12Programando_cheatsheet.R

moka

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```
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# Fecha: 12.04.2023
# Objetivo: Programming
# Referencia: Basado en R Programming Fundamentals, StanfordOnline XDFS112
```

```
# Limpiar el espacio de trabajo
rm(list=ls())
```

```
# Configurar el directorio
```

```
midirectorio<-setwd("~/Dropbox/0.POST-PHD/GOALS/2.CODE/R/Ecomienza/12Programando")
midirectorio
```

```
## [1] "/Users/moka/Dropbox/0.POST-PHD/GOALS/2.CODE/R/Ecomienza/12Programando"
```

```
# Obetener los archivos disponibles en el directorio
#dir()
#list.files()
# Importar datos
datos<-load("~/Dropbox/0.POST-PHD/GOALS/2.CODE/R/Ecomienza/datos/procesados/births1.Rdata")
head(births)
```

```
##   year month date_of_month day_of_week births
## 1 2000     1             1           6   9083
## 2 2000     1             2           7   8006
## 3 2000     1             3           1  11363
## 4 2000     1             4           2  13032
## 5 2000     1             5           3  12558
## 6 2000     1             6           4  12466
```

```
summary(births)
```

```
##       year          month        date_of_month    day_of_week     births     
##  Min.   :2000   Min.   : 1.000   Min.   : 1.00   Min.   :1    Min.   : 5728  
##  1st Qu.:2003   1st Qu.: 4.000   1st Qu.: 8.00   1st Qu.:2    1st Qu.: 8740  
##  Median :2007   Median : 7.000   Median :16.00   Median :4    Median :12343  
##  Mean   :2007   Mean   : 6.523   Mean   :15.73   Mean   :4    Mean   :11350  
##  3rd Qu.:2011   3rd Qu.:10.000   3rd Qu.:23.00   3rd Qu.:6    3rd Qu.:13082  
##  Max.   :2014   Max.   :12.000   Max.   :31.00   Max.   :7    Max.   :16081  
```

```
# Declaraciones logicas
# 1. Obtener subconjuntos de los datos
  # EQUIDAD ==
  # 1.1 Obtener datos solo para los viernes
  birthsFriday<-births[which(births[,4]==5),]
  # Primero, otenemos los booleanos que muestran cuando es viernes.
```

```r
births[,4]==5
```

```
##    [1] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALS
##   [20] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRU
##   [39] FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALS
##   [58] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALS
##   [77]  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALS
##   [96] FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALS
##  [115] FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALS
##  [134] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALS
##  [153] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRU
##  [172] FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALS
##  [191] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALS
##  [210]  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALS
##  [229] FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALS
##  [248] FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALS
##  [267] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALS
##  [286] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRU
##  [305] FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALS
##  [324] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALS
##  [343]  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALS
##  [362] FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALS
##  [381] FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALS
##  [400] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALS
##  [419] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRU
##  [438] FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALS
##  [457] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALS
##  [476]  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALS
##  [495] FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALS
##  [514] FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALS
##  [533] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALS
##  [552] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRU
##  [571] FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALS
##  [590] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALS
##  [609]  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALS
##  [628] FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALS
##  [647] FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALS
##  [666] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALS
##  [685] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRU
##  [704] FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALS
##  [723] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALS
##  [742]  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALS
##  [761] FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALS
##  [780] FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALS
##  [799] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALS
##  [818] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRU
##  [837] FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALS
##  [856] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALS
##  [875]  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALS
##  [894] FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALS
##  [913] FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALS
##  [932] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALS
##  [951] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRU
##  [970] FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALS
##  [989] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE
##  [ reached getOption("max.print") -- omitted 4479 entries ]
```

```
# Luego obtenemos los indices cuando el boolean es verdadero
? which
which(births[,4]==5)
```

```
##   [1]    7   14   21   28   35   42   49   56   63   70   77   84   91   98  105  112  119  126  133
##  [24]  168  175  182  189  196  203  210  217  224  231  238  245  252  259  266  273  280  287  294
##  [47]  329  336  343  350  357  364  371  378  385  392  399  406  413  420  427  434  441  448  455
##  [70]  490  497  504  511  518  525  532  539  546  553  560  567  574  581  588  595  602  609  616
##  [93]  651  658  665  672  679  686  693  700  707  714  721  728  735  742  749  756  763  770  777
## [116]  812  819  826  833  840  847  854  861  868  875  882  889  896  903  910  917  924  931  938
## [139]  973  980  987  994 1001 1008 1015 1022 1029 1036 1043 1050 1057 1064 1071 1078 1085 1092 1099
## [162] 1134 1141 1148 1155 1162 1169 1176 1183 1190 1197 1204 1211 1218 1225 1232 1239 1246 1253 1260
## [185] 1295 1302 1309 1316 1323 1330 1337 1344 1351 1358 1365 1372 1379 1386 1393 1400 1407 1414 1421
## [208] 1456 1463 1470 1477 1484 1491 1498 1505 1512 1519 1526 1533 1540 1547 1554 1561 1568 1575 1582
## [231] 1617 1624 1631 1638 1645 1652 1659 1666 1673 1680 1687 1694 1701 1708 1715 1722 1729 1736 1743
## [254] 1778 1785 1792 1799 1806 1813 1820 1827 1834 1841 1848 1855 1862 1869 1876 1883 1890 1897 1904
## [277] 1939 1946 1953 1960 1967 1974 1981 1988 1995 2002 2009 2016 2023 2030 2037 2044 2051 2058 2065
## [300] 2100 2107 2114 2121 2128 2135 2142 2149 2156 2163 2170 2177 2184 2191 2198 2205 2212 2219 2226
## [323] 2261 2268 2275 2282 2289 2296 2303 2310 2317 2324 2331 2338 2345 2352 2359 2366 2373 2380 2387
## [346] 2422 2429 2436 2443 2450 2457 2464 2471 2478 2485 2492 2499 2506 2513 2520 2527 2534 2541 2548
## [369] 2583 2590 2597 2604 2611 2618 2625 2632 2639 2646 2653 2660 2667 2674 2681 2688 2695 2702 2709
## [392] 2744 2751 2758 2765 2772 2779 2786 2793 2800 2807 2814 2821 2828 2835 2842 2849 2856 2863 2870
## [415] 2905 2912 2919 2926 2933 2940 2947 2954 2961 2968 2975 2982 2989 2996 3003 3010 3017 3024 3031
## [438] 3066 3073 3080 3087 3094 3101 3108 3115 3122 3129 3136 3143 3150 3157 3164 3171 3178 3185 3192
## [461] 3227 3234 3241 3248 3255 3262 3269 3276 3283 3290 3297 3304 3311 3318 3325 3332 3339 3346 3353
## [484] 3388 3395 3402 3409 3416 3423 3430 3437 3444 3451 3458 3465 3472 3479 3486 3493 3500 3507 3514
## [507] 3549 3556 3563 3570 3577 3584 3591 3598 3605 3612 3619 3626 3633 3640 3647 3654 3661 3668 3675
## [530] 3710 3717 3724 3731 3738 3745 3752 3759 3766 3773 3780 3787 3794 3801 3808 3815 3822 3829 3836
## [553] 3871 3878 3885 3892 3899 3906 3913 3920 3927 3934 3941 3948 3955 3962 3969 3976 3983 3990 3997
## [576] 4032 4039 4046 4053 4060 4067 4074 4081 4088 4095 4102 4109 4116 4123 4130 4137 4144 4151 4158
## [599] 4193 4200 4207 4214 4221 4228 4235 4242 4249 4256 4263 4270 4277 4284 4291 4298 4305 4312 4319
## [622] 4354 4361 4368 4375 4382 4389 4396 4403 4410 4417 4424 4431 4438 4445 4452 4459 4466 4473 4480
## [645] 4515 4522 4529 4536 4543 4550 4557 4564 4571 4578 4585 4592 4599 4606 4613 4620 4627 4634 4641
## [668] 4676 4683 4690 4697 4704 4711 4718 4725 4732 4739 4746 4753 4760 4767 4774 4781 4788 4795 4802
## [691] 4837 4844 4851 4858 4865 4872 4879 4886 4893 4900 4907 4914 4921 4928 4935 4942 4949 4956 4963
## [714] 4998 5005 5012 5019 5026 5033 5040 5047 5054 5061 5068 5075 5082 5089 5096 5103 5110 5117 5124
## [737] 5159 5166 5173 5180 5187 5194 5201 5208 5215 5222 5229 5236 5243 5250 5257 5264 5271 5278 5285
## [760] 5320 5327 5334 5341 5348 5355 5362 5369 5376 5383 5390 5397 5404 5411 5418 5425 5432 5439 5446
```

```
# Luego, obtenemos el sub conjunto utilizando los indices
birthsFriday<-births[which(births[,4]==5),]
# Ahora, queremos solo el dia 12 del mes
birthsFriday12<-birthsFriday[which(birthsFriday[,3]==12),]
birthsFriday12
```

```
##      year month date_of_month day_of_week births
## 133  2000     5            12           5  12132
## 378  2001     1            12           5  12735
## 651  2001    10            12           5  12676
## 833  2002     4            12           5  12272
## 924  2002     7            12           5  12760
## 1351 2003     9            12           5  13848
## 1442 2003    12            12           5  12484
## 1533 2004     3             12            5  12519
## 1778 2004    11             12            5  12783
## 2051 2005     8             12            5  13610
## 2324 2006     5             12            5  12685
## 2569 2007     1             12            5  13400
## 2842 2007    10             12            5  13400
## 3178 2008     9             12            5  14312
## 3269 2008    12             12            5  12903
## 3451 2009     6             12            5  12780
## 3696 2010     2             12            5  12281
## 3724 2010     3             12            5  12347
## 3969 2010    11             12            5  12090
## 4242 2011     8             12            5  12978
## 4669 2012    10             12            5  12349
## 4851 2013     4             12            5  11494
## 4942 2013     7             12            5  12535
## 5369 2014     9             12            5  13415
## 5460 2014    12             12            5  12001
```

```
# INEQUIDAD !=
# Ejemplo: Los viernes que no fueron el 12
notbirthsFriday12<-birthsFriday[which(birthsFriday[,3]!=12),]
notbirthsFriday12
```

```
##      year month date_of_month day_of_week births
## 7    2000     1             7           5  12516
## 14   2000     1            14           5  12180
## 21   2000     1            21           5  11953
## 28   2000     1            28           5  11934
## 35   2000     2             4           5  12035
## 42   2000     2            11           5  12411
## 49   2000     2            18           5  12406
## 56   2000     2            25           5  12204
## 63   2000     3             3           5  12390
## 70   2000     3            10           5  12152
## 77   2000     3            17           5  12385
## 84   2000     3            24           5  12327
## 91   2000     3            31           5  11820
## 98   2000     4             7           5  12213
## 105  2000     4            14           5  12053
## 112  2000     4            21           5  11257
## 119  2000     4            28           5  11989
## 126  2000     5             5           5  12539
## 140  2000     5            19           5  12174
## 147  2000     5            26           5  12726
## 154  2000     6             2           5  12695
## 161  2000     6             9           5  12504
## 168  2000     6            16           5  12727
## 175  2000     6            23           5  12603
## 182  2000     6            30           5  13225
## 189  2000     7             7           5  13658
## 196  2000     7            14           5  13230
## 203  2000     7            21           5  13027
## 210  2000     7            28           5  12890
## 217  2000     8             4           5  12940
## 224  2000     8            11           5  12729
## 231  2000     8            18           5  13124
## 238  2000     8            25           5  12926
## 245  2000     9             1           5  13145
## 252  2000     9             8           5  13487
## 259  2000     9            15           5  13552
## 266  2000     9            22           5  13189
## 273  2000     9            29           5  13045
## 280  2000    10             6           5  12774
## 287  2000    10            13           5  11723
## 294  2000    10            20           5  12471
## 301  2000    10            27           5  12333
## 308  2000    11             3           5  12630
## 315  2000    11            10           5  12554
## 322  2000    11            17           5  12888
## 329  2000    11            24           5   9805
## 336  2000    12             1           5  12545
## 343  2000    12             8           5  12548
## 350  2000    12            15           5  12656
## 357  2000    12            22           5  12248
## 364  2000    12            29           5  13607
## 371  2001     1             5           5  12647
## 385  2001     1            19           5  12339
## 392  2001     1            26           5  12191
## 399  2001     2             2           5  12470
## 406  2001     2             9           5  12343
## 413  2001     2            16           5  12355
## 420  2001     2            23           5  12242
## 427  2001     3             2           5  12383
## 434  2001     3             9           5  12461
## 441  2001     3            16           5  12460
## 448  2001     3            23           5  12432
## 455  2001     3            30           5  12059
## 462  2001     4             6           5  12407
## 469  2001     4            13           5  10881
## 476  2001     4            20           5  12296
## 483  2001     4            27           5  12335
## 490  2001     5             4           5  12276
## 497  2001     5            11           5  12296
## 504  2001     5            18           5  12313
## 511  2001     5            25           5  12722
## 518  2001     6             1           5  12677
## 525  2001     6             8           5  12451
## 532  2001     6            15           5  12394
## 539  2001     6            22           5  12299
## 546  2001     6            29           5  12922
## 553  2001     7             6           5  13151
## 560  2001     7            13           5  12187
## 567  2001     7            20           5  12950
## 574  2001     7            27           5  12677
## 581  2001     8             3           5  12859
## 588  2001     8            10           5  13094
## 595  2001     8            17           5  13102
## 602  2001     8            24           5  12996
## 609  2001     8            31           5  13461
## 616  2001     9             7           5  13721
## 623  2001     9            14           5  13444
## 630  2001     9            21           5  13341
## 637  2001     9            28           5  13174
## 644  2001    10             5           5  12851
## 658  2001    10            19           5  12359
## 665  2001    10            26           5  12296
## 672  2001    11             2           5  12374
## 679  2001    11             9           5  12416
## 686  2001    11            16           5  12979
## 693  2001    11            23           5   9594
## 700  2001    11            30           5  12019
## 707  2001    12             7           5  11693
## 714  2001    12            14           5  12405
## 721  2001    12            21           5  13530
## 728  2001    12            28           5  14235
## 735  2002     1             4           5  12671
## 742  2002     1            11           5  12276
## 749  2002     1            18           5  12251
## 756  2002     1            25           5  12069
## 763  2002     2             1           5  12130
## 770  2002     2             8           5  12444
## 777  2002     2            15           5  12548
## 784  2002     2            22           5  12667
## 791  2002     3             1           5  12388
## 798  2002     3             8           5  12244
## 805  2002     3            15           5  12472
## 812  2002     3            22           5  12252
## 819  2002     3            29           5  11449
## 826  2002     4             5           5  12006
## 840  2002     4            19           5  12297
## 847  2002     4            26           5  11917
## 854  2002     5             3           5  12130
## 861  2002     5            10           5  12329
## 868  2002     5            17           5  12218
## 875  2002     5            24           5  12775
## 882  2002     5            31           5  12568
## 889  2002     6             7           5  12280
## 896  2002     6            14           5  12562
## 903  2002     6            21           5  12377
## 910  2002     6            28           5  12996
## 917  2002     7             5           5  11326
## 931  2002     7            19           5  12900
## 938  2002     7            26           5  12914
## 945  2002     8             2           5  13127
## 952  2002     8             9           5  12893
## 959  2002     8            16           5  13132
## 966  2002     8            23           5  13133
## 973  2002     8            30           5  13300
## 980  2002     9             6           5  13680
## 987  2002     9            13           5  13028
## 994  2002     9            20           5  13721
## 1001 2002     9            27           5  13298
## 1008 2002    10             4           5  12814
## 1015 2002    10            11           5  12467
## 1022 2002    10            18           5  12197
## 1029 2002    10            25           5  12523
## 1036 2002    11             1           5  12591
## 1043 2002    11             8           5  12472
## 1050 2002    11            15           5  12273
## 1057 2002    11            22           5  12978
## 1064 2002    11            29           5   9341
## 1071 2002    12             6           5  11775
## 1078 2002    12            13           5  11600
## 1085 2002    12            20           5  14015
## 1092 2002    12            27           5  13650
## 1099 2003     1             3           5  12252
## 1106 2003     1            10           5  12517
## 1113 2003     1            17           5  12110
## 1120 2003     1            24           5  12107
## 1127 2003     1            31           5  11989
## 1134 2003     2             7           5  12381
## 1141 2003     2            14           5  13051
## 1148 2003     2            21           5  12689
## 1155 2003     2            28           5  12533
## 1162 2003     3             7           5  12503
## 1169 2003     3            14           5  12770
## 1176 2003     3            21           5  12653
## 1183 2003     3            28           5  12493
## 1190 2003     4             4           5  12669
## 1197 2003     4            11           5  12397
## 1204 2003     4            18           5  11680
## 1211 2003     4            25           5  12255
## 1218 2003     5             2           5  12549
## 1225 2003     5             9           5  12710
## 1232 2003     5            16           5  12840
## 1239 2003     5            23           5  13176
## 1246 2003     5            30           5  13224
## 1253 2003     6             6           5  12869
## 1260 2003     6            13           5  12013
## 1267 2003     6            20           5  12693
## 1274 2003     6            27           5  12862
## 1281 2003     7             4           5   9504
## 1288 2003     7            11           5  13096
## 1295 2003     7            18           5  13225
## 1302 2003     7            25           5  12977
## 1309 2003     8             1           5  13242
## 1316 2003     8             8           5  13352
## 1323 2003     8            15           5  13206
## 1330 2003     8            22           5  13478
## 1337 2003     8            29           5  13769
## 1344 2003     9             5           5  13897
## 1358 2003     9            19           5  13560
## 1365 2003     9            26           5  13846
## 1372 2003    10             3           5  13284
## 1379 2003    10            10           5  13306
## 1386 2003    10            17           5  12676
## 1393 2003    10              24            5  12566
## 1400 2003    10              31            5  11005
## 1407 2003    11               7            5  12535
## 1414 2003    11              14            5  12433
## 1421 2003    11              21            5  13036
## 1428 2003    11              28            5   9407
## 1435 2003    12               5            5  12180
## 1449 2003    12              19            5  13693
##  [ reached 'max' / getOption("max.print") -- omitted 557 rows ]
```

```
nrow(birthsFriday12)+nrow(notbirthsFriday12)
```

```
## [1] 782
```

```
nrow(birthsFriday)
```

```
## [1] 782
```

```
# EQUIDAD con un intervalo %in%
birthsWeekends<-births[which(births[,4] %in% c(6,7)),]
birthsWeekends
```

```
##     year month date_of_month day_of_week births
## 1   2000     1             1           6   9083
## 2   2000     1             2           7   8006
## 8   2000     1             8           6   8934
## 9   2000     1             9           7   7949
## 15  2000     1            15           6   8525
## 16  2000     1            16           7   7657
## 22  2000     1            22           6   8855
## 23  2000     1            23           7   7856
## 29  2000     1            29           6   8805
## 30  2000     1            30           7   7764
## 36  2000     2             5           6   8624
## 37  2000     2             6           7   7862
## 43  2000     2            12           6   8836
## 44  2000     2            13           7   7933
## 50  2000     2            19           6   8861
## 51  2000     2            20           7   7943
## 57  2000     2            26           6   9026
## 58  2000     2            27           7   7836
## 64  2000     3             4           6   9054
## 65  2000     3             5           7   7734
## 71  2000     3            11           6   8822
## 72  2000     3            12           7   7937
## 78  2000     3            18           6   8677
## 79  2000     3            19           7   7782
## 85  2000     3            25           6   9155
## 86  2000     3            26           7   7815
## 92  2000     4             1           6   8388
## 93  2000     4             2           7   7540
## 99  2000     4             8           6   8743
## 100 2000     4             9           7   7759
## 106 2000     4            15           6   8887
## 107 2000     4            16           7   7859
## 113 2000     4            22           6   8367
## 114 2000     4            23           7   7483
## 120 2000     4            29           6   8703
## 121 2000     4            30           7   7641
## 127 2000     5             6           6   8814
## 128 2000     5             7           7   7797
## 134 2000     5            13           6   8747
## 135 2000     5            14           7   7617
## 141 2000     5            20           6   8673
## 142 2000     5            21           7   7887
## 148 2000     5            27           6   8991
## 149 2000     5            28           7   7873
## 155 2000     6             3           6   8940
## 156 2000     6             4           7   7983
## 162 2000     6            10           6   9134
## 163 2000     6            11           7   8116
## 169 2000     6            17           6   9143
## 170 2000     6            18           7   8162
## 176 2000     6            24           6   9094
## 177 2000     6            25           7   8178
## 183 2000     7             1           6   9376
## 184 2000     7             2           7   8100
## 190 2000     7             8           6   9631
## 191 2000     7             9           7   8586
## 197 2000     7            15           6   9627
## 198 2000     7            16           7   8423
## 204 2000     7            22           6   9463
## 205 2000     7            23           7   8166
## 211 2000     7            29           6   9465
## 212 2000     7            30           7   8444
## 218 2000     8             5           6   9398
## 219 2000     8             6           7   8350
## 225 2000     8            12           6   9305
## 226 2000     8            13           7   8313
## 232 2000     8            19           6   9276
## 233 2000     8            20           7   8346
## 239 2000     8            26           6   9341
## 240 2000     8            27           7   8240
## 246 2000     9             2           6   9265
## 247 2000     9             3           7   8248
## 253 2000     9             9           6   9860
## 254 2000     9            10           7   8552
## 260 2000     9            16           6   9780
## 261 2000     9            17           7   8683
## 267 2000     9            23           6   9494
## 268 2000     9            24           7   8539
## 274 2000     9            30           6   9335
## 275 2000    10             1           7   8453
## 281 2000    10             7           6   9131
## 282 2000    10             8           7   8119
## 288 2000    10            14           6   9163
## 289 2000    10            15           7   8156
## 295 2000    10            21           6   8956
## 296 2000    10            22           7   7938
## 302 2000    10            28           6   8978
## 303 2000    10            29           7   8124
## 309 2000    11             4           6   9084
## 310 2000    11             5           7   8078
## 316 2000    11            11           6   9318
## 317 2000    11            12           7   8070
## 323 2000    11            18           6   9137
## 324 2000    11            19           7   8077
## 330 2000    11            25           6   8537
## 331 2000    11            26           7   7950
## 337 2000    12             2           6   8914
## 338 2000    12             3           7   7930
## 344 2000    12             9           6   8853
## 345 2000    12            10           7   8022
## 351 2000    12            16           6   9184
## 352 2000    12            17           7   8026
## 358 2000    12            23           6   8484
## 359 2000    12            24           7   6971
## 365 2000    12            30           6   9405
## 366 2000    12            31           7   7892
## 372 2001     1             6           6   9180
## 373 2001     1             7           7   7883
## 379 2001     1            13           6   8836
## 380 2001     1            14           7   7818
## 386 2001     1            20           6   8771
## 387 2001     1            21           7   7850
## 393 2001     1            27           6   8795
## 394 2001     1            28           7   7761
## 400 2001     2             3           6   8650
## 401 2001     2             4           7   7716
## 407 2001     2            10           6   8791
## 408 2001     2            11           7   7563
## 414 2001     2            17           6   8609
## 415 2001     2            18           7   7555
## 421 2001     2            24           6   8656
## 422 2001     2            25           7   7794
## 428 2001     3             3           6   8935
## 429 2001     3             4           7   7799
## 435 2001     3            10           6   8807
## 436 2001     3            11           7   7697
## 442 2001     3            17           6   9006
## 443 2001     3            18           7   7526
## 449 2001     3            24           6   8830
## 450 2001     3            25           7   7800
## 456 2001     3            31           6   8770
## 457 2001     4             1           7   7212
## 463 2001     4             7           6   8755
## 464 2001     4             8           7   7718
## 470 2001     4            14           6   8262
## 471 2001     4            15           7   7230
## 477 2001     4            21           6   8849
## 478 2001     4            22           7   7758
## 484 2001     4            28           6   8574
## 485 2001     4            29           7   7602
## 491 2001     5             5           6   8795
## 492 2001     5             6           7   8001
## 498 2001     5            12           6   8692
## 499 2001     5            13           7   7479
## 505 2001     5            19           6   8803
## 506 2001     5            20           7   7732
## 512 2001     5            26           6   8911
## 513 2001     5            27           7   7529
## 519 2001     6             2           6   8920
## 520 2001     6             3           7   7887
## 526 2001     6             9           6   8756
## 527 2001     6            10           7   7674
## 533 2001     6            16           6   8780
## 534 2001     6            17           7   7722
## 540 2001     6            23           6   8452
## 541 2001     6            24           7   7639
## 547 2001     6            30           6   9247
## 548 2001     7             1           7   8145
## 554 2001     7             7           6   9544
## 555 2001     7             8           7   8249
## 561 2001     7            14           6   9269
## 562 2001     7            15           7   8047
## 568 2001     7            21           6   9410
## 569 2001     7            22           7   8116
## 575 2001     7            28           6   9102
## 576 2001     7            29           7   7892
## 582 2001     8             4           6   9143
## 583 2001     8             5           7   8062
## 589 2001     8            11           6   9275
## 590 2001     8            12           7   8261
## 596 2001     8            18           6   9294
## 597 2001     8            19           7   7945
## 603 2001     8            25           6   9229
## 604 2001     8            26           7   8115
## 610 2001     9             1           6   9248
## 611 2001     9             2           7   8239
## 617 2001     9             8           6   9344
## 618 2001     9             9           7   8347
## 624 2001     9            15           6   9662
## 625 2001     9            16           7   8319
## 631 2001     9            22           6   9607
## 632 2001     9            23           7   8495
## 638 2001     9            29           6   9243
## 639 2001     9            30           7   8042
## 645 2001    10             6           6   8872
## 646 2001    10             7           7   7744
## 652 2001    10            13           6   8659
## 653 2001    10            14           7   7753
## 659 2001    10            20           6   8747
## 660 2001    10            21           7   7506
## 666 2001    10            27           6   8458
## 667 2001    10            28           7   7676
## 673 2001    11             3           6   8572
## 674 2001    11             4           7   7533
## 680 2001    11            10           6   8665
## 681 2001    11            11           7   7599
## 687 2001    11            17           6   8774
## 688 2001    11            18           7   7495
## 694 2001    11            24           6   8100
## 695 2001    11            25           7   7456
##  [ reached 'max' / getOption("max.print") -- omitted 1366 rows ]
```

```
nrow(birthsWeekends)
```

```
## [1] 1566
```

```
# INEQUIDAD <,>
birthsWeekends2<-births[which(births[,4] >5),]
birthsWeekends2
```

```
##     year month date_of_month day_of_week births
## 1   2000     1             1           6   9083
## 2   2000     1             2           7   8006
## 8   2000     1             8           6   8934
## 9   2000     1             9           7   7949
## 15  2000     1            15           6   8525
## 16  2000     1            16           7   7657
## 22  2000     1            22           6   8855
## 23  2000     1            23           7   7856
## 29  2000     1            29           6   8805
## 30  2000     1            30           7   7764
## 36  2000     2             5           6   8624
## 37  2000     2             6           7   7862
## 43  2000     2            12           6   8836
## 44  2000     2            13           7   7933
## 50  2000     2            19           6   8861
## 51  2000     2            20           7   7943
## 57  2000     2            26           6   9026
## 58  2000     2            27           7   7836
## 64  2000     3             4           6   9054
## 65  2000     3             5           7   7734
## 71  2000     3            11           6   8822
## 72  2000     3            12           7   7937
## 78  2000     3            18           6   8677
## 79  2000     3            19           7   7782
## 85  2000     3            25           6   9155
## 86  2000     3            26           7   7815
## 92  2000     4             1           6   8388
## 93  2000     4             2           7   7540
## 99  2000     4             8           6   8743
## 100 2000     4             9           7   7759
## 106 2000     4            15           6   8887
## 107 2000     4            16           7   7859
## 113 2000     4            22           6   8367
## 114 2000     4            23           7   7483
## 120 2000     4            29           6   8703
## 121 2000     4            30           7   7641
## 127 2000     5             6           6   8814
## 128 2000     5             7           7   7797
## 134 2000     5            13           6   8747
## 135 2000     5            14           7   7617
## 141 2000     5            20           6   8673
## 142 2000     5            21           7   7887
## 148 2000     5            27           6   8991
## 149 2000     5            28           7   7873
## 155 2000     6             3           6   8940
## 156 2000     6             4           7   7983
## 162 2000     6            10           6   9134
## 163 2000     6            11           7   8116
## 169 2000     6            17           6   9143
## 170 2000     6            18           7   8162
## 176 2000     6            24           6   9094
## 177 2000     6            25           7   8178
## 183 2000     7             1           6   9376
## 184 2000     7             2           7   8100
## 190 2000     7             8           6   9631
## 191 2000     7             9           7   8586
## 197 2000     7            15           6   9627
## 198 2000     7            16           7   8423
## 204 2000     7            22           6   9463
## 205 2000     7            23           7   8166
## 211 2000     7            29           6   9465
## 212 2000     7            30           7   8444
## 218 2000     8             5           6   9398
## 219 2000     8             6           7   8350
## 225 2000     8            12           6   9305
## 226 2000     8            13           7   8313
## 232 2000     8            19           6   9276
## 233 2000     8            20           7   8346
## 239 2000     8            26           6   9341
## 240 2000     8            27           7   8240
## 246 2000     9             2           6   9265
## 247 2000     9             3           7   8248
## 253 2000     9             9           6   9860
## 254 2000     9            10           7   8552
## 260 2000     9            16           6   9780
## 261 2000     9            17           7   8683
## 267 2000     9            23           6   9494
## 268 2000     9            24           7   8539
## 274 2000     9            30           6   9335
## 275 2000    10             1           7   8453
## 281 2000    10             7           6   9131
## 282 2000    10             8           7   8119
## 288 2000    10            14           6   9163
## 289 2000    10            15           7   8156
## 295 2000    10            21           6   8956
## 296 2000    10            22           7   7938
## 302 2000    10            28           6   8978
## 303 2000    10            29           7   8124
## 309 2000    11             4           6   9084
## 310 2000    11             5           7   8078
## 316 2000    11            11           6   9318
## 317 2000    11            12           7   8070
## 323 2000    11            18           6   9137
## 324 2000    11            19           7   8077
## 330 2000    11            25           6   8537
## 331 2000    11            26           7   7950
## 337 2000    12             2           6   8914
## 338 2000    12             3           7   7930
## 344 2000    12             9           6   8853
## 345 2000    12            10           7   8022
## 351 2000    12            16           6   9184
## 352 2000    12            17           7   8026
## 358 2000    12            23           6   8484
## 359 2000    12            24           7   6971
## 365 2000    12            30           6   9405
## 366 2000    12            31           7   7892
## 372 2001     1             6           6   9180
## 373 2001     1             7           7   7883
## 379 2001     1            13           6   8836
## 380 2001     1            14           7   7818
## 386 2001     1            20           6   8771
## 387 2001     1            21           7   7850
## 393 2001     1            27           6   8795
## 394 2001     1            28           7   7761
## 400 2001     2             3           6   8650
## 401 2001     2             4           7   7716
## 407 2001     2            10           6   8791
## 408 2001     2            11           7   7563
## 414 2001     2            17           6   8609
## 415 2001     2            18           7   7555
## 421 2001     2            24           6   8656
## 422 2001     2            25           7   7794
## 428 2001     3             3           6   8935
## 429 2001     3             4           7   7799
## 435 2001     3            10           6   8807
## 436 2001     3            11           7   7697
## 442 2001     3            17           6   9006
## 443 2001     3            18           7   7526
## 449 2001     3            24           6   8830
## 450 2001     3            25           7   7800
## 456 2001     3            31           6   8770
## 457 2001     4             1           7   7212
## 463 2001     4             7           6   8755
## 464 2001     4             8           7   7718
## 470 2001     4            14           6   8262
## 471 2001     4            15           7   7230
## 477 2001     4            21           6   8849
## 478 2001     4            22           7   7758
## 484 2001     4            28           6   8574
## 485 2001     4            29           7   7602
## 491 2001     5             5           6   8795
## 492 2001     5             6           7   8001
## 498 2001     5            12           6   8692
## 499 2001     5            13           7   7479
## 505 2001     5            19           6   8803
## 506 2001     5            20           7   7732
## 512 2001     5            26           6   8911
## 513 2001     5            27           7   7529
## 519 2001     6             2           6   8920
## 520 2001     6             3           7   7887
## 526 2001     6             9           6   8756
## 527 2001     6            10           7   7674
## 533 2001     6            16           6   8780
## 534 2001     6            17           7   7722
## 540 2001     6            23           6   8452
## 541 2001     6            24           7   7639
## 547 2001     6            30           6   9247
## 548 2001     7             1           7   8145
## 554 2001     7             7           6   9544
## 555 2001     7             8           7   8249
## 561 2001     7            14           6   9269
## 562 2001     7            15           7   8047
## 568 2001     7            21           6   9410
## 569 2001     7            22           7   8116
## 575 2001     7            28           6   9102
## 576 2001     7            29           7   7892
## 582 2001     8             4           6   9143
## 583 2001     8             5           7   8062
## 589 2001     8            11           6   9275
## 590 2001     8            12           7   8261
## 596 2001     8            18           6   9294
## 597 2001     8            19           7   7945
## 603 2001     8            25           6   9229
## 604 2001     8            26           7   8115
## 610 2001     9             1           6   9248
## 611 2001     9             2           7   8239
## 617 2001     9             8           6   9344
## 618 2001     9             9           7   8347
## 624 2001     9            15           6   9662
## 625 2001     9            16           7   8319
## 631 2001     9            22           6   9607
## 632 2001     9            23           7   8495
## 638 2001     9            29           6   9243
## 639 2001     9            30           7   8042
## 645 2001    10             6           6   8872
## 646 2001    10             7           7   7744
## 652 2001    10            13           6   8659
## 653 2001    10            14           7   7753
## 659 2001    10            20           6   8747
## 660 2001    10            21           7   7506
## 666 2001    10            27           6   8458
## 667 2001    10            28           7   7676
## 673 2001    11             3           6   8572
## 674 2001    11             4           7   7533
## 680 2001    11            10           6   8665
## 681 2001    11            11           7   7599
## 687 2001    11            17           6   8774
## 688 2001    11            18           7   7495
## 694 2001    11            24           6   8100
## 695 2001    11            25           7   7456
##  [ reached 'max' / getOption("max.print") -- omitted 1366 rows ]
```

```r
nrow(birthsWeekends2)
```

```
## [1] 1566
```

```r
# Mayor o igual >=
birthsWeekends3<-births[which(births[,4] >=6),]
birthsWeekends3
```

```
##     year month date_of_month day_of_week births
## 1   2000     1             1           6   9083
## 2   2000     1             2           7   8006
## 8   2000     1             8           6   8934
## 9   2000     1             9           7   7949
## 15  2000     1            15           6   8525
## 16  2000     1            16           7   7657
## 22  2000     1            22           6   8855
## 23  2000     1            23           7   7856
## 29  2000     1            29           6   8805
## 30  2000     1            30           7   7764
## 36  2000     2             5           6   8624
## 37  2000     2             6           7   7862
## 43  2000     2            12           6   8836
## 44  2000     2            13           7   7933
## 50  2000     2            19           6   8861
## 51  2000     2            20           7   7943
## 57  2000     2            26           6   9026
## 58  2000     2            27           7   7836
## 64  2000     3             4           6   9054
## 65  2000     3             5           7   7734
## 71  2000     3            11           6   8822
## 72  2000     3            12           7   7937
## 78  2000     3            18           6   8677
## 79  2000     3            19           7   7782
## 85  2000     3            25           6   9155
## 86  2000     3            26           7   7815
## 92  2000     4             1           6   8388
## 93  2000     4             2           7   7540
## 99  2000     4             8           6   8743
## 100 2000     4             9           7   7759
## 106 2000     4            15           6   8887
## 107 2000     4            16           7   7859
## 113 2000     4            22           6   8367
## 114 2000     4            23           7   7483
## 120 2000     4            29           6   8703
## 121 2000     4            30           7   7641
## 127 2000     5             6           6   8814
## 128 2000     5             7           7   7797
## 134 2000     5            13           6   8747
## 135 2000     5            14           7   7617
## 141 2000     5            20           6   8673
## 142 2000     5            21           7   7887
## 148 2000     5            27           6   8991
## 149 2000     5            28           7   7873
## 155 2000     6             3           6   8940
## 156 2000     6             4           7   7983
## 162 2000     6            10           6   9134
## 163 2000     6            11           7   8116
## 169 2000     6            17           6   9143
## 170 2000     6            18           7   8162
## 176 2000     6            24           6   9094
## 177 2000     6            25           7   8178
## 183 2000     7             1           6   9376
## 184 2000     7             2           7   8100
## 190 2000     7             8           6   9631
## 191 2000     7             9           7   8586
## 197 2000     7            15           6   9627
## 198 2000     7            16           7   8423
## 204 2000     7            22           6   9463
## 205 2000     7            23           7   8166
## 211 2000     7            29           6   9465
## 212 2000     7            30           7   8444
## 218 2000     8             5           6   9398
## 219 2000     8             6           7   8350
## 225 2000     8            12           6   9305
## 226 2000     8            13           7   8313
## 232 2000     8            19           6   9276
## 233 2000     8            20           7   8346
## 239 2000     8            26           6   9341
## 240 2000     8            27           7   8240
## 246 2000     9             2           6   9265
## 247 2000     9             3           7   8248
## 253 2000     9             9           6   9860
## 254 2000     9            10           7   8552
## 260 2000     9            16           6   9780
## 261 2000     9            17           7   8683
## 267 2000     9            23           6   9494
## 268 2000     9            24           7   8539
## 274 2000     9            30           6   9335
## 275 2000    10             1           7   8453
## 281 2000    10             7           6   9131
## 282 2000    10             8           7   8119
## 288 2000    10            14           6   9163
## 289 2000    10            15           7   8156
## 295 2000    10            21           6   8956
## 296 2000    10            22           7   7938
## 302 2000    10            28           6   8978
## 303 2000    10            29           7   8124
## 309 2000    11             4           6   9084
## 310 2000    11             5           7   8078
## 316 2000    11            11           6   9318
## 317 2000    11            12           7   8070
## 323 2000    11            18           6   9137
## 324 2000    11            19           7   8077
## 330 2000    11            25           6   8537
## 331 2000    11            26           7   7950
## 337 2000    12             2           6   8914
## 338 2000    12             3           7   7930
## 344 2000    12             9           6   8853
## 345 2000    12            10           7   8022
## 351 2000    12            16           6   9184
## 352 2000    12            17           7   8026
## 358 2000    12            23           6   8484
## 359 2000    12            24           7   6971
## 365 2000    12            30           6   9405
## 366 2000    12            31           7   7892
## 372 2001     1             6           6   9180
## 373 2001     1             7           7   7883
## 379 2001     1            13           6   8836
## 380 2001     1            14           7   7818
## 386 2001     1            20           6   8771
## 387 2001     1            21           7   7850
## 393 2001     1            27           6   8795
## 394 2001     1            28           7   7761
## 400 2001     2             3           6   8650
## 401 2001     2             4           7   7716
## 407 2001     2            10           6   8791
## 408 2001     2            11           7   7563
## 414 2001     2            17           6   8609
## 415 2001     2            18           7   7555
## 421 2001     2            24           6   8656
## 422 2001     2            25           7   7794
## 428 2001     3             3           6   8935
## 429 2001     3             4           7   7799
## 435 2001     3            10           6   8807
## 436 2001     3            11           7   7697
## 442 2001     3            17           6   9006
## 443 2001     3            18           7   7526
## 449 2001     3            24           6   8830
## 450 2001     3            25           7   7800
## 456 2001     3            31           6   8770
## 457 2001     4             1           7   7212
## 463 2001     4             7           6   8755
## 464 2001     4             8           7   7718
## 470 2001     4            14           6   8262
## 471 2001     4            15           7   7230
## 477 2001     4            21           6   8849
## 478 2001     4            22           7   7758
## 484 2001     4            28           6   8574
## 485 2001     4            29           7   7602
## 491 2001     5             5           6   8795
## 492 2001     5             6           7   8001
## 498 2001     5            12           6   8692
## 499 2001     5            13           7   7479
## 505 2001     5            19           6   8803
## 506 2001     5            20           7   7732
## 512 2001     5            26           6   8911
## 513 2001     5            27           7   7529
## 519 2001     6             2           6   8920
## 520 2001     6             3           7   7887
## 526 2001     6             9           6   8756
## 527 2001     6            10           7   7674
## 533 2001     6            16           6   8780
## 534 2001     6            17           7   7722
## 540 2001     6            23           6   8452
## 541 2001     6            24           7   7639
## 547 2001     6            30           6   9247
## 548 2001     7             1           7   8145
## 554 2001     7             7           6   9544
## 555 2001     7             8           7   8249
## 561 2001     7            14           6   9269
## 562 2001     7            15           7   8047
## 568 2001     7            21           6   9410
## 569 2001     7            22           7   8116
## 575 2001     7            28           6   9102
## 576 2001     7            29           7   7892
## 582 2001     8             4           6   9143
## 583 2001     8             5           7   8062
## 589 2001     8            11           6   9275
## 590 2001     8            12           7   8261
## 596 2001     8            18           6   9294
## 597 2001     8            19           7   7945
## 603 2001     8            25           6   9229
## 604 2001     8            26           7   8115
## 610 2001     9             1           6   9248
## 611 2001     9             2           7   8239
## 617 2001     9             8           6   9344
## 618 2001     9             9           7   8347
## 624 2001     9            15           6   9662
## 625 2001     9            16           7   8319
## 631 2001     9            22           6   9607
## 632 2001     9            23           7   8495
## 638 2001     9            29           6   9243
## 639 2001     9            30           7   8042
## 645 2001    10             6           6   8872
## 646 2001    10             7           7   7744
## 652 2001    10            13           6   8659
## 653 2001    10            14           7   7753
## 659 2001    10            20           6   8747
## 660 2001    10            21           7   7506
## 666 2001    10            27           6   8458
## 667 2001    10            28           7   7676
## 673 2001    11             3           6   8572
## 674 2001    11             4           7   7533
## 680 2001    11            10           6   8665
## 681 2001    11            11           7   7599
## 687 2001    11            17           6   8774
## 688 2001    11            18           7   7495
## 694 2001    11            24           6   8100
## 695 2001    11            25           7   7456
##  [ reached 'max' / getOption("max.print") -- omitted 1366 rows ]
```

```
nrow(birthsWeekends3)
```

```
## [1] 1566
```

```
# Menor o igual <=
birthsWeekday<-births[which(births[,4] <=5),]
birthsWeekday
```

```
##     year month date_of_month day_of_week births
## 3   2000     1             3           1  11363
## 4   2000     1             4           2  13032
## 5   2000     1             5           3  12558
## 6   2000     1             6           4  12466
## 7   2000     1             7           5  12516
## 10  2000     1            10           1  11668
## 11  2000     1            11           2  12611
## 12  2000     1            12           3  12398
## 13  2000     1            13           4  11815
## 14  2000     1            14           5  12180
## 17  2000     1            17           1  10824
## 18  2000     1            18           2  12350
## 19  2000     1            19           3  12405
## 20  2000     1            20           4  12506
## 21  2000     1            21           5  11953
## 24  2000     1            24           1  11449
## 25  2000     1            25           2  12593
## 26  2000     1            26           3  12143
## 27  2000     1            27           4  12408
## 28  2000     1            28           5  11934
## 31  2000     1            31           1  11133
## 32  2000     2             1           2  12614
## 33  2000     2             2           3  12465
## 34  2000     2             3           4  12062
## 35  2000     2             4           5  12035
## 38  2000     2             7           1  11630
## 39  2000     2             8           2  12879
## 40  2000     2             9           3  12315
## 41  2000     2            10           4  12612
## 42  2000     2            11           5  12411
## 45  2000     2            14           1  12152
## 46  2000     2            15           2  13017
## 47  2000     2            16           3  12504
## 48  2000     2            17           4  12520
## 49  2000     2            18           5  12406
## 52  2000     2            21           1  10610
## 53  2000     2            22           2  12664
## 54  2000     2            23           3  12252
## 55  2000     2            24           4  12423
## 56  2000     2            25           5  12204
## 59  2000     2            28           1  11455
## 60  2000     2            29           2  11895
## 61  2000     3             1           3  12672
## 62  2000     3             2           4  12524
## 63  2000     3             3           5  12390
## 66  2000     3             6           1  11375
## 67  2000     3             7           2  12420
## 68  2000     3             8           3  12338
## 69  2000     3             9           4  12615
## 70  2000     3            10           5  12152
## 73  2000     3            13           1  11157
## 74  2000     3            14           2  12773
## 75  2000     3            15           3  12428
## 76  2000     3            16           4  12431
## 77  2000     3            17           5  12385
## 80  2000     3            20           1  11595
## 81  2000     3            21           2  12689
## 82  2000     3            22           3  12272
## 83  2000     3            23           4  12396
## 84  2000     3            24           5  12327
## 87  2000     3            27           1  11291
## 88  2000     3            28           2  12650
## 89  2000     3            29           3  12077
## 90  2000     3            30           4  12071
## 91  2000     3            31           5  11820
## 94  2000     4             3           1  11397
## 95  2000     4             4           2  12797
## 96  2000     4             5           3  12209
## 97  2000     4             6           4  12192
## 98  2000     4             7           5  12213
## 101 2000     4            10           1  11333
## 102 2000     4            11           2  12850
## 103 2000     4            12           3  12545
## 104 2000     4            13           4  11907
## 105 2000     4            14           5  12053
## 108 2000     4            17           1  11322
## 109 2000     4            18           2  12783
## 110 2000     4            19           3  12562
## 111 2000     4            20           4  12301
## 112 2000     4            21           5  11257
## 115 2000     4            24           1  11309
## 116 2000     4            25           2  12488
## 117 2000     4            26           3  12245
## 118 2000     4            27           4  12235
## 119 2000     4            28           5  11989
## 122 2000     5             1           1  11621
## 123 2000     5             2           2  12934
## 124 2000     5             3           3  12259
## 125 2000     5             4           4  12434
## 126 2000     5             5           5  12539
## 129 2000     5             8           1  11604
## 130 2000     5             9           2  12744
## 131 2000     5            10           3  12607
## 132 2000     5            11           4  12442
## 133 2000     5            12           5  12132
## 136 2000     5            15           1  11587
## 137 2000     5            16           2  12898
## 138 2000     5            17           3  12729
## 139 2000     5            18           4  12580
## 140 2000     5            19           5  12174
## 143 2000     5            22           1  11582
## 144 2000     5            23           2  13097
## 145 2000     5            24           3  12669
## 146 2000     5            25           4  13026
## 147 2000     5            26           5  12726
## 150 2000     5            29           1   8272
## 151 2000     5            30           2  11954
## 152 2000     5            31           3  12941
## 153 2000     6             1           4  13363
## 154 2000     6             2           5  12695
## 157 2000     6             5           1  11647
## 158 2000     6             6           2  12765
## 159 2000     6             7           3  12474
## 160 2000     6             8           4  12751
## 161 2000     6             9           5  12504
## 164 2000     6            12           1  11848
## 165 2000     6            13           2  12683
## 166 2000     6            14           3  12849
## 167 2000     6            15           4  12798
## 168 2000     6            16           5  12727
## 171 2000     6            19           1  11649
## 172 2000     6            20           2  13017
## 173 2000     6            21           3  12729
## 174 2000     6            22           4  12809
## 175 2000     6            23           5  12603
## 178 2000     6            26           1  12164
## 179 2000     6            27           2  13354
## 180 2000     6            28           3  13033
## 181 2000     6            29           4  13462
## 182 2000     6            30           5  13225
## 185 2000     7             3           1  11345
## 186 2000     7             4           2   9550
## 187 2000     7             5           3  12346
## 188 2000     7             6           4  13853
## 189 2000     7             7           5  13658
## 192 2000     7            10           1  12420
## 193 2000     7            11           2  13584
## 194 2000     7            12           3  12827
## 195 2000     7            13           4  12980
## 196 2000     7            14           5  13230
## 199 2000     7            17           1  12053
## 200 2000     7            18           2  13663
## 201 2000     7            19           3  13001
## 202 2000     7            20           4  13173
## 203 2000     7            21           5  13027
## 206 2000     7            24           1  12128
## 207 2000     7            25           2  13176
## 208 2000     7            26           3  12931
## 209 2000     7            27           4  13155
## 210 2000     7            28           5  12890
## 213 2000     7            31           1  11860
## 214 2000     8             1           2  13356
## 215 2000     8             2           3  12835
## 216 2000     8             3           4  13092
## 217 2000     8             4           5  12940
## 220 2000     8             7           1  11864
## 221 2000     8             8           2  13693
## 222 2000     8             9           3  13170
## 223 2000     8            10           4  12953
## 224 2000     8            11           5  12729
## 227 2000     8            14           1  11927
## 228 2000     8            15           2  13374
## 229 2000     8            16           3  13174
## 230 2000     8            17           4  13099
## 231 2000     8            18           5  13124
## 234 2000     8            21           1  12003
## 235 2000     8            22           2  13406
## 236 2000     8            23           3  12929
## 237 2000     8            24           4  13021
## 238 2000     8            25           5  12926
## 241 2000     8            28           1  12074
## 242 2000     8            29           2  13237
## 243 2000     8            30           3  13111
## 244 2000     8            31           4  13287
## 245 2000     9             1           5  13145
## 248 2000     9             4           1   8603
## 249 2000     9             5           2  12200
## 250 2000     9             6           3  13917
## 251 2000     9             7           4  13512
## 252 2000     9             8           5  13487
## 255 2000     9            11           1  12405
## 256 2000     9            12           2  13649
## 257 2000     9            13           3  13299
## 258 2000     9            14           4  13739
## 259 2000     9            15           5  13552
## 262 2000     9            18           1  12554
## 263 2000     9            19           2  13850
## 264 2000     9            20           3  13775
## 265 2000     9            21           4  13350
## 266 2000     9            22           5  13189
## 269 2000     9            25           1  12432
## 270 2000     9            26           2  13540
## 271 2000     9            27           3  13467
## 272 2000     9            28           4  13515
## 273 2000     9            29           5  13045
## 276 2000    10             2           1  12223
## 277 2000    10             3           2  13245
## 278 2000    10             4           3  13154
## 279 2000    10             5           4  13288
## 280 2000    10             6           5  12774
##  [ reached 'max' / getOption("max.print") -- omitted 3713 rows ]
```

```
nrow(birthsWeekday)
```

```
## [1] 3913
```

```
# Valores perdidos is.na()
is.na(births)
```

```
##          year month date_of_month day_of_week births
##    [1,] FALSE FALSE         FALSE       FALSE  FALSE
##    [2,] FALSE FALSE         FALSE       FALSE  FALSE
##    [3,] FALSE FALSE         FALSE       FALSE  FALSE
##    [4,] FALSE FALSE         FALSE       FALSE  FALSE
##    [5,] FALSE FALSE         FALSE       FALSE  FALSE
##    [6,] FALSE FALSE         FALSE       FALSE  FALSE
##    [7,] FALSE FALSE         FALSE       FALSE  FALSE
##    [8,] FALSE FALSE         FALSE       FALSE  FALSE
##    [9,] FALSE FALSE         FALSE       FALSE  FALSE
##   [10,] FALSE FALSE         FALSE       FALSE  FALSE
##   [11,] FALSE FALSE         FALSE       FALSE  FALSE
##   [12,] FALSE FALSE         FALSE       FALSE  FALSE
##   [13,] FALSE FALSE         FALSE       FALSE  FALSE
##   [14,] FALSE FALSE         FALSE       FALSE  FALSE
##   [15,] FALSE FALSE         FALSE       FALSE  FALSE
##   [16,] FALSE FALSE         FALSE       FALSE  FALSE
##   [17,] FALSE FALSE         FALSE       FALSE  FALSE
##   [18,] FALSE FALSE         FALSE       FALSE  FALSE
##   [19,] FALSE FALSE         FALSE       FALSE  FALSE
##   [20,] FALSE FALSE         FALSE       FALSE  FALSE
##   [21,] FALSE FALSE         FALSE       FALSE  FALSE
##   [22,] FALSE FALSE         FALSE       FALSE  FALSE
##   [23,] FALSE FALSE         FALSE       FALSE  FALSE
##   [24,] FALSE FALSE         FALSE       FALSE  FALSE
##   [25,] FALSE FALSE         FALSE       FALSE  FALSE
##   [26,] FALSE FALSE         FALSE       FALSE  FALSE
##   [27,] FALSE FALSE         FALSE       FALSE  FALSE
##   [28,] FALSE FALSE         FALSE       FALSE  FALSE
##   [29,] FALSE FALSE         FALSE       FALSE  FALSE
##   [30,] FALSE FALSE         FALSE       FALSE  FALSE
##   [31,] FALSE FALSE         FALSE       FALSE  FALSE
##   [32,] FALSE FALSE         FALSE       FALSE  FALSE
##   [33,] FALSE FALSE         FALSE       FALSE  FALSE
##   [34,] FALSE FALSE         FALSE       FALSE  FALSE
##   [35,] FALSE FALSE         FALSE       FALSE  FALSE
##   [36,] FALSE FALSE         FALSE       FALSE  FALSE
##   [37,] FALSE FALSE         FALSE       FALSE  FALSE
##   [38,] FALSE FALSE         FALSE       FALSE  FALSE
##   [39,] FALSE FALSE         FALSE       FALSE  FALSE
##   [40,] FALSE FALSE         FALSE       FALSE  FALSE
##   [41,] FALSE FALSE         FALSE       FALSE  FALSE
##   [42,] FALSE FALSE         FALSE       FALSE  FALSE
##   [43,] FALSE FALSE         FALSE       FALSE  FALSE
##   [44,] FALSE FALSE         FALSE       FALSE  FALSE
##   [45,] FALSE FALSE         FALSE       FALSE  FALSE
##   [46,] FALSE FALSE         FALSE       FALSE  FALSE
##   [47,] FALSE FALSE         FALSE       FALSE  FALSE
##   [48,] FALSE FALSE         FALSE       FALSE  FALSE
##   [49,] FALSE FALSE         FALSE       FALSE  FALSE
##   [50,] FALSE FALSE         FALSE       FALSE  FALSE
##   [51,] FALSE FALSE         FALSE       FALSE  FALSE
##   [52,] FALSE FALSE         FALSE       FALSE  FALSE
##   [53,] FALSE FALSE         FALSE       FALSE  FALSE
##   [54,] FALSE FALSE         FALSE       FALSE  FALSE
##   [55,] FALSE FALSE         FALSE       FALSE  FALSE
##   [56,] FALSE FALSE         FALSE       FALSE  FALSE
##   [57,] FALSE FALSE         FALSE       FALSE  FALSE
##   [58,] FALSE FALSE         FALSE       FALSE  FALSE
##   [59,] FALSE FALSE         FALSE       FALSE  FALSE
##   [60,] FALSE FALSE         FALSE       FALSE  FALSE
##   [61,] FALSE FALSE         FALSE       FALSE  FALSE
##   [62,] FALSE FALSE         FALSE       FALSE  FALSE
##   [63,] FALSE FALSE         FALSE       FALSE  FALSE
##   [64,] FALSE FALSE         FALSE       FALSE  FALSE
##   [65,] FALSE FALSE         FALSE       FALSE  FALSE
##   [66,] FALSE FALSE         FALSE       FALSE  FALSE
##   [67,] FALSE FALSE         FALSE       FALSE  FALSE
##   [68,] FALSE FALSE         FALSE       FALSE  FALSE
##   [69,] FALSE FALSE         FALSE       FALSE  FALSE
##   [70,] FALSE FALSE         FALSE       FALSE  FALSE
##   [71,] FALSE FALSE         FALSE       FALSE  FALSE
##   [72,] FALSE FALSE         FALSE       FALSE  FALSE
##   [73,] FALSE FALSE         FALSE       FALSE  FALSE
##   [74,] FALSE FALSE         FALSE       FALSE  FALSE
##   [75,] FALSE FALSE         FALSE       FALSE  FALSE
##   [76,] FALSE FALSE         FALSE       FALSE  FALSE
##   [77,] FALSE FALSE         FALSE       FALSE  FALSE
##   [78,] FALSE FALSE         FALSE       FALSE  FALSE
##   [79,] FALSE FALSE         FALSE       FALSE  FALSE
##   [80,] FALSE FALSE         FALSE       FALSE  FALSE
##   [81,] FALSE FALSE         FALSE       FALSE  FALSE
##   [82,] FALSE FALSE         FALSE       FALSE  FALSE
##   [83,] FALSE FALSE         FALSE       FALSE  FALSE
##   [84,] FALSE FALSE         FALSE       FALSE  FALSE
##   [85,] FALSE FALSE         FALSE       FALSE  FALSE
##   [86,] FALSE FALSE         FALSE       FALSE  FALSE
##   [87,] FALSE FALSE         FALSE       FALSE  FALSE
##   [88,] FALSE FALSE         FALSE       FALSE  FALSE
##   [89,] FALSE FALSE         FALSE       FALSE  FALSE
##   [90,] FALSE FALSE         FALSE       FALSE  FALSE
##   [91,] FALSE FALSE         FALSE       FALSE  FALSE
##   [92,] FALSE FALSE         FALSE       FALSE  FALSE
##   [93,] FALSE FALSE         FALSE       FALSE  FALSE
##   [94,] FALSE FALSE         FALSE       FALSE  FALSE
##   [95,] FALSE FALSE         FALSE       FALSE  FALSE
##   [96,] FALSE FALSE         FALSE       FALSE  FALSE
##   [97,] FALSE FALSE         FALSE       FALSE  FALSE
##   [98,] FALSE FALSE         FALSE       FALSE  FALSE
##   [99,] FALSE FALSE         FALSE       FALSE  FALSE
##  [100,] FALSE FALSE         FALSE       FALSE  FALSE
##  [101,] FALSE FALSE         FALSE       FALSE  FALSE
##  [102,] FALSE FALSE         FALSE       FALSE  FALSE
##  [103,] FALSE FALSE         FALSE       FALSE  FALSE
##  [104,] FALSE FALSE         FALSE       FALSE  FALSE
##  [105,] FALSE FALSE         FALSE       FALSE  FALSE
##  [106,] FALSE FALSE         FALSE       FALSE  FALSE
##  [107,] FALSE FALSE         FALSE       FALSE  FALSE
##  [108,] FALSE FALSE         FALSE       FALSE  FALSE
##  [109,] FALSE FALSE         FALSE       FALSE  FALSE
##  [110,] FALSE FALSE         FALSE       FALSE  FALSE
##  [111,] FALSE FALSE         FALSE       FALSE  FALSE
##  [112,] FALSE FALSE         FALSE       FALSE  FALSE
##  [113,] FALSE FALSE         FALSE       FALSE  FALSE
##  [114,] FALSE FALSE         FALSE       FALSE  FALSE
##  [115,] FALSE FALSE         FALSE       FALSE  FALSE
##  [116,] FALSE FALSE         FALSE       FALSE  FALSE
##  [117,] FALSE FALSE         FALSE       FALSE  FALSE
##  [118,] FALSE FALSE         FALSE       FALSE  FALSE
##  [119,] FALSE FALSE         FALSE       FALSE  FALSE
##  [120,] FALSE FALSE         FALSE       FALSE  FALSE
##  [121,] FALSE FALSE         FALSE       FALSE  FALSE
##  [122,] FALSE FALSE         FALSE       FALSE  FALSE
##  [123,] FALSE FALSE         FALSE       FALSE  FALSE
##  [124,] FALSE FALSE         FALSE       FALSE  FALSE
##  [125,] FALSE FALSE         FALSE       FALSE  FALSE
##  [126,] FALSE FALSE         FALSE       FALSE  FALSE
##  [127,] FALSE FALSE         FALSE       FALSE  FALSE
##  [128,] FALSE FALSE         FALSE       FALSE  FALSE
##  [129,] FALSE FALSE         FALSE       FALSE  FALSE
##  [130,] FALSE FALSE         FALSE       FALSE  FALSE
##  [131,] FALSE FALSE         FALSE       FALSE  FALSE
##  [132,] FALSE FALSE         FALSE       FALSE  FALSE
##  [133,] FALSE FALSE         FALSE       FALSE  FALSE
##  [134,] FALSE FALSE         FALSE       FALSE  FALSE
##  [135,] FALSE FALSE         FALSE       FALSE  FALSE
##  [136,] FALSE FALSE         FALSE       FALSE  FALSE
##  [137,] FALSE FALSE         FALSE       FALSE  FALSE
##  [138,] FALSE FALSE         FALSE       FALSE  FALSE
##  [139,] FALSE FALSE         FALSE       FALSE  FALSE
##  [140,] FALSE FALSE         FALSE       FALSE  FALSE
##  [141,] FALSE FALSE         FALSE       FALSE  FALSE
##  [142,] FALSE FALSE         FALSE       FALSE  FALSE
##  [143,] FALSE FALSE         FALSE       FALSE  FALSE
##  [144,] FALSE FALSE         FALSE       FALSE  FALSE
##  [145,] FALSE FALSE         FALSE       FALSE  FALSE
##  [146,] FALSE FALSE         FALSE       FALSE  FALSE
##  [147,] FALSE FALSE         FALSE       FALSE  FALSE
##  [148,] FALSE FALSE         FALSE       FALSE  FALSE
##  [149,] FALSE FALSE         FALSE       FALSE  FALSE
##  [150,] FALSE FALSE         FALSE       FALSE  FALSE
##  [151,] FALSE FALSE         FALSE       FALSE  FALSE
##  [152,] FALSE FALSE         FALSE       FALSE  FALSE
##  [153,] FALSE FALSE         FALSE       FALSE  FALSE
##  [154,] FALSE FALSE         FALSE       FALSE  FALSE
##  [155,] FALSE FALSE         FALSE       FALSE  FALSE
##  [156,] FALSE FALSE         FALSE       FALSE  FALSE
##  [157,] FALSE FALSE         FALSE       FALSE  FALSE
##  [158,] FALSE FALSE         FALSE       FALSE  FALSE
##  [159,] FALSE FALSE         FALSE       FALSE  FALSE
##  [160,] FALSE FALSE         FALSE       FALSE  FALSE
##  [161,] FALSE FALSE         FALSE       FALSE  FALSE
##  [162,] FALSE FALSE         FALSE       FALSE  FALSE
##  [163,] FALSE FALSE         FALSE       FALSE  FALSE
##  [164,] FALSE FALSE         FALSE       FALSE  FALSE
##  [165,] FALSE FALSE         FALSE       FALSE  FALSE
##  [166,] FALSE FALSE         FALSE       FALSE  FALSE
##  [167,] FALSE FALSE         FALSE       FALSE  FALSE
##  [168,] FALSE FALSE         FALSE       FALSE  FALSE
##  [169,] FALSE FALSE         FALSE       FALSE  FALSE
##  [170,] FALSE FALSE         FALSE       FALSE  FALSE
##  [171,] FALSE FALSE         FALSE       FALSE  FALSE
##  [172,] FALSE FALSE         FALSE       FALSE  FALSE
##  [173,] FALSE FALSE         FALSE       FALSE  FALSE
##  [174,] FALSE FALSE         FALSE       FALSE  FALSE
##  [175,] FALSE FALSE         FALSE       FALSE  FALSE
##  [176,] FALSE FALSE         FALSE       FALSE  FALSE
##  [177,] FALSE FALSE         FALSE       FALSE  FALSE
##  [178,] FALSE FALSE         FALSE       FALSE  FALSE
##  [179,] FALSE FALSE         FALSE       FALSE  FALSE
##  [180,] FALSE FALSE         FALSE       FALSE  FALSE
##  [181,] FALSE FALSE         FALSE       FALSE  FALSE
##  [182,] FALSE FALSE         FALSE       FALSE  FALSE
##  [183,] FALSE FALSE         FALSE       FALSE  FALSE
##  [184,] FALSE FALSE         FALSE       FALSE  FALSE
##  [185,] FALSE FALSE         FALSE       FALSE  FALSE
##  [186,] FALSE FALSE         FALSE       FALSE  FALSE
##  [187,] FALSE FALSE         FALSE       FALSE  FALSE
##  [188,] FALSE FALSE         FALSE       FALSE  FALSE
##  [189,] FALSE FALSE         FALSE       FALSE  FALSE
##  [190,] FALSE FALSE         FALSE       FALSE  FALSE
##  [191,] FALSE FALSE         FALSE       FALSE  FALSE
##  [192,] FALSE FALSE         FALSE       FALSE  FALSE
##  [193,] FALSE FALSE         FALSE       FALSE  FALSE
##  [194,] FALSE FALSE         FALSE       FALSE  FALSE
##  [195,] FALSE FALSE         FALSE       FALSE  FALSE
##  [196,] FALSE FALSE         FALSE       FALSE  FALSE
##  [197,] FALSE FALSE         FALSE       FALSE  FALSE
##  [198,] FALSE FALSE         FALSE       FALSE  FALSE
##  [199,] FALSE FALSE         FALSE       FALSE  FALSE
##  [200,] FALSE FALSE         FALSE       FALSE  FALSE
##  [ reached getOption("max.print") -- omitted 5279 rows ]
```

```r
# Condiciones y direcciones
  # 1. Condicion si
  # Structura:
  #if (condition) {
  #  Do something
  #} else {
  #  do something else
  #}

  if (mean(birthsWeekends[,5])>mean(birthsWeekday[,5])){
    cat("En promedio, hay mas bebes en fines de semana")}else
      {cat("En promedio, mas bebes en dias de semana")}
```

```
## En promedio, mas bebes en dias de semana
```

```r
# Loops (Bucles)
  # For loop: iterar una misma actividad en secuencia
  # Structura
  #for(i in 1:K){
  #Repetir algo K veces
  #}
```

```r
# Ejemplo 1
for(i in 1:10){
  print(i)
}
```

```
## [1] 1
## [1] 2
## [1] 3
## [1] 4
## [1] 5
## [1] 6
## [1] 7
## [1] 8
## [1] 9
## [1] 10
```

```r
# Ejemplo 2
A=matrix(rnorm(200),nrow=5)
# obtener el valor maximo de cada columna de A y guardarlo al final del loop
# matrix para guardar los maximos
Amax=rep(0,100/5)
for(i in 1:length(Amax)){
  Amax[i]<-max(A[,i])
}
# Problem: este metodo es secuencial, por lo que es lento.
# Solucion: version vectorizada utilizando funciones apply
?apply
# Obtener todas las funciones que permiten realizar vectorizacion
apropos("apply")
```

```
##  [1] ".rs.api.applyTheme" ".rs.applyTheme"     ".rs.applyTransform" "apply"              "dendrapply
##  [6] "eapply"             "kernapply"          "lapply"             "mapply"             "rapply"
## [11] "sapply"             "tapply"             "vapply"
```

```r
# apply permite aplicar funciones a todos las columnas de la matriz
apply(A,2,max)
```

```
##  [1]  1.99280770  1.20423305  0.50735632  1.25511357  2.72815621  1.29763999  0.96363807  0.60908143
## [10]  1.99591913  1.75205041  1.16477559  0.14895380  2.24675868  0.96114578  1.12137749  0.34237638
## [19] -0.09117393  0.57627284  0.54332654  0.86798128  0.83681617  0.33219877  1.00653033  0.74540112
## [28]  0.39637678  1.59918306  0.80739094  1.17532873  1.45590260  0.89800630  0.10885110  0.75114390
## [37]  0.96669944  2.68202383  1.85919619  0.81988511
```

```r
apply(A,1,max)
```

```
## [1] 2.728156 2.246759 1.497690 2.682024 1.995919
```

```r
apply(A,2,sum)
```

```
##  [1] -1.1442146  0.3330088  0.2940098 -2.5613981  6.7863235  0.5274033 -1.3994096 -1.2536629 -0.5636
## [11]  4.7078145  0.2314377 -1.8747870 -0.3525901 -0.7273411  2.3812740 -2.0806511 -0.6341202 -6.2878
## [21] -1.5327842 -0.1717494 -0.6081975 -2.0410640  0.4879704  0.4423735 -2.6288852 -2.7123571  2.4279
## [31]  2.5964470 -0.7777505 -2.2368120 -5.5388474 -1.3000622 -1.1462235  0.9031954  1.7721472  2.1011
```

```r
system.time(apply(A,1,sum))
```

```
##    user  system elapsed
##   0.001   0.000   0.000
```

```
# Comparar tiempos
Abig=matrix(rnorm(20000),nrow=500)
# obtener el valor maximo de cada columna de A y guardarlo al final del loop
# matrix para guardar los maximos
Amax=rep(0,100/5)
tiempo_loop=system.time(for(i in 1:length(Amax)){
  Amax[i]<-max(Abig[,i])
})
tiempovectorizado=system.time(apply(A,2,max))

# No quitar el comentario de la linea inferior. Solamente copiar en la consola para que ejecute
#rmarkdown::render("12Programando_cheatsheet.R",c("pdf_document","html_document"))
```