hw 2

2022-10-03

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --
## v ggplot2 3.3.6      v purrr   0.3.4
## v tibble  3.1.8      v dplyr   1.0.10
## v tidyr   1.2.1      v stringr 1.4.1
## v readr   2.1.3      v forcats 0.5.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(ggplot2)
library(scales)
```

```
##
## Attaching package: 'scales'
##
## The following object is masked from 'package:purrr':
##
##     discard
##
## The following object is masked from 'package:readr':
##
##     col_factor
```

```
library(RColorBrewer)
```

```
setwd("~/Documents/GitHub/stats100")
```

```
colors<- read.csv("colors.csv")
colors
```

```
##       Eye    Sex   GPA
## 1   Brown   Male 3.349
## 2   Brown   Male 3.497
## 3   Brown   Male 3.384
## 4   Brown   Male 3.092
## 5   Brown   Male 3.309
## 6   Brown   Male 3.236
## 7   Brown   Male 3.234
## 8   Brown   Male 3.116
## 9   Brown   Male 3.578
```

```
## 10  Brown   Male 3.108
## 11  Brown   Male 3.074
## 12  Brown   Male 3.139
## 13  Brown   Male 3.448
## 14  Brown   Male 3.693
## 15  Brown   Male 3.487
## 16  Brown   Male 3.049
## 17  Brown   Male 3.438
## 18  Brown   Male 3.013
## 19  Brown   Male 3.856
## 20  Brown   Male 3.924
## 21  Brown   Male 3.488
## 22  Brown   Male 3.173
## 23  Brown   Male 3.583
## 24  Brown   Male 3.385
## 25  Brown   Male 3.636
## 26  Brown   Male 3.317
## 27  Brown   Male 3.088
## 28  Brown   Male 3.345
## 29  Brown   Male 3.903
## 30  Brown   Male 3.472
## 31  Brown   Male 3.975
## 32  Brown   Male 2.958
## 33  Brown   Male 3.482
## 34  Brown   Male 3.497
## 35  Brown   Male 3.533
## 36  Brown   Male 3.539
## 37  Brown   Male 3.328
## 38  Brown   Male 3.259
## 39  Brown   Male 2.986
## 40  Brown   Male 3.475
## 41  Brown   Male 3.677
## 42  Brown   Male 3.210
## 43  Brown   Male 3.395
## 44  Brown   Male 3.541
## 45  Brown   Male 3.406
## 46  Brown   Male 3.338
## 47  Brown   Male 3.525
## 48  Brown   Male 3.538
## 49  Brown   Male 3.420
## 50  Brown   Male 3.412
## 51  Brown   Male 3.558
## 52  Brown   Male 3.351
## 53  Brown   Male 3.449
## 54  Brown   Male 3.363
## 55  Brown   Male 3.451
## 56  Brown   Male 3.183
## 57  Brown   Male 3.190
## 58  Brown   Male 3.623
## 59  Brown   Male 3.400
## 60  Brown   Male 3.019
## 61  Brown   Male 3.056
## 62  Brown   Male 3.355
## 63  Brown   Male 3.978
```

```
## 64  Brown   Male 3.303
## 65  Brown   Male 3.750
## 66  Brown   Male 3.510
## 67  Brown   Male 3.257
## 68  Brown   Male 3.692
## 69  Brown   Male 3.279
## 70  Brown   Male 3.477
## 71  Brown   Male 3.292
## 72  Brown   Male 3.363
## 73  Brown   Male 3.602
## 74  Brown   Male 3.029
## 75  Brown   Male 3.158
## 76  Brown   Male 3.690
## 77  Brown   Male 3.320
## 78  Brown   Male 3.029
## 79  Brown   Male 3.264
## 80  Brown   Male 3.009
## 81  Brown   Male 3.579
## 82  Brown   Male 3.295
## 83  Brown   Male 3.336
## 84  Brown   Male 3.029
## 85  Brown   Male 3.303
## 86  Brown   Male 3.198
## 87  Brown   Male 3.859
## 88  Brown   Male 3.582
## 89  Brown   Male 3.304
## 90  Brown   Male 3.285
## 91  Brown   Male 3.555
## 92  Brown   Male 3.560
## 93  Brown   Male 3.398
## 94  Brown   Male 3.362
## 95  Brown   Male 3.462
## 96  Brown   Male 3.294
## 97  Brown   Male 3.301
## 98  Brown   Male 3.590
## 99   Blue   Male 3.105
## 100  Blue   Male 3.757
## 101  Blue   Male 3.485
## 102  Blue   Male 3.448
## 103  Blue   Male 3.394
## 104  Blue   Male 3.844
## 105  Blue   Male 3.194
## 106  Blue   Male 3.292
## 107  Blue   Male 3.492
## 108  Blue   Male 3.365
## 109  Blue   Male 3.189
## 110  Blue   Male 3.060
## 111  Blue   Male 3.657
## 112  Blue   Male 3.320
## 113  Blue   Male 3.322
## 114  Blue   Male 3.240
## 115  Blue   Male 3.592
## 116  Blue   Male 2.871
## 117  Blue   Male 3.508
```

```
## 118  Blue   Male 3.255
## 119  Blue   Male 3.247
## 120  Blue   Male 3.280
## 121  Blue   Male 3.289
## 122  Blue   Male 3.651
## 123  Blue   Male 3.638
## 124  Blue   Male 3.315
## 125  Blue   Male 3.756
## 126  Blue   Male 3.580
## 127  Blue   Male 3.320
## 128  Blue   Male 3.425
## 129  Blue   Male 3.500
## 130  Blue   Male 3.548
## 131  Blue   Male 3.283
## 132  Blue   Male 3.399
## 133  Blue   Male 2.964
## 134  Blue   Male 3.389
## 135  Blue   Male 3.356
## 136  Blue   Male 3.468
## 137  Blue   Male 3.527
## 138  Blue   Male 3.431
## 139  Blue   Male 3.430
## 140  Blue   Male 3.323
## 141  Blue   Male 3.330
## 142  Blue   Male 3.499
## 143  Blue   Male 3.300
## 144  Blue   Male 3.146
## 145  Blue   Male 3.613
## 146  Blue   Male 3.722
## 147  Blue   Male 3.224
## 148  Blue   Male 3.338
## 149  Blue   Male 3.331
## 150  Blue   Male 3.728
## 151  Blue   Male 3.234
## 152  Blue   Male 3.397
## 153  Blue   Male 3.494
## 154  Blue   Male 3.094
## 155  Blue   Male 3.548
## 156  Blue   Male 3.543
## 157  Blue   Male 3.603
## 158  Blue   Male 3.545
## 159  Blue   Male 3.528
## 160  Blue   Male 3.504
## 161  Blue   Male 3.392
## 162  Blue   Male 3.511
## 163  Blue   Male 3.492
## 164  Blue   Male 3.359
## 165  Blue   Male 3.188
## 166  Blue   Male 3.415
## 167  Blue   Male 3.282
## 168  Blue   Male 3.441
## 169  Blue   Male 3.473
## 170  Blue   Male 3.740
## 171  Blue   Male 2.786
```

```
## 172  Blue   Male 3.514
## 173  Blue   Male 3.309
## 174  Blue   Male 3.130
## 175  Blue   Male 3.583
## 176  Blue   Male 3.571
## 177  Blue   Male 3.508
## 178  Blue   Male 3.606
## 179  Blue   Male 3.320
## 180  Blue   Male 3.594
## 181  Blue   Male 3.577
## 182  Blue   Male 3.213
## 183  Blue   Male 3.370
## 184  Blue   Male 3.263
## 185  Blue   Male 3.441
## 186  Blue   Male 3.388
## 187  Blue   Male 3.274
## 188  Blue   Male 3.399
## 189  Blue   Male 3.365
## 190  Blue   Male 3.272
## 191  Blue   Male 3.540
## 192  Blue   Male 3.271
## 193  Blue   Male 3.088
## 194  Blue   Male 3.266
## 195  Blue   Male 3.367
## 196  Blue   Male 3.302
## 197  Blue   Male 3.258
## 198  Blue   Male 3.657
## 199  Blue   Male 3.324
## 200 Hazel   Male 3.183
## 201 Hazel   Male 3.729
## 202 Hazel   Male 3.370
## 203 Hazel   Male 3.253
## 204 Hazel   Male 3.573
## 205 Hazel   Male 3.490
## 206 Hazel   Male 3.042
## 207 Hazel   Male 3.015
## 208 Hazel   Male 3.167
## 209 Hazel   Male 3.448
## 210 Hazel   Male 3.264
## 211 Hazel   Male 3.465
## 212 Hazel   Male 3.456
## 213 Hazel   Male 3.461
## 214 Hazel   Male 3.844
## 215 Hazel   Male 3.470
## 216 Hazel   Male 3.382
## 217 Hazel   Male 3.431
## 218 Hazel   Male 3.555
## 219 Hazel   Male 3.098
## 220 Hazel   Male 2.996
## 221 Hazel   Male 3.593
## 222 Hazel   Male 3.360
## 223 Hazel   Male 3.356
## 224 Hazel   Male 3.421
## 225 Hazel   Male 3.403
```

```
## 226 Hazel   Male 3.364
## 227 Hazel   Male 3.445
## 228 Hazel   Male 3.293
## 229 Hazel   Male 3.412
## 230 Hazel   Male 3.593
## 231 Hazel   Male 3.343
## 232 Hazel   Male 3.335
## 233 Hazel   Male 3.455
## 234 Hazel   Male 3.675
## 235 Hazel   Male 3.460
## 236 Hazel   Male 3.468
## 237 Hazel   Male 3.678
## 238 Hazel   Male 3.553
## 239 Hazel   Male 3.044
## 240 Hazel   Male 3.174
## 241 Hazel   Male 3.241
## 242 Hazel   Male 3.396
## 243 Hazel   Male 3.602
## 244 Hazel   Male 3.374
## 245 Hazel   Male 3.173
## 246 Hazel   Male 3.489
## 247 Green   Male 3.392
## 248 Green   Male 3.578
## 249 Green   Male 3.407
## 250 Green   Male 3.788
## 251 Green   Male 3.215
## 252 Green   Male 3.436
## 253 Green   Male 3.401
## 254 Green   Male 3.449
## 255 Green   Male 3.523
## 256 Green   Male 3.221
## 257 Green   Male 3.667
## 258 Green   Male 3.233
## 259 Green   Male 3.446
## 260 Green   Male 3.339
## 261 Green   Male 3.617
## 262 Green   Male 3.527
## 263 Green   Male 3.284
## 264 Green   Male 3.274
## 265 Green   Male 3.218
## 266 Green   Male 3.501
## 267 Green   Male 3.086
## 268 Green   Male 3.569
## 269 Green   Male 3.652
## 270 Green   Male 3.538
## 271 Green   Male 3.280
## 272 Green   Male 3.153
## 273 Green   Male 3.315
## 274 Green   Male 3.437
## 275 Green   Male 3.109
## 276 Green   Male 3.318
## 277 Green   Male 2.881
## 278 Green   Male 3.289
## 279 Green   Male 3.201
```

```
## 280 Brown Female 3.559
## 281 Brown Female 3.406
## 282 Brown Female 3.244
## 283 Brown Female 3.803
## 284 Brown Female 3.406
## 285 Brown Female 3.213
## 286 Brown Female 2.906
## 287 Brown Female 3.128
## 288 Brown Female 3.141
## 289 Brown Female 3.425
## 290 Brown Female 3.397
## 291 Brown Female 3.324
## 292 Brown Female 3.488
## 293 Brown Female 3.179
## 294 Brown Female 3.483
## 295 Brown Female 3.456
## 296 Brown Female 3.698
## 297 Brown Female 3.319
## 298 Brown Female 3.480
## 299 Brown Female 3.388
## 300 Brown Female 3.518
## 301 Brown Female 3.174
## 302 Brown Female 3.178
## 303 Brown Female 3.341
## 304 Brown Female 3.355
## 305 Brown Female 3.448
## 306 Brown Female 3.345
## 307 Brown Female 3.391
## 308 Brown Female 3.353
## 309 Brown Female 3.234
## 310 Brown Female 3.394
## 311 Brown Female 3.548
## 312 Brown Female 3.419
## 313 Brown Female 3.314
## 314 Brown Female 3.695
## 315 Brown Female 3.458
## 316 Brown Female 3.565
## 317 Brown Female 3.715
## 318 Brown Female 3.416
## 319 Brown Female 3.408
## 320 Brown Female 3.713
## 321 Brown Female 3.273
## 322 Brown Female 3.619
## 323 Brown Female 3.221
## 324 Brown Female 3.446
## 325 Brown Female 3.226
## 326 Brown Female 3.456
## 327 Brown Female 2.888
## 328 Brown Female 3.419
## 329 Brown Female 3.516
## 330 Brown Female 3.583
## 331 Brown Female 3.567
## 332 Brown Female 3.393
## 333 Brown Female 3.337
```

```
## 334 Brown Female 3.006
## 335 Brown Female 3.391
## 336 Brown Female 3.381
## 337 Brown Female 3.329
## 338 Brown Female 3.570
## 339 Brown Female 3.146
## 340 Brown Female 3.143
## 341 Brown Female 3.580
## 342 Brown Female 3.408
## 343 Brown Female 3.713
## 344 Brown Female 3.415
## 345 Brown Female 3.307
## 346 Brown Female 3.561
## 347 Brown Female 3.412
## 348 Brown Female 3.470
## 349 Brown Female 3.338
## 350 Brown Female 3.668
## 351 Brown Female 3.431
## 352 Brown Female 3.789
## 353 Brown Female 3.336
## 354 Brown Female 3.538
## 355 Brown Female 3.795
## 356 Brown Female 3.373
## 357 Brown Female 3.235
## 358 Brown Female 3.276
## 359 Brown Female 3.545
## 360 Brown Female 3.065
## 361 Brown Female 3.405
## 362 Brown Female 3.797
## 363 Brown Female 3.546
## 364 Brown Female 3.192
## 365 Brown Female 3.546
## 366 Brown Female 3.213
## 367 Brown Female 3.470
## 368 Brown Female 3.306
## 369 Brown Female 3.661
## 370 Brown Female 3.248
## 371 Brown Female 3.427
## 372 Brown Female 3.168
## 373 Brown Female 3.256
## 374 Brown Female 3.495
## 375 Brown Female 3.325
## 376 Brown Female 3.216
## 377 Brown Female 3.273
## 378 Brown Female 3.307
## 379 Brown Female 3.262
## 380 Brown Female 2.923
## 381 Brown Female 3.608
## 382 Brown Female 3.695
## 383 Brown Female 3.378
## 384 Brown Female 3.157
## 385 Brown Female 3.204
## 386 Brown Female 3.422
## 387 Brown Female 3.430
```

```
## 388 Brown Female 3.337
## 389 Brown Female 3.510
## 390 Brown Female 3.596
## 391 Brown Female 3.497
## 392 Brown Female 3.202
## 393 Brown Female 3.183
## 394 Brown Female 3.655
## 395 Brown Female 3.386
## 396 Brown Female 3.395
## 397 Brown Female 3.029
## 398 Brown Female 3.669
## 399 Brown Female 3.407
## 400 Brown Female 3.465
## 401 Brown Female 3.305
## 402  Blue Female 3.336
## 403  Blue Female 3.117
## 404  Blue Female 3.457
## 405  Blue Female 3.283
## 406  Blue Female 3.366
## 407  Blue Female 3.499
## 408  Blue Female 3.531
## 409  Blue Female 3.551
## 410  Blue Female 3.349
## 411  Blue Female 3.410
## 412  Blue Female 3.479
## 413  Blue Female 3.300
## 414  Blue Female 3.651
## 415  Blue Female 3.523
## 416  Blue Female 3.539
## 417  Blue Female 3.286
## 418  Blue Female 3.810
## 419  Blue Female 3.385
## 420  Blue Female 3.310
## 421  Blue Female 3.767
## 422  Blue Female 3.236
## 423  Blue Female 3.602
## 424  Blue Female 3.448
## 425  Blue Female 3.197
## 426  Blue Female 3.308
## 427  Blue Female 3.683
## 428  Blue Female 3.586
## 429  Blue Female 3.550
## 430  Blue Female 3.313
## 431  Blue Female 3.296
## 432  Blue Female 3.413
## 433  Blue Female 3.256
## 434  Blue Female 3.371
## 435  Blue Female 3.133
## 436  Blue Female 3.486
## 437  Blue Female 3.590
## 438  Blue Female 3.208
## 439  Blue Female 3.701
## 440  Blue Female 3.458
## 441  Blue Female 3.065
```

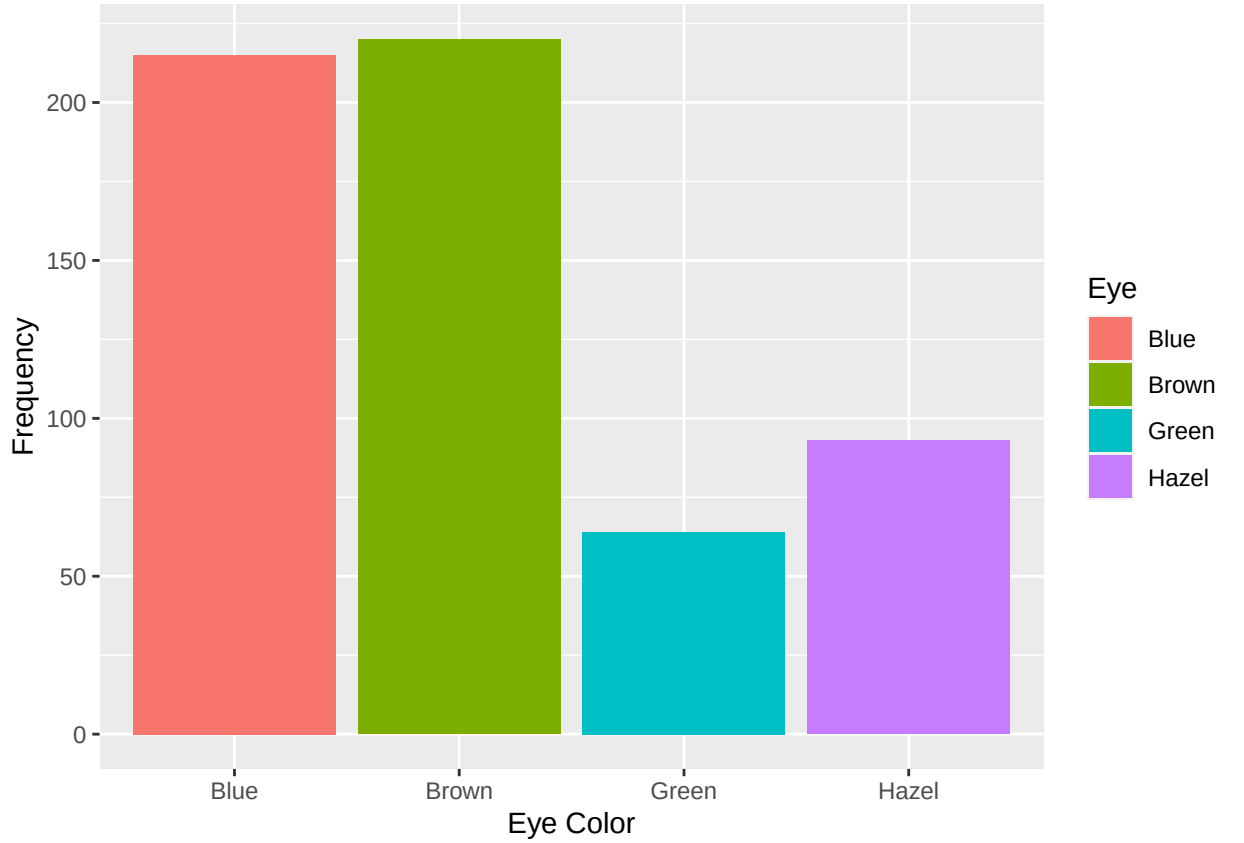
```
## 442  Blue Female 3.245
## 443  Blue Female 3.100
## 444  Blue Female 3.308
## 445  Blue Female 3.403
## 446  Blue Female 3.498
## 447  Blue Female 3.387
## 448  Blue Female 3.410
## 449  Blue Female 3.512
## 450  Blue Female 3.483
## 451  Blue Female 3.351
## 452  Blue Female 3.339
## 453  Blue Female 3.607
## 454  Blue Female 3.502
## 455  Blue Female 3.120
## 456  Blue Female 3.784
## 457  Blue Female 3.377
## 458  Blue Female 3.280
## 459  Blue Female 3.316
## 460  Blue Female 3.278
## 461  Blue Female 3.624
## 462  Blue Female 3.374
## 463  Blue Female 3.477
## 464  Blue Female 3.187
## 465  Blue Female 3.638
## 466  Blue Female 3.793
## 467  Blue Female 3.563
## 468  Blue Female 3.452
## 469  Blue Female 3.388
## 470  Blue Female 3.647
## 471  Blue Female 3.500
## 472  Blue Female 3.467
## 473  Blue Female 3.041
## 474  Blue Female 3.431
## 475  Blue Female 3.447
## 476  Blue Female 3.631
## 477  Blue Female 3.154
## 478  Blue Female 3.291
## 479  Blue Female 3.303
## 480  Blue Female 3.303
## 481  Blue Female 3.746
## 482  Blue Female 2.714
## 483  Blue Female 3.693
## 484  Blue Female 3.232
## 485  Blue Female 3.247
## 486  Blue Female 3.437
## 487  Blue Female 3.160
## 488  Blue Female 3.409
## 489  Blue Female 3.629
## 490  Blue Female 3.364
## 491  Blue Female 3.081
## 492  Blue Female 3.048
## 493  Blue Female 3.222
## 494  Blue Female 3.518
## 495  Blue Female 3.552
```

```
## 496  Blue Female 3.628
## 497  Blue Female 3.393
## 498  Blue Female 3.365
## 499  Blue Female 3.504
## 500  Blue Female 3.645
## 501  Blue Female 3.644
## 502  Blue Female 3.225
## 503  Blue Female 3.399
## 504  Blue Female 3.293
## 505  Blue Female 3.609
## 506  Blue Female 3.487
## 507  Blue Female 3.181
## 508  Blue Female 3.580
## 509  Blue Female 3.338
## 510  Blue Female 3.604
## 511  Blue Female 3.428
## 512  Blue Female 3.325
## 513  Blue Female 3.565
## 514  Blue Female 3.382
## 515  Blue Female 3.408
## 516 Hazel Female 3.615
## 517 Hazel Female 3.706
## 518 Hazel Female 3.102
## 519 Hazel Female 3.539
## 520 Hazel Female 3.395
## 521 Hazel Female 3.219
## 522 Hazel Female 3.215
## 523 Hazel Female 3.522
## 524 Hazel Female 3.208
## 525 Hazel Female 3.379
## 526 Hazel Female 3.778
## 527 Hazel Female 3.466
## 528 Hazel Female 3.239
## 529 Hazel Female 3.339
## 530 Hazel Female 3.495
## 531 Hazel Female 3.662
## 532 Hazel Female 3.618
## 533 Hazel Female 3.524
## 534 Hazel Female 3.514
## 535 Hazel Female 3.489
## 536 Hazel Female 3.582
## 537 Hazel Female 3.279
## 538 Hazel Female 3.202
## 539 Hazel Female 3.262
## 540 Hazel Female 3.303
## 541 Hazel Female 3.418
## 542 Hazel Female 3.041
## 543 Hazel Female 3.587
## 544 Hazel Female 3.488
## 545 Hazel Female 3.387
## 546 Hazel Female 3.192
## 547 Hazel Female 3.772
## 548 Hazel Female 3.526
## 549 Hazel Female 3.311
```

```
## 550 Hazel Female 3.093
## 551 Hazel Female 3.138
## 552 Hazel Female 3.233
## 553 Hazel Female 3.351
## 554 Hazel Female 3.415
## 555 Hazel Female 3.502
## 556 Hazel Female 3.211
## 557 Hazel Female 3.106
## 558 Hazel Female 3.617
## 559 Hazel Female 3.417
## 560 Hazel Female 3.568
## 561 Hazel Female 3.537
## 562 Green Female 3.527
## 563 Green Female 3.425
## 564 Green Female 3.131
## 565 Green Female 3.368
## 566 Green Female 3.622
## 567 Green Female 3.296
## 568 Green Female 3.389
## 569 Green Female 3.219
## 570 Green Female 3.451
## 571 Green Female 3.229
## 572 Green Female 3.239
## 573 Green Female 3.435
## 574 Green Female 3.268
## 575 Green Female 3.333
## 576 Green Female 3.204
## 577 Green Female 3.592
## 578 Green Female 3.657
## 579 Green Female 3.838
## 580 Green Female 3.534
## 581 Green Female 3.573
## 582 Green Female 3.454
## 583 Green Female 3.507
## 584 Green Female 3.620
## 585 Green Female 3.082
## 586 Green Female 3.502
## 587 Green Female 3.433
## 588 Green Female 3.305
## 589 Green Female 3.407
## 590 Green Female 2.936
## 591 Green Female 3.675
## 592 Green Female 3.303
```

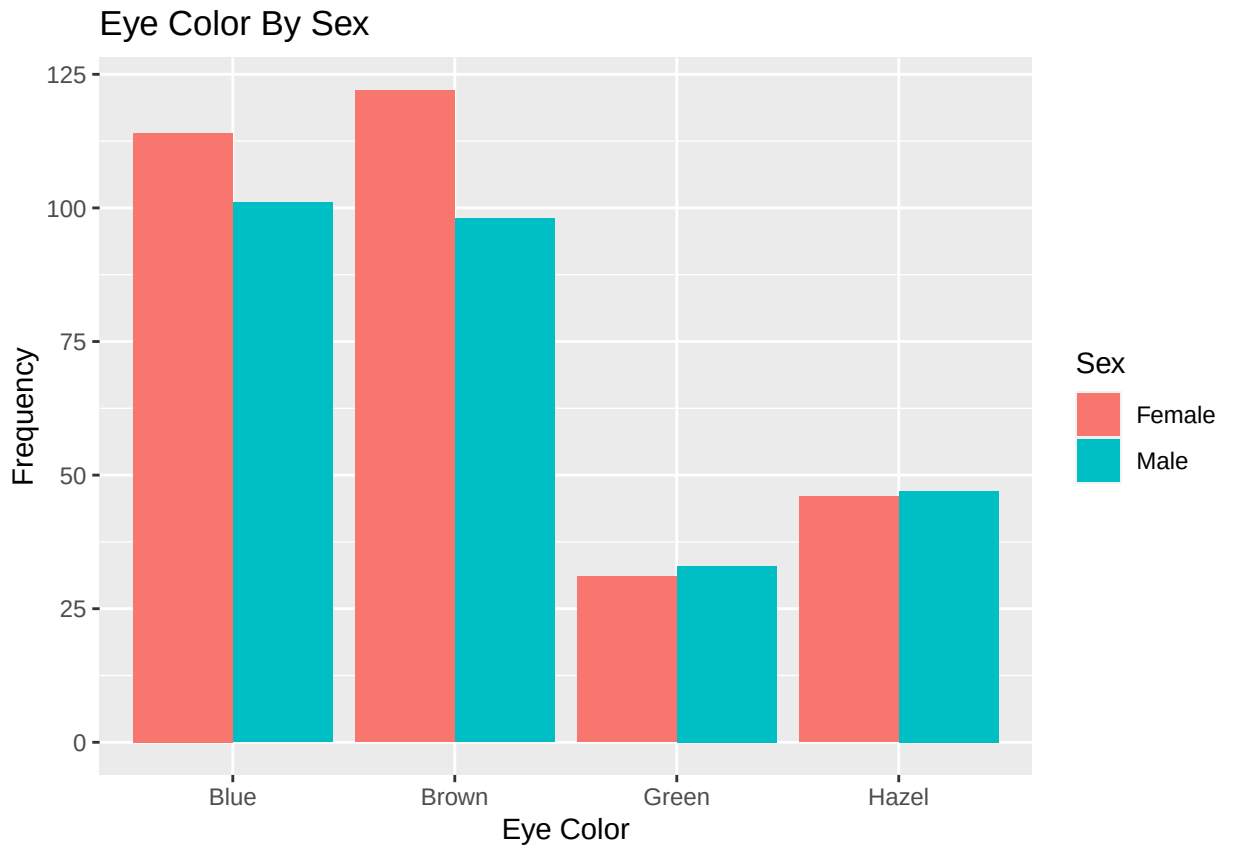
A. Plot a barplot of the eye color of the subjects. What color is the least common?

```
colors %>%
  ggplot(aes(x=Eye, fill=Eye))+
  geom_bar()+
  labs(x="Eye Color", y="Frequency")
```



B. Plot a two category barplot of the subjects, using sex and eye color. Comparing men and women, who has a higher probability of brown eyes?

```
colors %>%
  ggplot(aes(x=Eye, fill=Sex))+
  geom_bar(position="dodge")+
  labs(x="Eye Color", y="Frequency", title = "Eye Color By Sex")
```

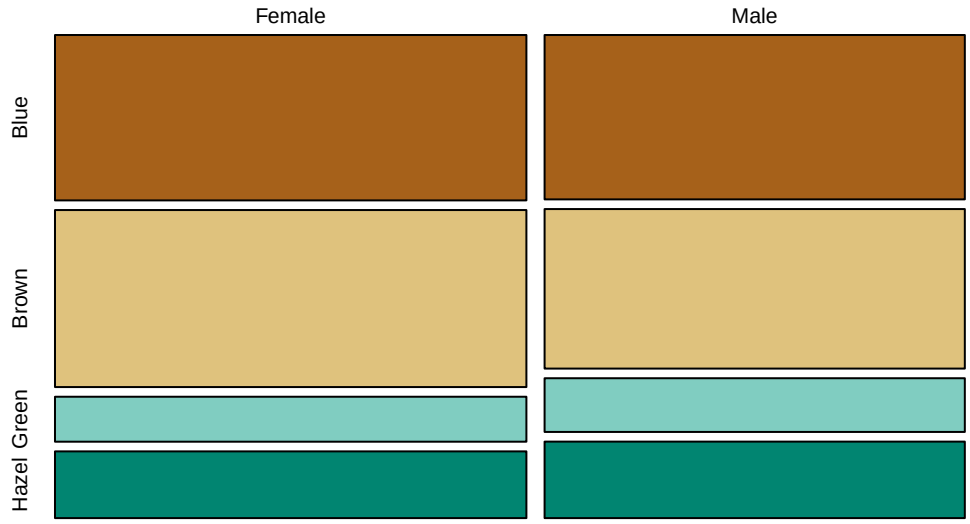


C. Plot a mosaic plot of sex and eye color. Are there more males or females in the study? Do males or females tend to have a higher probability of blue eyes? What eye color is least common for males?

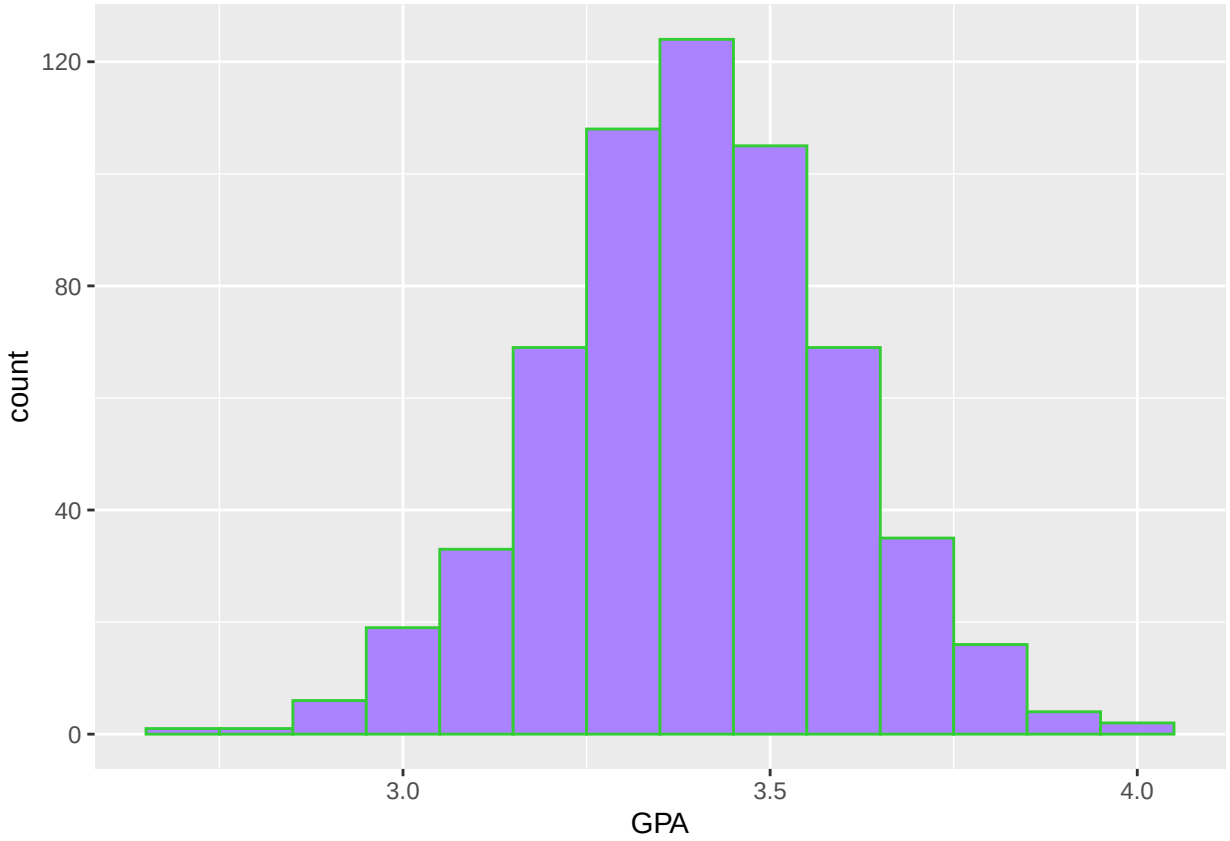
```
estable <-table(colors$Sex, colors$Eye)
estable
```

```
##
##          Blue Brown Green Hazel
##   Female  114   122    31    46
##   Male    101    98    33    47
```

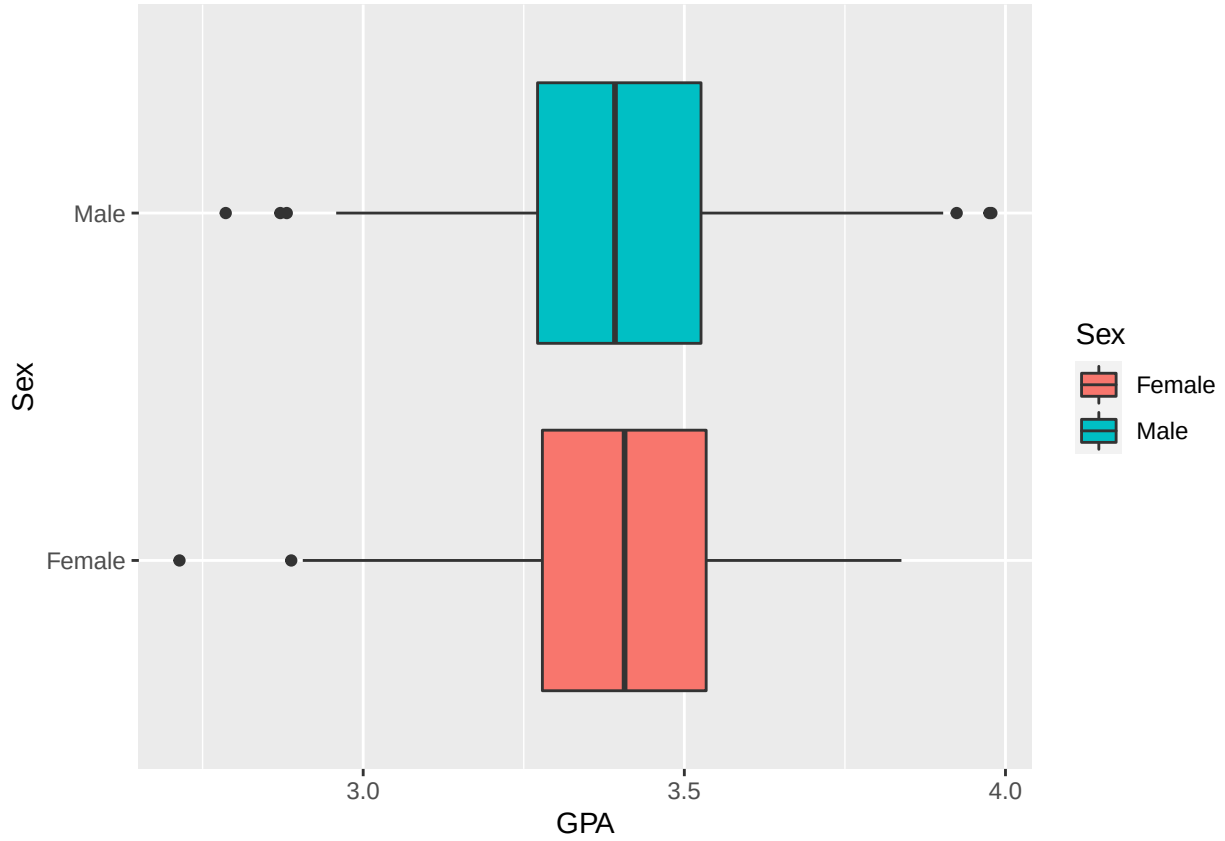
```
mosaicplot(estable, main = "Eye Colors By Sex", color = brewer.pal(4, "BrBG"))
```



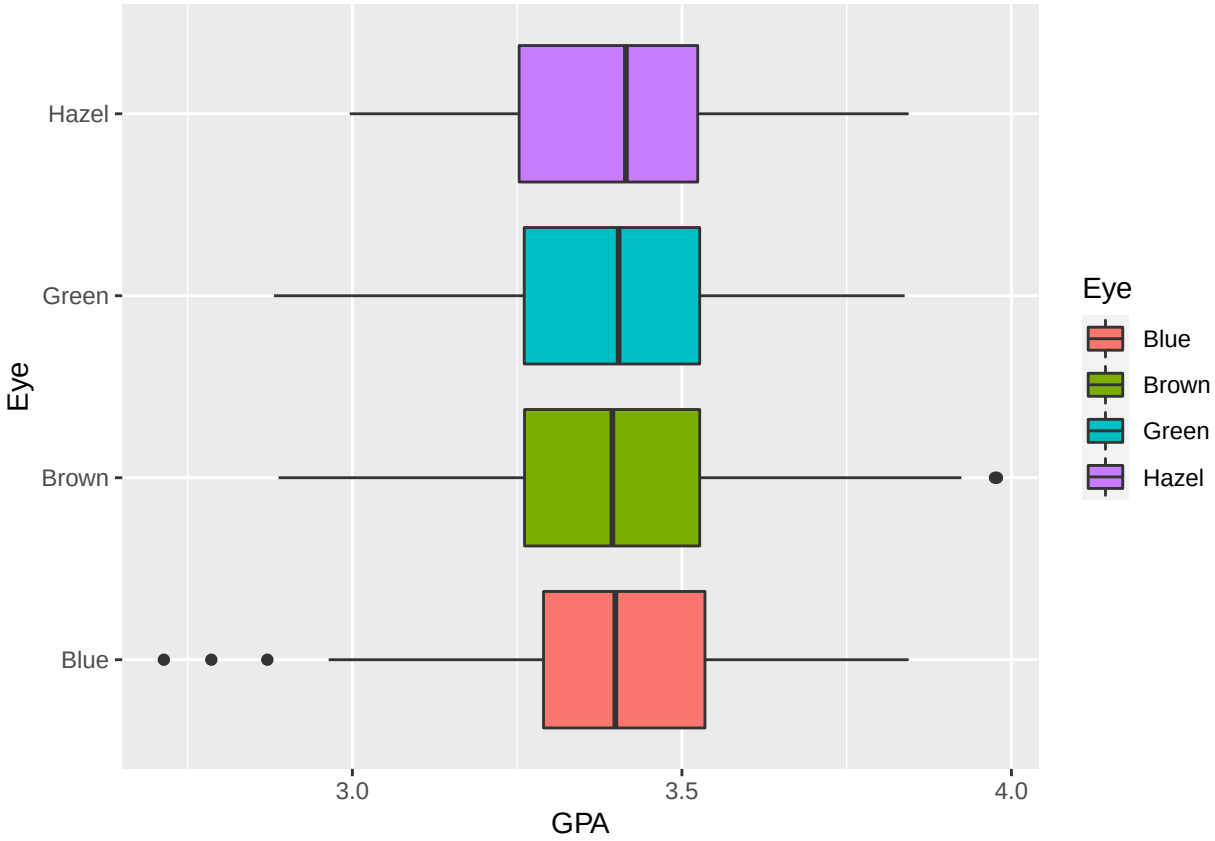

```
colors %>%
  ggplot(aes(x=GPA))+
  geom_histogram(binwidth = 0.1, color = "limegreen", fill= "mediumpurple1")
```




```
colors %>%
  ggplot(aes(x=GPA, y=Sex, fill=Sex))+
  geom_boxplot()
```




```
colors %>%
  ggplot(aes(x=GPA, y=Eye, fill=Eye))+
  geom_boxplot()
```


Hazel
Green
Brown
Blue
Eye
3.0
3.5
4.0
GPA
Eye
Blue
Brown
Green
Hazel