intro to viz

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#Input

D1 <- read.csv("School\_Demographics\_and\_Accountability\_Snapshot\_2006-2012.csv", header = TRUE, sep = ",")  
  
#Create a data frame only contains the years 2011-2012  
library(dplyr)

##   
## Attaching package: 'dplyr'

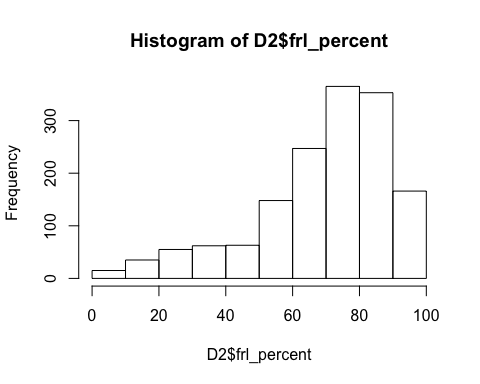
## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

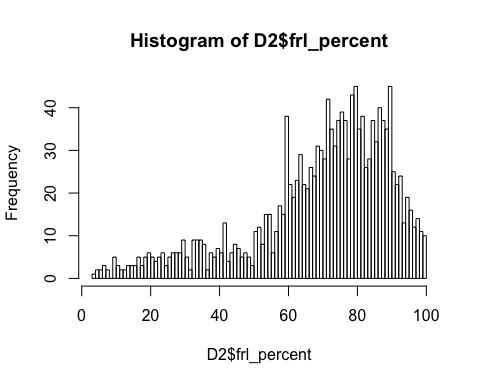
D2 <- filter(D1, schoolyear == 20112012)

#Histograms

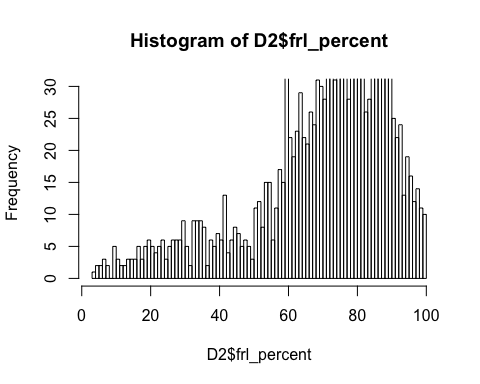
#Generate a histogramof the percentage of free/reduced lunch students (frl\_percent) at each school  
  
hist(D2$frl\_percent)



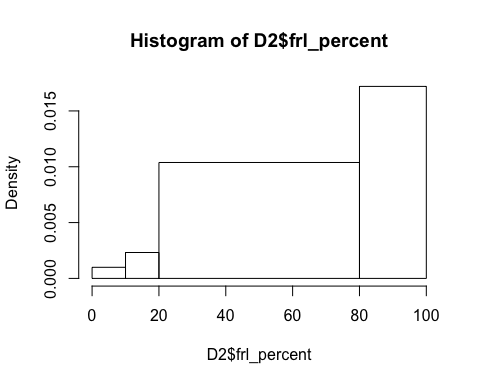
#Change the number of breaks to 100, do you get the same impression?  
  
hist(D2$frl\_percent, breaks = 100)



#Cut the y-axis off at 30  
  
hist(D2$frl\_percent, breaks = 100, ylim = c(0,30))

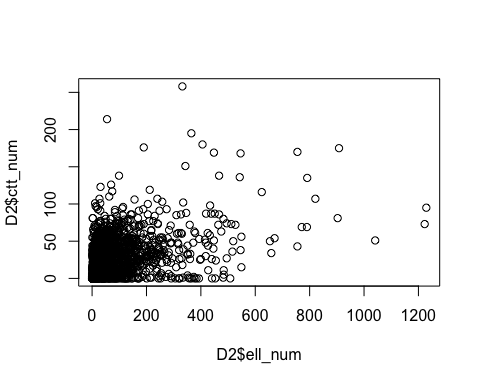


#Restore the y-axis and change the breaks so that they are 0-10, 10-20, 20-80, 80-100  
  
hist(D2$frl\_percent, breaks = c(0,10,20,80,100))

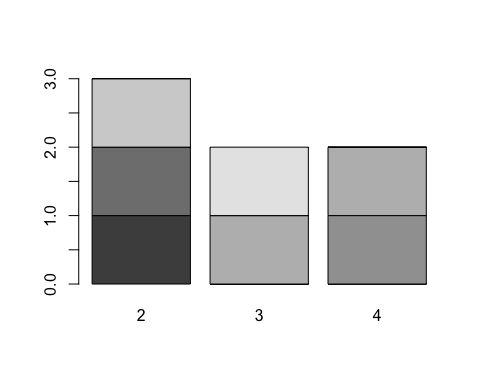


#Plots

#Plot the number of English language learners (ell\_num) by Computational Thinking Test scores (ctt\_num)   
  
plot(D2$ell\_num, D2$ctt\_num)



#Create two variables x & y  
x <- c(1,3,2,7,6,4,4)  
y <- c(2,4,2,3,2,4,3)  
  
#Create a table from x & y  
table1 <- table(x,y)  
  
#Display the table as a Barplot  
barplot(table1)

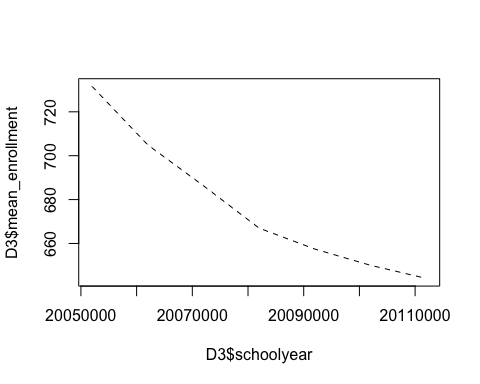


#Create a data frame of the average total enrollment for each year and plot the two against each other as a lines  
  
library(tidyr)

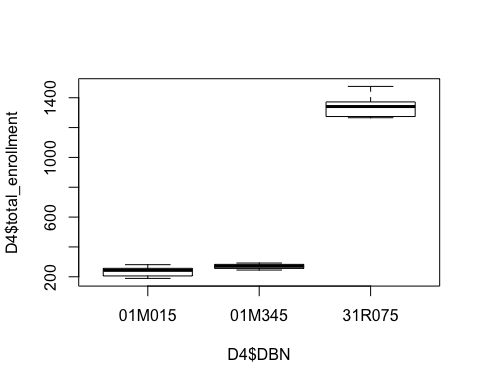
##   
## Attaching package: 'tidyr'

## The following object is masked \_by\_ '.GlobalEnv':  
##   
## table1

D3 <- D1 %>% group\_by(schoolyear) %>% summarise(mean\_enrollment = mean(total\_enrollment))  
  
plot(D3$schoolyear, D3$mean\_enrollment, type = "l", lty = "dashed")



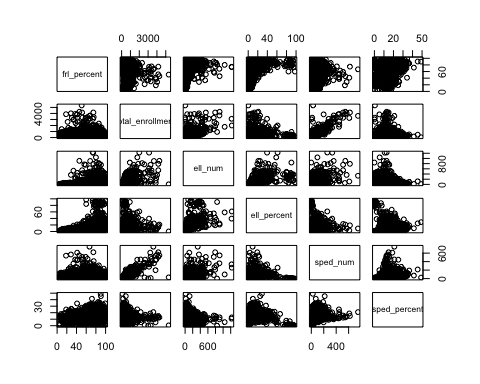
#Create a boxplot of total enrollment for three schools  
D4 <- filter(D1, DBN == "31R075"|DBN == "01M015"| DBN == "01M345")  
#The drop levels command will remove all the schools from the variable with not data   
D4 <- droplevels(D4)  
boxplot(D4$total\_enrollment ~ D4$DBN)

 #Pairs

#Use matrix notation to select columns 5,6, 21, 22, 23, 24  
D5 <- D2[,c(5,6, 21:24)]  
D5

## frl\_percent total\_enrollment ell\_num ell\_percent sped\_num  
## 1 89.4 189 20 10.6 40  
## 2 61.5 328 33 10.1 59  
## 3 92.5 626 128 20.4 97  
## 4 99.7 401 34 8.5 106  
## 5 78.9 176 6 3.4 45  
## 6 76.9 324 29 9.0 102  
## 7 52.5 440 31 7.0 61  
## 8 84.1 369 61 16.5 61  
## 9 82.2 230 34 14.8 54  
## 10 82.1 407 60 14.7 95  
## 11 91.8 433 53 12.2 97  
## 12 71.5 690 75 10.9 46  
## 13 89.6 388 65 16.8 75  
## 14 88.6 422 94 22.3 105  
## 15 71.0 170 13 7.6 53  
## 16 35.2 244 7 2.9 53  
## 17 87.9 115 22 19.1 37  
## 18 77.1 245 14 5.7 62  
## 19 42.7 247 19 7.7 34  
## 20 33.1 315 9 2.9 69  
## 21 34.7 336 12 3.6 53  
## 22 71.1 271 31 11.4 69  
## 23 71.8 394 83 21.1 86  
## 24 71.8 598 30 5.0 158  
## 25 72.8 224 9 4.0 20  
## 26 80.7 367 41 11.2 95  
## 27 77.0 562 453 80.6 7  
## 28 23.0 1613 4 0.2 43  
## 29 69.8 218 7 3.2 15  
## 30 18.0 617 1 0.2 5  
## 31 51.7 384 23 6.0 85  
## 32 76.2 518 198 38.2 71  
## 33 94.5 816 372 45.6 91  
## 34 14.2 813 28 3.4 117  
## 35 4.6 789 19 2.4 120  
## 36 38.4 700 22 3.1 108  
## 37 70.3 458 46 10.0 44  
## 38 11.9 615 14 2.3 94  
## 39 7.9 782 13 1.7 141  
## 40 88.1 806 295 36.6 80  
## 41 66.9 174 14 8.0 56  
## 42 65.6 288 41 14.2 62  
## 43 16.5 520 47 9.0 70  
## 44 5.7 351 0 0.0 48  
## 45 6.7 531 20 3.8 71  
## 46 61.8 1057 68 6.4 165  
## 47 64.9 586 113 19.3 156  
## 48 10.6 448 1 0.2 64  
## 49 23.7 789 46 5.8 98  
## 50 60.8 919 218 23.7 76  
## 51 66.5 785 157 20.0 123  
## 52 65.7 1015 171 16.8 111  
## 53 86.3 556 255 45.9 104  
## 54 11.4 186 4 2.2 25  
## 55 32.2 280 17 6.1 43  
## 56 15.2 759 32 4.2 147  
## 57 37.2 1243 64 5.1 194  
## 58 9.8 609 33 5.4 101  
## 59 61.3 551 42 7.6 106  
## 60 19.8 343 13 3.8 38  
## 61 37.2 416 39 9.4 42  
## 62 35.5 321 10 3.1 32  
## 63 6.4 827 6 0.7 105  
## 64 16.2 386 1 0.3 50  
## 65 26.0 256 10 3.9 60  
## 66 10.9 98 8 8.2 10  
## 67 7.4 551 21 3.8 57  
## 68 68.4 433 9 2.1 80  
## 69 37.3 292 7 2.4 49  
## 70 9.3 635 22 3.5 78  
## 71 60.8 343 13 3.8 70  
## 72 72.4 419 40 9.5 62  
## 73 56.7 414 9 2.2 57  
## 74 75.3 431 47 10.9 86  
## 75 75.6 451 94 20.8 98  
## 76 68.3 312 19 6.1 53  
## 77 62.2 336 13 3.9 83  
## 78 29.2 575 1 0.2 68  
## 79 51.0 248 12 4.8 32  
## 80 74.9 378 10 2.6 59  
## 81 76.0 215 20 9.3 70  
## 82 59.0 495 15 3.0 61  
## 83 34.6 433 2 0.5 47  
## 84 64.0 332 33 9.9 46  
## 85 58.7 304 23 7.6 65  
## 86 97.0 250 207 82.8 0  
## 87 5.6 253 8 3.2 8  
## 88 80.8 244 69 28.3 41  
## 89 56.4 1394 99 7.1 201  
## 90 17.9 489 2 0.4 43  
## 91 23.5 502 10 2.0 16  
## 92 54.6 432 7 1.6 10  
## 93 21.6 579 9 1.6 87  
## 94 31.0 673 14 2.1 98  
## 95 51.6 436 2 0.5 41  
## 96 15.8 507 1 0.2 6  
## 97 32.7 626 1 0.2 57  
## 98 83.1 421 66 15.7 79  
## 99 68.0 1768 70 4.0 192  
## 100 40.6 232 5 2.2 53  
## 101 74.2 607 33 5.4 113  
## 102 97.5 175 152 86.9 12  
## 103 93.9 294 24 8.2 66  
## 104 78.0 214 16 7.5 58  
## 105 61.5 226 20 8.8 37  
## 106 82.8 176 167 94.9 1  
## 107 60.3 429 16 3.7 35  
## 108 75.5 208 54 26.0 28  
## 109 50.7 154 4 2.6 2  
## 110 69.5 444 27 6.1 77  
## 111 80.7 325 252 77.5 1  
## 112 66.0 1032 192 18.6 177  
## 113 30.3 3297 0 0.0 14  
## 114 60.8 809 51 6.3 96  
## 115 83.5 237 37 15.6 78  
## 116 60.0 126 11 8.7 25  
## 117 45.5 491 1 0.2 17  
## 118 72.7 2073 212 10.2 292  
## 119 73.0 724 71 9.8 99  
## 120 65.3 217 1 0.5 11  
## 121 83.5 541 393 72.6 9  
## 122 66.1 423 23 5.4 74  
## 123 74.4 391 15 3.8 45  
## 124 82.6 353 135 38.2 8  
## 125 79.5 397 358 90.2 8  
## 126 73.5 430 18 4.2 77  
## 127 38.1 605 8 1.3 56  
## 128 32.1 157 2 1.3 0  
## 129 72.8 248 16 6.5 35  
## 130 85.6 807 484 60.0 19  
## 131 67.0 610 39 6.4 133  
## 132 75.7 68 1 1.5 15  
## 133 68.3 1599 45 2.8 184  
## 134 54.0 192 2 1.0 13  
## 135 69.8 466 29 6.2 73  
## 136 81.1 1127 218 19.3 175  
## 137 72.7 1433 131 9.1 246  
## 138 53.3 1344 22 1.6 149  
## 139 70.3 717 57 7.9 141  
## 140 50.4 289 29 10.0 67  
## 141 19.1 605 34 5.6 54  
## 142 29.0 831 28 3.4 81  
## 143 57.5 635 98 15.4 100  
## 144 84.9 539 40 7.4 70  
## 145 53.7 489 38 7.8 58  
## 146 10.1 963 28 2.9 128  
## 147 75.8 445 88 19.8 88  
## 148 77.5 383 27 7.0 91  
## 149 47.7 636 57 9.0 83  
## 150 73.7 826 171 20.7 145  
## 151 31.3 606 30 5.0 60  
## 152 71.6 629 37 5.9 54  
## 153 76.4 237 27 11.4 34  
## 154 68.0 549 47 8.6 91  
## 155 9.3 792 22 2.8 106  
## 156 79.8 200 25 12.5 55  
## 157 88.3 113 28 24.8 28  
## 158 75.8 295 20 6.8 53  
## 159 14.0 221 2 0.9 5  
## 160 28.2 402 8 2.0 51  
## 161 89.4 203 53 26.1 44  
## 162 64.4 177 17 9.6 49  
## 163 81.6 169 27 16.0 47  
## 164 67.3 246 16 6.5 70  
## 165 59.6 409 35 8.6 43  
## 166 66.4 418 60 14.4 82  
## 167 68.8 366 47 12.8 56  
## 168 20.6 729 18 2.5 115  
## 169 4.6 569 2 0.4 4  
## 170 73.2 283 71 25.1 61  
## 171 68.4 358 69 19.3 69  
## 172 50.4 199 7 3.5 20  
## 173 76.6 516 38 7.4 97  
## 174 24.0 219 2 0.9 38  
## 175 57.6 189 15 7.9 47  
## 176 16.4 124 1 0.8 23  
## 177 68.6 291 81 27.8 31  
## 178 18.4 1162 2 0.2 43  
## 179 21.7 2605 4 0.2 26  
## 180 79.9 541 57 10.5 84  
## 181 79.8 603 63 10.4 104  
## 182 70.5 564 44 7.8 130  
## 183 55.2 453 6 1.3 17  
## 184 3.7 138 2 1.4 4  
## 185 64.2 413 24 5.8 86  
## 186 34.5 317 7 2.2 46  
## 187 78.0 399 69 17.3 55  
## 188 47.9 495 0 0.0 10  
## 189 75.3 233 21 9.0 72  
## 190 74.0 233 20 8.6 45  
## 191 79.1 274 41 15.0 68  
## 192 90.1 244 53 21.7 72  
## 193 83.7 317 36 11.4 113  
## 194 86.1 778 119 15.3 163  
## 195 88.0 530 133 25.1 114  
## 196 75.6 432 56 13.0 51  
## 197 87.1 524 86 16.4 107  
## 198 95.4 300 48 16.0 96  
## 199 87.3 725 96 13.2 124  
## 200 85.8 337 75 22.3 93  
## 201 90.3 474 118 24.9 215  
## 202 93.4 355 133 37.5 70  
## 203 78.8 656 20 3.0 96  
## 204 98.4 365 103 28.2 29  
## 205 88.0 326 48 14.7 115  
## 206 42.0 247 4 1.6 21  
## 207 89.3 243 62 25.5 82  
## 208 81.2 325 39 12.0 85  
## 209 74.9 194 10 5.2 64  
## 210 84.8 179 21 11.7 57  
## 211 70.5 168 12 7.1 46  
## 212 71.8 349 34 9.7 85  
## 213 71.6 1650 44 2.7 95  
## 214 76.8 349 15 4.3 37  
## 215 42.4 208 4 1.9 34  
## 216 70.4 445 18 4.0 60  
## 217 67.3 449 10 2.2 30  
## 218 62.7 192 26 13.5 36  
## 219 71.8 294 20 6.8 73  
## 220 68.5 358 43 12.0 59  
## 221 61.1 240 5 2.1 39  
## 222 81.5 305 34 11.1 87  
## 223 73.3 623 72 11.6 111  
## 224 94.8 824 90 10.9 131  
## 225 87.6 280 40 14.3 60  
## 226 82.8 676 160 23.7 89  
## 227 79.8 201 31 15.4 41  
## 228 83.1 640 58 9.1 98  
## 229 81.6 284 24 8.5 59  
## 230 89.7 373 61 16.4 75  
## 231 97.3 953 292 30.6 160  
## 232 87.9 383 38 9.9 29  
## 233 95.9 285 49 17.2 68  
## 234 82.9 207 77 37.2 64  
## 235 78.4 351 27 7.7 70  
## 236 77.4 527 92 17.5 109  
## 237 67.6 222 21 9.5 24  
## 238 82.7 236 30 12.7 49  
## 239 76.6 192 20 10.4 34  
## 240 78.5 426 37 8.7 66  
## 241 53.6 212 1 0.5 20  
## 242 46.3 474 3 0.6 2  
## 243 67.0 425 42 9.9 92  
## 244 77.7 374 23 6.1 62  
## 245 76.7 160 14 8.7 47  
## 246 81.9 347 7 2.0 46  
## 247 57.6 1556 38 2.4 138  
## 248 60.0 112 11 9.8 32  
## 249 60.0 50 1 2.0 2  
## 250 65.1 580 8 1.4 58  
## 251 71.8 524 92 17.6 110  
## 252 18.5 406 0 0.0 0  
## 253 85.9 720 321 44.6 94  
## 254 89.1 778 360 46.3 103  
## 255 95.3 568 257 45.2 74  
## 256 84.4 420 244 58.1 35  
## 257 86.4 885 426 48.1 113  
## 258 90.1 642 261 40.7 112  
## 259 89.6 649 246 37.9 114  
## 260 96.6 636 266 41.8 67  
## 261 99.5 674 246 36.5 66  
## 262 90.0 652 237 36.3 87  
## 263 92.3 793 427 53.8 108  
## 264 84.4 612 274 44.8 135  
## 265 88.2 725 249 34.3 92  
## 266 90.0 959 336 35.0 108  
## 267 85.0 718 165 23.0 73  
## 268 63.4 226 54 23.9 42  
## 269 60.4 798 69 8.6 88  
## 270 96.3 1120 455 40.6 123  
## 271 93.4 372 109 29.3 50  
## 272 85.6 457 217 47.5 54  
## 273 93.4 342 150 43.9 77  
## 274 62.0 328 7 2.1 15  
## 275 70.4 527 81 15.4 61  
## 276 71.6 586 36 6.1 77  
## 277 63.6 432 101 23.4 47  
## 278 45.3 243 24 9.9 31  
## 279 94.4 649 254 39.1 88  
## 280 92.5 463 176 38.0 73  
## 281 91.2 428 186 43.5 74  
## 282 96.7 361 148 41.0 80  
## 283 86.9 322 151 46.9 53  
## 284 93.4 405 202 49.9 87  
## 285 78.8 520 156 30.0 90  
## 286 87.5 602 118 19.6 109  
## 287 92.1 155 146 94.2 2  
## 288 65.1 389 83 21.3 23  
## 289 63.7 233 72 30.9 17  
## 290 99.2 178 35 19.7 61  
## 291 89.3 630 271 43.0 86  
## 292 83.8 572 154 26.9 97  
## 293 72.5 694 222 32.0 116  
## 294 90.7 679 212 31.2 94  
## 295 86.2 274 48 17.5 34  
## 296 76.3 1285 30 2.3 71  
## 297 92.8 472 423 89.6 0  
## 298 96.2 683 205 30.0 133  
## 299 97.3 530 118 22.3 91  
## 300 80.4 550 145 26.4 108  
## 301 100.0 397 118 29.7 66  
## 302 83.8 758 87 11.5 132  
## 303 95.5 509 108 21.2 80  
## 304 91.4 636 77 12.1 113  
## 305 95.8 485 52 10.7 69  
## 306 91.6 680 136 20.0 125  
## 307 98.0 411 68 16.5 87  
## 308 98.6 286 76 26.6 67  
## 309 96.7 541 69 12.8 93  
## 310 85.5 610 85 13.9 88  
## 311 91.3 595 152 25.5 146  
## 312 79.1 568 123 21.7 151  
## 313 89.4 399 110 27.6 79  
## 314 84.3 279 63 22.6 63  
## 315 72.9 622 55 8.8 120  
## 316 91.6 494 41 8.3 84  
## 317 89.9 373 131 35.1 72  
## 318 89.2 509 94 18.5 94  
## 319 84.8 328 39 11.9 80  
## 320 88.4 266 107 40.2 54  
## 321 78.3 124 3 2.4 8  
## 322 77.5 393 354 90.1 7  
## 323 92.6 254 40 15.7 68  
## 324 92.7 296 101 34.1 49  
## 325 71.7 198 6 3.0 15  
## 326 64.7 153 12 7.8 13  
## 327 91.3 600 150 25.0 120  
## 328 82.7 319 42 13.2 63  
## 329 78.5 363 35 9.6 67  
## 330 90.1 465 17 3.7 24  
## 331 68.3 538 30 5.6 64  
## 332 89.9 311 68 21.9 70  
## 333 60.0 138 28 20.3 27  
## 334 77.0 502 71 14.1 93  
## 335 90.4 383 60 15.7 96  
## 336 74.3 477 24 5.0 89  
## 337 79.1 555 52 9.4 133  
## 338 76.7 738 67 9.1 162  
## 339 75.7 663 113 17.0 173  
## 340 77.8 587 61 10.4 115  
## 341 52.4 598 39 6.5 98  
## 342 78.6 732 103 14.1 120  
## 343 86.3 869 162 18.6 173  
## 344 87.3 723 104 14.4 137  
## 345 82.7 611 79 12.9 126  
## 346 57.0 1634 99 6.1 309  
## 347 67.7 920 47 5.1 165  
## 348 89.9 614 91 14.8 96  
## 349 75.5 401 49 12.2 87  
## 350 75.1 652 49 7.5 130  
## 351 60.1 464 4 0.9 55  
## 352 79.1 523 54 10.3 99  
## 353 75.4 1040 232 22.3 113  
## 354 88.1 519 116 22.4 102  
## 355 83.7 632 113 17.9 111  
## 356 90.0 476 129 27.1 72  
## 357 76.3 839 54 6.4 165  
## 358 83.3 967 68 7.0 143  
## 359 89.4 622 43 6.9 79  
## 360 95.2 493 68 13.8 53  
## 361 86.4 957 249 26.0 117  
## 362 75.9 959 37 3.9 105  
## 363 85.6 500 46 9.2 67  
## 364 72.2 379 10 2.6 59  
## 365 66.4 469 21 4.5 102  
## 366 74.6 478 55 11.5 115  
## 367 81.6 325 54 16.6 61  
## 368 99.6 669 159 23.8 174  
## 369 57.7 544 14 2.6 79  
## 370 75.8 359 57 15.9 98  
## 371 74.2 496 27 5.4 101  
## 372 79.6 333 42 12.6 60  
## 373 81.9 445 131 29.4 77  
## 374 91.4 192 30 15.6 27  
## 375 79.2 287 28 9.8 67  
## 376 73.6 243 38 15.6 71  
## 377 87.3 500 13 2.6 110  
## 378 62.7 285 18 6.3 52  
## 379 84.2 323 29 9.0 82  
## 380 81.3 432 32 7.4 104  
## 381 73.9 200 9 4.5 10  
## 382 66.8 3593 332 9.2 751  
## 383 93.0 388 74 19.1 90  
## 384 87.2 155 123 79.4 12  
## 385 85.3 311 29 9.3 60  
## 386 69.2 305 22 7.2 70  
## 387 59.6 272 18 6.6 64  
## 388 72.3 363 51 14.0 76  
## 389 81.9 451 61 13.5 116  
## 390 60.0 129 6 4.7 8  
## 391 83.8 191 21 11.0 54  
## 392 76.2 195 18 9.2 13  
## 393 85.7 717 80 11.2 159  
## 394 89.9 49 14 28.6 24  
## 395 90.0 395 42 10.6 78  
## 396 89.4 725 248 34.2 121  
## 397 97.3 653 195 29.9 119  
## 398 95.6 750 235 31.3 103  
## 399 87.4 646 131 20.3 77  
## 400 92.9 500 92 18.4 111  
## 401 88.2 1372 440 32.1 120  
## 402 85.8 710 135 19.0 128  
## 403 84.7 441 120 27.2 110  
## 404 94.8 612 112 18.3 107  
## 405 98.2 884 433 49.0 144  
## 406 92.5 1369 397 29.0 127  
## 407 95.9 857 184 21.5 99  
## 408 91.2 221 60 27.1 26  
## 409 92.4 831 213 25.6 112  
## 410 86.5 450 40 8.9 91  
## 411 90.6 864 320 37.0 107  
## 412 88.1 711 227 31.9 163  
## 413 89.8 735 167 22.7 102  
## 414 84.7 365 29 7.9 43  
## 415 89.0 539 120 22.3 140  
## 416 86.1 485 175 36.1 105  
## 417 98.5 667 256 38.4 100  
## 418 81.8 259 76 29.3 31  
## 419 99.1 731 170 23.3 97  
## 420 89.1 456 64 14.0 60  
## 421 87.1 405 45 11.1 35  
## 422 82.4 863 318 36.8 110  
## 423 94.6 441 88 20.0 120  
## 424 83.9 355 104 29.3 75  
## 425 94.4 220 45 20.5 66  
## 426 100.0 426 85 20.0 59  
## 427 60.4 550 22 4.0 133  
## 428 90.7 492 224 45.5 77  
## 429 93.3 407 59 14.5 74  
## 430 50.2 141 28 19.9 39  
## 431 79.5 606 57 9.4 89  
## 432 62.9 356 29 8.1 67  
## 433 58.9 354 31 8.8 55  
## 434 70.0 444 7 1.6 62  
## 435 76.1 365 44 12.1 59  
## 436 94.8 230 38 16.5 37  
## 437 79.1 450 86 19.1 101  
## 438 100.0 340 57 16.8 52  
## 439 84.7 452 153 33.8 74  
## 440 81.9 472 144 30.5 74  
## 441 79.4 493 54 11.0 80  
## 442 73.1 445 158 35.5 65  
## 443 87.8 357 42 11.8 66  
## 444 64.5 199 36 18.1 42  
## 445 80.0 349 85 24.4 68  
## 446 89.3 740 219 29.6 163  
## 447 85.7 336 291 86.6 3  
## 448 82.3 403 351 87.1 5  
## 449 81.4 386 80 20.7 101  
## 450 77.6 401 93 23.2 93  
## 451 76.9 455 26 5.7 39  
## 452 77.7 382 147 38.5 80  
## 453 93.9 471 217 46.1 70  
## 454 83.7 298 72 24.2 46  
## 455 80.6 382 89 23.3 77  
## 456 87.6 504 146 29.0 71  
## 457 66.2 763 50 6.6 107  
## 458 79.7 532 34 6.4 94  
## 459 76.9 705 68 9.6 143  
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## 1110 15.2  
## 1111 12.5  
## 1112 13.7  
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## 1114 17.0  
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## 1117 11.2  
## 1118 17.6  
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## 1150 7.5  
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## 1157 14.7  
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## 1159 5.7  
## 1160 10.8  
## 1161 10.3  
## 1162 9.0  
## 1163 6.1  
## 1164 14.1  
## 1165 18.0  
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## 1371 13.9  
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## 1373 14.8  
## 1374 12.5  
## 1375 14.1  
## 1376 11.6  
## 1377 19.1  
## 1378 7.9  
## 1379 6.4  
## 1380 30.3  
## 1381 7.5  
## 1382 12.9  
## 1383 7.8  
## 1384 13.7  
## 1385 20.1  
## 1386 16.5  
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## 1480 26.2  
## 1481 0.5  
## 1482 16.9  
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## 1495 16.0  
## 1496 16.6  
## 1497 16.2  
## 1498 11.6  
## 1499 10.9  
## 1500 18.2  
## 1501 5.1  
## 1502 11.8  
## 1503 17.7  
## 1504 12.2  
## 1505 18.4  
## 1506 22.1  
## 1507 4.9  
## 1508 18.6  
## 1509 9.4

#Draw a matrix of plots for every combination of variables  
pairs(D5)

 # Exercise

1. Create a simulated data set containing 100 students, each with a score from 1-100 representing performance in an educational game. The scores should tend to cluster around 75. Also, each student should be given a classification that reflects one of four interest groups: sport, music, nature, literature.

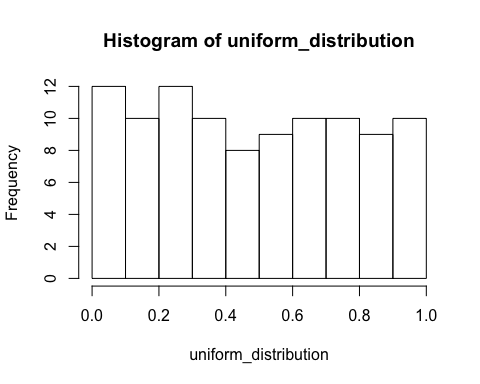
#rnorm(100, 75, 20) creates a random sample with a mean of 75 and standard deviation of 20  
#pmax sets a maximum value, pmin sets a minimum value  
#round rounds numbers to whole number values  
#sample draws a random samples from the groups vector according to a uniform distribution  
# sampling test  
set.seed(123)  
sample\_scores<- rnorm(100,75,20)  
sample\_scores

## [1] 63.79049 70.39645 106.17417 76.41017 77.58575 109.30130 84.21832  
## [8] 49.69878 61.26294 66.08676 99.48164 82.19628 83.01543 77.21365  
## [15] 63.88318 110.73826 84.95701 35.66766 89.02712 65.54417 53.64353  
## [22] 70.64050 54.47991 60.42218 62.49921 41.26613 91.75574 78.06746  
## [29] 52.23726 100.07630 83.52928 69.09857 92.90251 92.56267 91.43162  
## [36] 88.77281 86.07835 73.76177 68.88075 67.39058 61.10586 70.84165  
## [43] 49.69207 118.37912 99.15924 52.53783 66.94230 65.66689 90.59930  
## [50] 73.33262 80.06637 74.42906 74.14259 102.37205 70.48458 105.32941  
## [57] 44.02494 86.69227 77.47708 79.31883 82.59279 64.95353 68.33585  
## [64] 54.62849 53.56418 81.07057 83.96420 76.06008 93.44535 116.00169  
## [71] 65.17938 28.81662 95.11477 60.81598 61.23983 95.51143 69.30454  
## [78] 50.58565 78.62607 72.22217 75.11528 82.70561 67.58680 87.88753  
## [85] 70.59027 81.63564 96.93678 83.70363 68.48137 97.97615 94.87008  
## [92] 85.96794 79.77463 62.44188 102.21305 62.99481 118.74666 105.65221  
## [99] 70.28599 54.47158

score<-pmax(sample\_scores,1)  
score<-pmin(score,100)  
score<-round(score,digits=0)  
  
  
uniform\_distribution<-runif(score, min = 0, max = 1)  
uniform\_distribution

## [1] 0.238726027 0.962358936 0.601365726 0.515029727 0.402573342  
## [6] 0.880246541 0.364091865 0.288239281 0.170645235 0.172171746  
## [11] 0.482042606 0.252964929 0.216254790 0.674376388 0.047663627  
## [16] 0.700853087 0.351888638 0.408943998 0.820951324 0.918857348  
## [21] 0.282528330 0.961104794 0.728394428 0.686375082 0.052843943  
## [26] 0.395220135 0.477845380 0.560253264 0.698261595 0.915683538  
## [31] 0.618351227 0.428421509 0.542080367 0.058478489 0.260856857  
## [36] 0.397151953 0.197744737 0.831927563 0.152887223 0.803418542  
## [41] 0.546826157 0.662317642 0.171698494 0.633055360 0.311869747  
## [46] 0.724554346 0.398939825 0.969356411 0.967398371 0.726702539  
## [51] 0.257216746 0.221787935 0.593045652 0.267521432 0.531070399  
## [56] 0.785291671 0.168060811 0.404399181 0.471576278 0.868106807  
## [61] 0.925707956 0.881977559 0.674186843 0.950166979 0.516444894  
## [66] 0.576519021 0.336331206 0.347324631 0.020024301 0.502813046  
## [71] 0.871043414 0.006300784 0.072057124 0.164211225 0.770334074  
## [76] 0.735184306 0.971875636 0.466472377 0.074384513 0.648818124  
## [81] 0.758593170 0.137106081 0.396584595 0.224985329 0.057958561  
## [86] 0.395892688 0.064928300 0.225886433 0.054629109 0.670282040  
## [91] 0.297741783 0.100721582 0.071904097 0.880440569 0.754247402  
## [96] 0.816605888 0.982140374 0.103599645 0.099041829 0.798831611

hist(uniform\_distribution)



interest<-sample(c("sport","music","nature","literature"),100,replace=TRUE)  
student<-list(score=score,interest=interest)  
student

## $score  
## [1] 64 70 100 76 78 100 84 50 61 66 99 82 83 77 64 100 85  
## [18] 36 89 66 54 71 54 60 62 41 92 78 52 100 84 69 93 93  
## [35] 91 89 86 74 69 67 61 71 50 100 99 53 67 66 91 73 80  
## [52] 74 74 100 70 100 44 87 77 79 83 65 68 55 54 81 84 76  
## [69] 93 100 65 29 95 61 61 96 69 51 79 72 75 83 68 88 71  
## [86] 82 97 84 68 98 95 86 80 62 100 63 100 100 70 54  
##   
## $interest  
## [1] "music" "music" "sport" "music" "sport"   
## [6] "sport" "music" "nature" "sport" "nature"   
## [11] "literature" "sport" "music" "sport" "literature"  
## [16] "music" "music" "music" "nature" "sport"   
## [21] "sport" "literature" "sport" "sport" "literature"  
## [26] "nature" "sport" "music" "sport" "music"   
## [31] "literature" "music" "sport" "sport" "sport"   
## [36] "sport" "literature" "nature" "sport" "sport"   
## [41] "sport" "music" "music" "nature" "music"   
## [46] "nature" "sport" "sport" "literature" "sport"   
## [51] "sport" "sport" "literature" "nature" "sport"   
## [56] "literature" "sport" "nature" "nature" "literature"  
## [61] "music" "sport" "sport" "sport" "music"   
## [66] "sport" "music" "sport" "literature" "sport"   
## [71] "nature" "nature" "music" "music" "sport"   
## [76] "nature" "literature" "sport" "sport" "music"   
## [81] "sport" "music" "music" "music" "music"   
## [86] "literature" "literature" "literature" "literature" "nature"   
## [91] "literature" "nature" "nature" "nature" "sport"   
## [96] "nature" "nature" "nature" "literature" "music"

student\_score<-rbind(score,interest)  
id<-colnames(student\_score)<-c(1:100)  
id

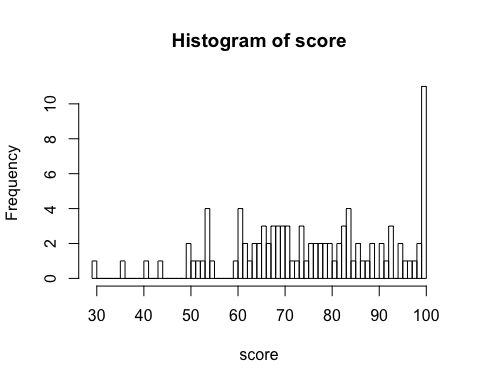
## [1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17  
## [18] 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34  
## [35] 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51  
## [52] 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68  
## [69] 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85  
## [86] 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

#data frame  
student\_score\_interest<-data.frame(score,interest)  
student\_score\_interest

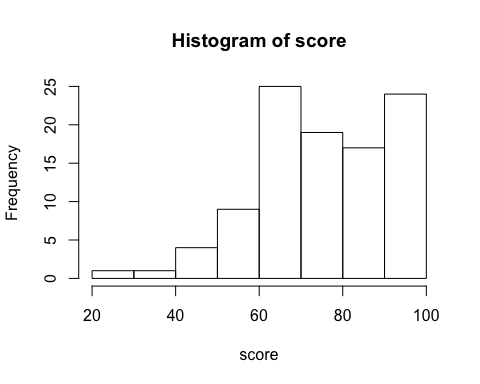
## score interest  
## 1 64 music  
## 2 70 music  
## 3 100 sport  
## 4 76 music  
## 5 78 sport  
## 6 100 sport  
## 7 84 music  
## 8 50 nature  
## 9 61 sport  
## 10 66 nature  
## 11 99 literature  
## 12 82 sport  
## 13 83 music  
## 14 77 sport  
## 15 64 literature  
## 16 100 music  
## 17 85 music  
## 18 36 music  
## 19 89 nature  
## 20 66 sport  
## 21 54 sport  
## 22 71 literature  
## 23 54 sport  
## 24 60 sport  
## 25 62 literature  
## 26 41 nature  
## 27 92 sport  
## 28 78 music  
## 29 52 sport  
## 30 100 music  
## 31 84 literature  
## 32 69 music  
## 33 93 sport  
## 34 93 sport  
## 35 91 sport  
## 36 89 sport  
## 37 86 literature  
## 38 74 nature  
## 39 69 sport  
## 40 67 sport  
## 41 61 sport  
## 42 71 music  
## 43 50 music  
## 44 100 nature  
## 45 99 music  
## 46 53 nature  
## 47 67 sport  
## 48 66 sport  
## 49 91 literature  
## 50 73 sport  
## 51 80 sport  
## 52 74 sport  
## 53 74 literature  
## 54 100 nature  
## 55 70 sport  
## 56 100 literature  
## 57 44 sport  
## 58 87 nature  
## 59 77 nature  
## 60 79 literature  
## 61 83 music  
## 62 65 sport  
## 63 68 sport  
## 64 55 sport  
## 65 54 music  
## 66 81 sport  
## 67 84 music  
## 68 76 sport  
## 69 93 literature  
## 70 100 sport  
## 71 65 nature  
## 72 29 nature  
## 73 95 music  
## 74 61 music  
## 75 61 sport  
## 76 96 nature  
## 77 69 literature  
## 78 51 sport  
## 79 79 sport  
## 80 72 music  
## 81 75 sport  
## 82 83 music  
## 83 68 music  
## 84 88 music  
## 85 71 music  
## 86 82 literature  
## 87 97 literature  
## 88 84 literature  
## 89 68 literature  
## 90 98 nature  
## 91 95 literature  
## 92 86 nature  
## 93 80 nature  
## 94 62 nature  
## 95 100 sport  
## 96 63 nature  
## 97 100 nature  
## 98 100 nature  
## 99 70 literature  
## 100 54 music

1. Using base R commands, draw a histogram of the scores. Change the breaks in your histogram until you think they best represent your data.

hist(score,breaks = 100)



hist(score,breaks = 10)



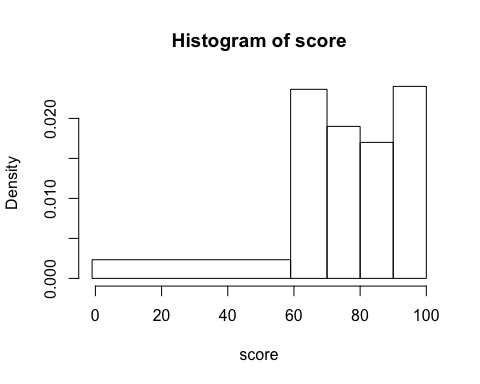
1. Create a new variable that groups the scores according to the breaks in your histogram.

#cut() divides the range of scores into intervals and codes the values in scores according to which interval they fall. We use a vector called `letters` as the labels, `letters` is a vector made up of the letters of the alphabet.  
#not correct...  
  
  
score\_range<-c(-1,0,59,70,80,90,100)  
letters<-c("NA","F","D",'C','B','A')  
grade<-table(cut(score,score\_range,letters))  
grade\_student<-cut(score,score\_range,letters,order\_result=TRUE)  
df1<-data.frame(score,grade\_student)  
df1

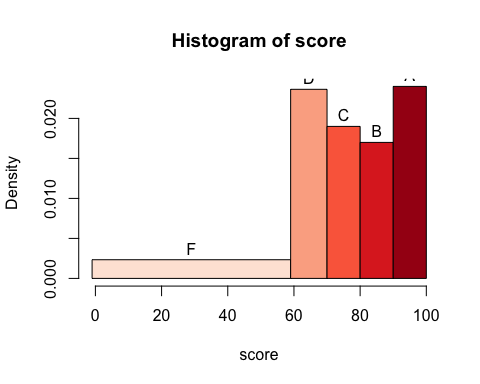
## score grade\_student  
## 1 64 D  
## 2 70 D  
## 3 100 A  
## 4 76 C  
## 5 78 C  
## 6 100 A  
## 7 84 B  
## 8 50 F  
## 9 61 D  
## 10 66 D  
## 11 99 A  
## 12 82 B  
## 13 83 B  
## 14 77 C  
## 15 64 D  
## 16 100 A  
## 17 85 B  
## 18 36 F  
## 19 89 B  
## 20 66 D  
## 21 54 F  
## 22 71 C  
## 23 54 F  
## 24 60 D  
## 25 62 D  
## 26 41 F  
## 27 92 A  
## 28 78 C  
## 29 52 F  
## 30 100 A  
## 31 84 B  
## 32 69 D  
## 33 93 A  
## 34 93 A  
## 35 91 A  
## 36 89 B  
## 37 86 B  
## 38 74 C  
## 39 69 D  
## 40 67 D  
## 41 61 D  
## 42 71 C  
## 43 50 F  
## 44 100 A  
## 45 99 A  
## 46 53 F  
## 47 67 D  
## 48 66 D  
## 49 91 A  
## 50 73 C  
## 51 80 C  
## 52 74 C  
## 53 74 C  
## 54 100 A  
## 55 70 D  
## 56 100 A  
## 57 44 F  
## 58 87 B  
## 59 77 C  
## 60 79 C  
## 61 83 B  
## 62 65 D  
## 63 68 D  
## 64 55 F  
## 65 54 F  
## 66 81 B  
## 67 84 B  
## 68 76 C  
## 69 93 A  
## 70 100 A  
## 71 65 D  
## 72 29 F  
## 73 95 A  
## 74 61 D  
## 75 61 D  
## 76 96 A  
## 77 69 D  
## 78 51 F  
## 79 79 C  
## 80 72 C  
## 81 75 C  
## 82 83 B  
## 83 68 D  
## 84 88 B  
## 85 71 C  
## 86 82 B  
## 87 97 A  
## 88 84 B  
## 89 68 D  
## 90 98 A  
## 91 95 A  
## 92 86 B  
## 93 80 C  
## 94 62 D  
## 95 100 A  
## 96 63 D  
## 97 100 A  
## 98 100 A  
## 99 70 D  
## 100 54 F

1. Now using the colorbrewer package (RColorBrewer; <http://colorbrewer2.org/#type=sequential&scheme=BuGn&n=3>) design a pallette and assign it to the groups in your data on the histogram.

library(RColorBrewer)  
#Let's look at the available palettes in RColorBrewer  
  
#The top section of palettes are sequential, the middle section are qualitative, and the lower section are diverging.  
#Make RColorBrewer palette available to R and assign to your bins  
  
#Use named palette in histogram  
  
hist(score,c(-1,59,70,80,90,100),right=TRUE)  
graph<-hist(score,c(-1,59,70,80,90,100),right=TRUE)

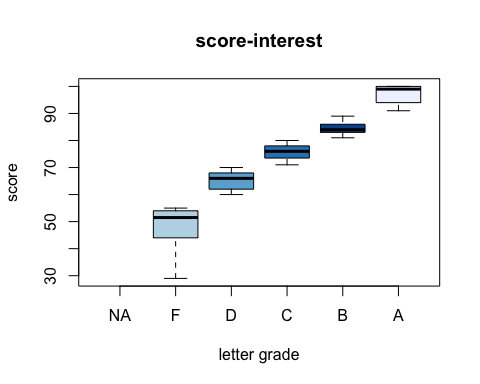


plot(graph,labels=c("F","D","C","B","A"),col=brewer.pal(5,"Reds"))



1. Create a boxplot that visualizes the scores for each interest group and color each interest group a different color.

#Make a vector of the colors from RColorBrewer  
plot\_color<-brewer.pal(5,"Blues")  
boxplot(score~grade\_student,data=df1,xlab="letter grade",ylab="score",main="score-interest",col=plot\_color)



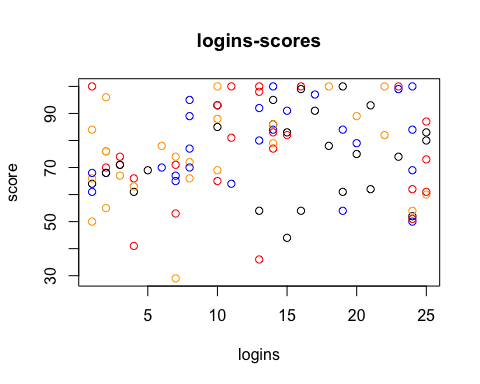
1. Now simulate a new variable that describes the number of logins that students made to the educational game. They should vary from 1-25.

set.seed(234)  
logins<-sample(1:25,100,replace=TRUE)  
logins

## [1] 1 2 14 2 18 13 24 1 4 4 23 22 15 14 11 18 10 13 8 1 16 3 19  
## [24] 25 21 4 13 6 24 16 19 10 10 10 15 20 14 3 24 3 19 7 24 22 16 7  
## [47] 7 8 17 25 13 7 23 1 6 10 15 25 8 14 25 10 1 2 13 11 14 2 21  
## [70] 23 7 7 14 25 1 2 5 24 20 8 20 14 2 10 3 15 17 1 2 13 8 14  
## [93] 25 24 24 4 19 11 8 24

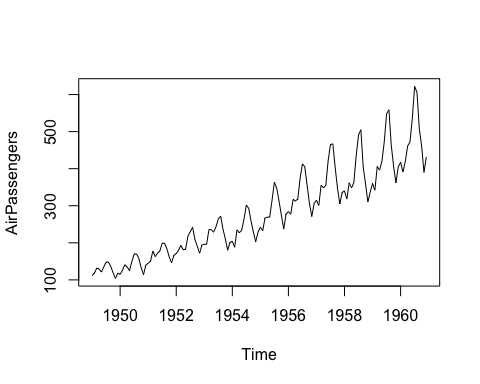
1. Plot the relationships between logins and scores. Give the plot a title and color the dots according to interest group.

plot(logins,score,main="logins-scores",col=c("black","red","blue","orange"))



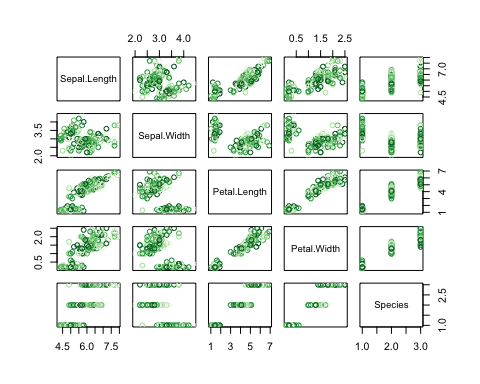
1. R contains several inbuilt data sets, one of these in called AirPassengers. Plot a line graph of the the airline passengers over time using this data set.

plot(type="l",AirPassengers)



1. Using another inbuilt data set, iris, plot the relationships between all of the variables in the data set. Which of these relationships is it appropraiet to run a correlation on?

plot(iris,col=brewer.pal(5,"Greens"))



1. Finally use the knitr function to generate an html document from your work. If you have time, try to change some of the output using different commands from the RMarkdown cheat sheet.
2. Commit, Push and Pull Request your work back to the main branch of the repository