```
# 6306_Doing_Data_Science
# Fall 2017 - Sept, 2017
# Assignment 2 - SWIRL
# Bruce Granger
#------------------------------------------------------------------------------------------
# REFERENCES
# http://swirlstats.com/scn/
# https://github.com/swirldev/swirl_courses
#------------------------------------------------------------------------------------------
# REDIRECT SCREEN OUTPUT TO FILE, sink() WILL BE UTILIZED
sink("N:/SMU/6306_Doing_Data_Science_Fall2017/Assignments/Assignment_2/Assignment_2_SWIRL_Logic.txt")

#------------------------------------------------------------------------------------------
# MODULES
# 8: LOGIC
#------------------------------------------------------------------------------------------
library(swirl)
swirl()
#------------------------------------------------------------------------------------------
# TURN OFF SCREEN REDIRECT OUTPUT TO FILE
sink()
```

1: R Programming Logic
2: No. Let me start something new.

Enter an item from the menu, or 0 to exit

1: R Programming
2: Take me to the swirl course repository!

Enter an item from the menu, or 0 to exit

 1: Basic Building Blocks      2: Workspace and Files      3: Sequences of Numbers      4: Vectors
 5: Missing Values           6: Subsetting Vectors      7: Matrices and Data Frames   8: Logic
 9: Functions              10: lapply and sapply      11: vapply and tapply        12: Looking at Data
13: Simulation             14: Dates and Times          15: Base Graphics


1: R Programming
2: Take me to the swirl course repository!


1: R Programming Logic
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1: R Programming
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1: R Programming Logic
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Enter an item from the menu, or 0 to exit
Enter an item from the menu, or 0 to exit
Enter an item from the menu, or 0 to exit
Enter an item from the menu, or 0 to exit




 |
 |==                                                                              |  2%


 |
 |=====                                                                           |  4%


 |
 |=======                                                                         |  6%[1] TRUE



 |
 |=========                                                                       |  8%

```
|
|===========                                                      | 10%[1] TRUE


|
|=============                                                    | 12%[1] FALSE


|
|===============                                                 | 13%

|
|==================                                              | 15%[1] TRUE


|
|====================                                            | 17%[1] TRUE


|
|=======================                                         | 19%

|
|==========================                                      | 21%
```
1: 7 == 7
2: 9 >= 10
3: 0 > -36
4: 6 < 8

Enter an item from the menu, or 0 to exit


```
|
|=============================                                   | 23%
```
1: -6 > -7
2: 7 == 9
3: 9 >= 10
4: 57 < 8


```
|
|===============================                                 | 25%[1]
```
TRUE


```
|
|=================================                               | 27%[1]
```
TRUE
[1] TRUE


```
|
|====================================                            | 29%
```

|
|======================================= | 31%
1: 7 != 8
2: !FALSE
3: !(0 >= -1)
4: 9 < 10


|
|======================================== |
33%
1: FALSE
2: %>%
3: Can there be objective truth when programming?
4: TRUE


|
|========================================== |
35%

|
|=========================================== |
37%[1] FALSE


|
|============================================== |
| 38%[1]  TRUE FALSE FALSE


|
|=============================================== |
| 40%

|
|================================================ |
| 42%[1] TRUE


|
|================================================== |
| 44%

|
|==================================================== |
| 46%

|
|====================================================== |
| 48%

|
  |========================================================================
| 50%[1] TRUE TRUE TRUE


  |
  |=========================================================================
| 52%[1] TRUE


  |
  |==========================================================================
| 54%


  |
  |===========================================================================
| 56%[1] TRUE


  |
  |============================================================================
| 58%


  |
  |=============================================================================
| 60%
1: 99.99 > 100 || 45 < 7.3 || 4 != 4.0
2: TRUE && FALSE || 9 >= 4 && 3 < 6
3: TRUE && 62 < 62 && 44 >= 44
4: FALSE || TRUE && FALSE


  |
  |================================================================================
| 62%
1: 6 >= -9 && !(6 > 7) && !(!TRUE)
2: FALSE && 6 >= 6 || 7 >= 8 || 50 <= 49.5
3: !(8 > 4) ||  5 == 5.0 && 7.8 >= 7.79
4: FALSE || TRUE && 6 != 4 || 9 > 4


  |
  |==================================================================================
| 63%


  |
  |===================================================================================
| 65%[1] TRUE


  |

|================================================================================
=                              | 67%
1: !isTRUE(4 < 3)
2: isTRUE(!TRUE)
3: isTRUE(NA)
4: isTRUE(3)
5: !isTRUE(8 != 5)


 |

|================================================================================
====                           | 69%[1] TRUE


 |

|================================================================================
======                         | 71%
1: identical(5 > 4, 3 < 3.1)
2: identical('hello', 'Hello')
3: !identical(7, 7)
4: identical(4, 3.1)



 |

|================================================================================
=========                      | 73%[1] TRUE


 |

|================================================================================
==========                     | 75%

 |

|================================================================================
=============                  | 77%
1: xor(!isTRUE(TRUE), 6 > -1)
2: xor(4 >= 9, 8 != 8.0)
3: xor(!!TRUE, !!FALSE)
4: xor(identical(xor, 'xor'), 7 == 7.0)



 |

|================================================================================
===============                | 79%

|

|==================================================================================================== | 81% [1] 5 1 2 9 10 4 7 8 6 3


  |

|==================================================================================================== | 83% [1] FALSE FALSE FALSE  TRUE  TRUE FALSE  TRUE  TRUE
 TRUE FALSE


  |

|==================================================================================================== | 85%

  |

|==================================================================================================== | 87%[1] 4 5 8


  |

|==================================================================================================== | 88%
1: which(ints < 2)
2: ints < 2
3: ints <= 2
4: which(ints <= 2)



  |

|==================================================================================================== | 90%

  |

|==================================================================================================== | 92%[1] FALSE


  |

|==================================================================================================== | 94%[1] TRUE


  |

|=============================================================================
====================================== | 96%
1: all(ints == 10)
2: any(ints == 10)
3: all(c(TRUE, FALSE, TRUE))
4: any(ints == 2.5)

 |

|=============================================================================
========================================= | 98%

 |

|=============================================================================
=========================================| 100%
1: No
2: Yes


1: R Programming
2: Take me to the swirl course repository!

Enter an item from the menu, or 0 to exit

```
# 6306_Doing_Data_Science
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#----------------------------------------------------------------------------------------
# REFERENCES
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#----------------------------------------------------------------------------------------
# REDIRECT SCREEN OUTPUT TO FILE, sink() WILL BE UTILIZED
sink("N:/SMU/6306_Doing_Data_Science_Fall2017/Assignments/Assignment_2/Assignment_2_SWIRL_FUNCTION
S.txt")


#----------------------------------------------------------------------------------------
# MODULES
# 9: FUNCTIONS
#----------------------------------------------------------------------------------------
library(swirl)
swirl()
#----------------------------------------------------------------------------------------
# TURN OFF SCREEN REDIRECT OUTPUT TO FILE
sink()
```

1: R Programming
2: Take me to the swirl course repository!


 1: Basic Building Blocks     2: Workspace and Files      3: Sequences of Numbers     4: Vectors
 5: Missing Values           6: Subsetting Vectors       7: Matrices and Data Frames   8: Logic
 9: Functions               10: lapply and sapply       11: vapply and tapply       12: Looking at Data
13: Simulation              14: Dates and Times          15: Base Graphics


```
  |
  |                                                           |   0%


  |
  |===                                                        |   2%

  |
  |=====                                                      |   4%[1] "2017-09-10"


  |
  |=======                                                    |   6%

  |
  |=========                                                  |   8%[1] 3.666667


  |
  |============                                               |  10%

  |
  |===============                                            |  12%

  |
  |=================                                          |  14%

  |
  |====================                                       |  16%[1] "My first
function!"


  |
  |=======================                                    |  18%

  |
  |==========================                                 |  20%function(x)
{
  x
}
```

```
 |
 |===========================                                                      | 22%

 |
 |==============================                                                   | 24%

 |
 |=================================                                                | 27%[1]
6.333333


 |
 |====================================                                             | 29%

 |
 |======================================                                           | 31%

 |
 |=========================================                                        |
33%[1] 1


 |
 |============================================                                     |
35%

 |
 |================================================                                 |
37%[1] 1


 |
 |===================================================                              |
| 39%

 |
 |======================================================                           |
| 41%[1] 5


 |
 |=========================================================                        |
| 43%

 |
 |============================================================                     |
| 45%[1] 0


 |
 |================================================================                 |
| 47%
```

|
|================================================================
| 49%function (num, divisor = 2)
NULL


|
|=================================================================
| 51%


|
|==================================================================
| 53%


|
|===================================================================
| 55%[1] 3.514138


|
|====================================================================
| 57%


|
|=====================================================================
| 59%


|
|======================================================================
| 61%


|
|=======================================================================
| 63%[1] 7


|
|=========================================================================
| 65%


|

|=============================================================================
=                             | 67%[1] 9 5 1
[1] 8


|

|==============================================================================
====                          | 69%[1] 0


|

|===============================================================================
======                               | 71%

  |

|===============================================================================
=========                            | 73%

  |

|===============================================================================
============                         | 76%[1] "Programming is fun!"

  |

|===============================================================================
==============                       | 78%

  |

|===============================================================================
================                     | 80%

  |

|===============================================================================
==================                   | 82%[1] "START between the good and the bad STOP"

  |

|===============================================================================
=====================                | 84%

  |

|===============================================================================
=========================            | 86%[1] "News from Estes Park today where You know you have
arrived! students took to the streets in protest of the new Alive being installed on campus."

  |

|===============================================================================
==========================           | 88%

  |

|===============================================================================
============================         | 90%
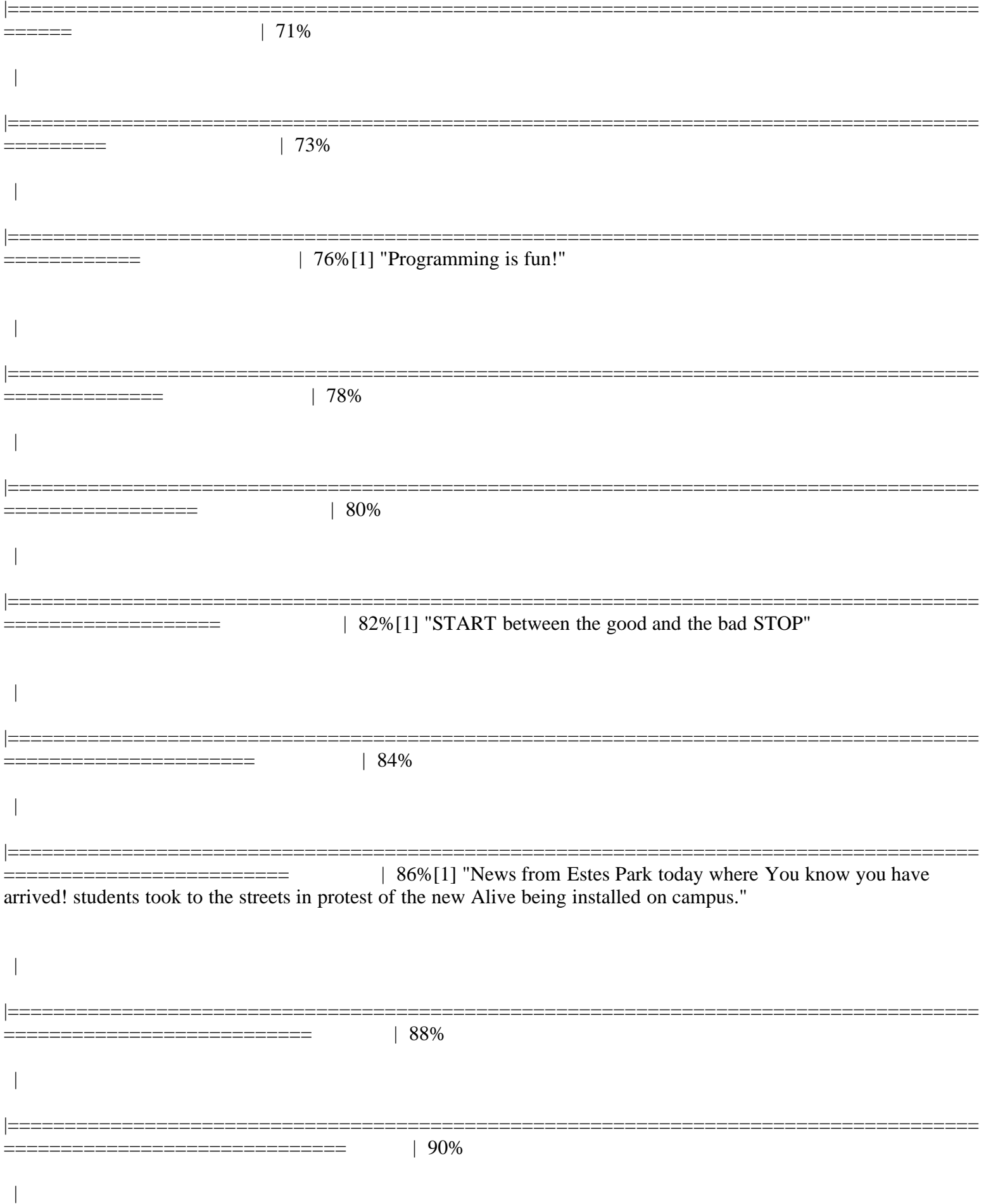
  |

|==================================================================================================== | 92%

  |

|==================================================================================================== | 94%

  |

|==================================================================================================== | 96%[1] "I love R!"


  |

|==================================================================================================== | 98%

  |

|====================================================================================================| 100%
1: Yes
2: No


1: R Programming
2: Take me to the swirl course repository!

```
# 6306_Doing_Data_Science
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#-----------------------------------------------------------------------------------
# REFERENCES
# http://swirlstats.com/scn/
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#-----------------------------------------------------------------------------------
# REDIRECT SCREEN OUTPUT TO FILE, sink() WILL BE UTILIZED
sink("N:/SMU/6306_Doing_Data_Science_Fall2017/Assignments/Assignment_2/Assignment_2_SWIRL_LAPPLY_S
APPLY.txt")


#-----------------------------------------------------------------------------------
# MODULES
# 9: lapply and sapply
#-----------------------------------------------------------------------------------
library(swirl)
swirl()
#-----------------------------------------------------------------------------------
# TURN OFF SCREEN REDIRECT OUTPUT TO FILE
sink()
```

1: R Programming
2: Take me to the swirl course repository!

```
  |
  |                                                                        |  0%


  |
  |===                                                                     |  2%


  |
  |=====                                                                   |  4%


  |
  |=======                                                                 |  6%


  |
  |=========                                                               |  8%


  |
  |=============                                                           | 10%        name
```
landmass zone area population language religion bars stripes colours red green blue gold white black orange mainhue

| | name | landmass | zone | area | population | language | religion | bars | stripes | colours | red | green | blue | gold | white | black | orange | mainhue |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Afghanistan | 5 | 1 | 648 | 16 | 10 | 2 | 0 | 3 | 5 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | green |
| 2 | Albania | 3 | 1 | 29 | 3 | 6 | 6 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | red |
| 3 | Algeria | 4 | 1 | 2388 | 20 | 8 | 2 | 2 | 0 | 3 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | green |
| 4 | American-Samoa | 6 | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 5 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | blue |
| 5 | Andorra | 3 | 1 | 0 | 0 | 6 | 0 | 3 | 0 | 3 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | gold |
| 6 | Angola | 4 | 2 | 1247 | 7 | 10 | 5 | 0 | 2 | 3 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | red |

| | circles | crosses | saltires | quarters | sunstars | crescent | triangle | icon | animate | text | topleft | botright |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | black | green |
| 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | red | red |
| 3 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | green | white |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | blue | red |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | blue | red |
| 6 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | red | black |

```
  |
  |================                                                        | 12%[1] 194  30


  |
  |==================                                                      | 14%
```

```
  |
  |===================                                            | 16%[1] "data.frame"

  |
  |=======================                                        | 18%

  |
  |==========================                                     | 20%

  |
  |============================                                   | 22%

  |
  |==============================                                 | 24%$name
[1] "factor"

$landmass
[1] "integer"

$zone
[1] "integer"

$area
[1] "integer"

$population
[1] "integer"

$language
[1] "integer"

$religion
[1] "integer"

$bars
[1] "integer"

$stripes
[1] "integer"

$colours
[1] "integer"

$red
[1] "integer"

$green
[1] "integer"

$blue
[1] "integer"

$gold
```

[1] "integer"

$white
[1] "integer"

$black
[1] "integer"

$orange
[1] "integer"

$mainhue
[1] "factor"

$circles
[1] "integer"

$crosses
[1] "integer"

$saltires
[1] "integer"

$quarters
[1] "integer"

$sunstars
[1] "integer"

$crescent
[1] "integer"

$triangle
[1] "integer"

$icon
[1] "integer"

$animate
[1] "integer"

$text
[1] "integer"

$topleft
[1] "factor"

$botright
[1] "factor"


|
|================================                                               | 26%[1]

"list"

```
  |
  |====================================                                         |  28%
  |
  |=======================================                                      |  30%
```
[1] "factor"  "integer" "integer" "integer" "integer" "integer" "integer" "integer" "integer" "integer" "integer" "integer"
"integer"
[14] "integer" "integer" "integer" "integer" "factor"  "integer" "integer" "integer" "integer" "integer" "integer" "integer"
"integer"
[27] "integer" "integer" "factor"  "factor"

```
  |
  |=========================================                                    |  32%
  |
  |===========================================                                  |
```
34%[1] "character"

```
  |
  |===============================================                              |
```
36%

```
  |
  |=================================================                            |  38%
  |
  |===================================================                          |  40%
  |
  |=======================================================                      |  42%
```
[1] 26

```
  |
  |==========================================================                   |  44%
  |
  |============================================================                 |  46%
  |
  |==============================================================               |
```
48%  red green blue gold white black orange
1 1   1    1    0    1     1     1      0
2 1   0    0    1    0     1     0      0
3 1   1    1    0    0     1     0      0

```
4   1   0   1   1   1   0   1
5   1   0   1   1   0   0   0
6   1   0   0   1   0   1   0
   red green blue gold white black orange
1   1   1   0   1   1   1   0
2   1   0   0   1   0   1   0
3   1   1   0   0   1   0   0
4   1   0   1   1   1   0   1
5   1   0   1   1   0   0   0
6   1   0   0   1   0   1   0
```

```
  |
  |=================================================================
|  50%$red
[1] 153

$green
[1] 91

$blue
[1] 99

$gold
[1] 91

$white
[1] 146

$black
[1] 52

$orange
[1] 26




  |
  |==================================================================
|  52%

  |
  |====================================================================
|  54%   red  green   blue  gold  white  black orange
   153    91     99    91    146    52    26


  |
  |======================================================================
|  56%

  |
  |========================================================================
|  58%     red    green    blue    gold    white    black    orange
```

0.7886598 0.4690722 0.5103093 0.4690722 0.7525773 0.2680412 0.1340206

```
  |
  |===============================================================================
| 60%

  |
  |===============================================================================
| 62%

  |
  |===============================================================================
| 64%

  |
  |===============================================================================
| 66%$circles
[1] 0 4

$crosses
[1] 0 2

$saltires
[1] 0 1

$quarters
[1] 0 4

$sunstars
[1]  0 50



  |

|===============================================================================
==                               | 68%

  |

|===============================================================================
=====                            | 70%    circles crosses saltires quarters sunstars
[1,]    0    0    0    0    0
[2,]    4    2    1    4    50



  |

|===============================================================================
=======                          | 72%

  |
```
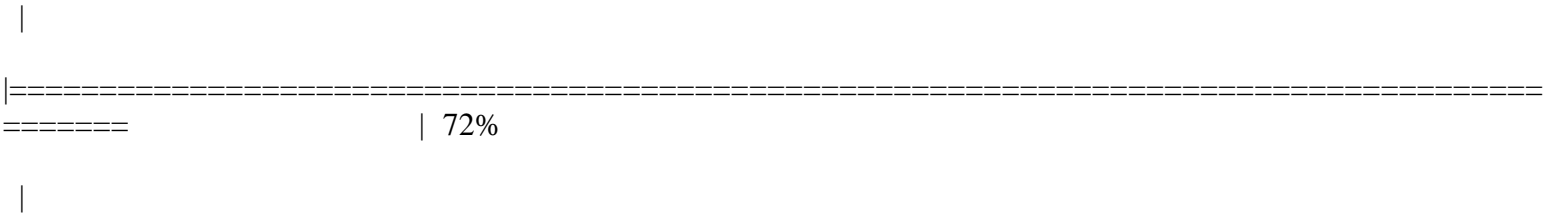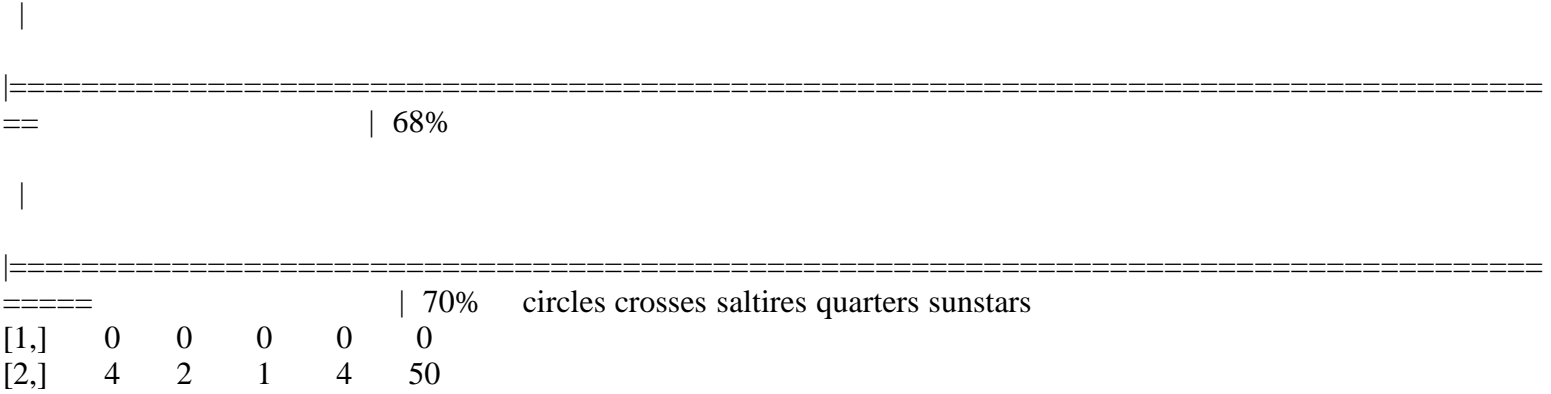
```
|==================================================================================
==========                             | 74%[1] "matrix"


 |


|==================================================================================
============                           | 76%


 |


|==================================================================================
==============                         | 78%[1] 3 4 5 6



 |


|==================================================================================
================                       | 80%


 |


|==================================================================================
==================                     | 82%$name
 [1] Afghanistan         Albania            Algeria            American-Samoa     Andorra
 [6] Angola              Anguilla           Antigua-Barbuda    Argentina          Argentine
[11] Australia           Austria            Bahamas            Bahrain            Bangladesh
[16] Barbados            Belgium            Belize             Benin              Bermuda
[21] Bhutan              Bolivia            Botswana           Brazil             British-Virgin-Isles
[26] Brunei              Bulgaria           Burkina            Burma              Burundi
[31] Cameroon            Canada             Cape-Verde-Islands Cayman-Islands     Central-African-Republic
[36] Chad                Chile              China              Colombia           Comorro-Islands
[41] Congo               Cook-Islands       Costa-Rica         Cuba               Cyprus
[46] Czechoslovakia      Denmark            Djibouti           Dominica           Dominican-Republic
[51] Ecuador             Egypt              El-Salvador        Equatorial-Guinea  Ethiopia
[56] Faeroes             Falklands-Malvinas Fiji               Finland            France
[61] French-Guiana       French-Polynesia   Gabon              Gambia             Germany-DDR
[66] Germany-FRG         Ghana              Gibraltar          Greece             Greenland
[71] Grenada             Guam               Guatemala          Guinea             Guinea-Bissau
[76] Guyana              Haiti              Honduras           Hong-Kong          Hungary
[81] Iceland             India              Indonesia          Iran               Iraq
[86] Ireland             Israel             Italy              Ivory-Coast        Jamaica
[91] Japan               Jordan             Kampuchea          Kenya              Kiribati
[96] Kuwait              Laos               Lebanon            Lesotho            Liberia
[101] Libya              Liechtenstein      Luxembourg         Malagasy           Malawi
[106] Malaysia           Maldive-Islands    Mali               Malta              Marianas
[111] Mauritania         Mauritius          Mexico             Micronesia         Monaco
[116] Mongolia           Montserrat         Morocco            Mozambique         Nauru
[121] Nepal              Netherlands        Netherlands-Antilles New-Zealand      Nicaragua
[126] Niger              Nigeria            Niue               North-Korea        North-Yemen
[131] Norway             Oman               Pakistan           Panama             Papua-New-Guinea
[136] Parguay            Peru               Philippines        Poland             Portugal
[141] Puerto-Rico        Qatar              Romania            Rwanda             San-Marino
[146] Sao-Tome           Saudi-Arabia       Senegal            Seychelles         Sierra-Leone
```

| | | | | |
|---|---|---|---|---|
| [151] Singapore | Soloman-Islands | Somalia | South-Africa | South-Korea |
| [156] South-Yemen | Spain | Sri-Lanka | St-Helena | St-Kitts-Nevis |
| [161] St-Lucia | St-Vincent | Sudan | Surinam | Swaziland |
| [166] Sweden | Switzerland | Syria | Taiwan | Tanzania |
| [171] Thailand | Togo | Tonga | Trinidad-Tobago | Tunisia |
| [176] Turkey | Turks-Cocos-Islands | Tuvalu | UAE | Uganda |
| [181] UK | Uruguay | US-Virgin-Isles | USA | USSR |
| [186] Vanuatu | Vatican-City | Venezuela | Vietnam | Western-Samoa |
| [191] Yugoslavia | Zaire | Zambia | Zimbabwe | |

194 Levels: Afghanistan Albania Algeria American-Samoa Andorra Angola Anguilla Antigua-Barbuda Argentina
Argentine Australia ... Zimbabwe

$landmass
[1] 5 3 4 6 1 2

$zone
[1] 1 3 2 4

$area
 [1]  648   29 2388    0 1247 2777 7690   84   19    1  143   31   23  113   47 1099  600 8512    6  111  274
678
 [23]   28  474 9976    4  623 1284  757 9561 1139    2  342   51  115    9  128   43   22   49  284 1001   21
1222
 [45]   12   18  337  547   91  268   10  108  249  239  132 2176  109  246   36  215  112   93  103 3268
1904 1648
 [67]  435   70  301  323   11  372   98  181  583  236   30 1760    3  587  118  333 1240 1031 1973 1566
447  783
 [89]  140   41 1267  925  121  195  324  212  804   76  463  407 1285  300  313   92  237   26 2150  196
72  637
[111] 1221   99  288  505   66 2506   63   17  450  185  945  514   57    5  164  781  245  178 9363 22402
15  912
[133]  256  905  753  391

$population
 [1]   16    3   20    0    7   28   15    8   90   10    1    6  119    9   35    4   24    2   11 1008    5   47   31   54   17   61
[27]   14  684  157   39   57  118   13   77   12   56   18   84   48   36   22   29   38   49   45  231  274   60

$language
 [1] 10  6  8  1  2  4  3  5  7  9

$religion
[1] 2 6 1 0 5 3 4 7

$bars
[1] 0 2 3 1 5

$stripes
 [1]  3  0  2  1  5  9 11 14  4  6 13  7

$colours
[1] 5 3 2 8 6 4 7 1

$red
[1] 1 0

$green
[1] 1 0

$blue
[1] 0 1

$gold
[1] 1 0

$white
[1] 1 0

$black
[1] 1 0

$orange
[1] 0 1

$mainhue
[1] green  red    blue   gold   white  orange black  brown
Levels: black blue brown gold green orange red white

$circles
[1] 0 1 4 2

$crosses
[1] 0 1 2

$saltires
[1] 0 1

$quarters
[1] 0 1 4

$sunstars
 [1]  1  0  6 22 14  3  4  5 15 10  7  2  9 50

$crescent
[1] 0 1

$triangle
[1] 0 1

$icon
[1] 1 0

$animate
[1] 0 1

$text
[1] 0 1

$topleft

[1] black red   green blue  white orange gold
Levels: black blue gold green orange red white

$botright
[1] green red   white black blue  gold  orange brown
Levels: black blue brown gold green orange red white


|

|=================================================================================
============================                       | 84%    name  landmass    zone    area population  language
religion     bars   stripes   colours     red    green
    194      6      4     136      48      10      8      5     12      8      2      2
    blue    gold   white    black   orange  mainhue  circles  crosses  saltires quarters sunstars crescent
    2      2      2      2      2      8      4      3      2      3     14      2
 triangle    icon   animate    text   topleft botright
    2      2      2      2      7      8


|

|=================================================================================
=========================                       | 86%


|

|=================================================================================
===========================                       | 88%$name
  [1] Afghanistan        Albania          Algeria         American-Samoa       Andorra
  [6] Angola          Anguilla         Antigua-Barbuda     Argentina          Argentine
 [11] Australia         Austria         Bahamas         Bahrain         Bangladesh
 [16] Barbados         Belgium         Belize         Benin          Bermuda
 [21] Bhutan          Bolivia         Botswana         Brazil         British-Virgin-Isles
 [26] Brunei          Bulgaria         Burkina         Burma          Burundi
 [31] Cameroon         Canada          Cape-Verde-Islands   Cayman-Islands      Central-African-Republic
 [36] Chad           Chile          China          Colombia         Comorro-Islands
 [41] Congo          Cook-Islands       Costa-Rica        Cuba          Cyprus
 [46] Czechoslovakia      Denmark         Djibouti         Dominica         Dominican-Republic
 [51] Ecuador          Egypt          El-Salvador       Equatorial-Guinea    Ethiopia
 [56] Faeroes          Falklands-Malvinas    Fiji          Finland         France
 [61] French-Guiana       French-Polynesia     Gabon          Gambia         Germany-DDR
 [66] Germany-FRG        Ghana          Gibraltar        Greece         Greenland
 [71] Grenada          Guam          Guatemala        Guinea         Guinea-Bissau
 [76] Guyana          Haiti          Honduras         Hong-Kong        Hungary
 [81] Iceland          India          Indonesia        Iran          Iraq
 [86] Ireland          Israel          Italy          Ivory-Coast       Jamaica
 [91] Japan          Jordan          Kampuchea        Kenya          Kiribati
 [96] Kuwait          Laos           Lebanon         Lesotho         Liberia
[101] Libya           Liechtenstein      Luxembourg        Malagasy         Malawi
[106] Malaysia         Maldive-Islands     Mali          Malta          Marianas
[111] Mauritania        Mauritius        Mexico         Micronesia        Monaco
[116] Mongolia         Montserrat        Morocco         Mozambique        Nauru

```
[121] Nepal            Netherlands       Netherlands-Antilles  New-Zealand        Nicaragua
[126] Niger            Nigeria           Niue              North-Korea        North-Yemen
[131] Norway           Oman              Pakistan          Panama             Papua-New-Guinea
[136] Parguay          Peru              Philippines       Poland             Portugal
[141] Puerto-Rico      Qatar             Romania           Rwanda             San-Marino
[146] Sao-Tome         Saudi-Arabia      Senegal           Seychelles         Sierra-Leone
[151] Singapore        Soloman-Islands   Somalia           South-Africa       South-Korea
[156] South-Yemen      Spain             Sri-Lanka         St-Helena          St-Kitts-Nevis
[161] St-Lucia         St-Vincent        Sudan             Surinam            Swaziland
[166] Sweden           Switzerland       Syria             Taiwan             Tanzania
[171] Thailand         Togo              Tonga             Trinidad-Tobago    Tunisia
[176] Turkey           Turks-Cocos-Islands  Tuvalu         UAE                Uganda
[181] UK               Uruguay           US-Virgin-Isles   USA                USSR
[186] Vanuatu          Vatican-City      Venezuela         Vietnam            Western-Samoa
[191] Yugoslavia       Zaire             Zambia            Zimbabwe
194 Levels: Afghanistan Albania Algeria American-Samoa Andorra Angola Anguilla Antigua-Barbuda Argentina
Argentine Australia ... Zimbabwe

$landmass
[1] 5 3 4 6 1 2

$zone
[1] 1 3 2 4

$area
 [1]  648   29 2388    0 1247 2777 7690   84   19    1  143   31   23  113   47 1099  600 8512    6  111  274
678
[23]   28  474 9976    4  623 1284  757 9561 1139    2  342   51  115    9  128   43   22   49  284 1001   21
1222
[45]   12   18  337  547   91  268   10  108  249  239  132 2176  109  246   36  215  112   93  103 3268
1904 1648
[67]  435   70  301  323   11  372   98  181  583  236   30 1760    3  587  118  333 1240 1031 1973 1566
447  783
[89]  140   41 1267  925  121  195  324  212  804   76  463  407 1285  300  313   92  237   26 2150  196
72  637
[111] 1221   99  288  505   66 2506   63   17  450  185  945  514   57    5  164  781  245  178 9363 22402
15  912
[133]  256  905  753  391

$population
 [1]   16    3   20    0    7   28   15    8   90   10    1    6  119    9   35    4   24    2   11 1008    5   47   31   54   17   61
[27]   14  684  157   39   57  118   13   77   12   56   18   84   48   36   22   29   38   49   45  231  274   60

$language
 [1] 10  6  8  1  2  4  3  5  7  9

$religion
[1] 2 6 1 0 5 3 4 7

$bars
[1] 0 2 3 1 5

$stripes
 [1]  3  0  2  1  5  9 11 14  4  6 13  7
```

$colours
[1] 5 3 2 8 6 4 7 1

$red
[1] 1 0

$green
[1] 1 0

$blue
[1] 0 1

$gold
[1] 1 0

$white
[1] 1 0

$black
[1] 1 0

$orange
[1] 0 1

$mainhue
[1] green  red    blue   gold   white  orange black  brown
Levels: black blue brown gold green orange red white

$circles
[1] 0 1 4 2

$crosses
[1] 0 1 2

$saltires
[1] 0 1

$quarters
[1] 0 1 4

$sunstars
 [1]  1  0  6 22 14  3  4  5 15 10  7  2  9 50

$crescent
[1] 0 1

$triangle
[1] 0 1

$icon
[1] 1 0

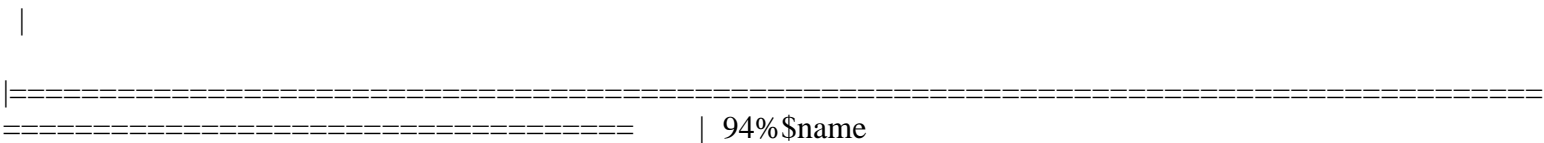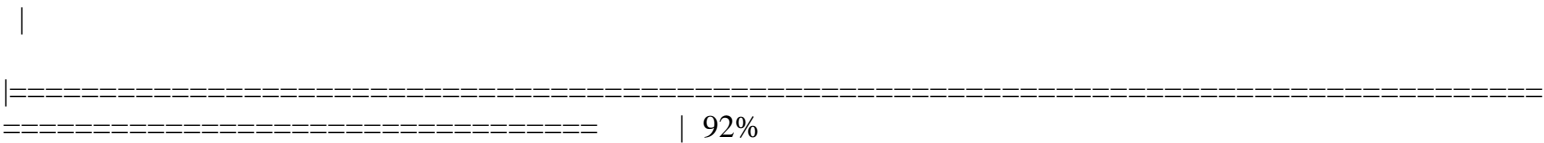$animate

[1] 0 1

$text
[1] 0 1

$topleft
[1] black  red    green blue  white  orange gold
Levels: black blue gold green orange red white

$botright
[1] green  red    white black blue   gold   orange brown
Levels: black blue brown gold green orange red white


 |

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============================        | 90%

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==============================      | 92%

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==================================        | 94%$name
[1] Albania
194 Levels: Afghanistan Albania Algeria American-Samoa Andorra Angola Anguilla Antigua-Barbuda Argentina
Argentine Australia ... Zimbabwe

$landmass
[1] 3

$zone
[1] 3

$area
[1] 29

$population
[1] 3

$language
[1] 6

$religion
[1] 6

$bars
[1] 2

$stripes
[1] 0

$colours
[1] 3

$red
[1] 0

$green
[1] 0

$blue
[1] 1

$gold
[1] 0

$white
[1] 0

$black
[1] 0

$orange
[1] 1

$mainhue
[1] red
Levels: black blue brown gold green orange red white

$circles
[1] 1

$crosses
[1] 1

$saltires
[1] 1

$quarters
[1] 1

$sunstars
[1] 0

$crescent
[1] 1

$triangle
[1] 1

$icon
[1] 0

$animate
[1] 1

$text
[1] 1

$topleft
[1] red
Levels: black blue gold green orange red white

$botright
[1] red
Levels: black blue brown gold green orange red white
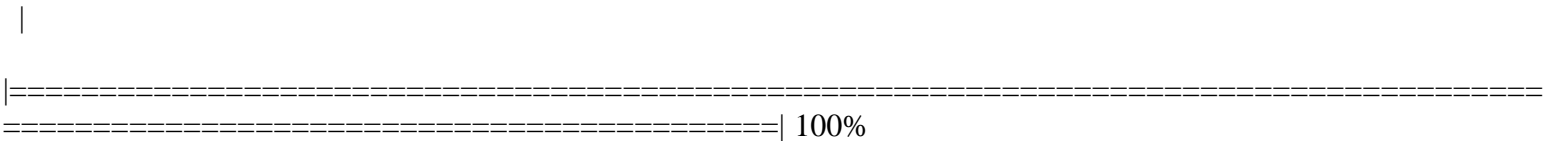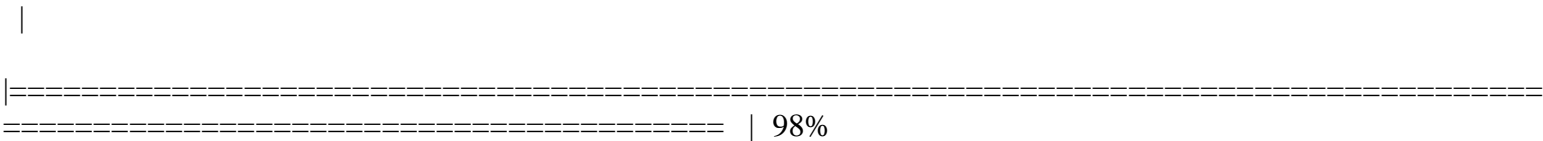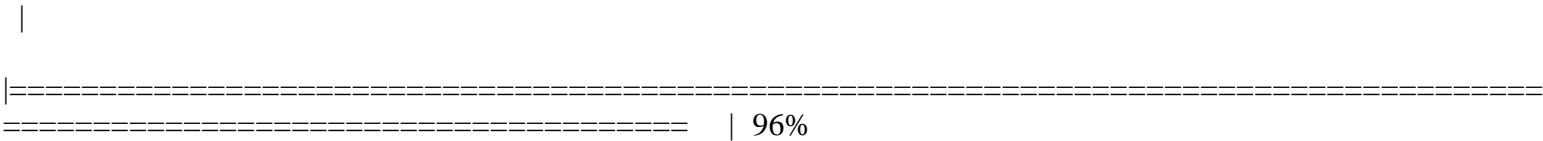

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|====================================================================================
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1: No
2: Yes


1: R Programming
2: Take me to the swirl course repository!

```
# 6306_Doing_Data_Science
# Fall 2017 - Sept, 2017
# Assignment 2 - SWIRL
# Bruce Granger
#----------------------------------------------------------------------------------------
# REFERENCES
# http://swirlstats.com/scn/
# https://github.com/swirldev/swirl_courses
#----------------------------------------------------------------------------------------
# REDIRECT SCREEN OUTPUT TO FILE, sink() WILL BE UTILIZED
sink("N:/SMU/6306_Doing_Data_Science_Fall2017/Assignments/Assignment_2/Assignment_2_SWIRL_VAPPLY_T
APPLY.txt")


#----------------------------------------------------------------------------------------
# MODULES
# 9: vapply and tapply
#----------------------------------------------------------------------------------------
library(swirl)
swirl()
#----------------------------------------------------------------------------------------
# TURN OFF SCREEN REDIRECT OUTPUT TO FILE
sink()
```

1: R Programming
2: Take me to the swirl course repository!


 1: Basic Building Blocks     2: Workspace and Files      3: Sequences of Numbers     4: Vectors
 5: Missing Values            6: Subsetting Vectors      7: Matrices and Data Frames   8: Logic
 9: Functions               10: lapply and sapply      11: vapply and tapply        12: Looking at Data
13: Simulation              14: Dates and Times          15: Base Graphics


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|
|====================                                                      | 16%$name
 [1] Afghanistan        Albania           Algeria           American-Samoa      Andorra
 [6] Angola            Anguilla          Antigua-Barbuda   Argentina           Argentine
[11] Australia         Austria           Bahamas           Bahrain             Bangladesh
[16] Barbados          Belgium           Belize            Benin               Bermuda
[21] Bhutan            Bolivia           Botswana          Brazil              British-Virgin-Isles
[26] Brunei            Bulgaria          Burkina           Burma               Burundi
[31] Cameroon          Canada            Cape-Verde-Islands  Cayman-Islands    Central-African-Republic
[36] Chad              Chile             China             Colombia            Comorro-Islands
[41] Congo             Cook-Islands      Costa-Rica        Cuba                Cyprus
[46] Czechoslovakia    Denmark           Djibouti          Dominica            Dominican-Republic
[51] Ecuador           Egypt             El-Salvador       Equatorial-Guinea   Ethiopia
[56] Faeroes           Falklands-Malvinas  Fiji            Finland             France
[61] French-Guiana     French-Polynesia  Gabon            Gambia              Germany-DDR
[66] Germany-FRG       Ghana             Gibraltar         Greece              Greenland
[71] Grenada           Guam              Guatemala         Guinea              Guinea-Bissau
[76] Guyana            Haiti             Honduras          Hong-Kong           Hungary
[81] Iceland           India             Indonesia         Iran                Iraq
[86] Ireland           Israel            Italy             Ivory-Coast         Jamaica
[91] Japan             Jordan            Kampuchea         Kenya               Kiribati
[96] Kuwait            Laos              Lebanon           Lesotho             Liberia
[101] Libya            Liechtenstein     Luxembourg        Malagasy            Malawi
[106] Malaysia         Maldive-Islands   Mali              Malta               Marianas
[111] Mauritania       Mauritius         Mexico            Micronesia          Monaco
[116] Mongolia         Montserrat        Morocco           Mozambique          Nauru
[121] Nepal            Netherlands       Netherlands-Antilles  New-Zealand     Nicaragua
[126] Niger            Nigeria           Niue              North-Korea         North-Yemen

```
[131] Norway            Oman                Pakistan         Panama              Papua-New-Guinea
[136] Parguay           Peru                Philippines      Poland              Portugal
[141] Puerto-Rico       Qatar               Romania          Rwanda              San-Marino
[146] Sao-Tome          Saudi-Arabia        Senegal          Seychelles          Sierra-Leone
[151] Singapore         Soloman-Islands     Somalia          South-Africa        South-Korea
[156] South-Yemen       Spain               Sri-Lanka        St-Helena           St-Kitts-Nevis
[161] St-Lucia          St-Vincent          Sudan            Surinam             Swaziland
[166] Sweden            Switzerland         Syria            Taiwan              Tanzania
[171] Thailand          Togo                Tonga            Trinidad-Tobago     Tunisia
[176] Turkey            Turks-Cocos-Islands Tuvalu           UAE                 Uganda
[181] UK                Uruguay             US-Virgin-Isles  USA                 USSR
[186] Vanuatu           Vatican-City        Venezuela        Vietnam             Western-Samoa
[191] Yugoslavia        Zaire               Zambia           Zimbabwe
194 Levels: Afghanistan Albania Algeria American-Samoa Andorra Angola Anguilla Antigua-Barbuda Argentina
Argentine Australia ... Zimbabwe

$landmass
[1] 5 3 4 6 1 2

$zone
[1] 1 3 2 4

$area
  [1]  648   29 2388    0 1247 2777 7690   84   19    1  143   31   23  113   47 1099  600 8512    6  111  274
678
 [23]   28  474 9976    4  623 1284  757 9561 1139    2  342   51  115    9  128   43   22   49  284 1001   21
1222
 [45]   12   18  337  547   91  268   10  108  249  239  132 2176  109  246   36  215  112   93  103 3268
1904 1648
 [67]  435   70  301  323   11  372   98  181  583  236   30 1760    3  587  118  333 1240 1031 1973 1566
447  783
 [89]  140   41 1267  925  121  195  324  212  804   76  463  407 1285  300  313   92  237   26 2150  196
72  637
[111] 1221   99  288  505   66 2506   63   17  450  185  945  514   57    5  164  781  245  178 9363 22402
15  912
[133]  256  905  753  391

$population
 [1]   16    3   20    0    7   28   15    8   90   10    1    6  119    9   35    4   24    2   11 1008    5   47   31   54   17   61
[27]   14  684  157   39   57  118   13   77   12   56   18   84   48   36   22   29   38   49   45  231  274   60

$language
 [1] 10  6  8  1  2  4  3  5  7  9

$religion
[1] 2 6 1 0 5 3 4 7

$bars
[1] 0 2 3 1 5

$stripes
 [1]  3  0  2  1  5  9 11 14  4  6 13  7

$colours
```

[1] 5 3 2 8 6 4 7 1

$red
[1] 1 0

$green
[1] 1 0

$blue
[1] 0 1

$gold
[1] 1 0

$white
[1] 1 0

$black
[1] 1 0

$orange
[1] 0 1

$mainhue
[1] green  red    blue   gold   white  orange black  brown
Levels: black blue brown gold green orange red white

$circles
[1] 0 1 4 2

$crosses
[1] 0 1 2

$saltires
[1] 0 1

$quarters
[1] 0 1 4

$sunstars
 [1]  1  0  6 22 14  3  4  5 15 10  7  2  9 50
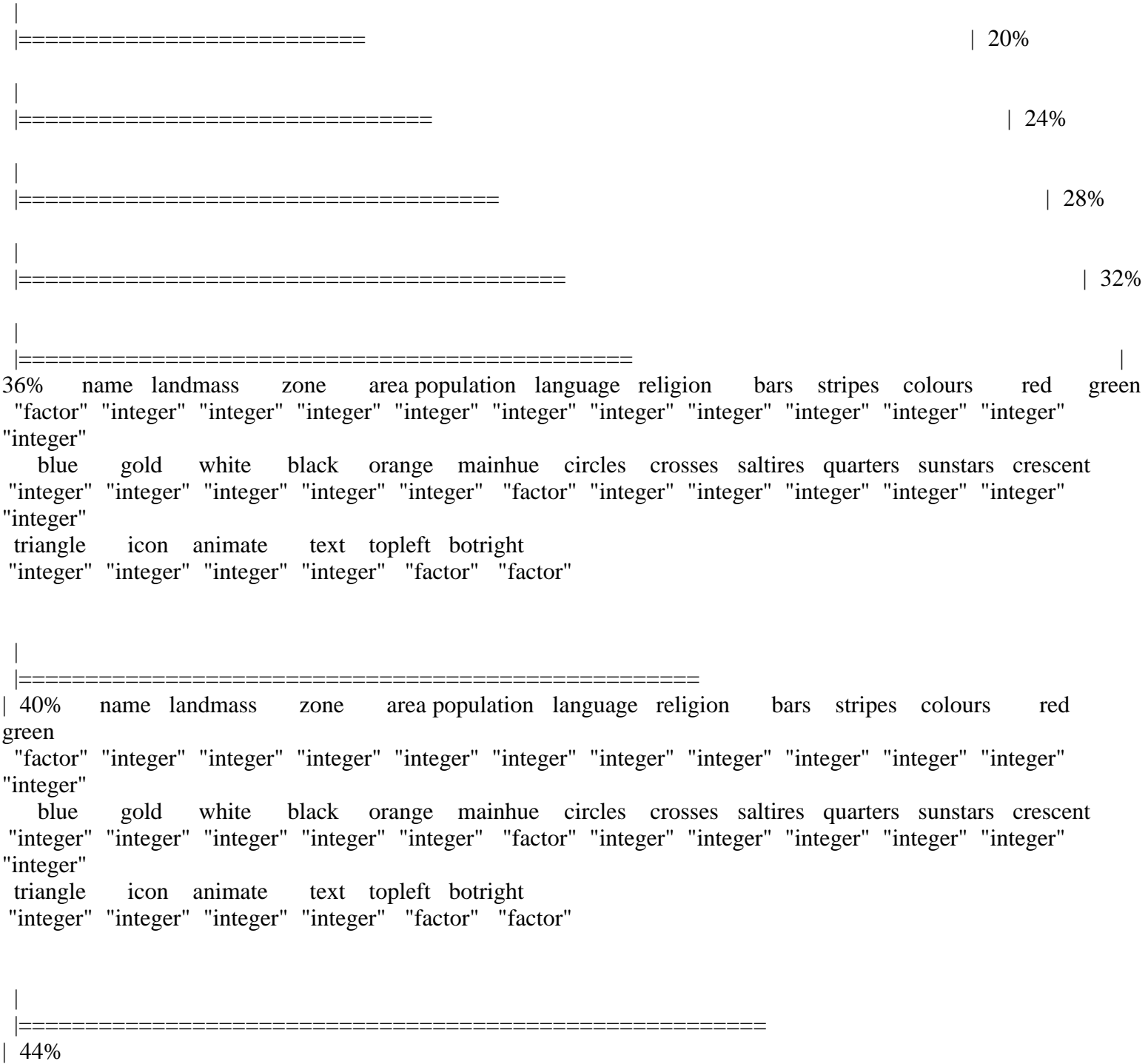
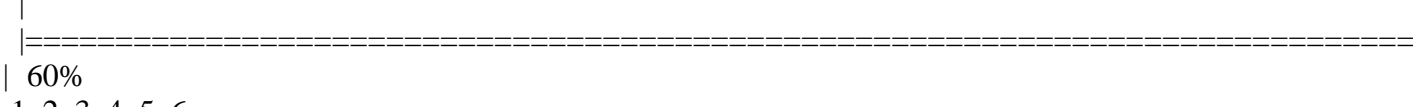$crescent
[1] 0 1

$triangle
[1] 0 1

$icon
[1] 1 0

$animate
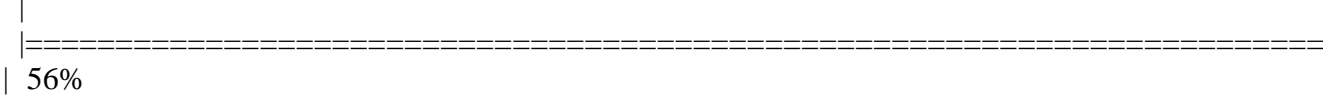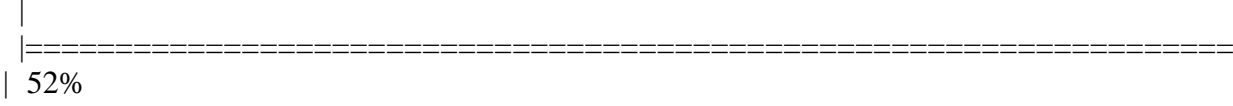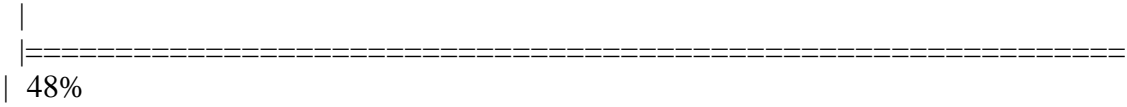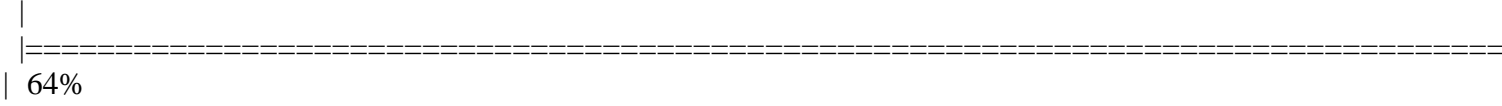[1] 0 1

$text
[1] 0 1

$topleft
[1] black  red   green blue  white orange gold
Levels: black blue gold green orange red white

$botright
[1] green red   white black blue  gold  orange brown
Levels: black blue brown gold green orange red white
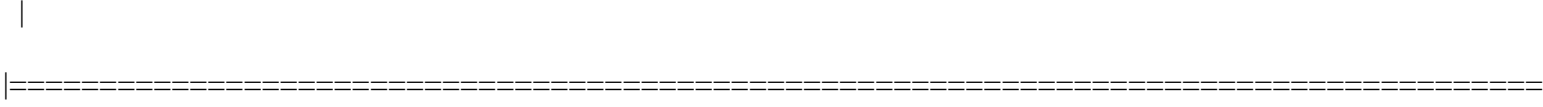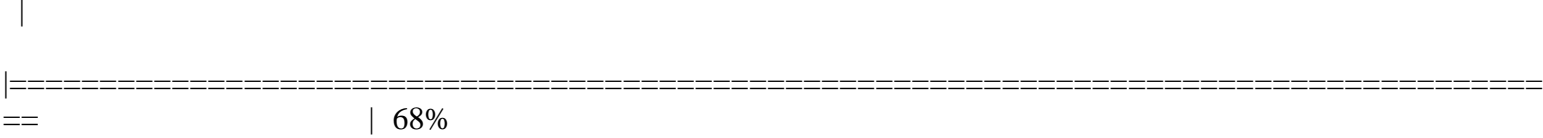

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 |==============================================                          |
```
36%    name landmass    zone      area population language religion  bars stripes colours    red      green
 "factor" "integer" "integer" "integer" "integer" "integer" "integer" "integer" "integer" "integer" "integer"
"integer"
    blue    gold    white    black   orange mainhue  circles crosses saltires quarters sunstars crescent
 "integer" "integer" "integer" "integer" "integer" "factor" "integer" "integer" "integer" "integer" "integer"
"integer"
 triangle    icon   animate    text topleft botright
 "integer" "integer" "integer" "integer" "factor"  "factor"


```
 |
 |======================================================                  |
```
| 40%     name landmass     zone      area population language religion     bars    stripes   colours     red
green
 "factor" "integer" "integer" "integer" "integer" "integer" "integer" "integer" "integer" "integer" "integer"
"integer"
    blue     gold    white    black    orange mainhue   circles  crosses saltires quarters sunstars crescent
 "integer" "integer" "integer" "integer" "integer" "factor" "integer" "integer" "integer" "integer" "integer"
"integer"
 triangle    icon   animate    text topleft botright
 "integer" "integer" "integer" "integer" "factor"  "factor"


```
 |
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| 44%

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| 48%


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| 52%


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| 56%


|
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| 60%
 1 2 3 4 5 6
31 17 35 52 39 20


|
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| 64%
 0   1
155  39


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=======                         | 72%    1       2       3       4       5       6
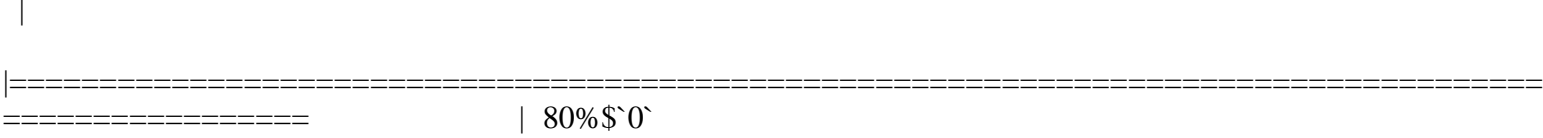0.4193548 0.1764706 0.1142857 0.1346154 0.1538462 0.3000000
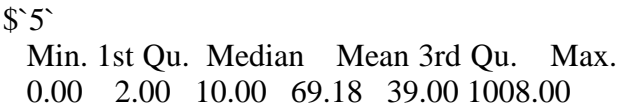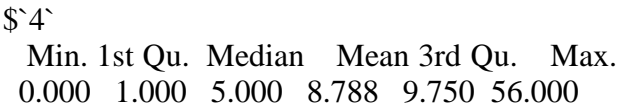

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============                    | 76%
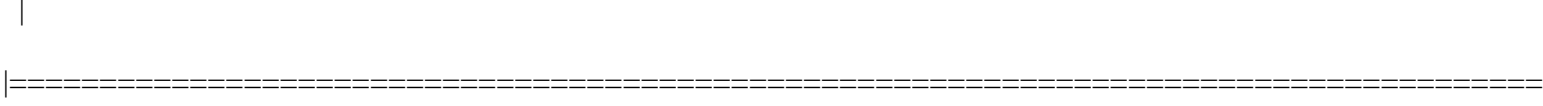
|

|=============================================================================
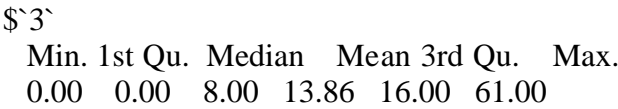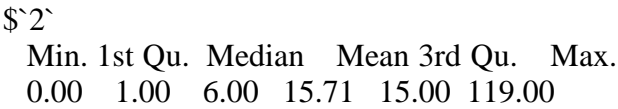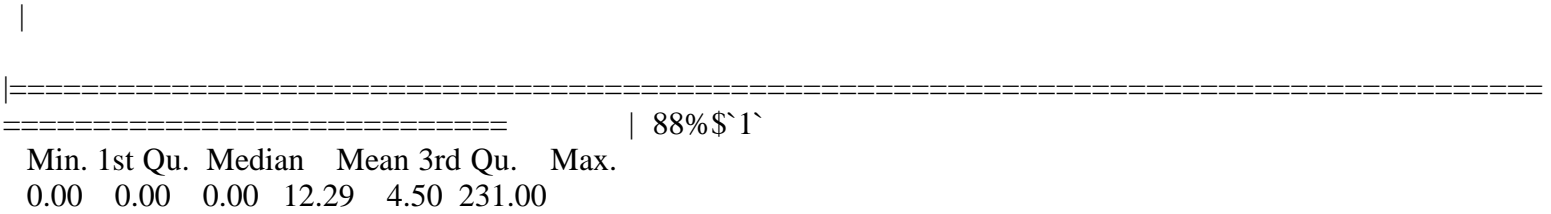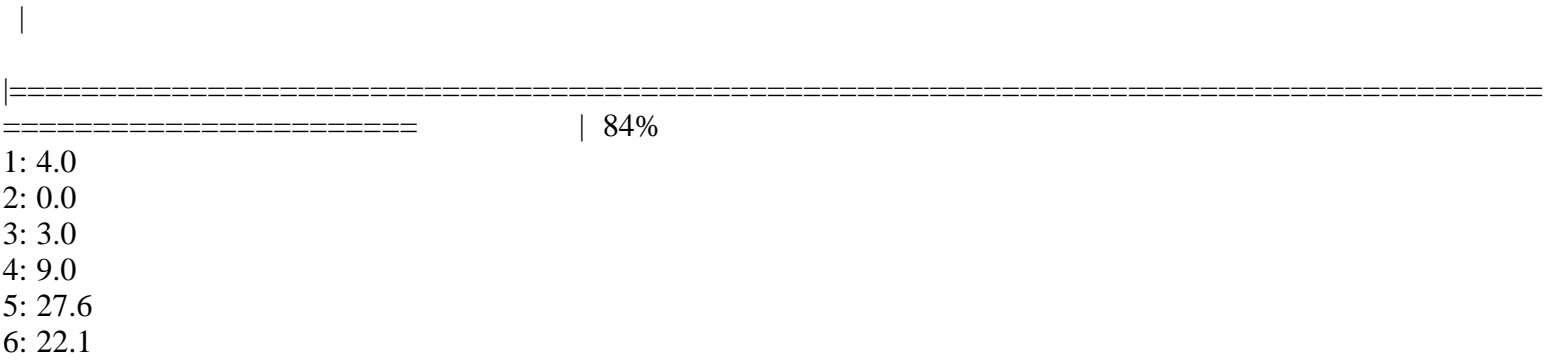================                | 80%$`0`
  Min. 1st Qu.  Median   Mean 3rd Qu.   Max.
  0.00   0.00   3.00  27.63   9.00 684.00

$`1`
  Min. 1st Qu.  Median   Mean 3rd Qu.   Max.
   0.0    0.0    4.0   22.1   15.0 1008.0

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======================== | 84%
1: 4.0
2: 0.0
3: 3.0
4: 9.0
5: 27.6
6: 22.1


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============================ | 88%$`1`
  Min. 1st Qu.  Median   Mean 3rd Qu.   Max.
  0.00   0.00   0.00  12.29   4.50 231.00

$`2`
  Min. 1st Qu.  Median   Mean 3rd Qu.   Max.
  0.00   1.00   6.00  15.71  15.00 119.00

$`3`
  Min. 1st Qu.  Median   Mean 3rd Qu.   Max.
  0.00   0.00   8.00  13.86  16.00  61.00

$`4`
  Min. 1st Qu.  Median   Mean 3rd Qu.   Max.
 0.000  1.000  5.000  8.788  9.750 56.000

$`5`
  Min. 1st Qu.  Median   Mean 3rd Qu.   Max.
  0.00   2.00  10.00  69.18  39.00 1008.00

$`6`
  Min. 1st Qu.  Median   Mean 3rd Qu.   Max.
  0.00   0.00   0.00  11.30   1.25 157.00


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|===============================================================================
================================ | 92%
1: 56.00
2: 1010.0
3: 157.00
4: 5.00
5: 119.0

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|=======================================================================
=================================== | 96%

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|=======================================================================
========================================| 100%
1: No
2: Yes


1: R Programming
2: Take me to the swirl course repository!