HW1_tmy.R

tangmuyao

2021-03-25

```
##Homework II (Due March 25 12pm, 2021)
#2020111522
## Question 1

options(digits = 4)      #The first way(global set the digits to 17)
pi
```

```
## [1] 3.142
```

```
## Question 2

#2.1

length<-c(75,85,91.6,95,NA,105.5,106)
length
```

```
## [1]  75.0  85.0  91.6  95.0    NA 105.5 106.0
```

```
tb<-c(0,0,1,NA,0,0,0)
tb
```

```
## [1]  0  0  1 NA  0  0  0
```

```
lengthAverage <- sum(length,na.rm=TRUE)/6
lengthAverage
```

```
## [1] 93.02
```

```
#2.2

place<-c("MO","MO","MO","MO","LN","SE","QM")
month<-c(11,07,07,NA,09,09,11)
Boar<-cbind(place,month,length,tb)  #bind in to a matrix
Boar
```

```
##      place month length  tb
## [1,] "MO"  "11"  "75"    "0"
## [2,] "MO"  "7"   "85"    "0"
## [3,] "MO"  "7"   "91.6"  "1"
## [4,] "MO"  NA    "95"    NA
## [5,] "LN"  "9"   NA      "0"
## [6,] "SE"  "9"   "105.5" "0"
## [7,] "QM"  "11"  "106"   "0"
```

```
#the cbind functions automatically change numeric into characteristic
result<-c("dim"=dim(Boar),"nrow"=nrow(Boar),"ncol"=ncol(Boar))
result
```

```
## dim1 dim2 nrow ncol
##    7    4    7    4
```

```
#2.3

m1 <- matrix(c(1,4,2,2,2,3,3,1,0),nrow=3,ncol=3)
t(m1)
```

```
##      [,1] [,2] [,3]
## [1,]    1    4    2
## [2,]    2    2    3
## [3,]    3    1    0
```

```
m2 <- solve(m1)
m1%*%m2
```

```
##           [,1] [,2] [,3]
## [1,] 1.000e+00    0    0
## [2,] 5.551e-17    1    0
## [3,] 0.000e+00    0    1
```

```
## Question 3

#3.1

result <- c(1,1)
for (i in 1:20 ){result[i]=i*(i+1)/2}
result
```

```
##  [1]   1   3   6  10  15  21  28  36  45  55  66  78  91 105 120 136 153 171 190
## [20] 210
```

```
#3.2

names(result) <- letters[1:20]
result
```

```
##   a   b   c   d   e   f   g   h   i   j   k   l   m   n   o   p   q   r   s   t
##   1   3   6  10  15  21  28  36  45  55  66  78  91 105 120 136 153 171 190 210
```

```
#3.3

vowel <- c("a","e","i","o","u")
outcome = result[vowel]
outcome
```

```
##    a    e    i    o <NA>
##    1   15   45  120   NA
```

```
## Question 4

oriMat=matrix(0:99,nrow =10,byrow = TRUE)
turnMat <- oriMat-floor(sqrt(oriMat))^2          #use floor
turnMat[turnMat!=0] <- NA                        #set the number which differs from the original one as
turnMat <- turnMat+oriMat                        #NA plus digits equals still NA
tapply(turnMat,rep(1:nrow(turnMat),ncol(turnMat)),function(i)i) #change into list
```

```
## $`1`
##  [1]  0  1 NA NA  4 NA NA NA NA  9
```

```
##
## $`2`
##  [1] NA NA NA NA NA NA 16 NA NA NA
##
## $`3`
##  [1] NA NA NA NA NA 25 NA NA NA NA
##
## $`4`
##  [1] NA NA NA NA NA NA 36 NA NA NA
##
## $`5`
##  [1] NA NA NA NA NA NA NA NA NA 49
##
## $`6`
##  [1] NA NA NA NA NA NA NA NA NA NA
##
## $`7`
##  [1] NA NA NA NA 64 NA NA NA NA NA
##
## $`8`
##  [1] NA NA NA NA NA NA NA NA NA NA
##
## $`9`
##  [1] NA 81 NA NA NA NA NA NA NA NA
##
## $`10`
##  [1] NA NA NA NA NA NA NA NA NA NA
```

```
## Question 5

turnMatrix <- as.matrix(iris)       #change into matrix
delete = turnMatrix[,-5]            #delete a column
delete=apply(delete,2,as.numeric)   #change into numeric
delete
```

```
##        Sepal.Length Sepal.Width Petal.Length Petal.Width
##   [1,]          5.1         3.5          1.4         0.2
##   [2,]          4.9         3.0          1.4         0.2
##   [3,]          4.7         3.2          1.3         0.2
##   [4,]          4.6         3.1          1.5         0.2
##   [5,]          5.0         3.6          1.4         0.2
##   [6,]          5.4         3.9          1.7         0.4
##   [7,]          4.6         3.4          1.4         0.3
##   [8,]          5.0         3.4          1.5         0.2
##   [9,]          4.4         2.9          1.4         0.2
##  [10,]          4.9         3.1          1.5         0.1
##  [11,]          5.4         3.7          1.5         0.2
##  [12,]          4.8         3.4          1.6         0.2
##  [13,]          4.8         3.0          1.4         0.1
##  [14,]          4.3         3.0          1.1         0.1
##  [15,]          5.8         4.0          1.2         0.2
##  [16,]          5.7         4.4          1.5         0.4
##  [17,]          5.4         3.9          1.3         0.4
##  [18,]          5.1         3.5          1.4         0.3
##  [19,]          5.7         3.8          1.7         0.3
```

```
##  [20,]          5.1          3.8          1.5          0.3
##  [21,]          5.4          3.4          1.7          0.2
##  [22,]          5.1          3.7          1.5          0.4
##  [23,]          4.6          3.6          1.0          0.2
##  [24,]          5.1          3.3          1.7          0.5
##  [25,]          4.8          3.4          1.9          0.2
##  [26,]          5.0          3.0          1.6          0.2
##  [27,]          5.0          3.4          1.6          0.4
##  [28,]          5.2          3.5          1.5          0.2
##  [29,]          5.2          3.4          1.4          0.2
##  [30,]          4.7          3.2          1.6          0.2
##  [31,]          4.8          3.1          1.6          0.2
##  [32,]          5.4          3.4          1.5          0.4
##  [33,]          5.2          4.1          1.5          0.1
##  [34,]          5.5          4.2          1.4          0.2
##  [35,]          4.9          3.1          1.5          0.2
##  [36,]          5.0          3.2          1.2          0.2
##  [37,]          5.5          3.5          1.3          0.2
##  [38,]          4.9          3.6          1.4          0.1
##  [39,]          4.4          3.0          1.3          0.2
##  [40,]          5.1          3.4          1.5          0.2
##  [41,]          5.0          3.5          1.3          0.3
##  [42,]          4.5          2.3          1.3          0.3
##  [43,]          4.4          3.2          1.3          0.2
##  [44,]          5.0          3.5          1.6          0.6
##  [45,]          5.1          3.8          1.9          0.4
##  [46,]          4.8          3.0          1.4          0.3
##  [47,]          5.1          3.8          1.6          0.2
##  [48,]          4.6          3.2          1.4          0.2
##  [49,]          5.3          3.7          1.5          0.2
##  [50,]          5.0          3.3          1.4          0.2
##  [51,]          7.0          3.2          4.7          1.4
##  [52,]          6.4          3.2          4.5          1.5
##  [53,]          6.9          3.1          4.9          1.5
##  [54,]          5.5          2.3          4.0          1.3
##  [55,]          6.5          2.8          4.6          1.5
##  [56,]          5.7          2.8          4.5          1.3
##  [57,]          6.3          3.3          4.7          1.6
##  [58,]          4.9          2.4          3.3          1.0
##  [59,]          6.6          2.9          4.6          1.3
##  [60,]          5.2          2.7          3.9          1.4
##  [61,]          5.0          2.0          3.5          1.0
##  [62,]          5.9          3.0          4.2          1.5
##  [63,]          6.0          2.2          4.0          1.0
##  [64,]          6.1          2.9          4.7          1.4
##  [65,]          5.6          2.9          3.6          1.3
##  [66,]          6.7          3.1          4.4          1.4
##  [67,]          5.6          3.0          4.5          1.5
##  [68,]          5.8          2.7          4.1          1.0
##  [69,]          6.2          2.2          4.5          1.5
##  [70,]          5.6          2.5          3.9          1.1
##  [71,]          5.9          3.2          4.8          1.8
##  [72,]          6.1          2.8          4.0          1.3
##  [73,]          6.3          2.5          4.9          1.5
```

```
##  [74,]          6.1         2.8          4.7         1.2
##  [75,]          6.4         2.9          4.3         1.3
##  [76,]          6.6         3.0          4.4         1.4
##  [77,]          6.8         2.8          4.8         1.4
##  [78,]          6.7         3.0          5.0         1.7
##  [79,]          6.0         2.9          4.5         1.5
##  [80,]          5.7         2.6          3.5         1.0
##  [81,]          5.5         2.4          3.8         1.1
##  [82,]          5.5         2.4          3.7         1.0
##  [83,]          5.8         2.7          3.9         1.2
##  [84,]          6.0         2.7          5.1         1.6
##  [85,]          5.4         3.0          4.5         1.5
##  [86,]          6.0         3.4          4.5         1.6
##  [87,]          6.7         3.1          4.7         1.5
##  [88,]          6.3         2.3          4.4         1.3
##  [89,]          5.6         3.0          4.1         1.3
##  [90,]          5.5         2.5          4.0         1.3
##  [91,]          5.5         2.6          4.4         1.2
##  [92,]          6.1         3.0          4.6         1.4
##  [93,]          5.8         2.6          4.0         1.2
##  [94,]          5.0         2.3          3.3         1.0
##  [95,]          5.6         2.7          4.2         1.3
##  [96,]          5.7         3.0          4.2         1.2
##  [97,]          5.7         2.9          4.2         1.3
##  [98,]          6.2         2.9          4.3         1.3
##  [99,]          5.1         2.5          3.0         1.1
## [100,]          5.7         2.8          4.1         1.3
## [101,]          6.3         3.3          6.0         2.5
## [102,]          5.8         2.7          5.1         1.9
## [103,]          7.1         3.0          5.9         2.1
## [104,]          6.3         2.9          5.6         1.8
## [105,]          6.5         3.0          5.8         2.2
## [106,]          7.6         3.0          6.6         2.1
## [107,]          4.9         2.5          4.5         1.7
## [108,]          7.3         2.9          6.3         1.8
## [109,]          6.7         2.5          5.8         1.8
## [110,]          7.2         3.6          6.1         2.5
## [111,]          6.5         3.2          5.1         2.0
## [112,]          6.4         2.7          5.3         1.9
## [113,]          6.8         3.0          5.5         2.1
## [114,]          5.7         2.5          5.0         2.0
## [115,]          5.8         2.8          5.1         2.4
## [116,]          6.4         3.2          5.3         2.3
## [117,]          6.5         3.0          5.5         1.8
## [118,]          7.7         3.8          6.7         2.2
## [119,]          7.7         2.6          6.9         2.3
## [120,]          6.0         2.2          5.0         1.5
## [121,]          6.9         3.2          5.7         2.3
## [122,]          5.6         2.8          4.9         2.0
## [123,]          7.7         2.8          6.7         2.0
## [124,]          6.3         2.7          4.9         1.8
## [125,]          6.7         3.3          5.7         2.1
## [126,]          7.2         3.2          6.0         1.8
## [127,]          6.2         2.8          4.8         1.8
```

```
## [128,]          6.1         3.0          4.9         1.8
## [129,]          6.4         2.8          5.6         2.1
## [130,]          7.2         3.0          5.8         1.6
## [131,]          7.4         2.8          6.1         1.9
## [132,]          7.9         3.8          6.4         2.0
## [133,]          6.4         2.8          5.6         2.2
## [134,]          6.3         2.8          5.1         1.5
## [135,]          6.1         2.6          5.6         1.4
## [136,]          7.7         3.0          6.1         2.3
## [137,]          6.3         3.4          5.6         2.4
## [138,]          6.4         3.1          5.5         1.8
## [139,]          6.0         3.0          4.8         1.8
## [140,]          6.9         3.1          5.4         2.1
## [141,]          6.7         3.1          5.6         2.4
## [142,]          6.9         3.1          5.1         2.3
## [143,]          5.8         2.7          5.1         1.9
## [144,]          6.8         3.2          5.9         2.3
## [145,]          6.7         3.3          5.7         2.5
## [146,]          6.7         3.0          5.2         2.3
## [147,]          6.3         2.5          5.0         1.9
## [148,]          6.5         3.0          5.2         2.0
## [149,]          6.2         3.4          5.4         2.3
## [150,]          5.9         3.0          5.1         1.8
```

```
apply(delete,2,mean)
```

```
## Sepal.Length  Sepal.Width Petal.Length  Petal.Width
##        5.843        3.057        3.758        1.199
```

```
## Question 6

#6.1

a <- sort(islands,decreasing = TRUE)
a[30:35]
```

```
## Hokkaido Moluccas Sakhalin Tasmania    Celon    Banks
##       30       29       29       26       25       23
```

```
#6.2

a <- sort(islands,decreasing = TRUE)[1:15]
b <- sort(islands,decreasing = FALSE)[1:15]
c(a,b)
```

```
##             Asia           Africa    North America    South America
##            16988            11506             9390             6795
##       Antarctica           Europe        Australia        Greenland
##             5500             3745             2968              840
##       New Guinea           Borneo       Madagascar           Baffin
##              306              280              227              184
##          Sumatra           Honshu          Britain        Vancouver
##              183               89               84               12
##           Hainan  Prince of Wales            Timor           Kyushu
##               13               13               13               14
##           Taiwan      New Britain      Spitsbergen     Axel Heiberg
```

```
##              14              15              15              16
##        Melville Southampton Tierra del Fuego           Devon
##              16              16              19              21
##           Banks           Celon
##              23              25
```

```
#6.3

names(islands[seq(1,48,2)])
```

```
##  [1] "Africa"           "Asia"             "Axel Heiberg"     "Banks"
##  [5] "Britain"          "Celon"            "Devon"            "Europe"
##  [9] "Hainan"           "Hokkaido"         "Iceland"          "Java"
## [13] "Luzon"            "Melville"         "Moluccas"         "New Guinea"
## [17] "New Zealand (S)"  "North America"    "Prince of Wales"  "South America"
## [21] "Spitsbergen"      "Taiwan"           "Tierra del Fuego" "Vancouver"
```

```
names(islands[seq(2,48,2)])
```

```
##  [1] "Antarctica"      "Australia"       "Baffin"          "Borneo"
##  [5] "Celebes"         "Cuba"            "Ellesmere"       "Greenland"
##  [9] "Hispaniola"      "Honshu"          "Ireland"         "Kyushu"
## [13] "Madagascar"      "Mindanao"        "New Britain"     "New Zealand (N)"
## [17] "Newfoundland"    "Novaya Zemlya"   "Sakhalin"        "Southampton"
## [21] "Sumatra"         "Tasmania"        "Timor"           "Victoria"
```

```
#6.4

a <- sort(islands)
names(a) <- NULL
a[seq(1,48,2)]
```

```
##  [1]    12    13    14    15    16    16    21    25    29    30    32    36
## [13]    42    43    49    73    82    89   184   280   840  3745  6795 11506
```

```
a[seq(2,48,2)]
```

```
##  [1]    13    13    14    15    16    19    23    26    29    30    33    40
## [13]    43    44    58    82    84   183   227   306  2968  5500  9390 16988
```