BART and json data

Today we are going to take a look at the BART website and look at the visualizations presented on the website [analytics.bart.gov](https://analytics.bart.gov/bart).

We will take a look at *json* formated data, which is a very common data format for sharing data on the internet.

## Directions:

1. Create an R Project call BART.
2. Download the [devices](https://www.bart.gov/sites/default/files/analytics/devices.json) data.
3. Try the following R code to make the bar graph for the devices used to access the BART website.

Load the libraries used.

library(tidyverse)

## ── Attaching packages ──────────────────────────────────────────────────── tidyverse 1.2.1 ──

## ✔ ggplot2 3.2.1 ✔ purrr 0.3.2
## ✔ tibble 2.1.3 ✔ dplyr 0.8.3
## ✔ tidyr 1.0.0 ✔ stringr 1.4.0
## ✔ readr 1.3.1 ✔ forcats 0.4.0

## ── Conflicts ─────────────────────────────────────────────────────── tidyverse\_conflicts() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag() masks stats::lag()

library(jsonlite)

##
## Attaching package: 'jsonlite'

## The following object is masked from 'package:purrr':
##
## flatten

Read in the json data.

json\_file <- "devices.json"

json\_data <- fromJSON(json\_file)
json\_data

## date device visits
## 1 20190625 desktop 15551
## 2 20190625 mobile 41997
## 3 20190625 tablet 1582
## 4 20190626 desktop 14352
## 5 20190626 mobile 40869
## 6 20190626 tablet 1389
## 7 20190627 desktop 14031
## 8 20190627 mobile 41155
## 9 20190627 tablet 1399
## 10 20190628 desktop 13956
## 11 20190628 mobile 46090
## 12 20190628 tablet 1385
## 13 20190629 desktop 7288
## 14 20190629 mobile 42827
## 15 20190629 tablet 1693
## 16 20190630 desktop 6957
## 17 20190630 mobile 46933
## 18 20190630 tablet 1633
## 19 20190701 desktop 14139
## 20 20190701 mobile 38068
## 21 20190701 tablet 1369
## 22 20190702 desktop 18289
## 23 20190702 mobile 50373
## 24 20190702 tablet 1628
## 25 20190703 desktop 14613
## 26 20190703 mobile 43388
## 27 20190703 tablet 1439
## 28 20190704 desktop 6201
## 29 20190704 mobile 36832
## 30 20190704 tablet 1467
## 31 20190705 desktop 8421
## 32 20190705 mobile 31632
## 33 20190705 tablet 1329
## 34 20190706 desktop 5436
## 35 20190706 mobile 27554
## 36 20190706 tablet 1392
## 37 20190707 desktop 6248
## 38 20190707 mobile 28532
## 39 20190707 tablet 1446
## 40 20190708 desktop 14268
## 41 20190708 mobile 37497
## 42 20190708 tablet 1338
## 43 20190709 desktop 14128
## 44 20190709 mobile 38507
## 45 20190709 tablet 1332
## 46 20190710 desktop 13849
## 47 20190710 mobile 38642
## 48 20190710 tablet 1413
## 49 20190711 desktop 13324
## 50 20190711 mobile 38617
## 51 20190711 tablet 1314
## 52 20190712 desktop 12875
## 53 20190712 mobile 40607
## 54 20190712 tablet 1451
## 55 20190713 desktop 6057
## 56 20190713 mobile 32788
## 57 20190713 tablet 1412
## 58 20190714 desktop 6576
## 59 20190714 mobile 31689
## 60 20190714 tablet 1565
## 61 20190715 desktop 14451
## 62 20190715 mobile 38308
## 63 20190715 tablet 1481
## 64 20190716 desktop 14449
## 65 20190716 mobile 39815
## 66 20190716 tablet 1455
## 67 20190717 desktop 13814
## 68 20190717 mobile 40983
## 69 20190717 tablet 1399
## 70 20190718 desktop 14773
## 71 20190718 mobile 44951
## 72 20190718 tablet 1508
## 73 20190719 desktop 12483
## 74 20190719 mobile 42166
## 75 20190719 tablet 1421
## 76 20190720 desktop 5824
## 77 20190720 mobile 34133
## 78 20190720 tablet 1451
## 79 20190721 desktop 6225
## 80 20190721 mobile 30953
## 81 20190721 tablet 1505
## 82 20190722 desktop 14416
## 83 20190722 mobile 39063
## 84 20190722 tablet 1435
## 85 20190723 desktop 14384
## 86 20190723 mobile 40504
## 87 20190723 tablet 1468
## 88 20190724 desktop 14448
## 89 20190724 mobile 48106
## 90 20190724 tablet 1483
## 91 20190725 desktop 14138
## 92 20190725 mobile 41832
## 93 20190725 tablet 1421
## 94 20190726 desktop 12373
## 95 20190726 mobile 40817
## 96 20190726 tablet 1433
## 97 20190727 desktop 6221
## 98 20190727 mobile 34308
## 99 20190727 tablet 1538
## 100 20190728 desktop 6509
## 101 20190728 mobile 33180
## 102 20190728 tablet 1538
## 103 20190729 desktop 13715
## 104 20190729 mobile 37370
## 105 20190729 tablet 1383
## 106 20190730 desktop 13974
## 107 20190730 mobile 39914
## 108 20190730 tablet 1395
## 109 20190731 desktop 13914
## 110 20190731 mobile 40389
## 111 20190731 tablet 1407
## 112 20190801 desktop 13443
## 113 20190801 mobile 39901
## 114 20190801 tablet 1391
## 115 20190802 desktop 12011
## 116 20190802 mobile 38891
## 117 20190802 tablet 1329
## 118 20190803 desktop 5964
## 119 20190803 mobile 32214
## 120 20190803 tablet 1543
## 121 20190804 desktop 6325
## 122 20190804 mobile 30814
## 123 20190804 tablet 1494
## 124 20190805 desktop 14191
## 125 20190805 mobile 38980
## 126 20190805 tablet 1568
## 127 20190806 desktop 14548
## 128 20190806 mobile 39724
## 129 20190806 tablet 1505
## 130 20190807 desktop 15100
## 131 20190807 mobile 42427
## 132 20190807 tablet 1445
## 133 20190808 desktop 13973
## 134 20190808 mobile 41476
## 135 20190808 tablet 1436
## 136 20190809 desktop 12491
## 137 20190809 mobile 42376
## 138 20190809 tablet 1387
## 139 20190810 desktop 6137
## 140 20190810 mobile 35757
## 141 20190810 tablet 1507
## 142 20190811 desktop 6227
## 143 20190811 mobile 32941
## 144 20190811 tablet 1644
## 145 20190812 desktop 13949
## 146 20190812 mobile 38668
## 147 20190812 tablet 1460
## 148 20190813 desktop 14696
## 149 20190813 mobile 41031
## 150 20190813 tablet 1540
## 151 20190814 desktop 14319
## 152 20190814 mobile 42195
## 153 20190814 tablet 1531
## 154 20190815 desktop 14720
## 155 20190815 mobile 42568
## 156 20190815 tablet 1621
## 157 20190816 desktop 13626
## 158 20190816 mobile 43009
## 159 20190816 tablet 1773
## 160 20190817 desktop 6267
## 161 20190817 mobile 35854
## 162 20190817 tablet 1707
## 163 20190818 desktop 6941
## 164 20190818 mobile 33712
## 165 20190818 tablet 1752
## 166 20190819 desktop 15277
## 167 20190819 mobile 41562
## 168 20190819 tablet 1541
## 169 20190820 desktop 14928
## 170 20190820 mobile 42863
## 171 20190820 tablet 1536
## 172 20190821 desktop 14592
## 173 20190821 mobile 42507
## 174 20190821 tablet 1520
## 175 20190822 desktop 14561
## 176 20190822 mobile 43354
## 177 20190822 tablet 1573
## 178 20190823 desktop 12792
## 179 20190823 mobile 41510
## 180 20190823 tablet 1547
## 181 20190824 desktop 6538
## 182 20190824 mobile 37138
## 183 20190824 tablet 1739
## 184 20190825 desktop 6922
## 185 20190825 mobile 34530
## 186 20190825 tablet 1675
## 187 20190826 desktop 14618
## 188 20190826 mobile 40365
## 189 20190826 tablet 1530
## 190 20190827 desktop 14132
## 191 20190827 mobile 41772
## 192 20190827 tablet 1541
## 193 20190828 desktop 14145
## 194 20190828 mobile 41277
## 195 20190828 tablet 1449
## 196 20190829 desktop 14593
## 197 20190829 mobile 43854
## 198 20190829 tablet 1532
## 199 20190830 desktop 13155
## 200 20190830 mobile 44778
## 201 20190830 tablet 1575
## 202 20190831 desktop 6009
## 203 20190831 mobile 36380
## 204 20190831 tablet 1703
## 205 20190901 desktop 5929
## 206 20190901 mobile 33740
## 207 20190901 tablet 1573
## 208 20190902 desktop 7410
## 209 20190902 mobile 36017
## 210 20190902 tablet 1664
## 211 20190903 desktop 15390
## 212 20190903 mobile 44009
## 213 20190903 tablet 1647
## 214 20190904 desktop 14520
## 215 20190904 mobile 42503
## 216 20190904 tablet 1589
## 217 20190905 desktop 14474
## 218 20190905 mobile 44053
## 219 20190905 tablet 1503
## 220 20190906 desktop 13282
## 221 20190906 mobile 45707
## 222 20190906 tablet 1616
## 223 20190907 desktop 6371
## 224 20190907 mobile 38548
## 225 20190907 tablet 1702
## 226 20190908 desktop 6632
## 227 20190908 mobile 35898
## 228 20190908 tablet 1633
## 229 20190909 desktop 15896
## 230 20190909 mobile 46659
## 231 20190909 tablet 1538
## 232 20190910 desktop 15182
## 233 20190910 mobile 43902
## 234 20190910 tablet 1546
## 235 20190911 desktop 15143
## 236 20190911 mobile 44537
## 237 20190911 tablet 1597
## 238 20190912 desktop 14927
## 239 20190912 mobile 52976
## 240 20190912 tablet 1673
## 241 20190913 desktop 12930
## 242 20190913 mobile 45278
## 243 20190913 tablet 1475
## 244 20190914 desktop 6293
## 245 20190914 mobile 38741
## 246 20190914 tablet 1676
## 247 20190915 desktop 6771
## 248 20190915 mobile 38084
## 249 20190915 tablet 1627
## 250 20190916 desktop 15142
## 251 20190916 mobile 46061
## 252 20190916 tablet 1544
## 253 20190917 desktop 14549
## 254 20190917 mobile 43660
## 255 20190917 tablet 1494
## 256 20190918 desktop 14440
## 257 20190918 mobile 43491
## 258 20190918 tablet 1483
## 259 20190919 desktop 25108
## 260 20190919 mobile 62112
## 261 20190919 tablet 1734
## 262 20190920 desktop 13503
## 263 20190920 mobile 46900
## 264 20190920 tablet 1527
## 265 20190921 desktop 5957
## 266 20190921 mobile 35927
## 267 20190921 tablet 1519
## 268 20190922 desktop 6353
## 269 20190922 mobile 32894
## 270 20190922 tablet 1578

Fix the visits column so that it is a numeric value.

json\_data <- json\_data %>% mutate(visits = as.numeric(visits))
json\_data

## date device visits
## 1 20190625 desktop 15551
## 2 20190625 mobile 41997
## 3 20190625 tablet 1582
## 4 20190626 desktop 14352
## 5 20190626 mobile 40869
## 6 20190626 tablet 1389
## 7 20190627 desktop 14031
## 8 20190627 mobile 41155
## 9 20190627 tablet 1399
## 10 20190628 desktop 13956
## 11 20190628 mobile 46090
## 12 20190628 tablet 1385
## 13 20190629 desktop 7288
## 14 20190629 mobile 42827
## 15 20190629 tablet 1693
## 16 20190630 desktop 6957
## 17 20190630 mobile 46933
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## 19 20190701 desktop 14139
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## 57 20190713 tablet 1412
## 58 20190714 desktop 6576
## 59 20190714 mobile 31689
## 60 20190714 tablet 1565
## 61 20190715 desktop 14451
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## 213 20190903 tablet 1647
## 214 20190904 desktop 14520
## 215 20190904 mobile 42503
## 216 20190904 tablet 1589
## 217 20190905 desktop 14474
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## 230 20190909 mobile 46659
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## 232 20190910 desktop 15182
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## 263 20190920 mobile 46900
## 264 20190920 tablet 1527
## 265 20190921 desktop 5957
## 266 20190921 mobile 35927
## 267 20190921 tablet 1519
## 268 20190922 desktop 6353
## 269 20190922 mobile 32894
## 270 20190922 tablet 1578

Make a table of the most recent day’s data.

json\_data %>% filter( date == "20190922" ) %>%
 group\_by(device)

## # A tibble: 3 x 3
## # Groups: device [3]
## date device visits
## <chr> <chr> <dbl>
## 1 20190922 desktop 6353
## 2 20190922 mobile 32894
## 3 20190922 tablet 1578

Make a bar plot.

json\_data %>% filter( date == "20190922" ) %>%
 ggplot(aes(y = visits, x = device)) +
 geom\_bar(stat="identity")



Make a bar plot using percentages.

json\_data <- json\_data %>% filter( date == "20190922" ) %>%
 mutate(visits\_percentage = 100\*visits/sum(visits))
json\_data

## date device visits visits\_percentage
## 1 20190922 desktop 6353 15.561543
## 2 20190922 mobile 32894 80.573178
## 3 20190922 tablet 1578 3.865279

json\_data %>% ggplot(aes(y = visits\_percentage, x = device)) +
 geom\_bar(stat="identity") +
 coord\_flip()

