



TAN MONIVISAL

USING WEB SCRAPPER TO EXTRACT DATA FOR ANALYSIS

Introduction

To provide a guide for those who have light knowledge in the market of portable computers and plan to purchase their new laptops, this report will categorize laptops by comparing products across various brands based on their Central Processing Unit (CPU). There are many other factors to consider when choosing a laptop, but CPU plays the most important role in determining the laptop's performance.

Product information used for the analysis are extracted from a Gold One's website, which is one of well-known computer vendors in Cambodia. Since the website is rich in product information and frequently updated, its data will serve as a basis for local laptop market analysis.

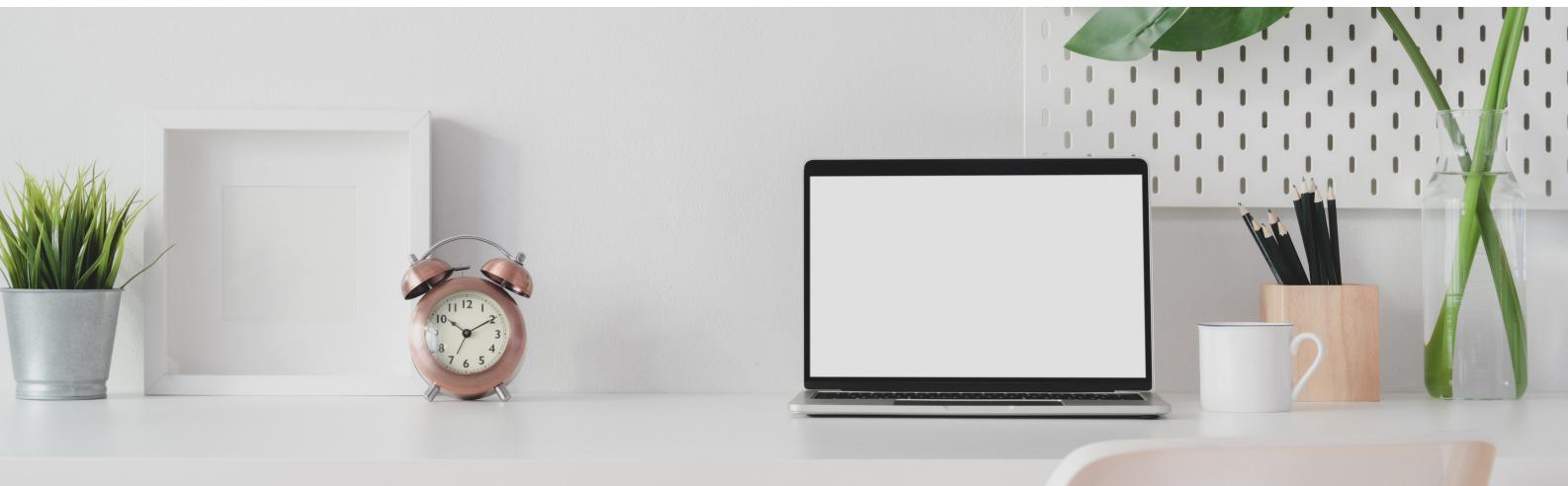
Data Scraping

A web scraping tool, known as "Web Scraper", is used to extract data from the website. In this analysis, only the data on "Laptop" category are collected. Laptop has two sub-categories, including Notebook & Convertible and Gaming Laptop.

A sub-category section has several pages and lists 24 products per page. When clicked on a product, it will lead to a single page that contains details of the product. Only some information are selected from that single page, which include product name, brand, product code, price, and its description.

As shown in the Selector Graph, the pagination selector acts as a child selector to the sub-category selector and a parent selector to the product selector. Therefore, the pagination selector will navigate through all unique pages under each sub-category section.

The screenshot shows a website's navigation structure and product listing. At the top, there are links for LAPTOP, DESKTOP, GAMING, PERIPHERAL, BLOG, and PC BUILDER. Below this, there are sections for FREE QUOTATION and PROFESSIONAL CONSULTING. The main content area shows a navigation tree for 'Notebook & Convertible' and 'Gaming Laptop'. A list of Acer Swift 3X laptops is displayed with their star ratings and prices: \$699.00, \$679.00, \$899.00, and \$899.00. Below this is a pagination bar showing pages 1 to 8. The bottom part of the screenshot shows a detailed product page for an Acer Aspire 3 laptop, with a red box highlighting the 'DESCRIPTION' section which includes technical specifications like 'Processor: Intel® Core™ i5 Processor (Core i5-1135G7 / 8GB / SSD 256GB M2 / 14" FHD)' and 'Price: \$329.00'.

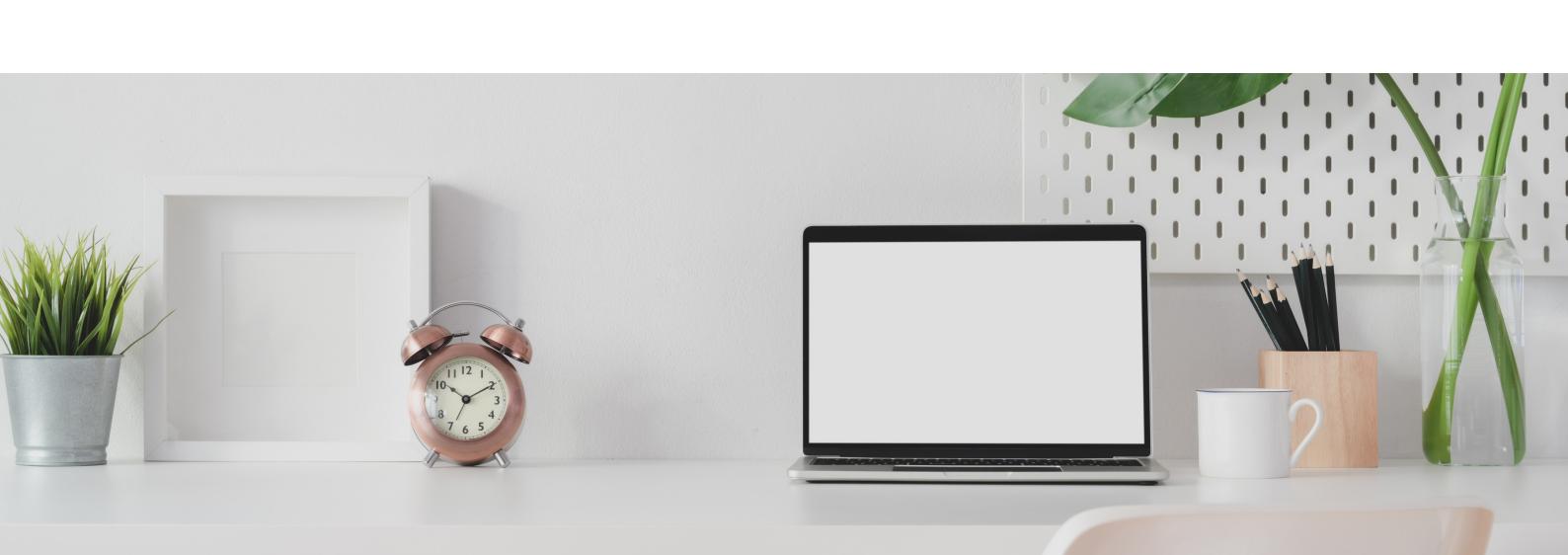


Data Cleaning

The dataset extracted from the website has to be cleaned in order to improve the usability of the data. To do this, Excel is primarily used for the whole cleaning process. String values contained in "product" and "specs" columns are broken down into other several columns to get meaningful attributes. For the product column, values other than the product name are omitted. And in the spec column, string values are extracted and formed into other attributed columns such as cpu, processor, ram, storage, graphic 1, graphic 2 and display.

web-scrap	web-scrap	laptop	laptop-hr	category	category-1	subcatego	subcatego	pagina	paginator	product	product-h	brand	price	product c	specd
16.33.1067	https://w1	LAPTOP	https://w1	Laptop	https://w1	Gaming L	https://w1	2	https://w1	Lenovo Ide	https://w1	LENOVO	\$959.00	Product C	FREE : Orig
16.33.1064	https://w1	LAPTOP	https://w1	Laptop	https://w1	Gaming L	https://www.goldonecompu	Asus ROG	https://w1	ASUS	https://w1	ASUS	\$999.00	Product C	FREE : Orig
16.33.1070	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	7	https://w1	Microsoft	https://w1	Microsoft	\$599.00	Product C	FREE : Sree
16.33.1070	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	7	https://w1	MSI Made	https://w1	MSI	\$599.00	Product C	FREE : Sree
16.33.1073	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	6	https://w1	MacBook	https://w1	Apple	\$1,299.00	Product C	FREE : Sree
16.33.1067	https://w1	LAPTOP	https://w1	Laptop	https://w1	Gaming L	https://w1	2	https://w1	Lenovo Le	https://w1	LENOVO	\$999.00	Product C	FREE : Bag
16.33.1078	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	3	https://w1	Asus ZenB	https://w1	ASUS	\$999.00	Product C	FREE : Sree
16.33.1079	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	2	https://w1	Asus Vivo	https://w1	ASUS	\$879.00	Product C	FREE : Bac
16.33.1065	https://w1	LAPTOP	https://w1	Laptop	https://w1	Gaming L	https://www.goldonecompu	Acer Nitro	https://w1	ACER	https://w1	ACER	\$949.00	Product C	FREE : Bac
16.33.1069	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://www.goldonecompu	Acer Aspire	https://w1	ACER	https://w1	ACER	\$799.00	Product C	FREE : Carr
16.33.1076	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	4	https://w1	Dell Vostro	https://w1	DELL	\$859.00	Product C	FREE : Carr
16.33.1070	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	4	https://w1	Dell Inspri	https://w1	DELL	\$929.00	Product C	FREE : Carr
16.33.1065	https://w1	Laptop	https://w1	Laptop	https://w1	Gaming L	https://www.goldonecompu	AORUS 15	https://w1	Gigabyte	https://w1	Gigabyte	\$999.00	Product C	FREE : Orig
16.33.1076	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	4	https://w1	Dell Inspri	https://w1	DELL	\$969.00	Product C	FREE : Carr
16.33.1069	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	8	https://w1	XPG XENIA	https://w1	Adata	\$999.00	Product C	FREE : Bac
16.33.1077	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	3	https://w1	Dell Inspri	https://w1	DELL	\$919.00	Product C	FREE : Carr
16.33.1074	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	5	https://w1	Lenovo Th	https://w1	LENOVO	\$999.00	Product C	FREE : bag
16.33.1078	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	2	https://w1	Asus Viv	https://w1	ASUS	\$939.00	Product C	FREE : Bac
16.33.1067	https://w1	LAPTOP	https://w1	Laptop	https://w1	Gaming L	https://www.goldonecompu	Asus ROG	https://w1	ASUS	https://w1	ASUS	\$999.00	Product C	FREE : Orig
16.33.1069	https://w1	LAPTOP	https://w1	Laptop	https://w1	Notebook	https://w1	8	https://w1	XPG XENIA	https://w1	Adata	\$999.00	Product C	FREE : Bac

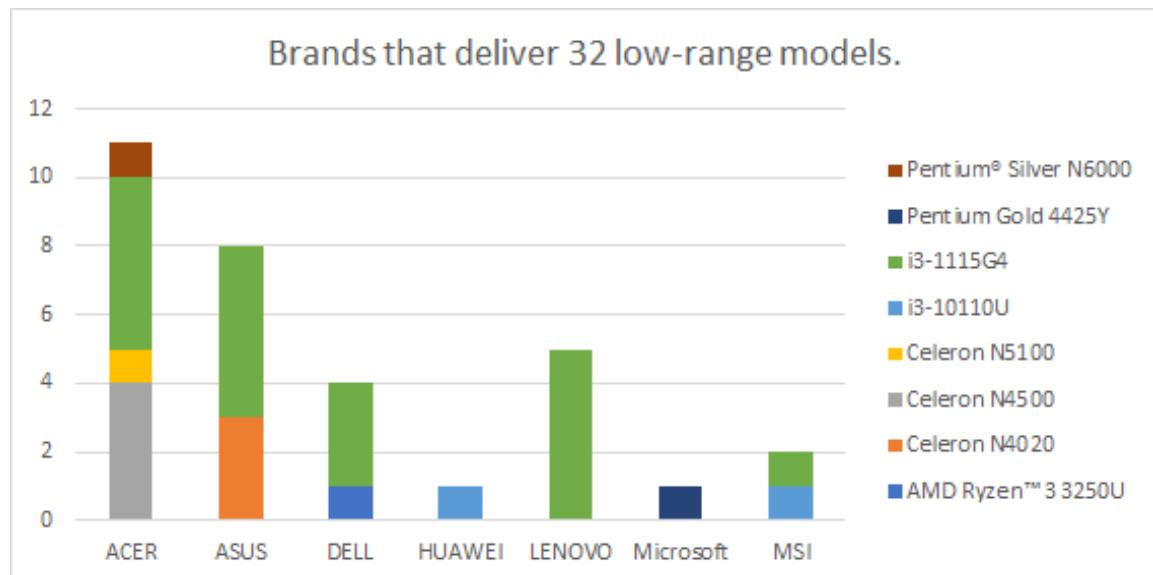
laptop-hr	display	product	prod-due-req	brand	cpu	price	processor	ram	storage	graphic1	graphic2	display
Notebook & Convert	I	Acer Swift 3 SF314-55-56J3	https://w1	ACER	\$679	i5-1135G7	Processor or (Core)	8GB DDR4	500 256GB M.2	Inte Xe Graphics	14" FHD (1920x1080)	B
Notebook & Convert	I	Acer Swift 3 SF314-55-57D1	https://w1	ACER	\$679	i5-1135G7	Processor or (Core)	8GB DDR4	500 256GB M.2	Inte Xe Graphics	14" FHD (1920x1080)	B
Notebook & Convert	I	Acer Swift 3X SF314-510C	https://w1	ACER	\$699	i5-1135G7	Processor or (Core)	8GB LPDDR4X 500 256GB PCIe NVMe	Inte Xe Max With 4GB Dedicated VRAM	14" FHD (1920x1080)	B	
Notebook & Convert	I	Acer Swift 3X SF314-510C	https://w1	ACER	\$679	i5-1135G7	Processor or (Core)	8GB LPDDR4X 500 256GB PCIe NVMe	Inte Xe Max With 4GB Dedicated VRAM	14" FHD (1920x1080)	B	
Notebook & Convert	I	Acer Swift 3X SF314-510C	https://w1	ACER	\$699	i5-1135G7	Processor or (Core)	8GB LPDDR4X 500 256GB PCIe NVMe	Inte Xe Max With 4GB Dedicated VRAM	14" FHD (1920x1080)	B	
Notebook & Convert	I	Acer Swift 3X SF314-510C	https://w1	ACER	\$699	i5-1135G7	Processor or (Core)	8GB LPDDR4X 500 256GB PCIe NVMe	Inte Xe Max With 4GB Dedicated VRAM	14" FHD (1920x1080)	B	
Notebook & Convert	I	Acer Swift 3 SF314-55-54-C	https://w1	ACER	\$399	i5-1135G7	Processor or (Core)	8GB DDR4	500 256GB M.2	Intel UHD Graphics	14" FHD (1920x1080)	B
Notebook & Convert	I	Acer Swift 3 SF314-2021	https://w1	ACER	\$449	i5-1135G7	Processor or (Core)	8GB DDR4	500 256GB M.2	Intel UHD Graphics	14" FHD (1920x1080)	B
Notebook & Convert	I	Acer Swift 3 SF314-511-37XK	https://w1	ACER	\$599	i5-1135G7	Processor or (Core)	8GB DDR4	500 256GB M.2	Integrated Graphics	14" FHD (1920x1080)	B
Notebook & Convert	I	Acer Swift 3 SF314-511-37XK	https://w1	ACER	\$469	i5-1135G7	Processor or (Core)	8GB DDR4	500 256GB M.2	Intel UHD Graphics	14" FHD (1920x1080)	B
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$499	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	Inte Xe Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$629	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	NVIDIA GeForce MX330 with Intel Iris Xe Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$629	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	NVIDIA GeForce MX330 with Intel Iris Xe Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$629	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	NVIDIA GeForce MX330 with Intel Iris Xe Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$599	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	Intel UHD Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$599	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	Intel UHD Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$599	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	Intel UHD Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$599	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	Intel UHD Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$599	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	Intel UHD Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$599	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	Intel UHD Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$599	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	Intel UHD Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$599	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	Intel UHD Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Aspire 5 A515-54-58F6	https://w1	ACER	\$599	i5-1135G7	Processor or (Core)	8GB DDR4	256GB M.2 PCIe NVMe	Intel UHD Graphics	14" FHD (1920x1080)	F
Notebook & Convert	I	Acer Predator Triton 300	https://w1	ACER	\$1,599	i7-10750H	Processor or (Core)	16GB DDR4	500 1TB NVMe M.2 (2)	NVIDIA GeForce RTX 2080 with Intel Iris Xe Graphics	14" FHD (1920x1080)	B
Gaming Laptop	I	Acer Nitro 5 AN515-57-50F9	https://w1	ACER	\$999	i5-10400H	Processor or (Core)	16GB DDR4	500 128GB M.2 PCIe NVMe	NVIDIA GeForce GTX 1650 (4GB VRAM)	15.6" FHD (1920x1080)	B
Gaming Laptop	I	Acer Nitro 5 AN515-57-50F9	https://w1	ACER	\$999	i5-10400H	Processor or (Core)	16GB DDR4	500 128GB M.2 PCIe NVMe	NVIDIA GeForce GTX 1650 (4GB VRAM)	15.6" FHD (1920x1080)	B
Gaming Laptop	I	Acer Nitro 5 AN515-57-50F9	https://w1	ACER	\$999	i5-10400H	Processor or (Core)	16GB DDR4	500 128GB M.2 PCIe NVMe	NVIDIA GeForce GTX 1650 (4GB VRAM)	15.6" FHD (1920x1080)	B
Gaming Laptop	I	Acer Nitro 5 AN515-57-50F9	https://w1	ACER	\$1,599	i7-10750H	Processor or (Core)	16GB DDR4	500 128GB M.2 PCIe NVMe	NVIDIA GeForce GTX 2070 (8GB VRAM)	15.6" FHD (1920x1080)	B
Gaming Laptop	I	Acer Nitro 5 AN515-57-50F9	https://w1	ACER	\$1,599	i7-10750H	Processor or (Core)	16GB DDR4	500 128GB M.2 PCIe NVMe	NVIDIA GeForce GTX 2070 (8GB VRAM)	15.6" FHD (1920x1080)	B
Notebook & Convert	I	ASUS XENIA X510QG-1129EX	https://w1	Adata	\$1,199	i5-1135G7	Processor or (Core)	16GB DDR4	32GB 500 128GB M.2 PCIe NVMe	Intel Iris Xe Graphics	14" FHD (1920x1080)	I



Laptop Category: Low-range Models

Low-range laptops available in the website use three types of CPUs, which are Pentium, Celeron, i3 and AMD Ryzen 3. Each of these types has different variations denoted by the number after it, and higher number also indicate new versions and some performance improvements.

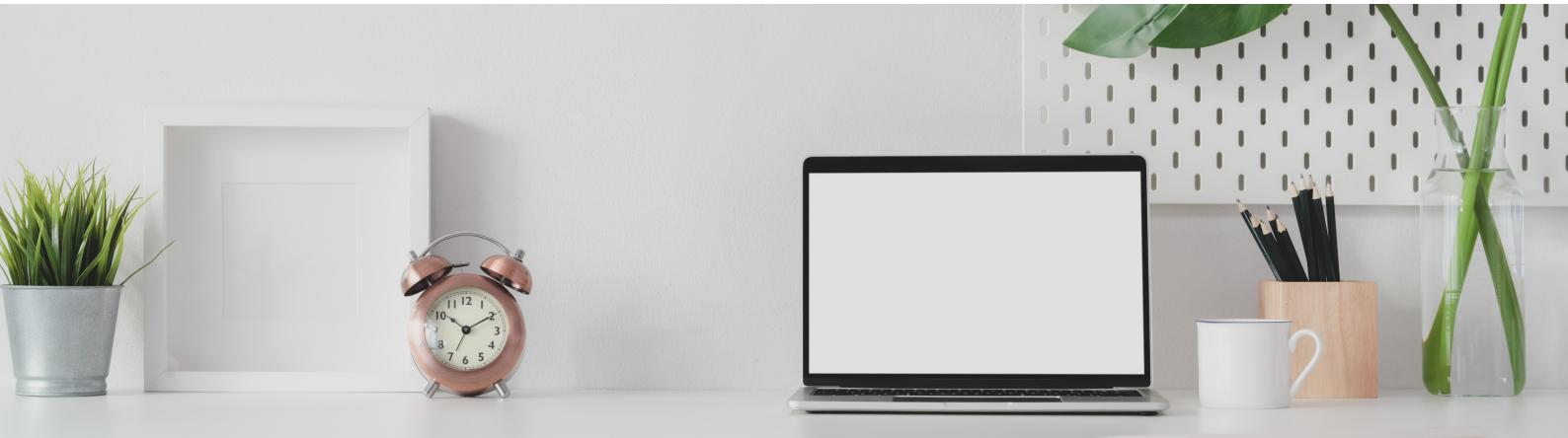
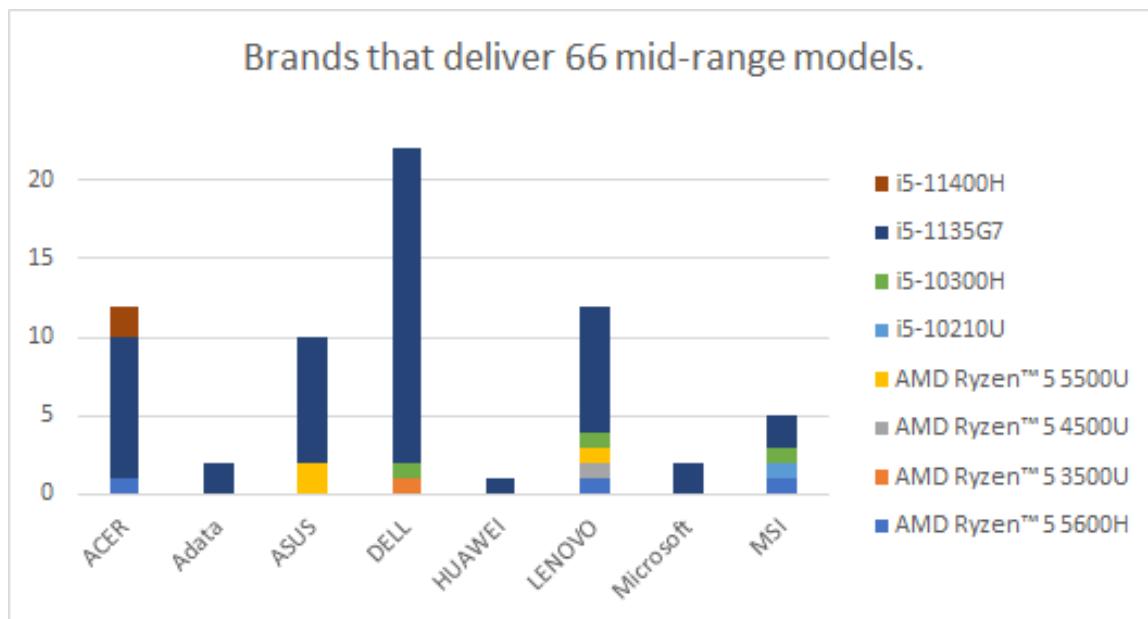
According to the graph, there are seven brands which produce a total of 32 low-range models. And ACER is a major brand that offers more choices of CPUs, which include Celeron N4500, Celeron N5100, i3-1115G4 and Pentium Silver N6000.



Laptop Category: Mid-range Models

The graphs shows that there are eight brands that produces a total of 66 mid-range laptops. In addition, LENEVO has laptops that use various CPU options such as i5-1135G7, i5-10300H, AMD Ryzen 5 5500U, AMD Ryzen 5 4500U and AMD Ryzen 5 5600H.

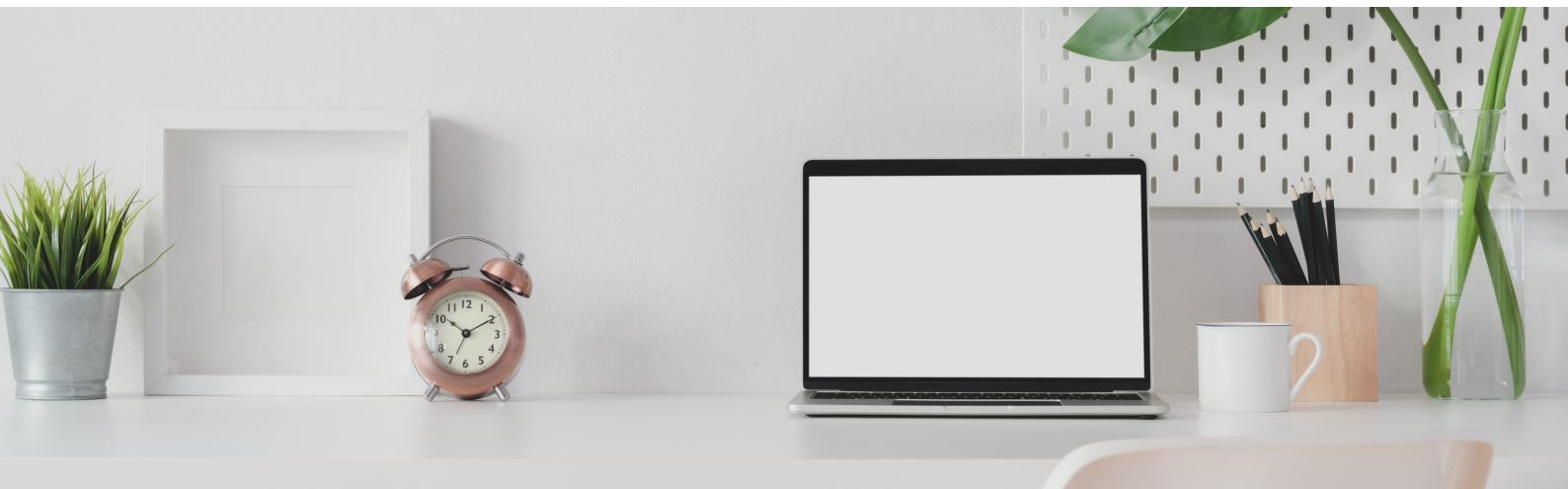
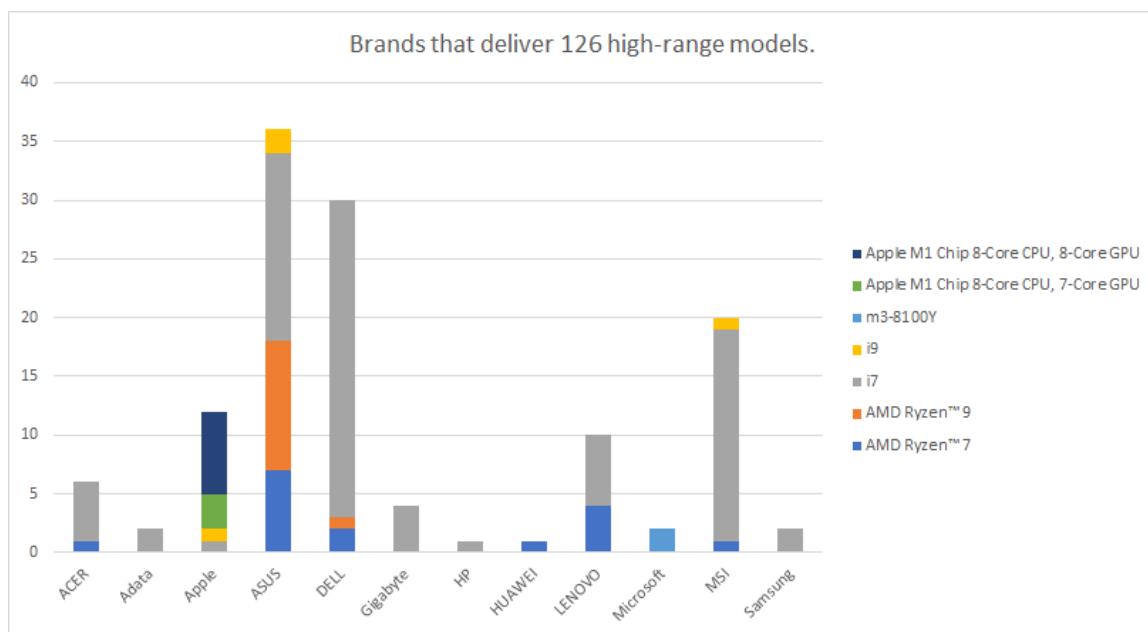
Noticeably, DELL dominates the mid-range category as it produces 20 models that use CPU i5-1135G7, other two models that use CPU i5-10300H and AMD Ryzen 5 3500U. In general, i5-1135G7 is the most popular CPU in the mid-range category and is used by the eight brands.



Laptop Category: High-range Models

According to the graph, there are 12 brands that product a total amount of 126 models for high-range category. Interestingly, three brands, including ASUS, DELL and MSI, produce most of the high-range laptops.

Still, ASUS offers more CPU choices that include i9, i7, AMD Ryzen 9 and AMD Ryzen 7. However, DELL laptops use more core i7 than other brands in the high-range category. Also note that M1 Chip that has 8 cores is only available in Apple laptops.



Conclusion

After comparing 226 products in the Golden One's website, three main categories are formed, which include low range, middle range and high range. There are seven brands with 32 models in the low range, eight brands with 66 models in the middle range, and 12 brands with 126 model in the high range.

This analysis provides a glimpse of laptop products from various brands based on their CPU only. Therefore, when planning to purchase a new laptop, other factors should be taken into account to achieve a more accurate and inclusive perspective of a laptop product.

