Laptop Purchasing Guide

Tips and Information
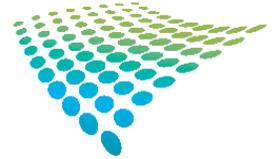
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Introduction

Buying a laptop should be a cake-walk activity if you are aware of all of it's hardware and software components and also if you are able to map your requirements with the exact machine being offered. Agilytics presents this e-guide to help you with the information and tips before you spend a fortune on a laptop.

Typically there are five major categories of information: -

1. Performance 2. Display 3. Operating System 4. Ports and Connectivity 5. Design

Let's get through these categories one by one.

Performance

Before we tell you more about what drives a laptop's performance, let's begin with the question – "How will you use your laptop?"

Light use	Medium use	Heavy and Demanding use
Simple, everyday activities like surfing the web, email and social media, watching movies or streaming content.	Typing for work, browsing the web, editing documents and photos and basic gaming. This could include students or professionals who do a lot of research and could have multiple documents or tabs open at a time.	Includes content creation, heavy programming, specialized applications such as AutoCAD, Photoshop and MATLAB, as well as heavy gaming.

Performance = Processor + RAM + Internal Memory + Battery + Graphics Card

A laptop's performance is based on 5 main pillars.

1. Processor   2. RAM   3. Internal storage
4. Battery   5. Graphics card

Each laptop's specifications are based on different combinations of these 5 aspects.
Example: Intel Core i5 processor, 4 GB RAM, 500 GB storage, Nvidia graphics card, 41 Watt-hour battery capacity.

1.a. Processor

- The processor is your computer's brain. The more powerful a brain, the more it can do and do it faster.
- Better the Processor, the more you can get done on your laptop.

Processor Types:

- Laptop processors are made primarily by two companies – Intel and AMD.
- Intel has its Pentium, Celeron and Core i3, i5, i7 & i9 series (in increasing order of processing power).
- AMD has A, FX and Ryzen series of processors (in increasing order of processing power).

Here's a breakdown of what makes each processor series ideal for which kind of user.

	Atom	Celeron	Pentium	Core i3	Core i5	Core i7	Core i9
General performance	Basic	<	<	<	<	<	Highest
Use case	• Browsing, watching movies • Often used in tablet and netbooks • Not suited for content creation	• Browsing, watching movies, email	• Browsing, watching movies, email. • Light productivity work e.g. MS Office	Everything that a Pentium can do + multitasking, better HD playback.	Everything that a Core i3 can do plus: • Light Gaming • Photo editing • Heavy Excel usage	Everything that a Core i5 can do + • Professional photo editing • Video editing • Heavy Gaming	• Hardcore gaming, • heavy 3D modelling & rendering
Cores	1-4 cores	2-4 core	2-4 cores	2-4 cores	2-4 cores	2-6 cores	8 cores
Indicative Clock speed	1.3 GHz - 1.6 GHz	1.1 GHz - 3.7 GHz	1.2 GHz - 3.7 GHz	1.9 GHz - 4.0 GHz	1.9 GHz - 4.0 GHz	2.40 GHz - 4.00 GHz	2.40 GHz - 5.00 GHz

	AMD E2	AMD A4 & AMD A6	AMD A9, AMD A10 & AMD A12	AMD Ryzen 3	AMD Ryzen 5	AMD Ryzen 7
General performance	<	<	<	<	<	Highest
Use case	Browsing, social media	Browsing, social media, watching HD content	Enhanced HD streaming and multitasking	Watching videos, streaming and multitasking	Multitasking, gaming and content creation	Hard core gaming and content creation
Cores	2 cores	2-4 core	2-4 cores	2-4 cores	4 cores	6 cores
Indicative Clock speed	1.8 GHz - 2.8 GHz	1GHz - 2.0 GHz	2.4GHz - 3.0 GHz	2.0GHz - 2.6GHz	2.0GHz-3.2GHz	2.2GHz - 3.3GHz

1.b. RAM

More RAM = Better Multi-tasking

- RAM stands for Random Access Memory and is what stores all the open apps, files and games you may be playing
- More RAM allows more of them to be running simultaneously.
- Typically laptops come with 4, 8 or 16GB of RAM.

RAM Type

- DDR4: Faster, efficient power consumption
- DDR3: Older, slower & consumes more power

PRO TIP
Buy a laptop with DDR4 RAM as it saves power, improves battery life, and future-proofs your laptop. DDR3 RAMs are cheaper, but there is a good chance that DDR3 may soon be obsolete, and any upgrades or replacements will not be possible.

Upgradability

- With time, the applications and operating system you use will be upgraded to newer versions, and would need more RAM. This may cause some slow-down in performance or the system to hang frequently.
- This is when upgrading the RAM can keep the laptop usable for longer, especially if you've bought a laptop with just 4GB of RAM.

PRO TIP
For most users, we recommend 8GB RAM given how much RAM programs use today. However, if you plan on gaming or using heavy software like Photoshop, AutoCAD etc, you should consider at least a 16GB RAM.

1.c. Internal Storage

- This is also referred to as the hard drive size or capacity of the laptop.
- Storage on a laptop is where the operating systems (like Windows or Mac OS) are installed. This is also where all the documents, photos, apps, games and movies are stored.
- Without sufficient storage, you will not be able to store anything, and it will also impact the speed of performance.
- For those on a budget, HDDs are a better option while those into gaming or media editing are best off choosing an SSD

Usually, laptop storage is of 3 types: Hard Disk Drive (HDD), Solid-State Drive (SSD) & Solid-State Hybrid Drive (SSHD)

Internal Memory Types

Hard Disk Drive (HDD)	Solid-State Drive (SSD)	Solid-State Hybrid Drive (SSHD)
A mechanical hard disk drive (often shortened to HDD) is a type of storage which gives you lots of capacity on a budget. A HDD is considered slow because it has moving parts that spin to read data	A solid state drive (sometimes called SSD) is a type of drive that is faster, but also more expensive, than HDDs SSDs can start up Windows in less than 5 seconds. Programs will run faster if you're using an SSD. However, all this performance comes at a higher price.	SSHD is a combination of the HDD and the SSD, which means you not only get large storage space, but everything loads faster too. Example: An SSHD unit could have a 128GB SSD paired with a 500GB or 1TB HDD. The Operating System (OS) would be installed on the SSD along with other programs while the HDD part is used for storing documents, movies etc. This means that your OS and programs start up faster.

1.d. Battery

Bigger Battery = More hours of usage (& also heavier laptop)

- The battery is what keeps your laptop running when it isn't plugged into the power outlet.
- Usually measured in Watt-Hour (WHr). More WHr = More battery life.
- Bigger batteries usually mean heavier laptops.
- Things like screen brightness, Wi-Fi and Bluetooth connectivity, type of processor and even the load on your CPU will impact battery life.
- Gaming, video playback, heavy editing etc can all speed up battery drain noticeably.

1.e. Graphics Card

- A graphics card is a dedicated chip inside your laptop, responsible for the quality of visuals you see on your screen.
- Just like RAM the more the GBs in your graphics card, the smoother your games will run, even in Full HD or 4K resolution.
- Photo and video editing software like Photoshop, design software like AutoCAD, and of course most modern games require a dedicated graphics card to function smoothly.

Nvidia graphics cards	Use case
GTX 1050	Casual gaming & photo editing
GTX 1050Ti	
GTX 1060	
GTX 1650	
GTX 1660	
GTX 1660 Ti	
GTX 1070	Heavy / hardcore gaming: Using these graphics cards it is possible to play the most demanding games with high resolution & high FPS (Frames per second) settings Heavy video editing
GTX 1070Ti	
GTX 1080	
GTX 1080Ti	
RTX 2060	
RTX 2070	
RTX 2080	
RTX 2080Ti	

AMD graphics cards	Use case
AMD RX 550	
AMD Radeon RX 560	Casual gaming & photo editing
AMD Radeon RX 570	
AMD Radeon RX 580	
AMD Radeon RX 590	
AMD Radeon RX Vega 56	Heavy / hardcore gaming: Using these graphics cards it is possible to play the most demanding games with high resolution & high FPS (Frames per second) settings Heavy video editing
AMD Radeon RX Vega 64	
AMD Radeon RX Vega 64 Liquid cooled	
AMD Radeon VII	
AMD Radeon RX 5700	
AMD Radeon RX 5700 XT 50th Anniversary	
AMD Radeon RX 5700 XT 50th Anniversary	

Integrated vs Dedicated

Integrated	Dedicated
Integrated graphics cards are present on most laptops and are suited to let you watch movies or do very light photo-editing. Usually Intel & AMD processors contain an integrated graphics chip which is sufficient for everyday needs.	Dedicated graphics cards are required for heavy gaming, photo & video editing as they are more powerful than integrated graphics card. Nvidia and AMD are 2 popular companies making dedicated graphics cards.

PRO TIP
Unless you plan to use the laptop for heavy gaming, an integrated graphics should serve your purpose.

Display

While choosing the right display for your laptop, you will need to decide the right **screen size**, and the right **resolution** for your usage.

2a. Screen size

- Screens come in several sizes, all measured diagonally. The most common screen size is 15.6 inches, but there are also 11 inch, 13 inch and other screen sizes, going up to 17.3 inches on some hardcore gaming laptops.
- A larger screen size is ideal for gaming, watching movies, photo or video editing and complex data visualization; while a smaller screen size is lighter and easier to carry around.
- Do remember the bigger the screen, heavier the laptop. This is because of all the glass that goes into making the display, which has to be made durable and hence, the added weight.

PRO TIP
If you need to carry your laptop around a lot, then consider a laptop with a display between 11 to 14 inches.

2b. Display Resolution
Higher screen resolution = Sharp, clear and rich visual experience.

- The most common screen resolutions are HD Ready, Full HD and 4K.
- Screen resolution is measured as the pixel count and is mentioned in horizontal and vertical pixel counts.

Display Resolution

HD or HD ready	Full HD or 1080p	Ultra HD and 4K
Available in entry level & budget laptops, this display has 1366 x 768 pixel count.	Available in high end laptops, this display type has 1920 x 1080 pixel count and double the pixels and clarity vs HD screens.	With 3840 X 2160 pixels, it has 4 times the resolution of Full HD and is therefore called 4K.
Sufficient to watch movies, basic graphic games or working on documents.	They offer a sharper visual experience to enjoy HD movies or graphic rich games	These produce even sharper images and are ideal for high resolution video editing, watching 4K videos or graphic intensive gaming.
It is a cost efficient display.		It is the most expensive display

PRO TIP

Full HD is currently the recommended resolution as it is a balance between cost, good visuals and battery life.

Other factors you should consider while choosing the right display

2.1a. Screen Type: IPS (in-plane switching) vs. Non-IPS (in-plane switching)

- IPS displays show life-like colors, the way they were meant to be, all while allowing 2-3 people to huddle around your screen without any loss in brightness.
- For those looking for the best visual experience which means great looking colors and viewing angles, choose a laptop with an IPS display.
- If you are on a budget, you can just go for a display that is not IPS. It will also bring the cost of the laptop down.

PRO TIP

For most use cases, non-IPS displays would work, however, if you're into creative work or like watching movies with friends, then an IPS display makes all the difference.

2.1b. Touch screen:

These are normally seen in 2-in-1 laptops. Touchscreen displays enable editing directly on the screen with the help of a stylus or screen scrolling, zooming and other such controls using your fingers. This makes your laptop experience similar to that of a tablet or a smartphone.

2.1c. Refresh Rate

- Refresh rate is the number of times an image is changed per second on the laptop screen.
- It is measured in Hertz or Frames per Second (FPS).
- For gaming purposes, a higher refresh rate is recommended.
- The standard refresh rate for laptops is 60Hz. If the refresh rate is low, your screen may not be able to keep up with the fast-paced graphics of gaming.
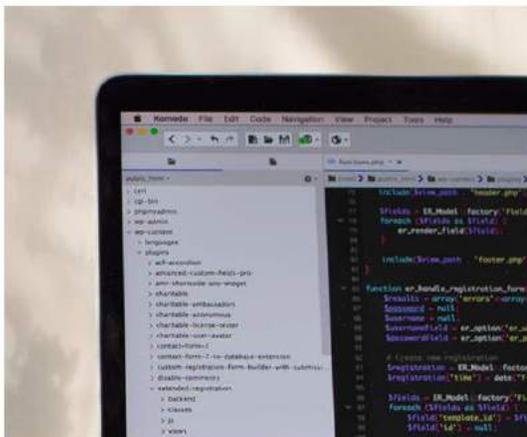
2.1d. Bezels

- Bezels are the black plastic border that surround the screen on your laptop.
- They may not look very pretty, but they serve to protect your screen from accidental damage.
- Similar to smartphones, Bezel-less is the new trend which allows laptop makers to give you bigger displays without increasing the size of the body.

2.1e. Matte vs. Glossy Display
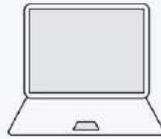
- Matte displays have started becoming more common as they don't have reflections, and are best suited for people who do a lot of content creation and need absolute clarity for work. These displays come at a premium cost.

- Glossy displays are very common on laptops and generally make the colors on the monitor pop, but they also mean reflections.

Operating System

Operating System (OS)

- The operating system controls the hardware of the laptop, and allows other softwares to communicate with the hardware
- It manages all software and hardware, including files, memory and connected devices.
- It lets you interact with your laptop and your programs in the simplest possible way.

Here's a list to help you choose from the various operating systems available to power your laptop:

|	⊞ Windows	🍎 Mac OS	⊚ Chrome OS	Δ Linux	DOS
Usage	It is the most commonly used Operating System. However, all Laptops may not come with preinstalled Windows. A DOS laptop will need separate purchase and installation of Windows.	All Apple Laptops are preinstalled with Mac OS. The software and hardware on MacBooks are designed by Apple to work in sync, providing a smooth performance.	Works on Chromebooks. While there are a few offline apps, high quality internet is required to work effectively as it is primarily cloud-based.	It is an open source operating system commonly used by programmers. However, it is not as intuitive as Windows and not advised for most normal users.	Most Basic OS. However no other software will operate on the device. The user needs to install Windows or Linux as per her needs.
Compatible Software	Any software to be installed on the machine needs to be compatible with its Operating System. Most common softwares are Windows compatible.	Any software to be installed on the machine needs to be compatible with Mac OS.	Any software to be installed needs to be compatible with Chrome OS.	Any software to be installed on the machine needs to be compatible with the Linux distribution. Compatible software options are usually more limited than for Windows.	No compatible softwares available – needs to have Windows/Linux installed first.
Preinstalled Software	Trial versions of a few softwares are preinstalled. Not all Windows laptops come with MS Office full version preinstalled. Laptops with preinstalled full MS Office versions will be called out separately by the manufacturer.	Apple's own software like Pages and Keynote are preinstalled. MS Office to be purchased separately.	Limited software loaded with others available as apps from Google Play store. It has Google's built-in virus and malware protection.	May vary by Linux distribution. Easily downloadable open-source software such as VLC, LibreOffice, Mozilla Firefox is available on the Internet.	None

PRO TIP

If you plan to use your laptop for a small business or other professional usage, it might be worthwhile to consider a device with Windows 10 Pro, which has more advanced security features. However, laptops with Windows 10 Pro are usually significantly more expensive.

PRO TIP

If you plan to buy a Linux/DOS based machine, and later install Windows, make sure you contact a professional or download the correct drivers only from the manufacturer's website.

Ports and Connectivity
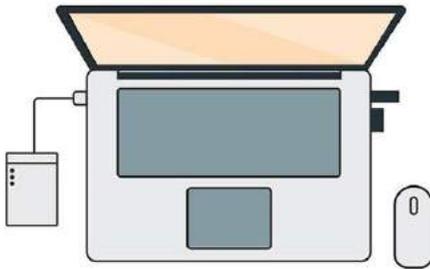
- The ports & connectivity options on your laptop define what all you can connect with your laptop
- You need these to connect with pen drive, external hard disk, mouse, projector, TV, headphones or even to charge your phone.
- Make sure your laptop has enough ports for connecting multiple devices simultaneously, especially the ones you will use most often.

Different ports serve different purposes, but here are a few essential ones to look for:

USB type -A

- These ports are used to connect regular USB devices like mobile phones, Pen drives, etc.
- A higher number with the USB indicates a faster speed. (Example: USB 3.1 is faster than USB 3.0 which is faster than USB 2.0)

USB type - C

- These ports provide faster data transfer and smaller sized chargers compared to USB A. You can use these to connect universal chargers and docks.

Card reader

- Use this port to directly connect microSD or SD memory cards to copy data from your DSLR or phone.

HDMI

- With this connector you can connect your laptop with an LED TV or projector.

VGA port

- This is an older type of connector for TVs, monitors and projectors.

Thunderbolt

- This is the latest and fastest type of connector for laptops. Thunderbolt is a combination of Type C connector and DisplayPort and allows charging, connection with peripherals or displays, with a single port.

PRO TIP
You can tell if a laptop has Thunderbolt enabled USB-C ports by looking for a lightning bolt next to it.

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Design

Which form factor and design should I choose?

Basic Laptops | For everyday and light weight use

- Basic laptops have a traditional clam-type design, with a screen that folds down onto the keyboard and mousepad.
- They are generally less expensive than touchscreen or 2-in-1 models.
- These are the most common and affordable laptops and are sufficient for most users.

Thin and Light weight Laptops | For people on the go

- These are laptops below 1.8kgs in weight and usually have a display size of 14 inches or lower.
- They are slim, portable, and lightweight — meaning they're a great choice for those who want a powerful device they can take with them on the go.
- Thin and light weight laptops are generally considered to be innovative in their design as they pack in top end specifications in a thin and light body.
- Nowadays there are thin and light laptops available from all top brands in the market, as of 2019

Touchscreen

- Laptops with touchscreen displays enable scribbling on screen to edit documents directly with the help of a stylus or screen scrolling, zooming and other such controls using your fingers.
- This makes your laptop experience similar to that of a tablet or a smartphone.

2-in-1 Laptops

2-in-1 Laptops are versatile devices that can function as both a laptop and as a tablet.

There are two types of 2-in-1 Laptops : Detachable and Convertible.

1. Detachable   2. Convertible

This is ideal for those who want the flexibility to use the laptop in the traditional laptop mode or tablet mode.

1. Detachable 2-in-1

- With a detachable, the display of the laptop actually detaches from the keyboard, meaning you can use it like a tablet.
- Some detachable 2-in-1s have a limited space, processor and battery capacity. Hence, detachable 2-in-1s are often slightly lower-powered than convertible ones.
- Some detachable 2-in-1s overcome this by including two processors (one in the display, the other in the main body), or only including a small battery in the display portion, and a larger battery to be used when the display and keyboard are attached.

2. Convertible 2-in-1

- In a 2-in-1 convertible laptop the screen cannot be detached.
- Instead, the screen can rotate 360 degrees (all the way around), meaning the keyboard goes on the bottom and the display goes on the top.
- The resulting form is a little thicker version of a tablet, but often more powerful thanks to the extra space for internal components.

Gaming Laptops

- Gaming laptops are generally equipped with powerful hardware and a sturdy design, IPS display and a dedicated graphics card.
- Generally, gaming laptops are heavier and bulkier than basic or business laptops, but with all that extra space, manufacturers are able to fit more powerful processors, widescreen IPS displays with higher refresh rates, larger batteries, and often even graphics processing units, or GPUs.
- These are ideal for usage in one place and compromise on portability while delivering superior performance.

Additional things to keep in mind

Lid & body

- The lid and body - typically made from plastics or aluminums - should be adequately flexible and light weight.
- Most laptops have an angle of rotation of around 90 to 120 degrees. There are a few laptops in which the lid can rotate 180 degrees, meaning lower chances of breakage. Convertible 2-in-1s allow for a rotation of up to 360 degrees.

Keyboard

- Chiclet style keyboards generally have flat and shallow keys allow for easy typing.
- The keyboard's spacing and depth should allow for comfortable typing.
- Many laptops come with a backlit keyboard, look out for this feature in case you wish to use your laptop in the dark.

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