Homework assignment #1

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September 21, 2022

2.8.

2.8.1

```
temp <- c(35, 88, 42, 84, 81, 30)
temp
```

```
## [1] 35 88 42 84 81 30
```

2.8.7

```
v1 <- seq(1, 99, 2)
v1
```

```
##  [1]  1  3  5  7  9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49
## [26] 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97 99
```

2.8.8

```
v2 <- seq(6, 55, 4/7)
length(v2)
```

```
## [1] 86
```

2.8.9

```
class(a <- seq(1, 10, 0.5))
```

```
## [1] "numeric"
```

2.8.10

```
class(a <- seq(1, 10))
```

```
## [1] "integer"
```

2.8.11

```
class(a <- 1L)
```

```
## [1] "integer"
```

2.8.12

```
x <- c("1", "3", "5")
x <- as.integer(x)
class(x)
```

```
## [1] "integer"
```

2.10

```
library(dslabs)
data("murders")
```

2.10.5

```
ranks <- rank(murders$population)
my_df <- data.frame(state = murders$state, ranks = ranks)
my_df
```

```
##                   state ranks
## 1               Alabama    29
## 2                Alaska     5
## 3               Arizona    36
## 4              Arkansas    20
## 5            California    51
## 6              Colorado    30
## 7           Connecticut    23
## 8              Delaware     7
## 9  District of Columbia     2
## 10              Florida    49
## 11              Georgia    44
## 12               Hawaii    12
```

```
## 13               Idaho    13
## 14            Illinois    47
## 15             Indiana    37
## 16                Iowa    22
## 17              Kansas    19
## 18            Kentucky    26
## 19           Louisiana    27
## 20               Maine    11
## 21            Maryland    33
## 22       Massachusetts    38
## 23            Michigan    43
## 24           Minnesota    31
## 25         Mississippi    21
## 26            Missouri    34
## 27             Montana     8
## 28            Nebraska    14
## 29              Nevada    17
## 30       New Hampshire    10
## 31          New Jersey    41
## 32          New Mexico    16
## 33            New York    48
## 34      North Carolina    42
## 35        North Dakota     4
## 36                Ohio    45
## 37            Oklahoma    24
## 38              Oregon    25
## 39        Pennsylvania    46
## 40        Rhode Island     9
## 41      South Carolina    28
## 42        South Dakota     6
## 43           Tennessee    35
## 44               Texas    50
## 45                Utah    18
## 46             Vermont     3
## 47            Virginia    40
## 48          Washington    39
## 49       West Virginia    15
## 50           Wisconsin    32
## 51             Wyoming     1
```

2.10.6

```
ind <- order(murders$population)
my_df <- data.frame(state = murders$state[ind], ranks = ranks[ind])
my_df
```

```
##                   state ranks
```

```
## 1               Wyoming     1
## 2  District of Columbia     2
## 3               Vermont     3
## 4          North Dakota     4
## 5                Alaska     5
## 6          South Dakota     6
## 7              Delaware     7
## 8               Montana     8
## 9          Rhode Island     9
## 10        New Hampshire    10
## 11                Maine    11
## 12               Hawaii    12
## 13                Idaho    13
## 14             Nebraska    14
## 15        West Virginia    15
## 16           New Mexico    16
## 17               Nevada    17
## 18                 Utah    18
## 19               Kansas    19
## 20             Arkansas    20
## 21          Mississippi    21
## 22                 Iowa    22
## 23          Connecticut    23
## 24             Oklahoma    24
## 25               Oregon    25
## 26             Kentucky    26
## 27            Louisiana    27
## 28       South Carolina    28
## 29              Alabama    29
## 30             Colorado    30
## 31            Minnesota    31
## 32            Wisconsin    32
## 33             Maryland    33
## 34             Missouri    34
## 35            Tennessee    35
## 36              Arizona    36
## 37              Indiana    37
## 38        Massachusetts    38
## 39           Washington    39
## 40             Virginia    40
## 41           New Jersey    41
## 42       North Carolina    42
## 43             Michigan    43
## 44              Georgia    44
## 45                 Ohio    45
## 46         Pennsylvania    46
## 47             Illinois    47
## 48             New York    48
```

```
## 49              Florida    49
## 50                Texas    50
## 51           California    51
```

2.10.7

```
data("na_example")
ind <- is.na(na_example)
sum(ind)
```

```
## [1] 145
```

2.10.8

```
mean(na_example[!ind])
```

```
## [1] 2.301754
```

2.14

2.14.1

```
murder_rate <- murders$total / murders$population * 100000
murder_rate
```

```
##  [1]  2.8244238  2.6751860  3.6295273  3.1893901  3.3741383  1.2924531
##  [7]  2.7139722  4.2319369 16.4527532  3.3980688  3.7903226  0.5145920
## [13]  0.7655102  2.8369608  2.1900730  0.6893484  2.2081106  2.6732010
## [19]  7.7425810  0.8280881  5.0748655  1.8021791  4.1786225  0.9992600
## [25]  4.0440846  5.3598917  1.2128379  1.7521372  3.1104763  0.3798036
## [31]  2.7980319  3.2537239  2.6679599  2.9993237  0.5947151  2.6871225
## [37]  2.9589340  0.9396843  3.5977513  1.5200933  4.4753235  0.9825837
## [43]  3.4509357  3.2013603  0.7959810  0.3196211  3.1246001  1.3829942
## [49]  1.4571013  1.7056487  0.8871131
```

```
low <- murder_rate < 1
low
```

```
##  [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE
## [13]  TRUE FALSE FALSE  TRUE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE  TRUE
## [25] FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE FALSE
## [37] FALSE  TRUE FALSE FALSE FALSE  TRUE FALSE FALSE  TRUE  TRUE FALSE FALSE
## [49] FALSE FALSE  TRUE
```

2.14.2

```
which(low)
```

```
##  [1] 12 13 16 20 24 30 35 38 42 45 46 51
```

2.14.3

```
murders$state[which(low)]
```

```
##  [1] "Hawaii"        "Idaho"         "Iowa"          "Maine"
##  [5] "Minnesota"     "New Hampshire" "North Dakota"  "Oregon"
##  [9] "South Dakota"  "Utah"          "Vermont"       "Wyoming"
```

2.14.4

```
murders$state[low & murders$region == "Northeast"]
```

```
## [1] "Maine"         "New Hampshire" "Vermont"
```

2.14.5

```
length(murder_rate[murder_rate < mean(murder_rate)])
```

```
## [1] 27
```

2.14.6

```
ind <- match(c("AK", "MI", "IA"), murders$abb)
murders$state[ind]
```

```
## [1] "Alaska"   "Michigan" "Iowa"
```

2.14.7

```
abbs <- c("MA", "ME", "MI", "MO", "MU")
actual_abbs <- abbs %in% murders$abb
actual_abbs
```

```
## [1]  TRUE  TRUE  TRUE  TRUE FALSE
```

2.14.8

```
abbs[which(!actual_abbs)]
```

```
## [1] "MU"
```

3.6

3.6.7

```
compute_s_n <- function(n) {
  return (sum(seq(1, n) ^ 2))
}
compute_s_n(10)
```

```
## [1] 385
```

3.6.8

```
s_n <- vector("numeric", 25)
for (i in 1:25) {
  s_n[i] <- compute_s_n(i)
}
s_n
```

```
##  [1]    1    5   14   30   55   91  140  204  285  385  506  650  819 1015 1240
## [16] 1496 1785 2109 2470 2870 3311 3795 4324 4900 5525
```

3.6.9

```
s_n <- vector("numeric", 25)
s_n <- sapply(1:25, compute_s_n)
s_n
```

```
##  [1]    1    5   14   30   55   91  140  204  285  385  506  650  819 1015 1240
## [16] 1496 1785 2109 2470 2870 3311 3795 4324 4900 5525
```