

Hardware

Mobile Technologies

① Examples

* Laptop and Notebook *

↳ 1st mobile tech

→ complete computer in a case that includes a battery and Wifi comm.

→ can easily attach a 3G modem (allow you to work anywhere)

Netbooks

↳ low-power, low-spec

→ Cheap + just powerful enough to do basic computing tasks (search web, email + limited general purpose computing)
↳ word processing

→ Tablets have taken place
↳ convenient + easy

+ • powerful CPU

↳ can run all normal comp. applications

• Full-scale OS

• Expandable

↳ use huge range of existing computer peripherals

- • size ---> too large to be portable

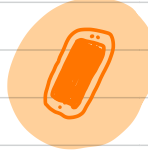
• battery life ---> too short to be useful

• not "always on"

• no built-in cellular network ---> not always connected

* Smartphone *

↳ mobile computer with OS



+

• "always on"

↳ no boot or load time

• always connected

↳ built in cellular data

• Convergence device

• small size -> portable

• built-in sensors

• longer battery life

↳ than laptop

- • mobile OS

↳ can't run full-scale productivity apps as on PC

• input can be difficult

• not easily expandable w/ peripherals

* E-Reader *

↳ let you read electronic books

→ can also be done using e-book software on phone or tablet

① Single-Purpose Designs

→ dedicated - sole purpose = e-books

→ Kindle or Kobo

→ display text but not suited to movies, photos, etc.

→ low powered + do not run other software



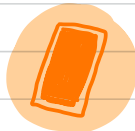
+

• Cheaper than phone or tablet

• smaller + lighter

• longer battery life (weeks)

• easy to read in sunlight (not good in low light)



* Tablet *

↳ same as cellphone but without phone function

+

• same as smartphone

• larger screen ← easier to use for computing tasks

• longer battery life

- • single purpose device

• an extra item to carry around (instead of having app on phone)

mobile OS

(ios + Android + Windows RT)

• can't run full desktop software

↳ less capable

• same as phone

full desktop OS

(Windows)

• same problems as laptop

↳ power hungry, not always on, etc

② Tablet-Based Designs

→ Kindle Fire

→ allow full, color, multimedia exp

→ theoretically able to run other software

↳ not much developed for them



* Mobile + Wearable *

Something that does not need to remain in one place or attached to wired connections (i.e. power or comm cables)

Google Glass, Apple Watch
→ devices that you wear on your body instead of carrying around
no longer need to remember to carry

2 Advantages of mobility

→ think "convenience"

- can combine functions in new, creative ways ∴ carry fewer items
- not restricted by time or location
- can achieve + produce more in less time.

3 Constraints on mobile technology

limit performance

* always on *



- always working in bg.
- don't have to boot up, connect, start specific software just to do a small task
- never really off (display is off to save power)
- fast + responsive

* Battery Life *



- largest limiting factor
- longer operation = bigger battery = bigger device
- want to operate for longer and also be smarter, faster, more powerful, always on and use more sensors ← also limited by battery

* Size *



- small and light = easy to carry around
- powerful + long battery life = computing components take up physical space
- limiting space = limiting the computing components you can fit in it.

* always connected *



- always connected to the internet
- don't have to "go online"
- able to communicate + access for more data than device can store

- Powerful CPU = more electricity
- Radio-based communication (wifi/cellular) → uses more power

more powerful = Greater need for electricity = bigger battery

- we always have to have access to chargers or carry spare batteries
- can't quite make it through a day without battery dying
- limit how much we use our device to conserve power
- trade-off between computing power and power consumption.
→ devices not as powerful as they could be

* Powerful *



- multi-core 64 bit CPU
- ↳ almost as good as desktop comp.

* Convergent *



- Miniturisation = allow smartphones + tablets to become devices that include the functionality of many mobile devices.

* Speed + Availability *



- connect us to others or internet = critical factor in usefulness
- when cellphone reception is poor = no longer used for tasks like phone calls, browsing, etc ∴ less useful

Factors Influencing the Performance of a computer

no single specification but rather a lot of components

★ CPU ★

→ does most of the processing

↳ affect speed of computer

① Speed (GHz)

- bigger = better
- higher speed means that the CPU can process more instructions in the same amount of time

② Cores

- more = better
- a whole complete CPU on the chip. (Quadcore has 4 CPUs on same chip)
- Each CPU can be working on separate programs @ same time
- extremely useful when:
 - user runs more than avg number of apps
 - computer runs as a server which has to handle multiple clients @ one time

Hyperthreading
ability of CPU or core into forcing OS into thinking there are more CPUs

★ Cache ★

→ bigger = better
→ temporarily stores recently accessed or frequently accessed data or instructions on the faster media.

→ uses a limited amount of faster media to speed up access to data and instructions stored on a slower media

→ when these data/instructions need to be used, they can be accessed much faster

→ bigger cache = more data accessible from faster media ∴ better performance

→ cache = built into CPU / hard drive ∴ have to replace these parts.

(L1, L2, L3) motherboard
↳ CPU outside CPU
smallest + fastest

★ Storage ★

→ lower access time = better
↳ avg time it takes to read or write data

→ improve speed = replace a conventional (mechanical) hard drive with a SSD.

SSD

- expensive, faster, smaller not mechanical, quieter

↳ if you can't replace entire storage, use SSD for OS and software + store your data on a normal, mechanical drive.

★ Network ★

→ Higher network = better

→ more data can be transferred in the same amount of time.

→ Mbps/Gbps

↳ Switches

→ Critical factor when a lot of connecting to other computers or resources (such as storage) over a network.

↳ if not doing much networked computing, not worth worrying about.

★ Graphic Processing Ability ★

Multiple factors

1. Speed + number of processing cores on the GPU chip.
2. Speed + amount of memory on the card
3. Speed of its communication with the motherboard.

- better graphics card = increase the performance when doing graphics-intensive tasks

↳ imp. for gamers playing competitive graphics-intensive games such as FPS (First Person Shooters).

- If you don't use the computer for any of the above-mentioned tasks, then GPU performance is not important at all.

↳ The separate processor chip on the card is the actual GPU.

★ Bus Performance ★

- Bigger = Better

↳ speed @ which data is moved between the CPU and other parts of the computer system (memory, GPU, storage)

- bus speed = MHz/GHz + # of lanes/channels

- buy new motherboard with new RAM + CPU to take advantage of faster bus

least significant factor + not sensible to replace all main working parts of comp.

★ memory ★

→ bigger = better
→ where computer keeps the data or instructions it is working with

→ faster than magnetic storage so keeping data in memory is faster than constantly swapping between storage and memory

↳ ∴ adding more memory is often the cheapest + simplest way to improve performance

Hardware Requirements

① Home or Personal Use

- limited office tasks
- Internet banking
- e-mail + browsing the web
- social networking
- Skype
- view + share photos
- entertainment

② SOHO (Small Office Home Office) Users

↳ entry-level desktop for admin functions

- account or billing
- databases with clients, suppliers, stock, etc
- planning and scheduling, etc

(architects, engineers, etc)

- workstation to design their architectural or engineering plans and models.

③ Power Users

↳ hardcore gamers, architects, engineers, video editing professionals, scientists

- high-end specs

↳ fast processors

→ large memory + storage

→ specific hardware related to interests at job.

→ most of the advanced functions of the software they use.