.0

Android 12.0

MIUI

- MIUI (pronunciation: Me You I) is a modified Android ROM developed by electronics manufacturer Xiaomi for its smartphones. The first MIUI ROM was based on Android 2.2 (2010).
- MIUI includes various features such as theme support.
- There are different versions for each Xiaomi phone, and each version has variants according to the regions in which the phone is sold, such as Chinese, Global, EEA, Russian, Indonesian, Indian, Taiwan and Turkish.
- MIUI does not ship with Google Play Services in China. However, MIUI releases for Android devices outside China have Google Play Services and Google Apps such as Gmail, Google Maps, Google Play Store pre-installed and functioning as on any other Android device. MIUI global versions are certified by Google.

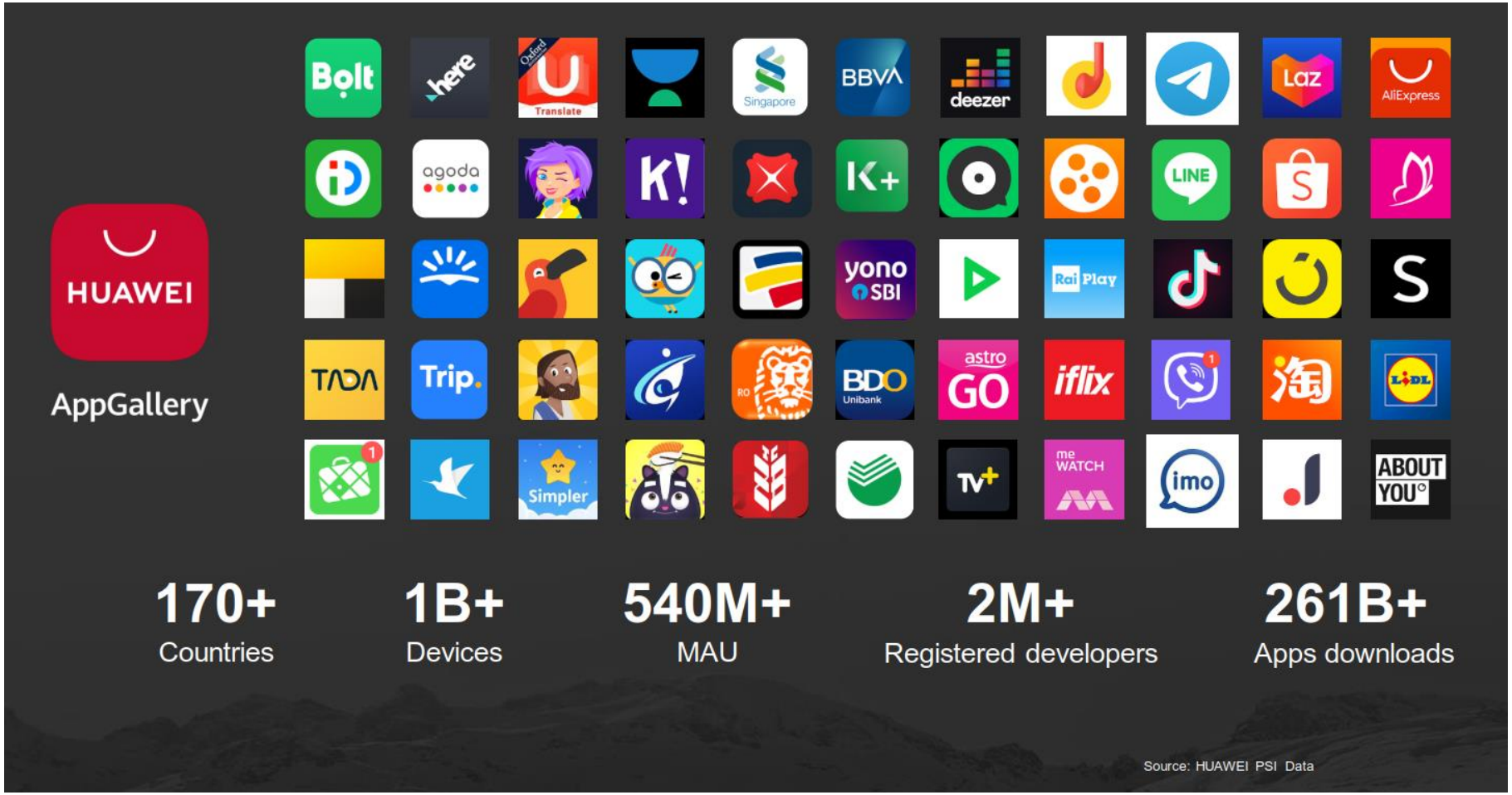
HarmonyOS

HarmonyOS

- HarmonyOS (鸿蒙 in Chinese) is a distributed operating system developed by Huawei to run on multiple devices.
- HarmonyOS was first released in September 10, 2019.
- Official website: https://www.openharmony.cn/
- In contrast to Android apps being packaged into APK file format, HarmonyOS apps are released as an App Pack suffixed with .app for distribution at Huawei's AppGallery. Each App Pack contains one or more HarmonyOS Ability Package (HAP) files and a pack.info file.

HarmonyOS

HarmonyOS



HarmonyOS

HarmonyOS

- To facilitate application development, several kits are provided:
  - Account Kit
    - Give users easy, quick, and secure sign-ins
  - Location Kit
    - Pinpoint precise user locations with the speed and accuracy of multiple methods
  - Game Service
    - Focus on innovating the gaming experience with in-depth services
  - Scan Kit
    - Give users access to the QR and other barcodes around them
  - Machine Learning Kit
    - Take advantages of machine learning for more visual and language services
  - Awareness Kit
    - Get the context and status of users to give them a smarter experience
  - Push Kit
    - Improve user awareness and engagement in apps
  - Wallet Kit
    - Be part of the All-in-One Wallet digital lifestyle with the convenience of multiple open and accessible passes

BlackBerry OS

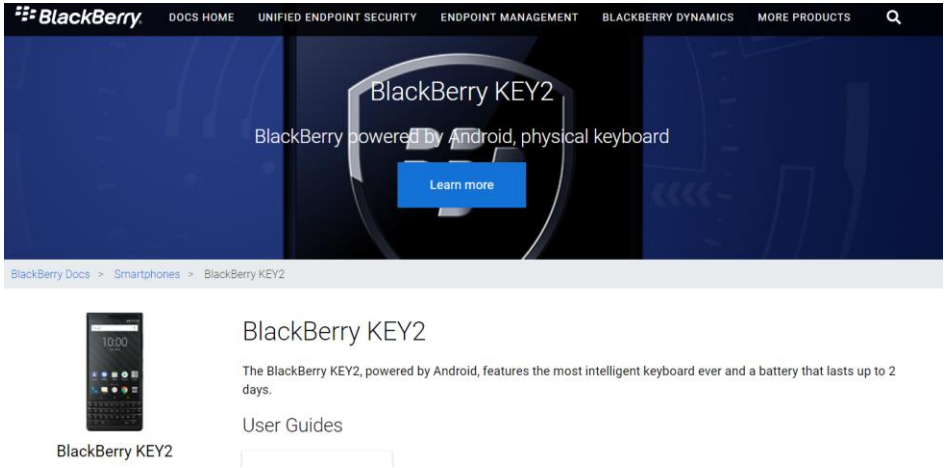
- BlackBerry OS is a proprietary mobile operating system developed by the Canadian company BlackBerry Limited (formerly known as Research In Motion, or RIM) in January 1999.
- BlackBerry provides enterprises and governments with the software and services they need to secure the Internet of Things (e.g., e-mail service).
- At its peak in September 2013, there were 85 million BlackBerry subscribers worldwide. However, BlackBerry lost its dominant position in the market due to the success of the Android and iOS platforms. Its number had fallen to 23 million and 11 million in March 2016 and May 2017, respectively.

BlackBerry OS

- BlackBerry supports many languages:
  - US English, UK English, French, Spanish, Portuguese, Brazilian, Portuguese, Basque, Catalan, Galician, Italian, German, Greek, Dutch, Russian, Polish, Czech, Hungarian, Turkish, Arabic, Hebrew, Indonesian, Thai, Japanese, Chinese (Traditional), Chinese (Simplified), Korean.
- Physical keyboard is a feature of BlackBerry devices.

BlackBerry OS

- In 2013, BlackBerry introduced BlackBerry 10, a major revamp of the platform based on the QNX operating system. BlackBerry 10 was meant to replace the aging BlackBerry OS platform with a new system that was more in line with the user experiences of Android and iOS platforms.
- In September 2015, BlackBerry announced the Priv, which is an android-based handset.
- BlackBerry's latest mobile launch is the KEY series (https://docs.blackberry.com/en/smartphones/key2).



iOS (iPhone OS)

- iOS (known as iPhone OS prior to June 2010) is Apple's mobile operating system.
- Apple is a company who developed iPhone Operating System (iOS).
- This OS was released on June 29, 2007, with the first iPhone.
- Used in iPhone, iPad, iPod touch, Apple Watch and Apple TV.

First iPhone on display under glass at 2007 Macworld

iOS (iPhone OS)

- Game center:
  - A service introduced by Apple that allows users to play and challenge friends when playing online multiplayer social gaming network games. Games can now share multiplayer functionality between the Mac and iOS versions of the app.
  - Game Center was announced during an iOS 4 preview event hosted by Apple on April 8, 2010. A preview was released to registered Apple developers in August 2010.

Sample functions:

- **Leaderboards**
- **Dashboard**
- **Achievements**
- **Challenges**
- **Multiplayer**
- **Friends**

iOS (iPhone OS)

- Programming languages:
  - Objective-C – most common
  - Swift – the emerging programming language
  - C / C++ – also possible but not supported

Symbian OS

- Produced by the software development and licensing company Symbian Ltd.
- Symbian Ltd. was established in June 1998 and is headquartered in Southwark in the UK.
- The native language of the Symbian OS is C++.
- Java 2nd the most important programming language on Symbian OS.

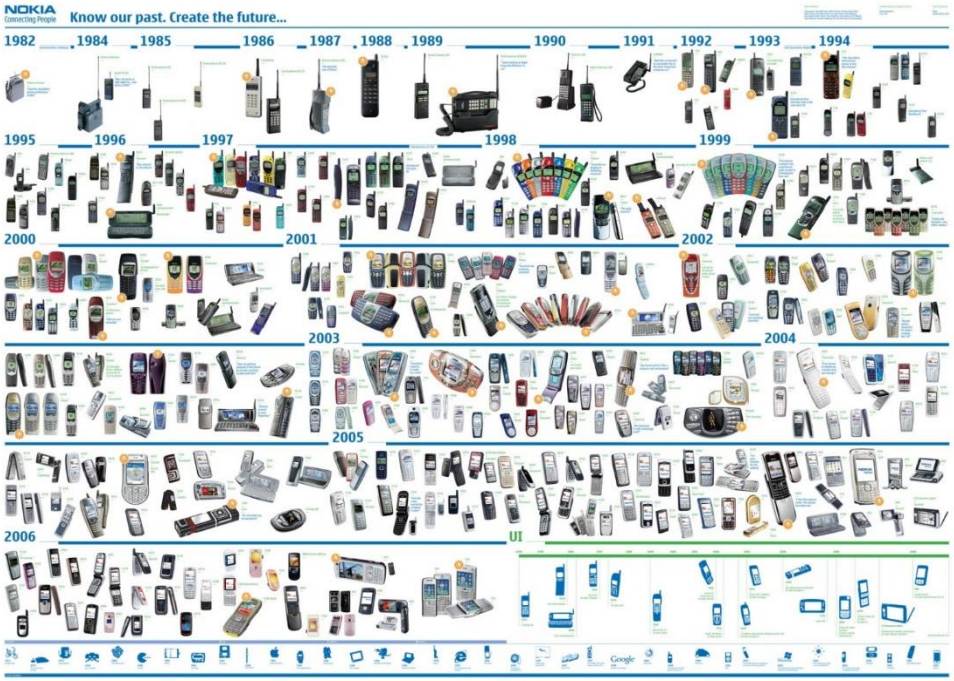
```
import java.awt.Graphics;
import java.awt.Graphics2D;
import java.awt.geom.Rectangle2D;
/**
 * Displays a JFrame and draws a ractangle on it using
 * the Java 2D Graphics API
 * @author www.javadb.com
 */
public class Java2DFrame extends javax.swing.JFrame {

    /**
     * Creates a new instance of Java2DFrame
     */
    public Java2DFrame() {
        initComponents();
    }
```

Symbian OS

- Differences between major versions (network connectivity):
  - 2002: Symbian OS 6.0 and 6.1 (ER6): Bluetooth was added for exchanging data over short distances from fixed and mobile devices.
  - 2003: Symbian OS 7.0 and 7.0s: This version added EDGE (Enhanced Data Rates for GSM Evolution) support and IPV6.
  - 2008: Symbian OS 8.0: There are not great evolution but has shared some APIs to support 3G.
  - 2009: Symbian OS 9.0: APIs to support WiFi.
  - 2009: Symbian OS 9.1: To support Bluetooth version 2.0. Introduce an Enhanced Data Rate (EDR) for faster data transfer.
  - 2009: Symbian OS 9.3: The WiFi 802.11 and the HSDPA (High Speed Downlink Packet Access) appear on Symbian OS.
  - 2009: Symbian OS 9.5: This version includes native-support for mobile digital television broadcasts in DVB-H and ISDB-T formats and also location services.

Symbian OS

- Mostly used in Nokia's mobile phones
- The last Nokia phone supporting Symbian was Nokia 808 PureView, which was released in 2012.
- Final release: Nokia Belle Feature Pack 2 (released on 2 Oct, 2012)



Reference: http://www.fonearena.com/

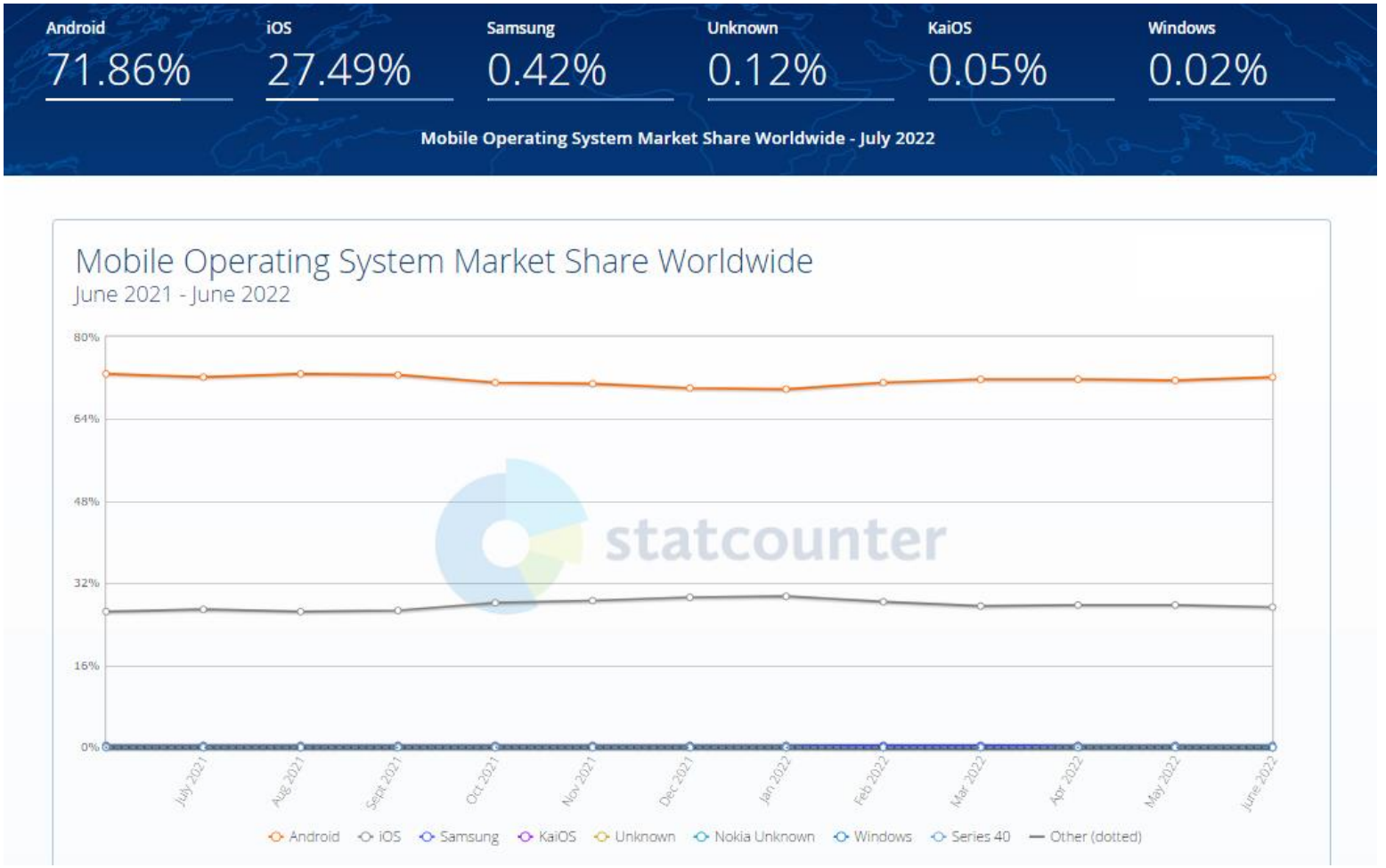
Windows Mobile OS / Windows Phone OS

- Windows Mobile (2000 – 2013):
  - A mobile operating system developed by Microsoft
  - Last version: Windows Mobile 6.5 (based on Windows CE 5.2 kernel)
  - Superseded by Windows Phone
- Windows Phone (2010 – 2015):
  - Latest version: Windows 10 Mobile
- Selling point: Coherent file system similar to that of Windows 9x/Windows NT and support many of the same file types.

Windows Mobile OS / Windows Phone OS

- Programming languages:
  - C++ language, C# and VB.NET
  - Developers have several options for deploying mobile applications. These include writing native code with Visual C++, writing managed code that works with the .NET Compact Framework.
- Note: Windows is providing more support to Android and iOS than before.
  - Windows 10 users can use Microsoft's Your Phone app to mirror phone content to a PC (https://www.theverge.com/2018/8/14/17689670/microsoft-windows-10-your-phone-app-microsoft-store-download)

Market Share of Mobile OS



https://gs.statcounter.com/os-market-share/mobile/worldwide

Market Share of Mobile OS

Android	iOS	Unknown	Samsung	Windows	SymbianOS
70.35%	29.11%	0.51%	0.01%	0.01%	0.01%

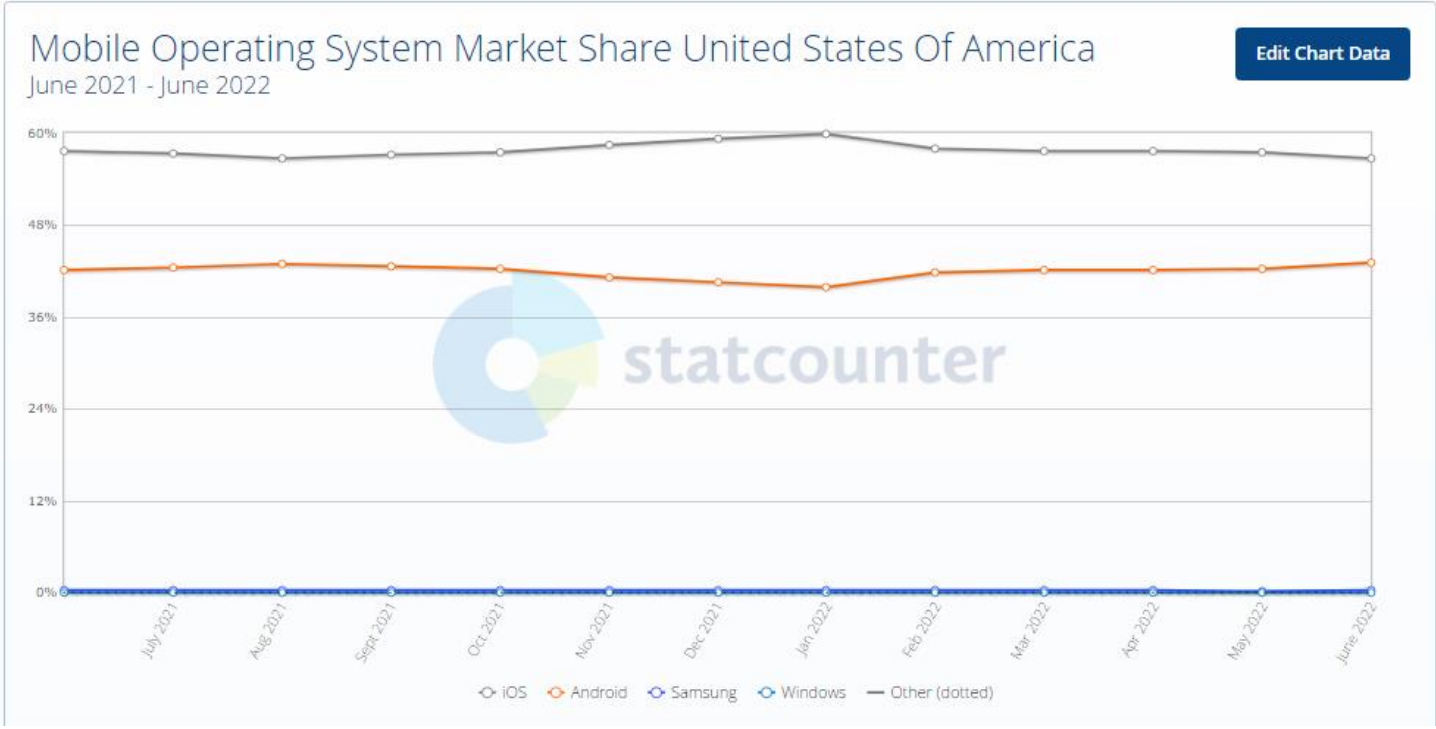
Mobile Operating System Market Share in China - July 2022

https://gs.statcounter.com/os-market-share/mobile/china

Market Share of Mobile OS

iOS	Android	Samsung	Windows	KaiOS	Playstation
55.22%	44.46%	0.27%	0.02%	0.01%	0%

Mobile Operating System Market Share in United States Of America - July 2022



https://gs.statcounter.com/os-market-share/mobile/united-states-of-america

Market Share of Programming Languages

Worldwide, Jan 2023 compared to a year ago:

Rank	Change	Language	Share	Trend
1		Python	27.93 %	-0.9 %
2		Java	16.78 %	-1.3 %
3		JavaScript	9.63 %	+0.5 %
4	↑	C#	6.99 %	-0.3 %
5	↓	C/C++	6.9 %	-0.5 %
6		PHP	5.29 %	-0.8 %
7		R	4.03 %	-0.2 %
8	↑↑↑	TypeScript	2.79 %	+1.0 %
9		Swift	2.23 %	+0.3 %
10	↓↓	Objective-C	2.2 %	-0.1 %
11	↑↑	Go	1.94 %	+0.7 %
12	↑↑↑	Rust	1.9 %	+0.9 %
13	↓	Kotlin	1.81 %	+0.1 %
14	↓↓↓↓	Matlab	1.63 %	-0.1 %
15	↑	Ruby	1.13 %	+0.3 %
16	↓↓	VBA	1.03 %	-0.0 %
17		Ada	0.89 %	+0.2 %
18	↑↑↑	Dart	0.86 %	+0.5 %
19		Scala	0.62 %	+0.0 %
20	↓↓	Visual Basic	0.56 %	-0.1 %
21	↑↑↑	Lua	0.55 %	+0.2 %
22	↓↓	Abap	0.5 %	+0.1 %
23	↑↑	Haskell	0.35 %	+0.1 %
24	↑↑↑↑	Julia	0.34 %	+0.1 %
25	↓↓↓	Groovy	0.34 %	-0.0 %
26		Cobol	0.33 %	+0.1 %
27	↓↓↓↓	Perl	0.33 %	+0.0 %
28	↓	Delphi/Pascal	0.12 %	-0.1 %

Reference: http://pypl.github.io/PYPL.html

Why Mobile Apps?

Why Mobile Apps?

- Comparing with reading a related page using browsers, using smart phone apps have the following advantages:
  - More convenient
    - No need to type in URL especially for the first time
  - Better fit to the mobile phone screen
    - Web pages are designed to be browsed using computers in general. So the words are usually too small to be displayed on mobile phone screens.
  - Less data is downloaded from the server

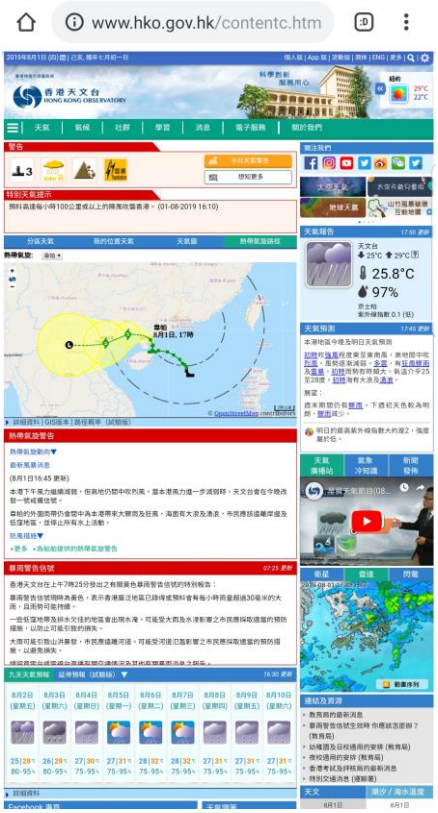
Why Mobile Apps?

Using "MyObservatory" app:

Total data consumption: 53.6 KB

Assume that the app has been pre-installed.

我的天文台 (MyObservatory)
Hong Kong Observatory 天氣



Using Chrome browser:

Total data consumption: 108.9 KB

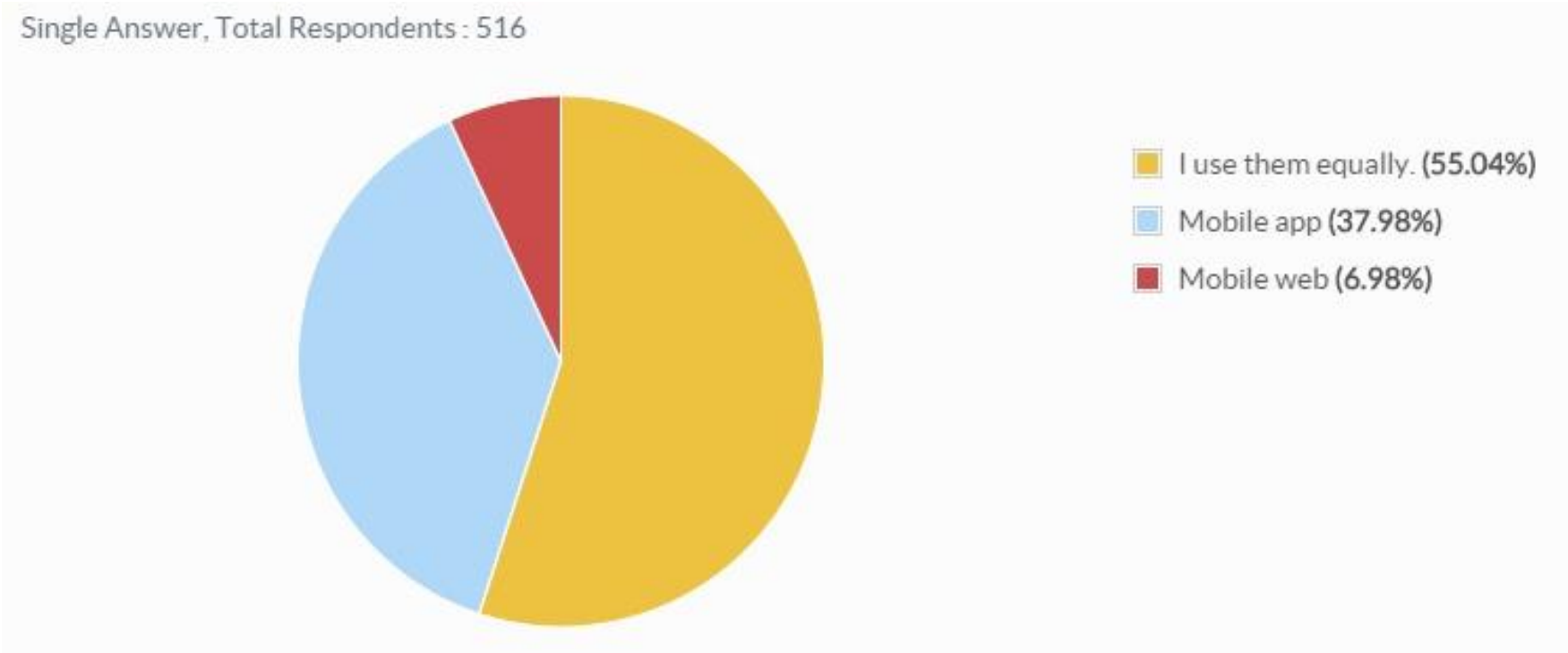
Assume that it is the first time to open this web page.

Data measured using this app:

Why Mobile Apps?

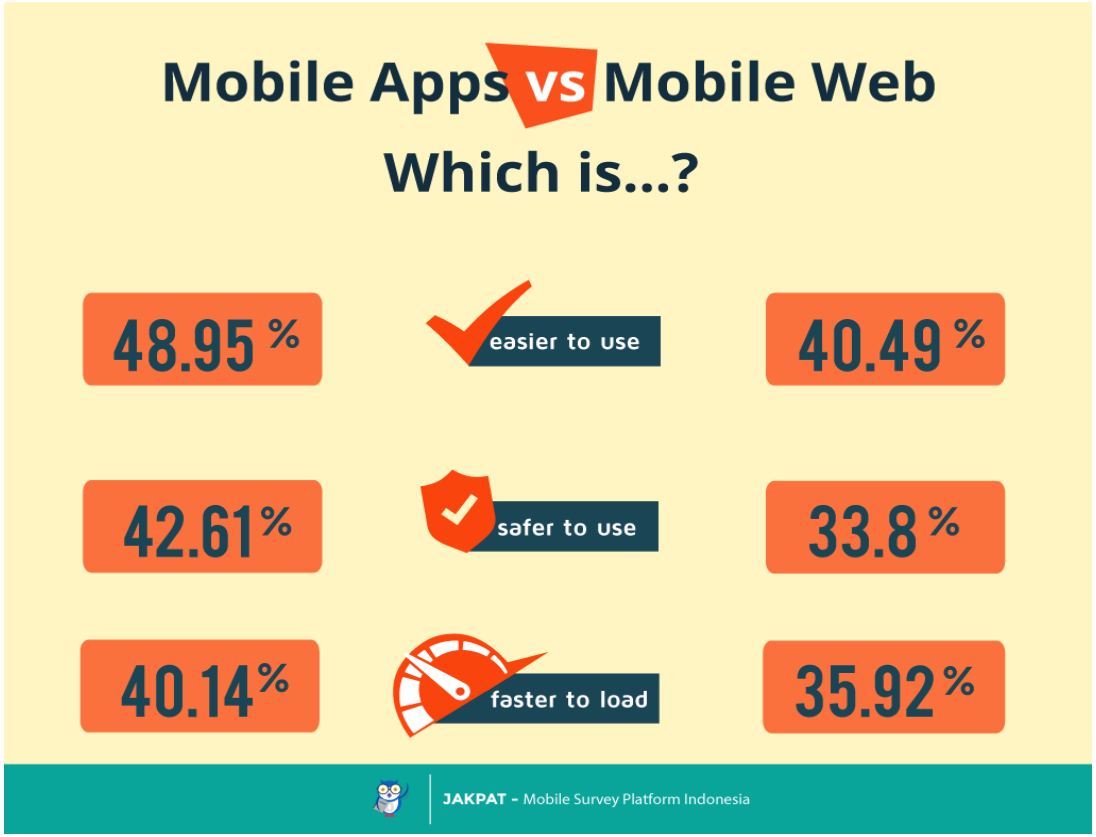
- Less data is downloaded from the server
  - For browsers, all components including text and images are downloaded from the server.
  - For apps, images are stored in the apps and only essential elements (basically text) are downloaded from the server.
  - For example:
    - 2.9 KB for transmitting the sunny icon
    - 5 B for transmitting the word “sunny”
    - Can further save data: only 39 possible icons and so each icon can be uniquely represented by 6 bits!

User's preference in the mobile space



Reference: http://blog.jakpat.net/mobile-web-vs-mobile-apps-survey-report/

User's preference in the mobile space



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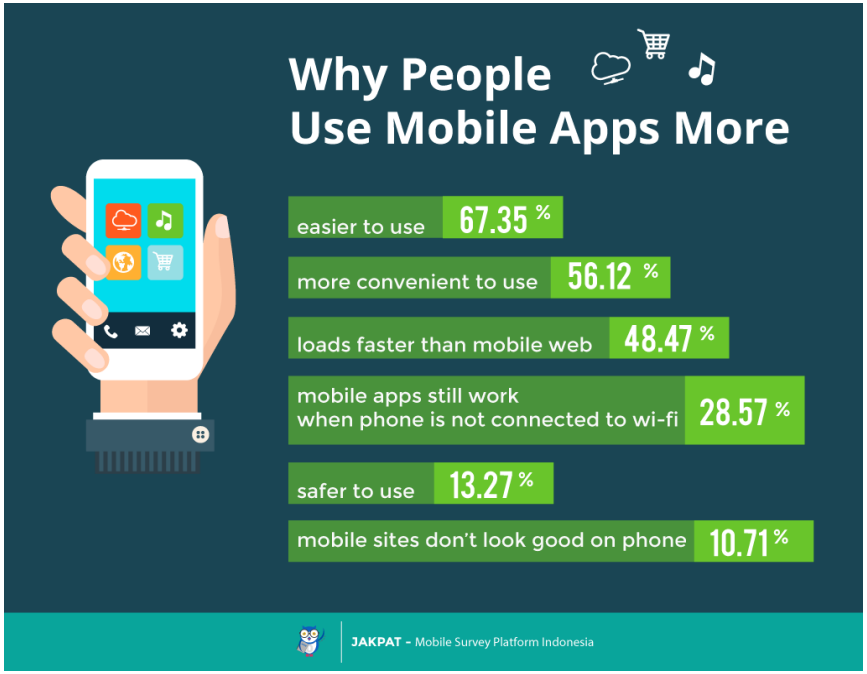
User's preference in the mobile space



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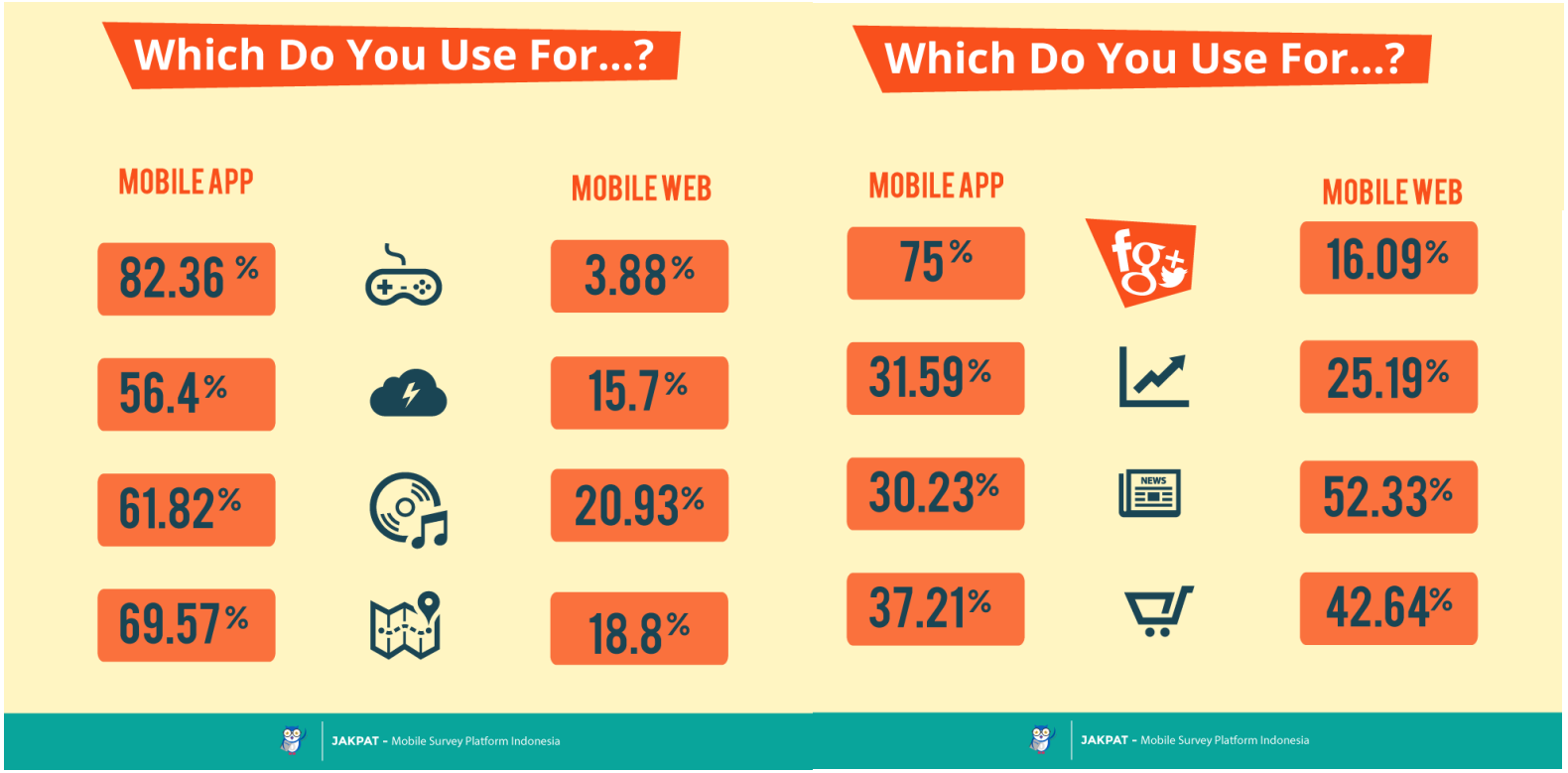

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Key Principles of Mobile User Experience Design

Key Principles of Mobile User Experience Design

- Principle 1: Remove the clutter, protect your design from overloads
  - Allocate user's attention accordingly to your or user's needs. Too much information can scare your user away and cause confusion.
  - Get rid of all odd elements such as buttons, images, texts and other elements that are not vital. Perfection is achieved when there is nothing left to take away. Improve the comprehension by providing one primary action per screen. On mobile, it's better to have many screens with a single action per each rather than one screen with many actions that are not clear.
  - 'One of the basic rules of good UX is to reduce the effort users have to put in to get what they want.' – Nick Babich.

Key Principles of Mobile User Experience Design

- Principle 2: Intuitive navigation
  - This principle is at a high priority for every mobile (and web as well) app design. Good navigation should be invisible and effortlessly lead the user to the proper destination without any explanation. Visual metaphors and navigation elements must create a coherent flow.
  - Mobile navigation must be consistent and communicate the current location. The user should know where exactly he or she is right now.

Key Principles of Mobile User Experience Design

- Principle 3: Seamless experience for all type of devices
  - Creating a seamless experience across mobile, desktop and tablet is very important for your users. There should be no dramatic difference for the same app across different devices.
- Principle 4: Design finger-friendly tap-targets
  - All the targets in mobile interfaces design should be big enough so users could tap them easily with a finger. Not less than 7 – 10 mm. Don’t forget about the clear visual feedback.

Key Principles of Mobile User Experience Design

- Principle 5: Legible content
  - One of the challenges of mobile design is to fit a lot of information on a small user interface. Do not try to squish everything down in an attempt to provide as much information as possible. Remember, that text should be at least 11 points to be legible at a typical viewing distance without zooming. A good UI has a lot of breathing room.
  - It's better not to experiment with decorative fonts, but use the standard Helvetica Neue for iOS and Roboto for Android.

Key Principles of Mobile User Experience Design

- Principle 6: Clearly visible interface elements
  - Use color and contrast to help users see and interpret your content. The contrast between elements is especially vital for users with low vision.
  - The W3C recommends the following contrast ratios for body text and image text:
    - Small text should have a contrast ratio of at least 4.5:1 against its background.
    - Large text (at 14 pt bold / 18 pt regular and up) should have a contrast ratio of at least 3:1 against its background.
    - Contrast ratio = (L1 + 0.05) / (L2 + 0.05) where
      - L1 is the relative luminance of the lighter of the colors
      - L2 is the relative luminance of the darker of the colors
      - Relative luminance can be formed as a properly weighted sum of RGB
    - Reference: https://www.w3.org/WAI/WCAG21/Understanding/contrast-minimum.html#dfn-image-of-text

Key Principles of Mobile User Experience Design

- Principle 7: Design controls should be based on hand position
  - According to Steven Hoober research, about 49% of mobile users rely on one thumb to get things done on their phones. So when designing a mobile app, take care about comfort zones for a person's one-handed reach on a smartphone. Place all the top-level menus, frequently-used controls and common actions in these comfort zones of one-thumb interactions.

Key Principles of Mobile User Experience Design

- Principle 8: Minimize the need for typing
  - Keep forms as short and simple as possible by removing any unnecessary fields. Use auto-complete and personalized data where appropriate so that users only have to enter the bare minimum of information.

UX Constraints of Mobile Apps

UX Constraints of Mobile Apps

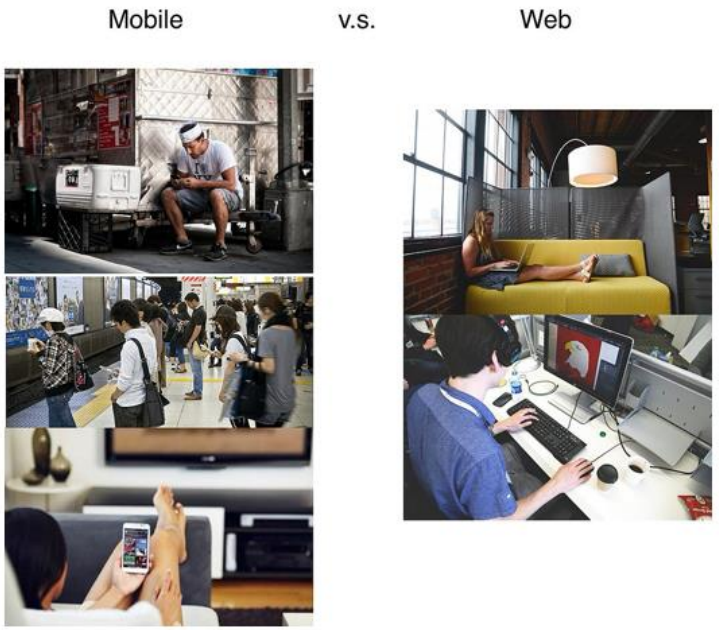
- Constraint 1: Client-side storage
  - One of the major constraints of mobile apps is that the app data sits client side rather than server side like on web (think Amazon, Facebook, Twitter, etc.). That means that every time a user downloads an app, they lose a certain amount of storage.
  - When users use up the storage, users often have to make a quick decision. They have to delete something. So the question becomes, is your app more important to your users than a family video, or favorite song?
  - On mobile, frequency of use is far more important than perceived utility…

UX Constraints of Mobile Apps

- Constraint 2: Small screen sizes and clunky controls
  - Even as screen sizes become larger and larger, the overall mobile experience is still not an optimal method for reading or accomplishing tasks.
  - “Mobile screens are smaller: reading through a peephole increases cognitive load and makes it about twice as hard to understand.” - Jakob Nielsen, Web Utility Consultant.
  - In addition, the controls and keyboards on smartphones can be particularly difficult to use. According to Foolproof UX, 56% of users said they had not signed up for an app or mobile service because the registration process was too time consuming.

UX Constraints of Mobile Apps

- Constraint 3: Environments full of distractions
  - Mobile users are much more prone to dropping off than their web counterparts.
    - Personal computers are more commonly used in workspaces such as coffee shops, home offices, and at work.
    - Phones are often used in non-work settings.
  - Even if they intend to return later, users often forget and never come back, deleting the app after weeks without use.
  - Once users drop off, you need to have a strategy for bringing them back into your app…



UX Constraints of Mobile Apps

- Constraint 4: Making any update is incredibly hard
  - “Shipping mobile software is inherently different than shipping web software – the stakes are higher.” - Christian Legnitto, Release Manager at Facebook
  - Making even the tiniest of changes in a mobile app is incredibly hard. Most teams already know that shipping even a small change takes an average of 7 days to be approved by Apple. Furthermore, because the data sits client side, users have to go in and download those updates manually.
  - If changes don’t perform as expected (driving wrong user behaviors, introducing bugs, etc.), fixing the issue immediately is out of the question. Instead, you’ll have to wait for an additional review process and slow user adoption.
  - That’s why release management is so important.

UX Constraints of Mobile Apps

- Constraints can be catalysts
  - On mobile, there are a lot of constraints to overcome, but as we've seen, constraints can actually make you more creative.
  - While on mobile you'll have to deal with small screen sizes, limited storage and connectivity, distractions, and app stores they'll also force your team to create better products.

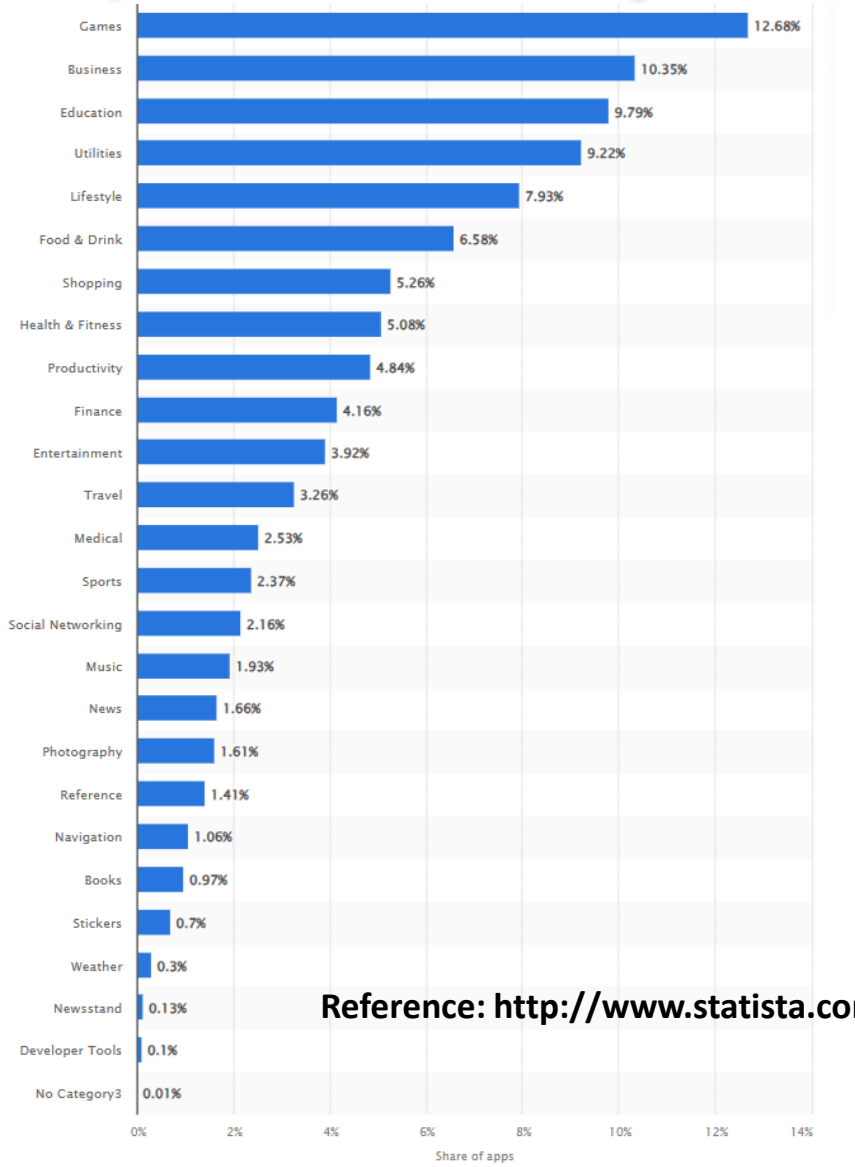
Types of Mobile Apps

By Categories

- Game
- Weather
- Social Networking
- Navigation / Map
- Music
- News
- Entertainment
- Sports
- Banking / Finance
- Shopping / Retail
- Dining / Restaurant
- Search
- Search and Bid
- Digital Books / Magazines
- …

Google Play: https://play.google.com/store/apps
Apple Store: http://www.apple.com/hk/itunes/

Most popular Apple App Store categories as of 3rd quarter 2022, by share of available apps



Reference: http://www.statista.com/statistics/270291/popular-categories-in-the-app-store/

By Nature

- Native Apps
  - Native apps are what typically springs to mind when you think of an app.
  - You download them from the App Store or Google Play, they sit within your device's applications, and you launch them by tapping their icon.
- Web Apps
  - Web app is the mobile version of a site.
  - An "app" like this loads within a mobile browser, like Safari or Chrome, like every other website. Your audience doesn't have to install a web app. They don't need to have available space on their devices.
  - Web apps are sometimes designed to look and behave like apps and are in general ideal when the purpose is simply to make content or functionality available on mobile, but an app is either not a good fit or too expensive.
  - Example: http://www.cs.hku.hk/

By Nature

- Hybrid Apps
  - The bulk of the app is built using cross-compatible web technologies, such as HTML5, CSS and JavaScript — the same languages used to write web apps.
  - Some native code is used however to allow the app to access the wider functionality of the device and produce a more refined user experience. For native apps, instead only native code is used.
  - The advantage of this approach is obvious: only a portion of native code has to be re-written to make the app work on the different kinds of devices available.
  - They wrap “web views” within native code to deliver their content.

```
<WebView  xmlns:android="http://schemas.android.com/apk/res/android"
   android:id="@+id/webview"
   android:layout_width="fill_parent"
   android:layout_height="fill_parent"
/>
```

```
WebView browser = (WebView) findViewById(R.id.webview);
```

```
browser.loadUrl("http://www.tutorialspoint.com");
```

By Nature

NATIVE vs. WEB vs. HYBRID: 7 FACTORS OF COMPARISON

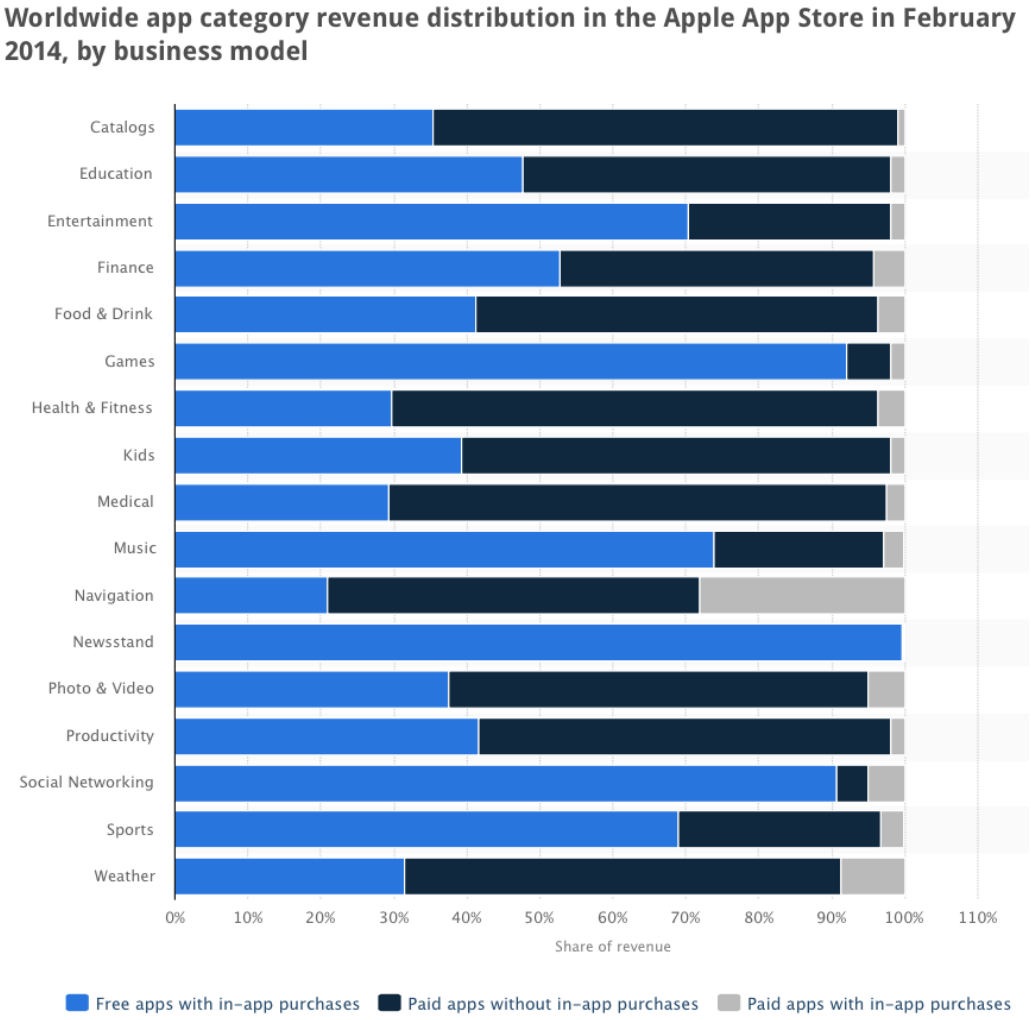
KEY: CON | PRO | NEUTRAL

	NATIVE	HYBRID	WEB
COST	Commonly the highest of the three choices if developing for multiple platforms	Similar to pure web costs, but extra skills are required for hybrid tools	Lowest cost due to single codebase and common skillset
CODE REUSABILITY/ PORTABILITY	Code for one platform only works for that platform	Most hybrid tools will enable portability of a single codebase to the major mobile platforms	Browser compatibility and performance are the only concerns
DEVICE ACCESS	Platform SDK enables access to all device APIs	Many device APIs closed to web apps can be accessed, depending on the tool	Only a few device APIs like geolocation can be accessed, but the number is growing
UI CONSISTENCY	Platform comes with familiar, original UI components	UI frameworks can achieve a fairly native look	UI frameworks can achieve a fairly native look
DISTRIBUTION	App stores provide marketing benefits, but also have requirements and restrictions	App stores provide marketing benefits, but also have requirements and restrictions	No restrictions to launch, but there are no app store benefits
PERFORMANCE	Native code has direct access to platform functionality, resulting in better performance	For complex apps, the abstraction layers often prevent native-like performance	Performance is based on browser and network connection
MONETIZATION	More monetization opportunities, but stores take a percentage	More monetization opportunities, but stores take a percentage	No store commissions or setup costs, but there are few monetization methods

Source: https://static.dzone.com/dz1/dz-files/Screen%20Shot%202014-06-13%20at%205.05.49%20PM.png

By Business Model

- Free apps with in-app purchases
- Paid apps without in-app purchases
- Paid apps with in-app purchases



Reference: http://www.statista.com/statistics/283753/apple-app-store-global-category-revenue-share-per-business-model/

Mobile App Development Trends

Reference: https://hackernoon.com/top-mobile-application-development-trends-in-2019-5bc1ba19188

Sharing of Economy

- An activity of acquiring, providing, or sharing access to goods and services that is often facilitated by a community-based online platform.
- Sharing economy has succeeded in large part because the real economy has been struggling
  - Lots of people are trying to fill holes in their income by monetizing their stuff and their labor in creative ways [Source: http://nymag.com/daily/intelligencer/2014/04/sharing-economy-is-about-desperation.html]
  - Mobile and e-payment technology helps boosting sharing economy
- The users of a Sharing Economy platform have to trust the platform itself as well as the product at hand

airbnb

App Store > Travel > Airbnb, Inc.

Airbnb 4+

Airbnb, Inc. >

Essentials

Offers iMessage App for iOS Offers Apple Watch App for iPhone

Details Ratings and Reviews Related

Download

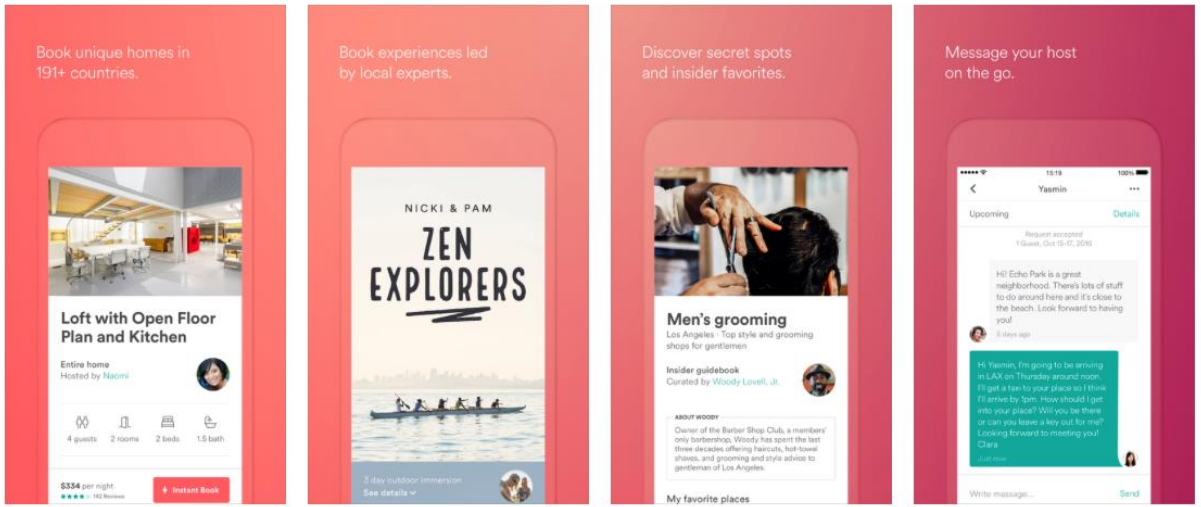
This app is designed for both iPhone and iPad

Rating: 4+

LINKS

Privacy Policy
Developer Website

Screenshots iPhone iPad iMessage Apple Watch Apple TV



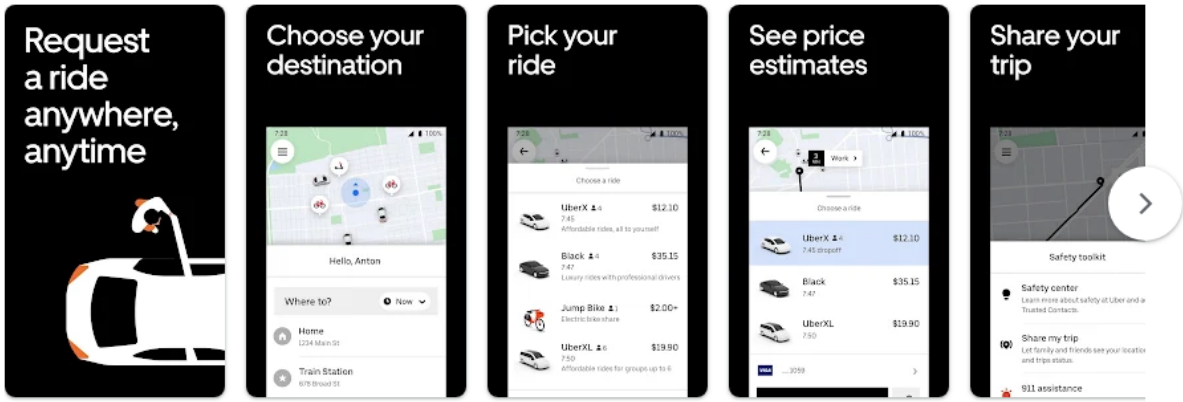
- Open up homes to complete strangers for money
- Allows everyone to run their mini-hotel.
- Airbnb is an online marketplace and hospitality service, enabling people to list or rent short-term lodging including vacation rentals, apartment rentals, homestays, hostel beds, or hotel rooms.
- The company does not own any lodging; it is merely a broker and receives percentage service fees from both guests and hosts in conjunction with every booking.
- It has over 3,000,000 lodging listings in 65,000 cities and 191 countries, and the cost of lodging is set by the host.

Uber - Request a ride

Uber Technologies, Inc.

4.3★ 10.2M reviews | 500M+ Downloads | 3+ Rated for 3+

Install | Add to wishlist

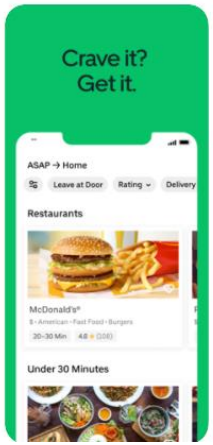


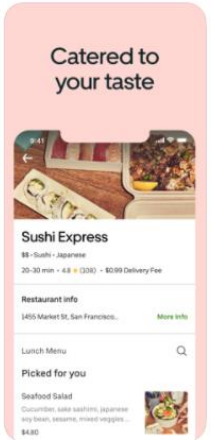
- Open up cars to strangers for money
- Allows everyone to be drivers
- Uber Technologies Inc. is an American worldwide online transportation network company headquartered in San Francisco, California.
- It develops, markets and operates the Uber app, which allows consumers with smart phones to submit a trip request, which the software program then automatically sends to the Uber driver nearest to the consumer, alerting the driver to the location of the customer.
- Uber drivers use their own personal cars.

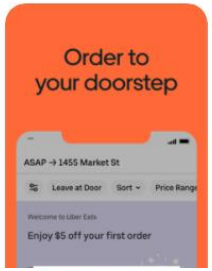
- The Uber app automatically calculates the fare and transfers the payment to the driver.
- In 2015, Uber achieved its 1 billion rides milestone since its founding
- As of August 2016, the service was available in over 66 countries and 545 cities worldwide.
- Since Uber's launch, several other companies have replicated its business model, a trend that has come to be referred to as "Uberification".
- The legality of Uber has been challenged by governments and taxi companies, who allege that its use of drivers who are not licensed to drive taxicabs is unsafe and illegal.
- Uber introduced Uber Taxi in 2021.

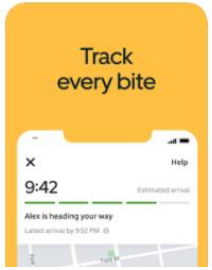
Uber Eats: Food Delivery 4+
Local restaurants to your door
Uber Technologies, Inc.
#2 in Food & Drink
4.8, 1.6M Ratings
Free

Screenshots iPhone iPad



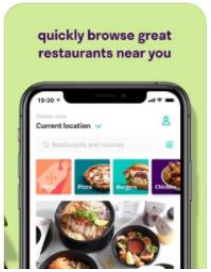


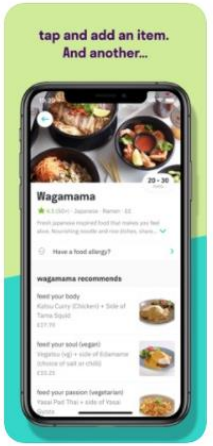


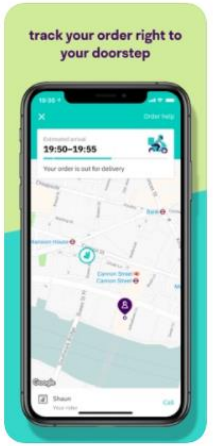


Deliveroo: Food delivery 12+
Restaurant food, delivered
Deliveroo
4.7, 60.2K Ratings
Free

Screenshots iPhone iPad

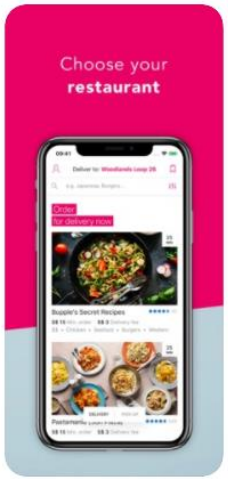






foodpanda - Food Delivery 4+
foodpanda
Foodpanda
#153 in Food & Drink
4.6, 92.5K Ratings
Free

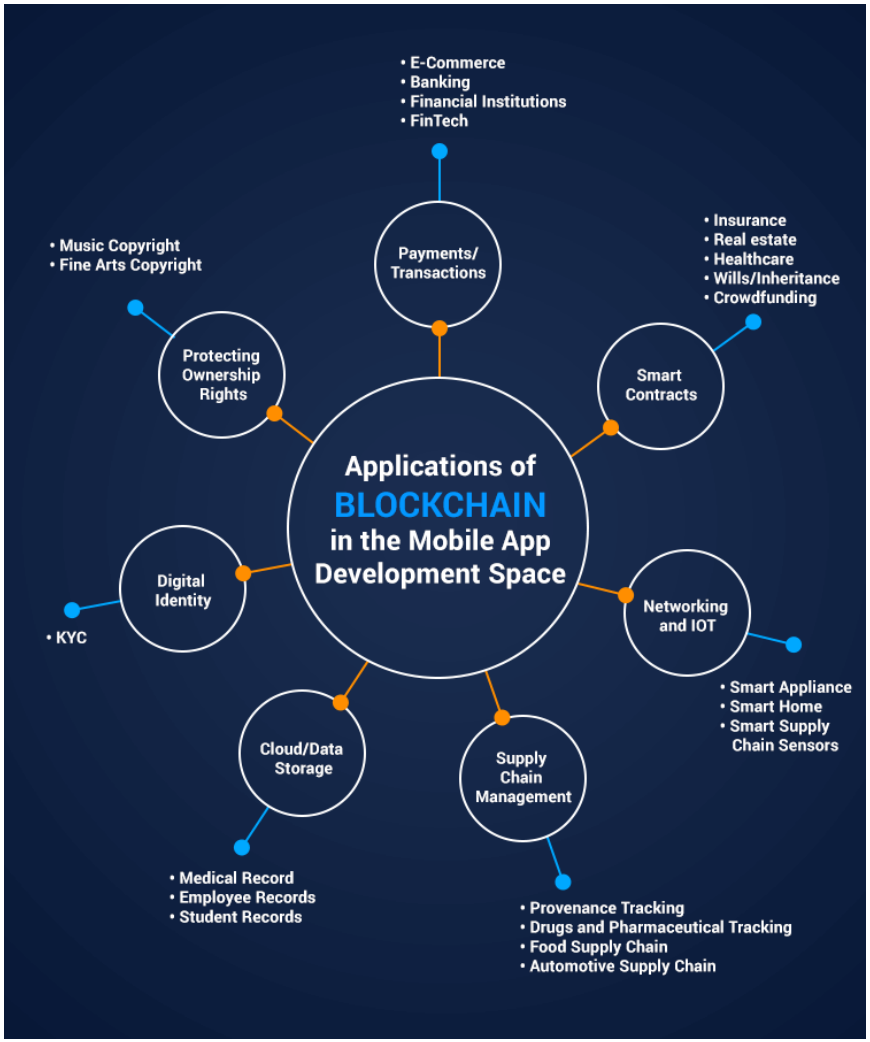
iPhone Screenshots



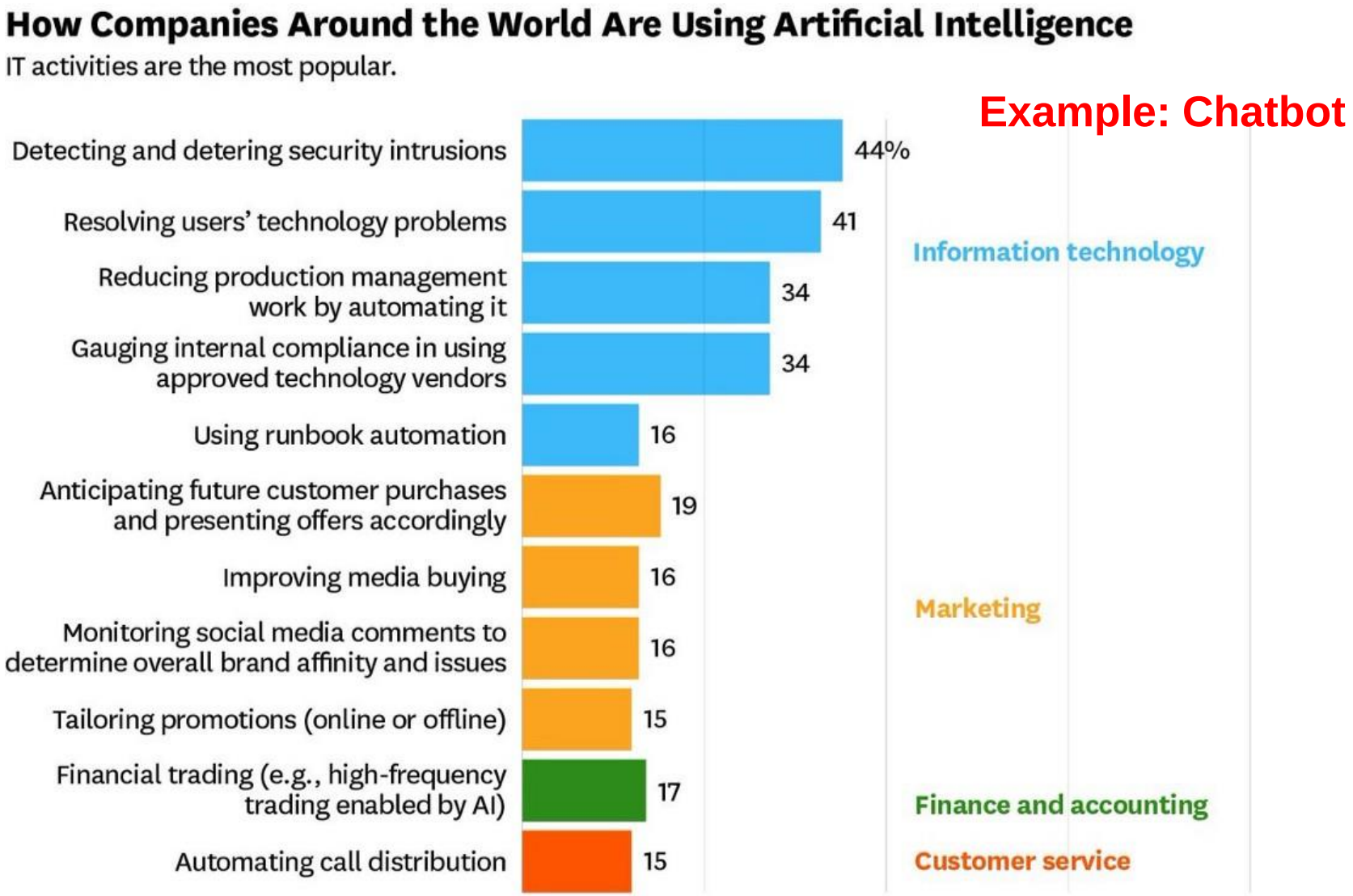
- Allows small restaurants to expand their reach to a larger customer base.
- On-demand meal delivery service.
- Key Components:
  - **Restaurant Partners:** Teams up with restaurants in different areas to offer a range of cuisines
  - **Menu:** May have daily rotating menu
  - **Ordering:** Customers can order through apps
  - **Payment:** Payment can be cashless, credit card, etc.
  - **Delivery:** Meals are delivered to the location selected in the app by couriers — who may be in cars, on foot, or on bikes.

Use of Block Chain

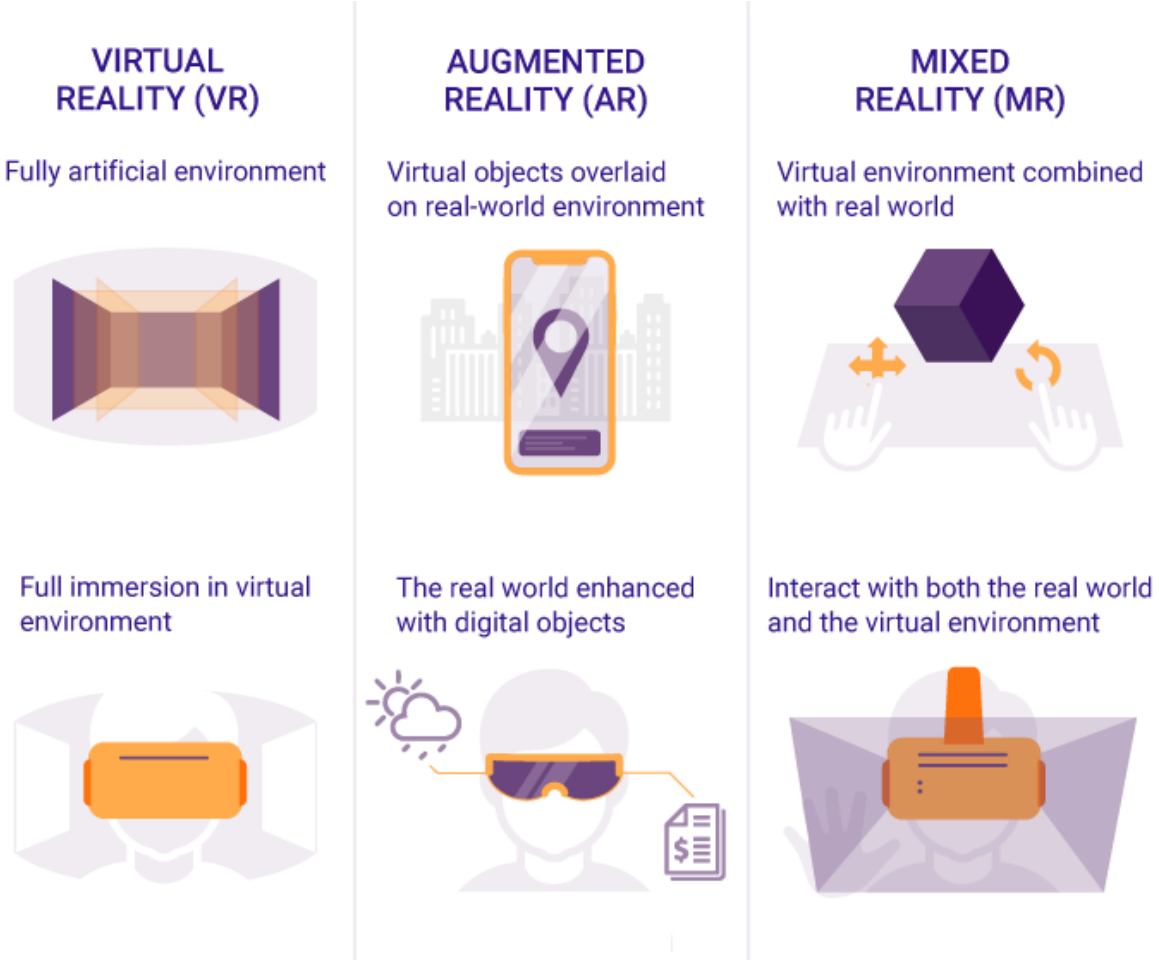
- Blockchain technology has helped many startups and businesses to create their own blockchain powered apps, smart contracts, and blockchain based software solutions.
- Blockchain in union with the Internet of Things (IoT) improves the way apps perform by speeding up transactions, reducing risk, and decreasing costs on your development project.



Use of Artificial Intelligence



Use of VR & AR



Example: Pokemon Go – according to reports, Pokemon Go has generated a revenue of $1.2 billion and was downloaded approx. 752 million times. Around 5 million active users playing Pokemon Go across the globe.

Use of 5G Technology

10x

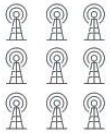
Decrease in latency:
Delivering latency as low as 1 ms.

10x

Connection density:
Enabling more efficient signaling for IoT connectivity.

3x

Spectrum efficiency:
Achieving even more bits per Hz with advanced antenna techniques.



100x

Traffic capacity:
Driving network hyper-densification with more small cells everywhere.

10x

Experienced throughput:
Bringing more uniform, multi-Gbps peak rates.

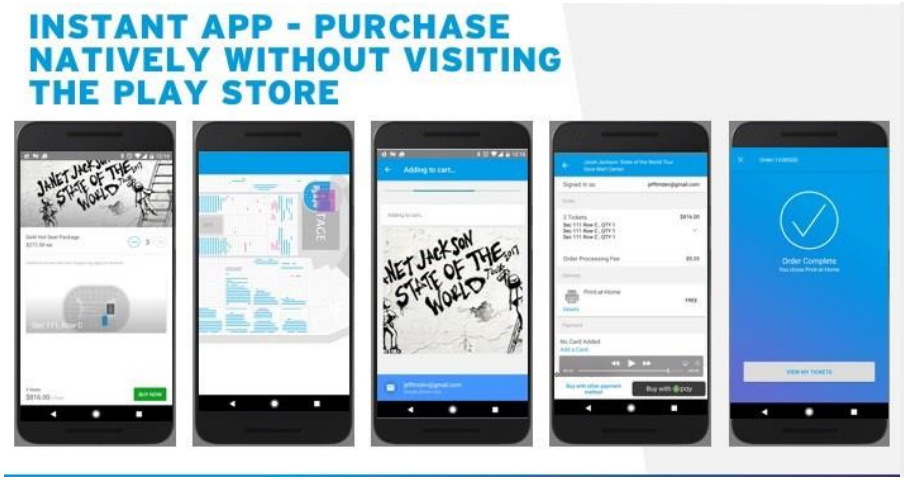
100x

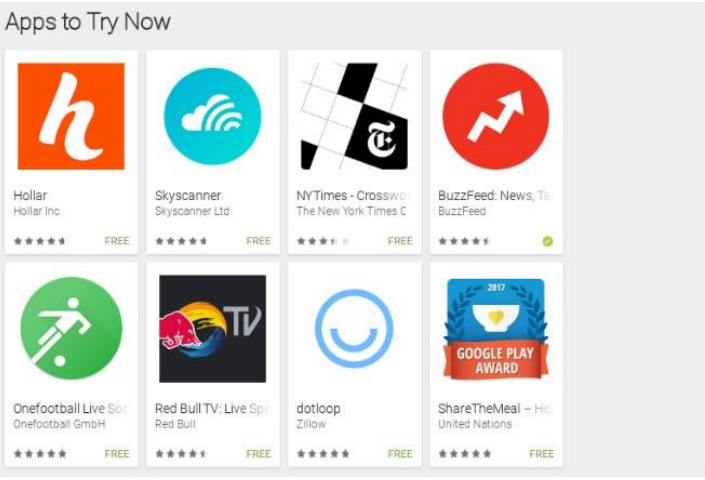
Network efficiency:
Optimizing network energy consumption with more efficient processing.

- Can we utilize advantages of 5G technology in our mobile apps development?

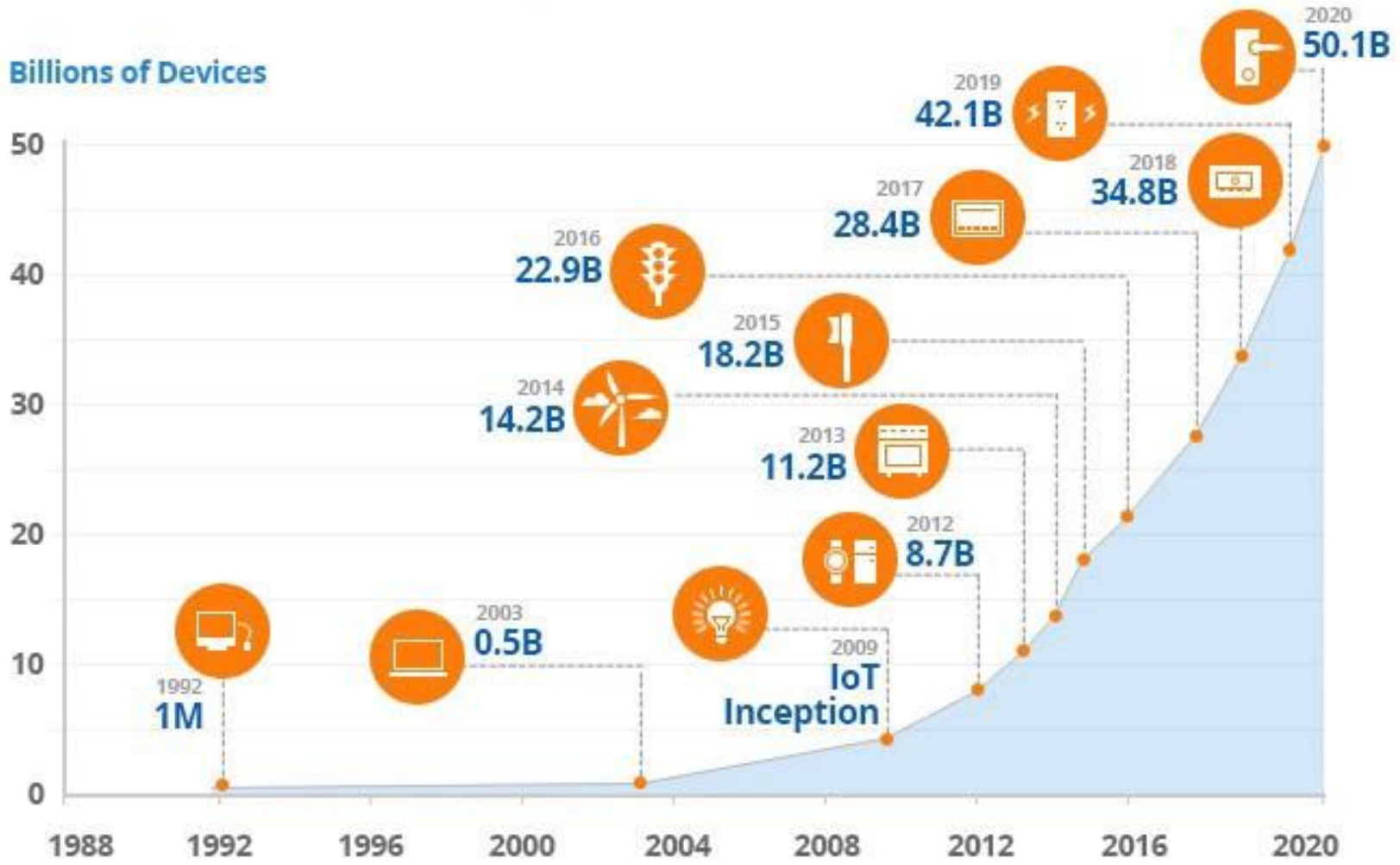
Instant Apps for Mobile App Development

- An instant app is a small software program that enables end users to test out a portion of a native Android app without installing it on a device.
- Instant apps, although they run like local apps, are native containers with access to a device's hardware.
- Because end users do not install them, instant apps do not take up storage on the device.
- Starting from version 3.0, Android Studio support developing instant apps or transforming full apps into an instant apps.





IoT Trends in the Sphere of Mobile App Development



Chapter 1.

End

2023-2024
COMP7506 Smart Phone Apps Development
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