

127.0.0.1:3333/project?project=2234660288450

OpenRefine

laptopData.csv

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1,303 rows

Extensions Wikibase

Extract...

Apply...

Show as: rows records

Show: 5 10 25 50 100 500 1000 rows

« first

previous

1

1000

next »

last »

Filter

1. Create project

1. Remove 30 rows

2. Text transform on 0 cells in column Company: grel.trim(value)

3. Text transform on 0 cells in column TypeName: grel.trim(value)

4. Remove column Unnamed: 0

5. Mass edit 24 cells in column TypeName

6. Mass edit 495 cells in column ScreenResolution

7. Mass edit 7 cells in column ScreenResolution

8. Mass edit 9 cells in column ScreenResolution

9. Mass edit 45 cells in column ScreenResolution

10. Text transform on 441 cells in column ScreenResolution: grel:value.replace(/Full HD|Touchscreen|IPS Panel Retina Display|IPS Panel Full HD|Quad HD+/, "")

11. Text transform on 464 cells in column ScreenResolution: grel:value.replace(/ +|IPS Panel| 4K Ultra HD | /, "")

	All	Unnamed: 0	Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu
1.	0	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 2.3GHz	8GB	128GB SSD	Intel Iris Plus Graphics 640	
2.	1	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	128GB Flash Storage	Intel HD Graphics 6000	
3.	2	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	8GB	256GB SSD	Intel HD Graphics 620	
4.	3	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.7GHz	16GB	512GB SSD	AMD Radeon Pro 455	
5.	4	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8GB	256GB SSD	Intel Iris Plus Graphics 650	
6.	5	Acer	Notebook	15.6	1366x768	AMD A9-Series 9420 3GHz	4GB	500GB HDD	AMD Radeon R5	
7.	6	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.2GHz	16GB	256GB Flash Storage	Intel Iris Pro Graphics	
8.	7	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	256GB Flash Storage	Intel HD Graphics 6000	
9.	8	Asus	Ultrabook	14	Full HD 1920x1080	Intel Core i7 8550U 1.8GHz	16GB	512GB SSD	Nvidia GeForce MX150	
10.	9	Acer	Ultrabook	14	IPS Panel Full HD 1920x1080	Intel Core i5 8250U 1.6GHz	8GB	256GB SSD	Intel UHD Graphics 620	
11.	10	HP	Notebook	15.6	1366x768	Intel Core i5 7200U 2.5GHz	4GB	500GB HDD	Intel HD Graphics 620	
12.	11	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i3 6006U 2GHz	4GB	500GB HDD	Intel HD Graphics 520	
13.	12	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.8GHz	16GB	256GB SSD	AMD Radeon Pro 555	
14.	13	Dell	Notebook	15.6	Full HD 1920x1080	Intel Core i3 6006U 2GHz	4GB	256GB SSD	AMD Radeon R5 M430	
15.	14	Apple	Ultrabook	12	IPS Panel Retina Display 2304x1440	Intel Core M m3 1.2GHz	8GB	256GB SSD	Intel HD Graphics 615	
16.	15	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 2.3GHz	8GB	256GB SSD	Intel Iris Plus Graphics 640	
17.	16	Dell	Notebook	15.6	Full HD 1920x1080	Intel Core i7 7500U 2.7GHz	8GB	256GB SSD	AMD Radeon R5 M430	
18.	17	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.9GHz	16GB	512GB SSD	AMD Radeon Pro 560	

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Undo / Redo 4 / 117

1,273 rows

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All	Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSys	
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2.	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	128GB Flash Storage	Intel HD Graphics 6000	macOS	1.2
3.	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	8GB	256GB SSD	Intel HD Graphics 620	No OS	1.8
4.	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.7GHz	16GB	512GB SSD	AMD Radeon Pro 455	macOS	1.8
5.	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8GB	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.3
6.	Acer	Notebook	15.6	1366x768	AMD A9-Series 9420 3GHz	4GB	500GB HDD	AMD Radeon R5	Windows 10	2.1
7.	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.2GHz	16GB	256GB Flash Storage	Intel Iris Pro Graphics	Mac OS X	2.0
8.	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	256GB Flash Storage	Intel HD Graphics 6000	macOS	1.2
9.	Asus	Ultrabook	14	Full HD 1920x1080	Intel Core i7 8550U 1.8GHz	16GB	512GB SSD	Nvidia GeForce MX150	Windows 10	1.3
10.	Acer	Ultrabook	14	IPS Panel Full HD 1920x1080	Intel Core i5 8250U 1.6GHz	8GB	256GB SSD	Intel UHD Graphics 620	Windows 10	1.6
11.	HP	Notebook	15.6	1366x768	Intel Core i5 7200U 2.5GHz	4GB	500GB HDD	Intel HD Graphics 620	No OS	1.8
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14.	Dell	Notebook	15.6	Full HD 1920x1080	Intel Core i3 6006U 2GHz	4GB	256GB SSD	AMD Radeon R5 M430	Windows 10	2.2
15.	Apple	Ultrabook	12	IPS Panel Retina Display 2304x1440	Intel Core M m3 1.2GHz	8GB	256GB SSD	Intel HD Graphics 615	macOS	0.9
16.	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 2.3GHz	8GB	256GB SSD	Intel Iris Plus Graphics 640	macOS	1.3
17.	Dell	Notebook	15.6	Full HD 1920x1080	Intel Core i7 7500U 2.7GHz	8GB	256GB SSD	AMD Radeon R5 M430	Windows 10	2.2
18.	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.9GHz	16GB	512GB SSD	AMD Radeon Pro 560	macOS	1.8

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Facet / Filter

Undo / Redo 5 / 117

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5.	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8GB	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.3
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9.	Asus	Ultrabook	14	Full HD 1920x1080	Intel Core i7 8550U 1.8GHz	16GB	512GB SSD	Nvidia GeForce MX150	Windows 10	1.3
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17.	Dell	Notebook	15.6	Full HD 1920x1080	Intel Core i7 7500U 2.7GHz	8GB	256GB SSD	AMD Radeon R5 M430	Windows 10	2.2
18.	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.9GHz	16GB	512GB SSD	AMD Radeon Pro 560	macOS	1.8

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Undo / Redo 6 / 117

1,273 rows

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3.	HP	Notebook	15.6	1920x1080	Intel Core i5 7200U 2.5GHz	8GB	256GB SSD	Intel HD Graphics 620	No OS	1.8
4.	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.7GHz	16GB	512GB SSD	AMD Radeon Pro 455	macOS	1.8
5.	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8GB	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.3
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7.	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.2GHz	16GB	256GB Flash Storage	Intel Iris Pro Graphics	Mac OS X	2.0
8.	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	256GB Flash Storage	Intel HD Graphics 6000	macOS	1.2
9.	Asus	Ultrabook	14	1920x1080	Intel Core i7 8550U 1.8GHz	16GB	512GB SSD	Nvidia GeForce MX150	Windows 10	1.3
10.	Acer	Ultrabook	14	IPS Panel Full HD 1920x1080	Intel Core i5 8250U 1.6GHz	8GB	256GB SSD	Intel UHD Graphics 620	Windows 10	1.6
11.	HP	Notebook	15.6	1366x768	Intel Core i5 7200U 2.5GHz	4GB	500GB HDD	Intel HD Graphics 620	No OS	1.8
12.	HP	Notebook	15.6	1920x1080	Intel Core i3 6006U 2GHz	4GB	500GB HDD	Intel HD Graphics 520	No OS	1.8
13.	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.8GHz	16GB	256GB SSD	AMD Radeon Pro 555	macOS	1.8
14.	Dell	Notebook	15.6	1920x1080	Intel Core i3 6006U 2GHz	4GB	256GB SSD	AMD Radeon R5 M430	Windows 10	2.2
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18.	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.9GHz	16GB	512GB SSD	AMD Radeon Pro 560	macOS	1.8

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Show as: rowsrecordsShow: 51025501005001000 rows« first« previous1- 1000next »last »

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Company: grel:trim(value)

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7. Mass edit 7 cells in column ScreenResolution

8. Mass edit 9 cells in column ScreenResolution

9. Mass edit 45 cells in column ScreenResolution

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11. Text transform on 464 cells in column ScreenResolution: grel:value.replace(/ | + |IPS Panel| 4K Ultra HD | /, "")

12. Text transform on 26 cells in column ScreenResolution: grel:value.replace(/4K Ultra HD/, "")

13. Mass edit 1 cells in column ScreenResolution

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1.	Apple	Ultrabook	13.3	2560x1600	Intel Core i5 2.3GHz	8GB	128GB SSD	Intel Iris Plus Graphics 640	macOS	1.3
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12.	HP	Notebook	15.6	1920x1080	Intel Core i3 6006U 2GHz	4GB	500GB HDD	Intel HD Graphics 520	No OS	1.8
13.	Apple	Ultrabook	15.4	2880x1800	Intel Core i7 2.8GHz	16GB	256GB SSD	AMD Radeon Pro 555	macOS	1.8
14.	Dell	Notebook	15.6	1920x1080	Intel Core i3 6006U 2GHz	4GB	256GB SSD	AMD Radeon R5 M430	Windows 10	2.2
15.	Apple	Ultrabook	12	2304x1440	Intel Core M m3 1.2GHz	8GB	256GB SSD	Intel HD Graphics 615	macOS	0.9
16.	Apple	Ultrabook	13.3	2560x1600	Intel Core i5 2.3GHz	8GB	256GB SSD	Intel Iris Plus Graphics 640	macOS	1.3
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Filter

value.replace("v", "V")

31. Text transform on 0 cells in column Cpu: value.replace("HZ", "Hz")

32. Text transform on 45 cells in column Cpu: value.replace("m", "M")

33. Text transform on 2 cells in column Cpu: value.replace("v", "V")

34. Text transform on 0 cells in column Ram: value.replace("gb", "GB")

35. Edit single cell on row 750, column Memory

36. Text transform on 1,272 cells in column Weight: value.replace("kg", ".")

37. Text transform on 0 cells in column Weight: grel:round(value, 2)

38. Text transform on 1,272 cells in column Weight: value.toNumber()

39. Text transform on 0 cells in column Weight: grel:round(value, 2)

40. Text transform on 1,272 cells in column Weight: grel:value.replace("kg", "").trim()

41. Text transform on 1,272 cells in column Weight: value.toNumber()

42. Text transform on 0 cells in column Weight: grel:round(value, 2)

Show as: rowsrecords

Show: 51025501005001000 rows

« first< previous1- 1000next > last »

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Filter

100. Mass edit 1 cells in column Weight

101. Create new column Cluster Key based on column Company by filling 1,273 rows with grel:cells["Company"].value + " | " + cells["TypeName"].value + " | " + cells["Inches"].value + " | " + cells["ScreenResolution"].value + " | " + cells["Cpu"].value + " | " + cells["Ram"].value

102. Text transform on 1,273 cells in column Cluster Key: grel:value + " | " + cells["Gpu"].value + " | " + cells["OpSys"].value

103. Mass edit 3 cells in column Cluster Key

104. Text transform on 639 cells in column Weight: value.toString()

105. Text transform on 1,272 cells in column Inches: value.toString()

106. Mass edit 192 cells in column Inches

107. Mass edit 6 cells in column Inches

108. Mass edit 2 cells in column Inches

109. Mass edit 4 cells in column Inches

110. Mass edit 1 cells in column Inches

111. Mass edit 2 cells in column Inches

	All	Company	Cluster Key	TypeName	Inches	ScreenResolution	Cpu	Ram
1.	Apple	Apple Ultrabook 13.3 2560x1600 Intel Core i5 2.3GHz 8GB 128GB SSD	Ultrabook	13.3	2560x1600	Intel Core i5 2.3GHz	8GB	
2.	Apple	Apple Ultrabook 13.3 1440x900 Intel Core i5 1.8GHz 8GB 128GB SSD	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	
3.	HP	HP Notebook 15.6 1920x1080 Intel Core i5 7200U 2.5GHz 8GB 256GB SSD	Notebook	15.6	1920x1080	Intel Core i5 7200U 2.5GHz	8GB	
4.	Apple	Apple Ultrabook 15.4 2880x1800 Intel Core i7 2.7GHz 16GB 512GB SSD	Ultrabook	15.4	2880x1800	Intel Core i7 2.7GHz	16GB	
5.	Apple	Apple Ultrabook 13.3 2560x1600 Intel Core i5 3.1GHz 8GB 256GB SSD	Ultrabook	13.3	2560x1600	Intel Core i5 3.1GHz	8GB	
6.	Acer	Acer Notebook 15.6 1366x768 AMD A9-Series 9420 3GHz 4GB 500GB HDD	Notebook	15.6	1366x768	AMD A9-Series 9420 3GHz	4GB	
7.	Apple	Apple Ultrabook 15.4 2880x1800 Intel Core i7 2.2GHz 16GB 256GB SSD	Ultrabook	15.4	2880x1800	Intel Core i7 2.2GHz	16GB	
8.	Apple	Apple Ultrabook 13.3 1440x900 Intel Core i5 1.8GHz 8GB 256GB SSD	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	
9.	Asus	Asus Ultrabook 14 1920x1080 Intel Core i7 8550U 1.8GHz 16GB 512GB SSD	Ultrabook	14	1920x1080	Intel Core i7 8550U 1.8GHz	16GB	
10.	Acer	Acer Ultrabook 14 1920x1080 Intel Core i5 8250U 1.6GHz 8GB 256GB SSD	Ultrabook	14	1920x1080	Intel Core i5 8250U 1.6GHz	8GB	
11.	HP	HP Notebook 15.6 1366x768 Intel Core i5 7200U 2.5GHz 4GB 500GB HDD	Notebook	15.6	1366x768	Intel Core i5 7200U 2.5GHz	4GB	
12.	HP	HP Notebook 15.6 1920x1080 Intel Core i3 6006U 2GHz 4GB 500GB HDD	Notebook	15.6	1920x1080	Intel Core i3 6006U 2GHz	4GB	
13.	Apple	Apple Ultrabook 15.4 2880x1800 Intel Core i7 2.8GHz 16GB 256GB SSD	Ultrabook	15.4	2880x1800	Intel Core i7 2.8GHz	16GB	
14.	Dell	Dell Notebook 15.6 1920x1080 Intel Core i3 6006U 2GHz 4GB 256GB SSD	Notebook	15.6	1920x1080	Intel Core i3 6006U 2GHz	4GB	
15.	Apple	Apple Ultrabook 12 2304x1440 Intel Core M M3 1.2GHz 8GB 256GB SSD	Ultrabook	12	2304x1440	Intel Core M M3 1.2GHz	8GB	
16.	Apple	Apple Ultrabook 13.3 2560x1600 Intel Core i5 2.3GHz 8GB 256GB SSD	Ultrabook	13.3	2560x1600	Intel Core i5 2.3GHz	8GB	
17.	Dell	Dell Notebook 15.6 1920x1080 Intel Core i7 7500U 2.7GHz 8GB 256GB SSD	Notebook	15.6	1920x1080	Intel Core i7 7500U 2.7GHz	8GB	
18.	Apple	Apple Ultrabook 15.4 2880x1800 Intel Core i7 2.9GHz 16GB 512GB SSD	Ultrabook	15.4	2880x1800	Intel Core i7 2.9GHz	16GB	

Scanned with OKEN Scanner

Google

Google

laptopData.csv - OpenRefine

127.0.0.1:3333/project?project=2234660288450

OpenRefine laptopData.csv

Open...ExportHelp

Facet / FilterUndo / Redo 114 / 117

1,273 rows

ExtensionsWikibase

Extract...Apply...

Show as: rowsrecordsShow: 51025501005001000 rows

« first« previous1- 1000next » last »

Filter

Cluster key: grel.value + " | " + cells["Gpu"].value + " | " + cells["OpSys"].value

103. Mass edit 3 cells in column Cluster Key

104. Text transform on 639 cells in column Weight: value.toString()

105. Text transform on 1,272 cells in column Inches: value.toString()

106. Mass edit 192 cells in column Inches

107. Mass edit 6 cells in column Inches

108. Mass edit 2 cells in column Inches

109. Mass edit 4 cells in column Inches

110. Mass edit 1 cells in column Inches

111. Mass edit 2 cells in column Inches

112. Edit single cell on row 466, column Inches

113. Mass edit 2 cells in column Cluster Key

114. Text transform on 1,273 cells in column Price: grel.round(value)

115. Fill down 0 cells in column Weight

116. Remove column Cluster Key

117. Rename column Weight to Weight(kg)

	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSys	Weight	Price	
iHz S	Ultrabook	13.3	2560x1600	Intel Core i5 2.3GHz	8GB	128GB SSD	Intel Iris Plus Graphics 640	macOS	1.37	71379	
Hz	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	128GB SSD	Intel HD Graphics 6000	macOS	1.34	47896	
103. Mass edit 3 cells in column Cluster Key	Notebook	15.6	1920x1080	Intel Core i5 7200U 2.5GHz	8GB	256GB SSD	Intel HD Graphics 620	No OS	1.86	30636	
104. Text transform on 639 cells in column Weight: value.toString()	o OS										
105. Text transform on 1,272 cells in column Inches: value.toString()	iHz S	Ultrabook	15.4	2880x1800	Intel Core i7 2.7GHz	16GB	512GB SSD	AMD Radeon Pro 455	macOS	1.83	135195
106. Mass edit 192 cells in column Inches	iHz S	Ultrabook	13.3	2560x1600	Intel Core i5 3.1GHz	8GB	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.37	96096
107. Mass edit 6 cells in column Inches	0 a 10	Notebook	15.6	1366x768	AMD A9-Series 9420 3GHz	4GB	500GB HDD	AMD Radeon R5	Windows 10	2.10	21312
108. Mass edit 2 cells in column Inches	iHz	Ultrabook	15.4	2880x1800	Intel Core i7 2.2GHz	16GB	256GB SSD	Intel Iris Pro Graphics	Mac OS X	2.04	114018
109. Mass edit 4 cells in column Inches	Hz	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	256GB SSD	Intel HD Graphics 6000	macOS	1.34	61736
110. Mass edit 1 cells in column Inches		Ultrabook	14.0	1920x1080	Intel Core i7 8550U 1.8GHz	16GB	512GB SSD	Nvidia GeForce MX150	Windows 10	1.30	79654
111. Mass edit 2 cells in column Inches		Ultrabook	14.0	1920x1080	Intel Core i5 8250U 1.6GHz	8GB	256GB SSD	Intel UHD Graphics 620	Windows 10	1.60	41026
112. Edit single cell on row 466, column Inches	lo OS	Notebook	15.6	1366x768	Intel Core i5 7200U 2.5GHz	4GB	500GB HDD	Intel HD Graphics 620	No OS	1.86	20987
113. Mass edit 2 cells in column Cluster Key	OS	Notebook	15.6	1920x1080	Intel Core i3 6006U 2GHz	4GB	500GB HDD	Intel HD Graphics 520	No OS	1.86	18381
114. Text transform on 1,273 cells in column Price: grel.round(value)	iHz	Ultrabook	15.4	2880x1800	Intel Core i7 2.8GHz	16GB	256GB SSD	AMD Radeon Pro 555	macOS	1.83	130002
115. Fill down 0 cells in column Weight		Notebook	15.6	1920x1080	Intel Core i3 6006U 2GHz	4GB	256GB SSD	AMD Radeon R5 M430	Windows 10	2.20	26581
116. Remove column Cluster Key	2GHz	Ultrabook	12.0	2304x1440	Intel Core M M3 1.2GHz	8GB	256GB SSD	Intel HD Graphics 615	macOS	0.92	67261
117. Rename column Weight to Weight(kg)	iHz S	Ultrabook	13.3	2560x1600	Intel Core i5 2.3GHz	8GB	256GB SSD	Intel Iris Plus Graphics 640	macOS	1.37	80908
		Notebook	15.6	1920x1080	Intel Core i7 7500U 2.7GHz	8GB	256GB SSD	AMD Radeon R5 M430	Windows 10	2.20	39694

Scanned with OKEN Scanner

Facet / Filter

Undo / Redo 117 / 117

1,273 rows

Extensions Wikibase

Extract... Apply...

Show as: rows records

Show: 5 10 25 50 100 500 1000 rows

« first « previous 1 - 1000 next » last »

Filter

Cluster Key: grel:value + " | " + cells["Gpu"].value + " | " + cells["OpSys"].value

103. Mass edit 3 cells in column Cluster Key

104. Text transform on 639 cells in column Weight: value.toString()

105. Text transform on 1,272 cells in column Inches: value.toString()

106. Mass edit 192 cells in column Inches

107. Mass edit 6 cells in column Inches

108. Mass edit 2 cells in column Inches

109. Mass edit 4 cells in column Inches

110. Mass edit 1 cells in column Inches

111. Mass edit 2 cells in column Inches

112. Edit single cell on row 466, column Inches

113. Mass edit 2 cells in column Cluster Key

114. Text transform on 1,273 cells in column Price: grel:round(value)

115. Fill down 0 cells in column Weight

116. Remove column Cluster Key

117. Rename column Weight to Weight(kg)

Type	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSys	Weight(kg)	Price
	Ultrabook	13.3	2560x1600	Intel Core i5 2.3GHz	8GB	128GB SSD	Intel Iris Plus Graphics 640	macOS	1.37	71379
	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	128GB SSD	Intel HD Graphics 6000	macOS	1.34	47896
	Notebook	15.6	1920x1080	Intel Core i5 7200U 2.5GHz	8GB	256GB SSD	Intel HD Graphics 620	No OS	1.86	30636
	Ultrabook	15.4	2880x1800	Intel Core i7 2.7GHz	16GB	512GB SSD	AMD Radeon Pro 455	macOS	1.83	135196
	Ultrabook	13.3	2560x1600	Intel Core i5 3.1GHz	8GB	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.37	96096
	Notebook	15.6	1366x768	AMD A9-Series 9420 3GHz	4GB	500GB HDD	AMD Radeon R5	Windows 10	2.10	21312
	Ultrabook	15.4	2880x1800	Intel Core i7 2.2GHz	16GB	256GB SSD	Intel Iris Pro Graphics	Mac OS X	2.04	114018
	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	256GB SSD	Intel HD Graphics 6000	macOS	1.34	61736
	Ultrabook	14.0	1920x1080	Intel Core i7 8550U 1.8GHz	16GB	512GB SSD	Nvidia GeForce MX150	Windows 10	1.30	79654
	Ultrabook	14.0	1920x1080	Intel Core i5 8250U 1.6GHz	8GB	256GB SSD	Intel UHD Graphics 620	Windows 10	1.60	41026
	Notebook	15.6	1366x768	Intel Core i5 7200U 2.5GHz	4GB	500GB HDD	Intel HD Graphics 620	No OS	1.86	20987
	Notebook	15.6	1920x1080	Intel Core i3 6006U 2GHz	4GB	500GB HDD	Intel HD Graphics 520	No OS	1.86	18361
	Ultrabook	15.4	2880x1800	Intel Core i7 2.8GHz	16GB	256GB SSD	AMD Radeon Pro 555	macOS	1.83	130002
	Notebook	15.6	1920x1080	Intel Core i3 6006U 2GHz	4GB	256GB SSD	AMD Radeon R5 M430	Windows 10	2.20	26581
	Ultrabook	12.0	2304x1440	Intel Core M M3 1.2GHz	8GB	256GB SSD	Intel HD Graphics 615	macOS	0.92	67261
	Ultrabook	13.3	2560x1600	Intel Core i5 2.3GHz	8GB	256GB SSD	Intel Iris Plus Graphics 640	macOS	1.37	80908
	Notebook	15.6	1920x1080	Intel Core i7 7500U 2.7GHz	8GB	256GB SSD	AMD Radeon R5 M430	Windows 10	2.20	39694
	Ultrabook	15.4	2880x1800	Intel Core i7 2.9GHz	16GB	512GB SSD	AMD Radeon Pro 560	macOS	1.83	152274
	Notebook	15.6	1920x1080	Intel Core i3 7100U 2.4GHz	8GB	1TB HDD	Nvidia GeForce 940MX	No OS	2.20	26587
	Ultrabook	13.3	1920x1080	Intel Core i5 8250U 1.6GHz	8GB	128GB SSD	Intel UHD Graphics 620	Windows 10	1.22	52161
	Gaming	15.6	1920x1080	Intel Core i5 7300HQ 2.5GHz	8GB	128GB SSD + 1TB HDD	Nvidia GeForce GTX 1050	Windows 10	2.50	53227
	Notebook	15.6	1366x768	AMD E-Series 9000e 1.5GHz	4GB	500GB HDD	AMD Radeon R2	No OS	1.86	13746
	2 in 1 Convertible	13.3	1920x1080	Intel Core i5 8250U 1.6GHz	8GB	256GB SSD	Intel UHD Graphics 620	Windows 10	1.62	43636
	Ultrabook	15.6	1920x1080	Intel Core i7 8550U 1.8GHz	8GB	256GB SSD	Intel HD Graphics 620	Windows 10	1.91	35112
	Notebook	15.6	1366x768	Intel Core i3 6006U 2GHz	4GB	1TB HDD	Intel HD Graphics 520	Windows 10	2.30	22306

Training ANN...

==== Decision Tree Results =====

• Parameters: {'ccp_alpha': 0.0, 'class_weight': None, 'criterion': 'entropy', 'max_depth': 15, 'max_features': None, 'max_leaf_nodes': None, 'min_impurity_decrease': 0.0, 'min_samples_leaf': 1, 'min_samples_split': 2, 'min_weight_fraction_leaf': 0.0, 'monotonic_cst': None, 'random_state': 42, 'splitter': 'best'}

✓ Train Accuracy: 0.99

✓ Test Accuracy: 0.77

✗ Train Error: 0.01

✗ Test Error: 0.23

✗ Precision: 0.76

✗ Recall: 0.77

✗ F1 Score: 0.76

Confusion Matrix:

```
[[63  5  1  0  0]
 [13 65 14  3  0]
 [ 0 14 67 10  7]
 [ 2  9 13 66  6]
 [ 0  0  0  8 82]]
```

==== Naïve Bayes Results =====

• Parameters: {'priors': None, 'var_smoothing': 1e-09}

✓ Train Accuracy: 0.58

✓ Test Accuracy: 0.55

✗ Train Error: 0.42

✗ Test Error: 0.45

✗ Precision: 0.53

✗ Recall: 0.55

✗ F1 Score: 0.53

Confusion Matrix:

```
[[58  8  3  0  0]
 [21 55 14  3  2]
 [ 5 32 27 17 17]
 [ 2  8 18 38 30]
 [ 0  0  7 14 69]]
```

==== KNN Results =====

```
Windows PowerShell
===== KNN Results =====
• Parameters: {'algorithm': 'auto', 'leaf_size': 30, 'metric': 'manhattan', 'metric_params': None, 'n_jobs': None, 'n_neighbors': 3, 'p': 2, 'weights': 'uniform'}
✓ Train Accuracy: 0.93
✓ Test Accuracy: 0.81
✗ Train Error: 0.07
✗ Test Error: 0.19
✗ Precision: 0.81
✗ Recall: 0.81
✗ F1 Score: 0.80

Confusion Matrix:
[[68  1  0  0  0]
 [13 57 21  3  1]
 [ 0  9 72 14  3]
 [ 0  2  7 79  8]
 [ 0  0  2  2 86]]

===== ANN Results =====
• Parameters: {'activation': 'relu', 'alpha': 0.0001, 'batch_size': 'auto', 'beta_1': 0.9, 'beta_2': 0.999, 'early_stopping': False, 'epsilon': 1e-08, 'hidden_layer_sizes': (100, 50), 'learning_rate': 'constant', 'learning_rate_init': 0.001, 'max_fun': 15000, 'max_iter': 500, 'momentum': 0.9, 'n_iter_no_change': 10, 'nesterovs_momentum': True, 'power_t': 0.5, 'random_state': 42, 'shuffle': True, 'solver': 'adam', 'tol': 0.0001, 'validation_fraction': 0.1, 'verbose': False, 'warm_start': False}
✓ Train Accuracy: 0.98
✓ Test Accuracy: 0.81
✗ Train Error: 0.02
✗ Test Error: 0.19
✗ Precision: 0.82
✗ Recall: 0.81
✗ F1 Score: 0.81

Confusion Matrix:
[[69  0  0  0  0]
 [14 61 18  1  1]
 [ 0  8 74 15  1]
 [ 1  3 11 75  6]
 [ 0  0  0  4 86]]

PS C:\Users\kittu\DM_assignment>
```



```
Iteration 185, loss = 1.04780374
Iteration 186, loss = 1.04793512
Iteration 187, loss = 1.04779292
Iteration 188, loss = 1.04681952
Iteration 189, loss = 1.04544351
Iteration 190, loss = 1.04692819
Iteration 191, loss = 1.04801718
Iteration 192, loss = 1.04586933
Iteration 193, loss = 1.04452653
Iteration 194, loss = 1.04749107
Iteration 195, loss = 1.04688572
Iteration 196, loss = 1.04627227
Iteration 197, loss = 1.04856293
Iteration 198, loss = 1.04734780
Iteration 199, loss = 1.04569360
Iteration 200, loss = 1.04554923
Iteration 201, loss = 1.04657086
Iteration 202, loss = 1.04579055
Iteration 203, loss = 1.04592944
Iteration 204, loss = 1.04508984
Training loss did not improve more than tol=0.000100 for 10 consecutive epochs. Stopping.
```

```
===== ANN Results (Activation: relu) =====
```

```
✓ Accuracy: 0.61
✗ Precision: 0.63
✗ Recall: 0.61
✗ F1 Score: 0.61
```

```
===== ANN Results (Activation: tanh) =====
```

```
✓ Accuracy: 0.62
✗ Precision: 0.64
✗ Recall: 0.62
✗ F1 Score: 0.63
```

```
===== ANN Results (Activation: logistic) =====
```

```
✓ Accuracy: 0.53
✗ Precision: 0.56
✗ Recall: 0.53
✗ F1 Score: 0.54
```

```
PS C:\Users\kittu\DM_assignment>
```

```
Windows PowerShell
warnings.warn(
PS C:\Users\kittu\DM_assignment> python3 question_4.py

==== Processing D1 Dataset ====
Training Decision Tree on D1...
Training Naïve Bayes on D1...
Training KNN on D1...
Training ANN on D1...
C:\Users\kittu\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.13_qbz5n2kfra8p0\LocalCache\local-packages\Python313\site-packages\sklearn\normalization\_multilayer_perceptron.py:691: ConvergenceWarning: Stochastic Optimizer: Maximum iterations (500) reached and the optimization hasn't converged yet.
  warnings.warn(

==== Processing D2 Dataset ====
Training Decision Tree on D2...
Training Naïve Bayes on D2...
Training KNN on D2...
Training ANN on D2...
C:\Users\kittu\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.13_qbz5n2kfra8p0\LocalCache\local-packages\Python313\site-packages\sklearn\normalization\_multilayer_perceptron.py:691: ConvergenceWarning: Stochastic Optimizer: Maximum iterations (500) reached and the optimization hasn't converged yet.
  warnings.warn(

==== Processing D3 Dataset ====
Training Decision Tree on D3...
Training Naïve Bayes on D3...
Training KNN on D3...
Training ANN on D3...
C:\Users\kittu\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.13_qbz5n2kfra8p0\LocalCache\local-packages\Python313\site-packages\sklearn\normalization\_multilayer_perceptron.py:691: ConvergenceWarning: Stochastic Optimizer: Maximum iterations (500) reached and the optimization hasn't converged yet.
  warnings.warn(

==== Processing D Dataset ====
Training Decision Tree on D...
Training Naïve Bayes on D...
Training KNN on D...
Training ANN on D...
C:\Users\kittu\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.13_qbz5n2kfra8p0\LocalCache\local-packages\Python313\site-packages\sklearn\normalization\_multilayer_perceptron.py:691: ConvergenceWarning: Stochastic Optimizer: Maximum iterations (500) reached and the optimization hasn't converged yet.
```




```
Windows PowerShell
ached and the optimization hasn't converged yet.
warnings.warn(

==== Processing D Dataset ====
Training Decision Tree on D...
Training Naïve Bayes on D...
Training KNN on D...
Training ANN on D...
C:\Users\kittu\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.13_qbz5n2kfra8p0\LocalCache\local-packages\Python313\site-packages\sklearn\normalization\_multilayer_perceptron.py:691: ConvergenceWarning: Stochastic Optimizer: Maximum iterations (500) reached and the optimization hasn't converged yet.
  warnings.warn(

==== D1 Results ====

• Decision Tree
✓ Accuracy: 0.58
✗ Precision: 0.61
✗ Recall: 0.58
✗ F1 Score: 0.59

• Naïve Bayes
✓ Accuracy: 0.53
✗ Precision: 0.57
✗ Recall: 0.53
✗ F1 Score: 0.51

• KNN
✓ Accuracy: 0.56
✗ Precision: 0.57
✗ Recall: 0.56
✗ F1 Score: 0.55

• ANN
✓ Accuracy: 0.50
✗ Precision: 0.50
✗ Recall: 0.50
✗ F1 Score: 0.48

==== D2 Results ====
```



```
Windows PowerShell
x + v

• ANN
✓ Accuracy: 0.50
✗ Precision: 0.50
✗ Recall: 0.50
✗ F1 Score: 0.48

===== D2 Results =====

• Decision Tree
✓ Accuracy: 0.55
✗ Precision: 0.58
✗ Recall: 0.55
✗ F1 Score: 0.56

• Naïve Bayes
✓ Accuracy: 0.49
✗ Precision: 0.47
✗ Recall: 0.49
✗ F1 Score: 0.47

• KNN
✓ Accuracy: 0.52
✗ Precision: 0.51
✗ Recall: 0.52
✗ F1 Score: 0.50

• ANN
✓ Accuracy: 0.62
✗ Precision: 0.62
✗ Recall: 0.62
✗ F1 Score: 0.62

===== D3 Results =====

• Decision Tree
✓ Accuracy: 0.66
✗ Precision: 0.67
✗ Recall: 0.66
✗ F1 Score: 0.66
```




```
Windows PowerShell
F1 Score: 0.51

KNN
✓ Accuracy: 0.61
✗ Precision: 0.60
✗ Recall: 0.61
✗ F1 Score: 0.60

ANN
✓ Accuracy: 0.64
✗ Precision: 0.64
✗ Recall: 0.64
✗ F1 Score: 0.64

===== D Results =====

Decision Tree
✓ Accuracy: 0.67
✗ Precision: 0.70
✗ Recall: 0.67
✗ F1 Score: 0.68

Naïve Bayes
✓ Accuracy: 0.53
✗ Precision: 0.53
✗ Recall: 0.53
✗ F1 Score: 0.52

KNN
✓ Accuracy: 0.64
✗ Precision: 0.64
✗ Recall: 0.64
✗ F1 Score: 0.63

ANN
✓ Accuracy: 0.61
✗ Precision: 0.63
✗ Recall: 0.61
✗ F1 Score: 0.61
PS C:\Users\kittu\DM_assignment>
```

