Assignment 3

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R Packages Used

We installed and loaded the tidyverse and ggplot2 packages.

Load data set into .rmd file

```
covid_data <- read.csv("covid_data.csv", stringsAsFactors = FALSE)
```

Question 1

Print the structure of your dataset.

```
str(covid_data)
```

```
## 'data.frame':    187 obs. of  15 variables:
##  $ Country.Region        : chr  "Afghanistan" "Albania" "Algeria" "Andorra" ...
##  $ Confirmed             : int  36263 4880 27973 907 950 86 167416 37390 15303 20558 ...
##  $ Deaths                : int  1269 144 1163 52 41 3 3059 711 167 713 ...
##  $ Recovered             : int  25198 2745 18837 803 242 65 72575 26665 9311 18246 ...
##  $ Active                : int  9796 1991 7973 52 667 18 91782 10014 5825 1599 ...
##  $ New.cases             : int  106 117 616 10 18 4 4890 73 368 86 ...
##  $ New.deaths            : int  10 6 8 0 1 0 120 6 6 1 ...
##  $ New.recovered         : int  18 63 749 0 0 5 2057 187 137 37 ...
##  $ Deaths...100.Cases    : num  3.5 2.95 4.16 5.73 4.32 3.49 1.83 1.9 1.09 3.47 ...
##  $ Recovered...100.Cases : num  69.5 56.2 67.3 88.5 25.5 ...
##  $ Deaths...100.Recovered: num  5.04 5.25 6.17 6.48 16.94 ...
##  $ Confirmed.last.week   : int  35526 4171 23691 884 749 76 130774 34981 12428 19743 ...
##  $ X1.week.change        : int  737 709 4282 23 201 10 36642 2409 2875 815 ...
##  $ X1.week...increase    : num  2.07 17 18.07 2.6 26.84 ...
##  $ WHO.Region            : chr  "Eastern Mediterranean" "Europe" "Africa" "Europe" ...
```

Question 2

List the variables in your dataset.

```
names(covid_data)
```

```
##  [1] "Country.Region"         "Confirmed"              "Deaths"
##  [4] "Recovered"              "Active"                 "New.cases"
##  [7] "New.deaths"             "New.recovered"          "Deaths...100.Cases"
## [10] "Recovered...100.Cases"  "Deaths...100.Recovered" "Confirmed.last.week"
## [13] "X1.week.change"         "X1.week...increase"     "WHO.Region"
```

Question 3

Print the top 15 rows of your dataset.

```
head(covid_data, 15)
```

```
##         Country.Region Confirmed Deaths Recovered Active New.cases New.deaths
## 1          Afghanistan     36263   1269     25198   9796       106          10
## 2              Albania      4880    144      2745   1991       117           6
## 3              Algeria     27973   1163     18837   7973       616           8
## 4              Andorra       907     52       803     52        10           0
## 5               Angola       950     41       242    667        18           1
## 6  Antigua and Barbuda        86      3        65     18         4           0
## 7            Argentina    167416   3059     72575  91782      4890         120
## 8              Armenia     37390    711     26665  10014        73           6
## 9            Australia     15303    167      9311   5825       368           6
## 10             Austria     20558    713     18246   1599        86           1
## 11          Azerbaijan     30446    423     23242   6781       396           6
## 12             Bahamas       382     11        91    280        40           0
## 13             Bahrain     39482    141     36110   3231       351           1
## 14          Bangladesh    226225   2965    125683  97577      2772          37
## 15            Barbados       110      7        94      9         0           0
##    New.recovered Deaths...100.Cases Recovered...100.Cases
## 1             18               3.50                 69.49
## 2             63               2.95                 56.25
## 3            749               4.16                 67.34
## 4              0               5.73                 88.53
## 5              0               4.32                 25.47
## 6              5               3.49                 75.58
## 7           2057               1.83                 43.35
## 8            187               1.90                 71.32
## 9            137               1.09                 60.84
## 10            37               3.47                 88.75
## 11           558               1.39                 76.34
## 12             0               2.88                 23.82
## 13           421               0.36                 91.46
## 14          1801               1.31                 55.56
## 15             0               6.36                 85.45
##    Deaths...100.Recovered Confirmed.last.week X1.week.change X1.week...increase
## 1                    5.04               35526            737              2.07
## 2                    5.25                4171            709             17.00
## 3                    6.17               23691           4282             18.07
## 4                    6.48                 884             23              2.60
## 5                   16.94                 749            201             26.84
## 6                    4.62                  76             10             13.16
## 7                    4.21              130774          36642             28.02
## 8                    2.67               34981           2409              6.89
## 9                    1.79               12428           2875             23.13
## 10                   3.91               19743            815              4.13
## 11                   1.82               27890           2556              9.16
## 12                  12.09                 174            208            119.54
## 13                   0.39               36936           2546              6.89
## 14                   2.36              207453          18772              9.05
## 15                   7.45                 106              4              3.77
```

```
##               WHO.Region
## 1  Eastern Mediterranean
## 2                 Europe
## 3                 Africa
## 4                 Europe
## 5                 Africa
## 6               Americas
## 7               Americas
## 8                 Europe
## 9         Western Pacific
## 10                Europe
## 11                Europe
## 12              Americas
## 13 Eastern Mediterranean
## 14       South-East Asia
## 15              Americas
```

Question 4

Write a user defined function using any of the variables from the data set

```
sumColumnvalues = function(colName){
covid_data %>%summarise(sum(colName))
}

sumColumnvalues(covid_data$Active)
```

```
##   sum(colName)
## 1      6358362
```

Question 5

Use data manipulation techniques and filter rows based on any logical criteria that exist in your dataset.

```
deathRate = covid_data %>% filter(covid_data$Deaths > 50000)
deathRate
```

```
##   Country.Region Confirmed Deaths Recovered  Active New.cases New.deaths
## 1         Brazil   2442375  87618   1846641  508116     23284        614
## 2             US   4290259 148011   1325804 2816444     56336       1076
##   New.recovered Deaths...100.Cases Recovered...100.Cases Deaths...100.Recovered
## 1         33728               3.59                 75.61                  4.74
## 2         27941               3.45                 30.90                 11.16
##   Confirmed.last.week X1.week.change X1.week...increase WHO.Region
## 1             2118646         323729              15.28   Americas
## 2             3834677         455582              11.88   Americas
```

Question 6

Identify the dependent & independent variables and use reshaping techniques and create a new data frame by joining those variables from your dataset.

Deaths is independent and deaths..100.cases is dependent variable.

```
covid_data_reshaped = cbind(DEATHS = covid_data$Deaths, DEATHS_100CASES =
covid_data$Deaths...100.Cases)
covid_data_reshaped
```

```
##        DEATHS DEATHS_100CASES
##   [1,]   1269            3.50
##   [2,]    144            2.95
##   [3,]   1163            4.16
##   [4,]     52            5.73
##   [5,]     41            4.32
##   [6,]      3            3.49
##   [7,]   3059            1.83
##   [8,]    711            1.90
##   [9,]    167            1.09
##  [10,]    713            3.47
##  [11,]    423            1.39
##  [12,]     11            2.88
##  [13,]    141            0.36
##  [14,]   2965            1.31
##  [15,]      7            6.36
##  [16,]    538            0.80
##  [17,]   9822           14.79
##  [18,]      2            4.17
##  [19,]     35            1.98
##  [20,]      0            0.00
##  [21,]   2647            3.72
##  [22,]    294            2.80
##  [23,]      2            0.27
##  [24,]  87618            3.59
##  [25,]      3            2.13
##  [26,]    347            3.27
##  [27,]     53            4.82
##  [28,]      6            1.71
##  [29,]      1            0.26
##  [30,]     22            0.95
##  [31,]      0            0.00
##  [32,]    391            2.29
##  [33,]   8944            7.68
##  [34,]     59            1.28
##  [35,]     75            8.13
##  [36,]   9187            2.64
##  [37,]   4656            5.37
##  [38,]   8777            3.41
##  [39,]      7            1.98
##  [40,]     54            1.69
##  [41,]    208            2.35
##  [42,]    115            0.73
```

```
##  [43,]     96            0.61
##  [44,]    139            2.85
##  [45,]     87            3.44
##  [46,]     19            1.79
##  [47,]    373            2.40
##  [48,]    613            4.45
##  [49,]     58            1.15
##  [50,]      0            0.00
##  [51,]   1083            1.69
##  [52,]   5532            6.82
##  [53,]   4652            5.03
##  [54,]    408            2.71
##  [55,]     51            1.66
##  [56,]      0            0.00
##  [57,]     69            3.39
##  [58,]     34            1.47
##  [59,]    228            1.57
##  [60,]      0            0.00
##  [61,]    329            4.45
##  [62,]  30212           13.71
##  [63,]     49            0.68
##  [64,]      8            2.45
##  [65,]     16            1.41
##  [66,]   9125            4.41
##  [67,]    168            0.50
##  [68,]    202            4.78
##  [69,]      0            0.00
##  [70,]      0            0.00
##  [71,]   1761            3.89
##  [72,]     45            0.64
##  [73,]     26            1.33
##  [74,]     20            5.14
##  [75,]    158            2.15
##  [76,]      0            0.00
##  [77,]   1166            2.93
##  [78,]    596           13.40
##  [79,]     10            0.54
##  [80,]  33408            2.26
##  [81,]   4838            4.82
##  [82,]  15912            5.42
##  [83,]   4458            3.96
##  [84,]   1764            6.81
##  [85,]    474            0.74
##  [86,]  35112           14.26
##  [87,]     10            1.17
##  [88,]    998            3.20
##  [89,]     11            0.94
##  [90,]    585            0.69
##  [91,]    285            1.59
##  [92,]    185            2.50
##  [93,]    438            0.68
##  [94,]   1301            3.91
##  [95,]      0            0.00
##  [96,]     31            2.54
```

```
##  [97,]     51           1.31
##  [98,]     12           2.38
##  [99,]     72           6.17
## [100,]     64           2.26
## [101,]      1           1.16
## [102,]     80           3.96
## [103,]    112           1.77
## [104,]     91           0.94
## [105,]     99           2.70
## [106,]    124           1.39
## [107,]     15           0.45
## [108,]    124           4.93
## [109,]      9           1.28
## [110,]    156           2.51
## [111,]     10           2.91
## [112,]  44022          11.13
## [113,]    748           3.23
## [114,]      4           3.45
## [115,]      0           0.00
## [116,]     45           1.56
## [117,]    316           1.51
## [118,]     11           0.65
## [119,]      8           0.43
## [120,]     48           0.26
## [121,]   6160          11.53
## [122,]     22           1.41
## [123,]    108           3.14
## [124,]     69           6.10
## [125,]    860           2.09
## [126,]    466           4.56
## [127,]    255           2.79
## [128,]    393           0.51
## [129,]   5842           2.13
## [130,]   1322           2.15
## [131,]      0           0.00
## [132,]     43           0.95
## [133,]  18418           4.73
## [134,]   1945           2.37
## [135,]   1676           3.86
## [136,]   1719           3.42
## [137,]    165           0.15
## [138,]   2206           4.81
## [139,]  13334           1.63
## [140,]      5           0.27
## [141,]      0           0.00
## [142,]      0           0.00
## [143,]      0           0.00
## [144,]     42           6.01
## [145,]     14           1.62
## [146,]   2760           1.03
## [147,]    194           1.99
## [148,]    543           2.25
## [149,]      0           0.00
## [150,]     66           3.70
```

```
## [151,]     27            0.05
## [152,]     28            1.28
## [153,]    116            5.56
## [154,]     93            2.91
## [155,]   7067            1.56
## [156,]    300            2.11
## [157,]     46            2.00
## [158,]  28432           10.44
## [159,]     11            0.39
## [160,]    720            6.30
## [161,]     24            1.62
## [162,]   5700            7.18
## [163,]   1978            5.74
## [164,]     40            5.93
## [165,]      7            1.52
## [166,]     60            0.83
## [167,]     21            4.13
## [168,]     58            1.76
## [169,]      0            0.00
## [170,]     18            2.06
## [171,]      8            5.41
## [172,]     50            3.44
## [173,]   5630            2.48
## [174,] 148011            3.45
## [175,]      2            0.18
## [176,]   1636            2.44
## [177,]    345            0.58
## [178,]  45844           15.19
## [179,]     35            2.91
## [180,]    121            0.57
## [181,]    146            0.91
## [182,]      0            0.00
## [183,]     78            0.73
## [184,]      1           10.00
## [185,]    483           28.56
## [186,]    140            3.08
## [187,]     36            1.33
```

Creating new data frame for death rates per country.

```
countryDeathCases = data.frame(covid_data$Country.Region, covid_data_reshaped)
countryDeathCases
```

```
##            covid_data.Country.Region DEATHS DEATHS_100CASES
## 1                        Afghanistan   1269            3.50
## 2                            Albania    144            2.95
## 3                            Algeria   1163            4.16
## 4                            Andorra     52            5.73
## 5                             Angola     41            4.32
## 6                 Antigua and Barbuda      3            3.49
## 7                          Argentina   3059            1.83
## 8                            Armenia    711            1.90
## 9                          Australia    167            1.09
```

```
## 10                          Austria    713           3.47
## 11                       Azerbaijan    423           1.39
## 12                          Bahamas     11           2.88
## 13                          Bahrain    141           0.36
## 14                       Bangladesh   2965           1.31
## 15                         Barbados      7           6.36
## 16                          Belarus    538           0.80
## 17                          Belgium   9822          14.79
## 18                           Belize      2           4.17
## 19                            Benin     35           1.98
## 20                           Bhutan      0           0.00
## 21                          Bolivia   2647           3.72
## 22            Bosnia and Herzegovina    294           2.80
## 23                         Botswana      2           0.27
## 24                           Brazil  87618           3.59
## 25                           Brunei      3           2.13
## 26                         Bulgaria    347           3.27
## 27                     Burkina Faso     53           4.82
## 28                            Burma      6           1.71
## 29                          Burundi      1           0.26
## 30                       Cabo Verde     22           0.95
## 31                         Cambodia      0           0.00
## 32                         Cameroon    391           2.29
## 33                           Canada   8944           7.68
## 34          Central African Republic     59           1.28
## 35                             Chad     75           8.13
## 36                            Chile   9187           2.64
## 37                            China   4656           5.37
## 38                         Colombia   8777           3.41
## 39                          Comoros      7           1.98
## 40              Congo (Brazzaville)     54           1.69
## 41                 Congo (Kinshasa)    208           2.35
## 42                       Costa Rica    115           0.73
## 43                   Cote d'Ivoire     96           0.61
## 44                         Croatia    139           2.85
## 45                            Cuba     87           3.44
## 46                          Cyprus     19           1.79
## 47                         Czechia    373           2.40
## 48                         Denmark    613           4.45
## 49                        Djibouti     58           1.15
## 50                        Dominica      0           0.00
## 51                Dominican Republic   1083           1.69
## 52                         Ecuador   5532           6.82
## 53                           Egypt   4652           5.03
## 54                     El Salvador    408           2.71
## 55                  Equatorial Guinea     51           1.66
## 56                         Eritrea      0           0.00
## 57                         Estonia     69           3.39
## 58                        Eswatini     34           1.47
## 59                        Ethiopia    228           1.57
## 60                            Fiji      0           0.00
## 61                         Finland    329           4.45
## 62                          France  30212          13.71
## 63                           Gabon     49           0.68
```

```
## 64                      Gambia      8           2.45
## 65                     Georgia     16           1.41
## 66                     Germany   9125           4.41
## 67                       Ghana    168           0.50
## 68                      Greece    202           4.78
## 69                   Greenland      0           0.00
## 70                     Grenada      0           0.00
## 71                   Guatemala   1761           3.89
## 72                      Guinea     45           0.64
## 73                Guinea-Bissau     26           1.33
## 74                      Guyana     20           5.14
## 75                       Haiti    158           2.15
## 76                    Holy See      0           0.00
## 77                    Honduras   1166           2.93
## 78                     Hungary    596          13.40
## 79                     Iceland     10           0.54
## 80                       India  33408           2.26
## 81                   Indonesia   4838           4.82
## 82                        Iran  15912           5.42
## 83                        Iraq   4458           3.96
## 84                     Ireland   1764           6.81
## 85                      Israel    474           0.74
## 86                       Italy  35112          14.26
## 87                     Jamaica     10           1.17
## 88                       Japan    998           3.20
## 89                      Jordan     11           0.94
## 90                  Kazakhstan    585           0.69
## 91                       Kenya    285           1.59
## 92                      Kosovo    185           2.50
## 93                      Kuwait    438           0.68
## 94                  Kyrgyzstan   1301           3.91
## 95                        Laos      0           0.00
## 96                      Latvia     31           2.54
## 97                     Lebanon     51           1.31
## 98                     Lesotho     12           2.38
## 99                     Liberia     72           6.17
## 100                      Libya     64           2.26
## 101              Liechtenstein      1           1.16
## 102                  Lithuania     80           3.96
## 103                 Luxembourg    112           1.77
## 104                 Madagascar     91           0.94
## 105                     Malawi     99           2.70
## 106                   Malaysia    124           1.39
## 107                   Maldives     15           0.45
## 108                       Mali    124           4.93
## 109                      Malta      9           1.28
## 110                 Mauritania    156           2.51
## 111                  Mauritius     10           2.91
## 112                     Mexico  44022          11.13
## 113                    Moldova    748           3.23
## 114                     Monaco      4           3.45
## 115                   Mongolia      0           0.00
## 116                 Montenegro     45           1.56
## 117                    Morocco    316           1.51
```

```
## 118                        Mozambique     11           0.65
## 119                           Namibia      8           0.43
## 120                             Nepal     48           0.26
## 121                       Netherlands   6160          11.53
## 122                       New Zealand     22           1.41
## 123                         Nicaragua    108           3.14
## 124                             Niger     69           6.10
## 125                           Nigeria    860           2.09
## 126                    North Macedonia    466           4.56
## 127                            Norway    255           2.79
## 128                              Oman    393           0.51
## 129                          Pakistan   5842           2.13
## 130                            Panama   1322           2.15
## 131                  Papua New Guinea      0           0.00
## 132                          Paraguay     43           0.95
## 133                              Peru  18418           4.73
## 134                       Philippines   1945           2.37
## 135                            Poland   1676           3.86
## 136                          Portugal   1719           3.42
## 137                             Qatar    165           0.15
## 138                           Romania   2206           4.81
## 139                            Russia  13334           1.63
## 140                            Rwanda      5           0.27
## 141            Saint Kitts and Nevis      0           0.00
## 142                        Saint Lucia      0           0.00
## 143 Saint Vincent and the Grenadines      0           0.00
## 144                         San Marino     42           6.01
## 145            Sao Tome and Principe     14           1.62
## 146                      Saudi Arabia   2760           1.03
## 147                           Senegal    194           1.99
## 148                            Serbia    543           2.25
## 149                        Seychelles      0           0.00
## 150                      Sierra Leone     66           3.70
## 151                         Singapore     27           0.05
## 152                          Slovakia     28           1.28
## 153                          Slovenia    116           5.56
## 154                           Somalia     93           2.91
## 155                      South Africa   7067           1.56
## 156                       South Korea    300           2.11
## 157                       South Sudan     46           2.00
## 158                             Spain  28432          10.44
## 159                         Sri Lanka     11           0.39
## 160                             Sudan    720           6.30
## 161                          Suriname     24           1.62
## 162                            Sweden   5700           7.18
## 163                       Switzerland   1978           5.74
## 164                             Syria     40           5.93
## 165                            Taiwan*      7           1.52
## 166                        Tajikistan     60           0.83
## 167                          Tanzania     21           4.13
## 168                          Thailand     58           1.76
## 169                       Timor-Leste      0           0.00
## 170                              Togo     18           2.06
## 171                Trinidad and Tobago      8           5.41
```

```
## 172                          Tunisia     50            3.44
## 173                           Turkey   5630            2.48
## 174                               US 148011            3.45
## 175                           Uganda      2            0.18
## 176                          Ukraine   1636            2.44
## 177            United Arab Emirates    345            0.58
## 178                  United Kingdom  45844           15.19
## 179                          Uruguay     35            2.91
## 180                       Uzbekistan    121            0.57
## 181                        Venezuela    146            0.91
## 182                          Vietnam      0            0.00
## 183              West Bank and Gaza     78            0.73
## 184                  Western Sahara      1           10.00
## 185                           Yemen    483           28.56
## 186                          Zambia    140            3.08
## 187                        Zimbabwe     36            1.33
```

Question 7

Remove missing values in your dataset.

Showing missing values.

```
missingValues = is.na(covid_data)
missingValues
```

```
##        Country.Region Confirmed Deaths Recovered Active New.cases New.deaths
##   [1,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##   [2,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##   [3,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##   [4,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##   [5,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##   [6,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##   [7,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##   [8,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##   [9,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##  [10,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##  [11,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##  [12,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##  [13,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##  [14,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##  [15,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##  [16,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##  [17,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
##  [18,]          FALSE     FALSE  FALSE     FALSE  FALSE     FALSE      FALSE
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## [186,]                FALSE             FALSE          FALSE
## [187,]                FALSE             FALSE          FALSE
```

```
##        X1.week...increase WHO.Region
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##  [53,]              FALSE      FALSE
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## [187,]              FALSE      FALSE
```

Removing missing values

```
drop(covid_data)
```

```
##                       Country.Region Confirmed Deaths Recovered  Active
## 1                        Afghanistan     36263   1269     25198    9796
## 2                            Albania      4880    144      2745    1991
## 3                            Algeria     27973   1163     18837    7973
## 4                            Andorra       907     52       803      52
## 5                             Angola       950     41       242     667
## 6                 Antigua and Barbuda        86      3        65      18
## 7                          Argentina    167416   3059     72575   91782
## 8                            Armenia     37390    711     26665   10014
## 9                          Australia     15303    167      9311    5825
## 10                           Austria     20558    713     18246    1599
## 11                        Azerbaijan     30446    423     23242    6781
## 12                           Bahamas       382     11        91     280
## 13                           Bahrain     39482    141     36110    3231
## 14                        Bangladesh    226225   2965    125683   97577
## 15                          Barbados       110      7        94       9
## 16                           Belarus     67251    538     60492    6221
## 17                           Belgium     66428   9822     17452   39154
## 18                            Belize        48      2        26      20
## 19                             Benin      1770     35      1036     699
## 20                            Bhutan        99      0        86      13
## 21                           Bolivia     71181   2647     21478   47056
```

```
## 22            Bosnia and Herzegovina     10498    294      4930    5274
## 23                          Botswana       739      2        63     674
## 24                            Brazil   2442375  87618   1846641  508116
## 25                            Brunei       141      3       138       0
## 26                          Bulgaria     10621    347      5585    4689
## 27                      Burkina Faso      1100     53       926     121
## 28                             Burma       350      6       292      52
## 29                           Burundi       378      1       301      76
## 30                        Cabo Verde      2328     22      1550     756
## 31                          Cambodia       226      0       147      79
## 32                          Cameroon     17110    391     14539    2180
## 33                            Canada    116458   8944         0  107514
## 34          Central African Republic      4599     59      1546    2994
## 35                              Chad       922     75       810      37
## 36                             Chile    347923   9187    319954   18782
## 37                             China     86783   4656     78869    3258
## 38                          Colombia    257101   8777    131161  117163
## 39                           Comoros       354      7       328      19
## 40               Congo (Brazzaville)      3200     54       829    2317
## 41                  Congo (Kinshasa)      8844    208      5700    2936
## 42                        Costa Rica     15841    115      3824   11902
## 43                     Cote d'Ivoire     15655     96     10361    5198
## 44                           Croatia      4881    139      3936     806
## 45                              Cuba      2532     87      2351      94
## 46                            Cyprus      1060     19       852     189
## 47                           Czechia     15516    373     11428    3715
## 48                           Denmark     13761    613     12605     543
## 49                          Djibouti      5059     58      4977      24
## 50                          Dominica        18      0        18       0
## 51                Dominican Republic     64156   1083     30204   32869
## 52                           Ecuador     81161   5532     34896   40733
## 53                             Egypt     92482   4652     34838   52992
## 54                       El Salvador     15035    408      7778    6849
## 55                 Equatorial Guinea      3071     51       842    2178
## 56                           Eritrea       265      0       191      74
## 57                           Estonia      2034     69      1923      42
## 58                          Eswatini      2316     34      1025    1257
## 59                          Ethiopia     14547    228      6386    7933
## 60                              Fiji        27      0        18       9
## 61                           Finland      7398    329      6920     149
## 62                            France    220352  30212     81212  108928
## 63                             Gabon      7189     49      4682    2458
## 64                            Gambia       326      8        66     252
## 65                           Georgia      1137     16       922     199
## 66                           Germany    207112   9125    190314    7673
## 67                             Ghana     33624    168     29801    3655
## 68                            Greece      4227    202      1374    2651
## 69                         Greenland        14      0        13       1
## 70                           Grenada        23      0        23       0
## 71                         Guatemala     45309   1761     32455   11093
## 72                            Guinea      7055     45      6257     753
## 73                     Guinea-Bissau      1954     26       803    1125
## 74                            Guyana       389     20       181     188
## 75                             Haiti      7340    158      4365    2817
```

```
## 76                      Holy See        12      0        12       0
## 77                      Honduras     39741   1166      5039   33536
## 78                       Hungary      4448    596      3329     523
## 79                       Iceland      1854     10      1823      21
## 80                         India   1480073  33408    951166  495499
## 81                     Indonesia    100303   4838     58173   37292
## 82                          Iran    293606  15912    255144   22550
## 83                          Iraq    112585   4458     77144   30983
## 84                       Ireland     25892   1764     23364     764
## 85                        Israel     63985    474     27133   36378
## 86                         Italy    246286  35112    198593   12581
## 87                       Jamaica       853     10       714     129
## 88                         Japan     31142    998     21970    8174
## 89                        Jordan      1176     11      1041     124
## 90                    Kazakhstan     84648    585     54404   29659
## 91                         Kenya     17975    285      7833    9857
## 92                        Kosovo      7413    185      4027    3201
## 93                        Kuwait     64379    438     55057    8884
## 94                    Kyrgyzstan     33296   1301     21205   10790
## 95                          Laos        20      0        19       1
## 96                        Latvia      1219     31      1045     143
## 97                       Lebanon      3882     51      1709    2122
## 98                       Lesotho       505     12       128     365
## 99                       Liberia      1167     72       646     449
## 100                        Libya      2827     64       577    2186
## 101                Liechtenstein        86      1        81       4
## 102                    Lithuania      2019     80      1620     319
## 103                   Luxembourg      6321    112      4825    1384
## 104                   Madagascar      9690     91      6260    3339
## 105                       Malawi      3664     99      1645    1920
## 106                     Malaysia      8904    124      8601     179
## 107                     Maldives      3369     15      2547     807
## 108                         Mali      2513    124      1913     476
## 109                        Malta       701      9       665      27
## 110                   Mauritania      6208    156      4653    1399
## 111                    Mauritius       344     10       332       2
## 112                       Mexico    395489  44022    303810   47657
## 113                      Moldova     23154    748     16154    6252
## 114                       Monaco       116      4       104       8
## 115                     Mongolia       289      0       222      67
## 116                   Montenegro      2893     45       809    2039
## 117                      Morocco     20887    316     16553    4018
## 118                   Mozambique      1701     11         0    1690
## 119                      Namibia      1843      8       101    1734
## 120                        Nepal     18752     48     13754    4950
## 121                  Netherlands     53413   6160       189   47064
## 122                  New Zealand      1557     22      1514      21
## 123                    Nicaragua      3439    108      2492     839
## 124                        Niger      1132     69      1027      36
## 125                      Nigeria     41180    860     18203   22117
## 126              North Macedonia     10213    466      5564    4183
## 127                       Norway      9132    255      8752     125
## 128                         Oman     77058    393     57028   19637
## 129                     Pakistan    274289   5842    241026   27421
```

```
## 130                           Panama     61442   1322     35086   25034
## 131                 Papua New Guinea        62      0        11      51
## 132                         Paraguay      4548     43      2905    1600
## 133                             Peru    389717  18418    272547   98752
## 134                      Philippines     82040   1945     26446   53649
## 135                           Poland     43402   1676     32856    8870
## 136                         Portugal     50299   1719     35375   13205
## 137                            Qatar    109597    165    106328    3104
## 138                          Romania     45902   2206     25794   17902
## 139                           Russia    816680  13334    602249  201097
## 140                           Rwanda      1879      5       975     899
## 141           Saint Kitts and Nevis        17      0        15       2
## 142                      Saint Lucia        24      0        22       2
## 143 Saint Vincent and the Grenadines        52      0        39      13
## 144                       San Marino       699     42       657       0
## 145           Sao Tome and Principe       865     14       734     117
## 146                     Saudi Arabia    268934   2760    222936   43238
## 147                          Senegal      9764    194      6477    3093
## 148                           Serbia     24141    543         0   23598
## 149                       Seychelles       114      0        39      75
## 150                     Sierra Leone      1783     66      1317     400
## 151                        Singapore     50838     27     45692    5119
## 152                         Slovakia      2181     28      1616     537
## 153                         Slovenia      2087    116      1733     238
## 154                          Somalia      3196     93      1543    1560
## 155                     South Africa    452529   7067    274925  170537
## 156                      South Korea     14203    300     13007     896
## 157                      South Sudan      2305     46      1175    1084
## 158                            Spain    272421  28432    150376   93613
## 159                        Sri Lanka      2805     11      2121     673
## 160                            Sudan     11424    720      5939    4765
## 161                         Suriname      1483     24       925     534
## 162                           Sweden     79395   5700         0   73695
## 163                      Switzerland     34477   1978     30900    1599
## 164                            Syria       674     40         0     634
## 165                           Taiwan*       462      7       440      15
## 166                       Tajikistan      7235     60      6028    1147
## 167                         Tanzania       509     21       183     305
## 168                         Thailand      3297     58      3111     128
## 169                      Timor-Leste        24      0         0      24
## 170                             Togo       874     18       607     249
## 171             Trinidad and Tobago       148      8       128      12
## 172                          Tunisia      1455     50      1157     248
## 173                           Turkey    227019   5630    210469   10920
## 174                               US   4290259 148011   1325804 2816444
## 175                           Uganda      1128      2       986     140
## 176                          Ukraine     67096   1636     37202   28258
## 177            United Arab Emirates     59177    345     52510    6322
## 178                 United Kingdom     301708  45844      1437  254427
## 179                          Uruguay      1202     35       951     216
## 180                       Uzbekistan     21209    121     11674    9414
## 181                        Venezuela     15988    146      9959    5883
## 182                          Vietnam       431      0       365      66
## 183               West Bank and Gaza     10621     78      3752    6791
```

```
## 184                  Western Sahara        10      1         8       1
## 185                           Yemen      1691    483       833     375
## 186                          Zambia      4552    140      2815    1597
## 187                        Zimbabwe      2704     36       542    2126
##     New.cases New.deaths New.recovered Deaths...100.Cases Recovered...100.Cases
## 1         106         10            18                3.50                 69.49
## 2         117          6            63                2.95                 56.25
## 3         616          8           749                4.16                 67.34
## 4          10          0             0                5.73                 88.53
## 5          18          1             0                4.32                 25.47
## 6           4          0             5                3.49                 75.58
## 7        4890        120          2057                1.83                 43.35
## 8          73          6           187                1.90                 71.32
## 9         368          6           137                1.09                 60.84
## 10         86          1            37                3.47                 88.75
## 11        396          6           558                1.39                 76.34
## 12         40          0             0                2.88                 23.82
## 13        351          1           421                0.36                 91.46
## 14       2772         37          1801                1.31                 55.56
## 15          0          0             0                6.36                 85.45
## 16        119          4            67                0.80                 89.95
## 17        402          1            14               14.79                 26.27
## 18          0          0             0                4.17                 54.17
## 19          0          0             0                1.98                 58.53
## 20          4          0             1                0.00                 86.87
## 21       1752         64           309                3.72                 30.17
## 22        731         14           375                2.80                 46.96
## 23         53          1            11                0.27                  8.53
## 24      23284        614         33728                3.59                 75.61
## 25          0          0             0                2.13                 97.87
## 26        194          7           230                3.27                 52.58
## 27         14          0             6                4.82                 84.18
## 28          0          0             2                1.71                 83.43
## 29         17          0            22                0.26                 79.63
## 30         21          0           103                0.95                 66.58
## 31          1          0             4                0.00                 65.04
## 32        402          6             0                2.29                 84.97
## 33        682         11             0                7.68                  0.00
## 34          0          0             0                1.28                 33.62
## 35          7          0             0                8.13                 87.85
## 36       2133         75          1859                2.64                 91.96
## 37        213          4             7                5.37                 90.88
## 38      16306        508         11494                3.41                 51.02
## 39          0          0             0                1.98                 92.66
## 40        162          3            73                1.69                 25.91
## 41         13          4           190                2.35                 64.45
## 42        612         11            88                0.73                 24.14
## 43         59          0           183                0.61                 66.18
## 44         24          3            70                2.85                 80.64
## 45         37          0             2                3.44                 92.85
## 46          3          0             0                1.79                 80.38
## 47        192          2             0                2.40                 73.65
## 48        109          0            77                4.45                 91.60
## 49          9          0            11                1.15                 98.38
```

```
## 50          0          0          0          0.00          100.00
## 51       1248         20       1601          1.69           47.08
## 52        467         17          0          6.82           43.00
## 53        420         46       1007          5.03           37.67
## 54        405          8        130          2.71           51.73
## 55          0          0          0          1.66           27.42
## 56          2          0          2          0.00           72.08
## 57          0          0          1          3.39           94.54
## 58        109          2         39          1.47           44.26
## 59        579          5        170          1.57           43.90
## 60          0          0          0          0.00           66.67
## 61          5          0          0          4.45           93.54
## 62       2551         17        267         13.71           36.86
## 63        205          0        219          0.68           65.13
## 64         49          2          6          2.45           20.25
## 65          6          0          2          1.41           81.09
## 66        445          1        259          4.41           91.89
## 67        655          0        307          0.50           88.63
## 68         34          0          0          4.78           32.51
## 69          1          0          0          0.00           92.86
## 70          0          0          0          0.00          100.00
## 71        256         27        843          3.89           71.63
## 72         47          2        105          0.64           88.69
## 73          0          0          0          1.33           41.10
## 74         19          0          0          5.14           46.53
## 75         25          1          0          2.15           59.47
## 76          0          0          0          0.00          100.00
## 77        465         50        117          2.93           12.68
## 78         13          0          0         13.40           74.84
## 79          7          0          0          0.54           98.33
## 80      44457        637      33598          2.26           64.26
## 81       1525         57       1518          4.82           58.00
## 82       2434        212       1931          5.42           86.90
## 83       2553         96       1927          3.96           68.52
## 84         11          0          0          6.81           90.24
## 85       2029          4        108          0.74           42.41
## 86        168          5        147         14.26           80.64
## 87         11          0          0          1.17           83.70
## 88        594          0        364          3.20           70.55
## 89          8          0          0          0.94           88.52
## 90       1526          0       1833          0.69           64.27
## 91        372          5         90          1.59           43.58
## 92        496         16        274          2.50           54.32
## 93        606          5        684          0.68           85.52
## 94        483         24        817          3.91           63.69
## 95          0          0          0          0.00           95.00
## 96          0          0          0          2.54           85.73
## 97        132          0         17          1.31           44.02
## 98          0          0          0          2.38           25.35
## 99          5          0          5          6.17           55.36
## 100       158          4         24          2.26           20.41
## 101         0          0          0          1.16           94.19
## 102        11          0          4          3.96           80.24
## 103        49          0        178          1.77           76.33
```

```
## 104       395          6          681          0.94          64.60
## 105        24          0            6          2.70          44.90
## 106         7          0            1          1.39          96.60
## 107        67          0           19          0.45          75.60
## 108         3          1            2          4.93          76.12
## 109         1          0            0          1.28          94.86
## 110        37          0          223          2.51          74.95
## 111         0          0            0          2.91          96.51
## 112      4973        342         8588         11.13          76.82
## 113       120         13          245          3.23          69.77
## 114         0          0            0          3.45          89.66
## 115         1          0            4          0.00          76.82
## 116        94          2           70          1.56          27.96
## 117       609          3          115          1.51          79.25
## 118        32          0            0          0.65           0.00
## 119        68          0           26          0.43           5.48
## 120       139          3          626          0.26          73.35
## 121       419          1            0         11.53           0.35
## 122         1          0            1          1.41          97.24
## 123         0          0            0          3.14          72.46
## 124         0          0            0          6.10          90.72
## 125       648          2          829          2.09          44.20
## 126       127          6          137          4.56          54.48
## 127        15          0            0          2.79          95.84
## 128      1053          9         1729          0.51          74.01
## 129      1176         20         3592          2.13          87.87
## 130      1146         28          955          2.15          57.10
## 131         0          0            0          0.00          17.74
## 132       104          2          111          0.95          63.87
## 133     13756        575         4697          4.73          69.93
## 134      1592         13          336          2.37          32.24
## 135       337          5          103          3.86          75.70
## 136       135          2          158          3.42          70.33
## 137       292          0          304          0.15          97.02
## 138      1104         19          151          4.81          56.19
## 139      5607         85         3077          1.63          73.74
## 140        58          0           57          0.27          51.89
## 141         0          0            0          0.00          88.24
## 142         0          0            0          0.00          91.67
## 143         0          0            0          0.00          75.00
## 144         0          0            0          6.01          93.99
## 145         2          0           38          1.62          84.86
## 146      1993         27         2613          1.03          82.90
## 147        83          3           68          1.99          66.34
## 148       411          9            0          2.25           0.00
## 149         0          0            0          0.00          34.21
## 150         0          0            4          3.70          73.86
## 151       469          0          171          0.05          89.88
## 152         2          0           39          1.28          74.09
## 153         5          0           55          5.56          83.04
## 154        18          0           22          2.91          48.28
## 155      7096        298         9848          1.56          60.75
## 156        28          1          102          2.11          91.58
## 157        43          1            0          2.00          50.98
```

```
## 158         0          0             0              10.44                55.20
## 159        23          0            15               0.39                75.61
## 160        39          3            49               6.30                51.99
## 161        44          1            35               1.62                62.37
## 162       398          3             0               7.18                 0.00
## 163        65          1           200               5.74                89.62
## 164        24          2             0               5.93                 0.00
## 165         4          0             0               1.52                95.24
## 166        43          1            58               0.83                83.32
## 167         0          0             0               4.13                35.95
## 168         6          0             2               1.76                94.36
## 169         0          0             0               0.00                 0.00
## 170         6          0             8               2.06                69.45
## 171         1          0             0               5.41                86.49
## 172         3          0            15               3.44                79.52
## 173       919         17           982               2.48                92.71
## 174     56336       1076         27941               3.45                30.90
## 175        13          0             4               0.18                87.41
## 176       835         11           317               2.44                55.45
## 177       264          1           328               0.58                88.73
## 178       688          7             3              15.19                 0.48
## 179        10          1             3               2.91                79.12
## 180       678          5           569               0.57                55.04
## 181       525          4           213               0.91                62.29
## 182        11          0             0               0.00                84.69
## 183       152          2             0               0.73                35.33
## 184         0          0             0              10.00                80.00
## 185        10          4            36              28.56                49.26
## 186        71          1           465               3.08                61.84
## 187       192          2            24               1.33                20.04
##     Deaths...100.Recovered Confirmed.last.week X1.week.change
## 1                     5.04               35526            737
## 2                     5.25                4171            709
## 3                     6.17               23691           4282
## 4                     6.48                 884             23
## 5                    16.94                 749            201
## 6                     4.62                  76             10
## 7                     4.21              130774          36642
## 8                     2.67               34981           2409
## 9                     1.79               12428           2875
## 10                    3.91               19743            815
## 11                    1.82               27890           2556
## 12                   12.09                 174            208
## 13                    0.39               36936           2546
## 14                    2.36              207453          18772
## 15                    7.45                 106              4
## 16                    0.89               66213           1038
## 17                   56.28               64094           2334
## 18                    7.69                  40              8
## 19                    3.38                1602            168
## 20                    0.00                  90              9
## 21                   12.32               60991          10190
## 22                    5.96                8479           2019
## 23                    3.17                 522            217
```

```
## 24                  4.74            2118646          323729
## 25                  2.17                141               0
## 26                  6.21               8929            1692
## 27                  5.72               1065              35
## 28                  2.05                341               9
## 29                  0.33                322              56
## 30                  1.42               2071             257
## 31                  0.00                171              55
## 32                  2.69              16157             953
## 33                   Inf             112925            3533
## 34                  3.82               4548              51
## 35                  9.26                889              33
## 36                  2.87             333029           14894
## 37                  5.90              85622            1161
## 38                  6.69             204005           53096
## 39                  2.13                334              20
## 40                  6.51               2851             349
## 41                  3.65               8443             401
## 42                  3.01              11534            4307
## 43                  0.93              14312            1343
## 44                  3.53               4370             511
## 45                  3.70               2446              86
## 46                  2.23               1038              22
## 47                  3.26              14098            1418
## 48                  4.86              13453             308
## 49                  1.17               5020              39
## 50                  0.00                 18               0
## 51                  3.59              53956           10200
## 52                 15.85              74620            6541
## 53                 13.35              88402            4080
## 54                  5.25              12207            2828
## 55                  6.06               3071               0
## 56                  0.00                251              14
## 57                  3.59               2021              13
## 58                  3.32               1826             490
## 59                  3.57              10207            4340
## 60                  0.00                 27               0
## 61                  4.75               7340              58
## 62                 37.20             214023            6329
## 63                  1.05               6433             756
## 64                 12.12                112             214
## 65                  1.74               1039              98
## 66                  4.79             203325            3787
## 67                  0.56              28430            5194
## 68                 14.70               4012             215
## 69                  0.00                 13               1
## 70                  0.00                 23               0
## 71                  5.43              39039            6270
## 72                  0.72               6590             465
## 73                  3.24               1949               5
## 74                 11.05                337              52
## 75                  3.62               7053             287
## 76                  0.00                 12               0
## 77                 23.14              34611            5130
```

```
## 78                17.90              4339            109
## 79                 0.55              1839             15
## 80                 3.51           1155338         324735
## 81                 8.32             88214          12089
## 82                 6.24            276202          17404
## 83                 5.78             94693          17892
## 84                 7.55             25766            126
## 85                 1.75             52003          11982
## 86                17.68            244624           1662
## 87                 1.40               809             44
## 88                 4.54             25706           5436
## 89                 1.06              1223            -47
## 90                 1.08             73468          11180
## 91                 3.64             13771           4204
## 92                 4.59              5877           1536
## 93                 0.80             59763           4616
## 94                 6.14             27143           6153
## 95                 0.00                19              1
## 96                 2.97              1192             27
## 97                 2.98              2905            977
## 98                 9.38               359            146
## 99                11.15              1107             60
## 100               11.09              1980            847
## 101                1.23                86              0
## 102                4.94              1947             72
## 103                2.32              5639            682
## 104                1.45              7153           2537
## 105                6.02              2992            672
## 106                1.44              8800            104
## 107                0.59              2999            370
## 108                6.48              2475             38
## 109                1.35               677             24
## 110                3.35              5923            285
## 111                3.01               343              1
## 112               14.49            349396          46093
## 113                4.63             21115           2039
## 114                3.85               109              7
## 115                0.00               287              2
## 116                5.56              2188            705
## 117                1.91             17562           3325
## 118                 Inf              1507            194
## 119                7.92              1344            499
## 120                0.35             17844            908
## 121             3259.26             52132           1281
## 122                1.45              1555              2
## 123                4.33              3147            292
## 124                6.72              1105             27
## 125                4.72             37225           3955
## 126                8.38              9249            964
## 127                2.91              9034             98
## 128                0.69             68400           8658
## 129                2.42            266096           8193
## 130                3.77             54426           7016
## 131                0.00                19             43
```

```
## 132                1.48              3748             800
## 133                6.76            357681           32036
## 134                7.35             68898           13142
## 135                5.10             40383            3019
## 136                4.86             48771            1528
## 137                0.16            107037            2560
## 138                8.55             38139            7763
## 139                2.21            776212           40468
## 140                0.51              1629             250
## 141                0.00                17               0
## 142                0.00                23               1
## 143                0.00                50               2
## 144                6.39               699               0
## 145                1.91               746             119
## 146                1.24            253349           15585
## 147                3.00              8948             816
## 148                 Inf             21253            2888
## 149                0.00               108               6
## 150                5.01              1711              72
## 151                0.06             48035            2803
## 152                1.73              1980             201
## 153                6.69              1953             134
## 154                6.03              3130              66
## 155                2.57            373628           78901
## 156                2.31             13816             387
## 157                3.91              2211              94
## 158               18.91            264836            7585
## 159                0.52              2730              75
## 160               12.12             10992             432
## 161                2.59              1079             404
## 162                 Inf             78048            1347
## 163                6.40             33634             843
## 164                 Inf               522             152
## 165                1.59               451              11
## 166                1.00              6921             314
## 167               11.48               509               0
## 168                1.86              3250              47
## 169                0.00                24               0
## 170                2.97               783              91
## 171                6.25               137              11
## 172                4.32              1381              74
## 173                2.67            220572            6447
## 174               11.16           3834677          455582
## 175                0.20              1069              59
## 176                4.40             60767            6329
## 177                0.66             57193            1984
## 178             3190.26             296944            4764
## 179                3.68              1064             138
## 180                1.04             17149            4060
## 181                1.47             12334            3654
## 182                0.00               384              47
## 183                2.08              8916            1705
## 184               12.50                10               0
## 185               57.98              1619              72
```

```
## 186                   4.97               3326           1226
## 187                   6.64               1713            991
##     X1.week...increase            WHO.Region
## 1                 2.07 Eastern Mediterranean
## 2                17.00                Europe
## 3                18.07                Africa
## 4                 2.60                Europe
## 5                26.84                Africa
## 6                13.16              Americas
## 7                28.02              Americas
## 8                 6.89                Europe
## 9                23.13       Western Pacific
## 10                4.13                Europe
## 11                9.16                Europe
## 12              119.54              Americas
## 13                6.89 Eastern Mediterranean
## 14                9.05       South-East Asia
## 15                3.77              Americas
## 16                1.57                Europe
## 17                3.64                Europe
## 18               20.00              Americas
## 19               10.49                Africa
## 20               10.00       South-East Asia
## 21               16.71              Americas
## 22               23.81                Europe
## 23               41.57                Africa
## 24               15.28              Americas
## 25                0.00       Western Pacific
## 26               18.95                Europe
## 27                3.29                Africa
## 28                2.64       South-East Asia
## 29               17.39                Africa
## 30               12.41                Africa
## 31               32.16       Western Pacific
## 32                5.90                Africa
## 33                3.13              Americas
## 34                1.12                Africa
## 35                3.71                Africa
## 36                4.47              Americas
## 37                1.36       Western Pacific
## 38               26.03              Americas
## 39                5.99                Africa
## 40               12.24                Africa
## 41                4.75                Africa
## 42               37.34              Americas
## 43                9.38                Africa
## 44               11.69                Europe
## 45                3.52              Americas
## 46                2.12                Europe
## 47               10.06                Europe
## 48                2.29                Europe
## 49                0.78 Eastern Mediterranean
## 50                0.00              Americas
## 51               18.90              Americas
```

```
## 52                8.77              Americas
## 53                4.62 Eastern Mediterranean
## 54               23.17              Americas
## 55                0.00                Africa
## 56                5.58                Africa
## 57                0.64                Europe
## 58               26.83                Africa
## 59               42.52                Africa
## 60                0.00       Western Pacific
## 61                0.79                Europe
## 62                2.96                Europe
## 63               11.75                Africa
## 64              191.07                Africa
## 65                9.43                Europe
## 66                1.86                Europe
## 67               18.27                Africa
## 68                5.36                Europe
## 69                7.69                Europe
## 70                0.00              Americas
## 71               16.06              Americas
## 72                7.06                Africa
## 73                0.26                Africa
## 74               15.43              Americas
## 75                4.07              Americas
## 76                0.00                Europe
## 77               14.82              Americas
## 78                2.51                Europe
## 79                0.82                Europe
## 80               28.11       South-East Asia
## 81               13.70       South-East Asia
## 82                6.30 Eastern Mediterranean
## 83               18.89 Eastern Mediterranean
## 84                0.49                Europe
## 85               23.04                Europe
## 86                0.68                Europe
## 87                5.44              Americas
## 88               21.15       Western Pacific
## 89               -3.84 Eastern Mediterranean
## 90               15.22                Europe
## 91               30.53                Africa
## 92               26.14                Europe
## 93                7.72 Eastern Mediterranean
## 94               22.67                Europe
## 95                5.26       Western Pacific
## 96                2.27                Europe
## 97               33.63 Eastern Mediterranean
## 98               40.67                Africa
## 99                5.42                Africa
## 100              42.78 Eastern Mediterranean
## 101               0.00                Europe
## 102               3.70                Europe
## 103              12.09                Europe
## 104              35.47                Africa
## 105              22.46                Africa
```

```
## 106              1.18       Western Pacific
## 107             12.34       South-East Asia
## 108              1.54                Africa
## 109              3.55                Europe
## 110              4.81                Africa
## 111              0.29                Africa
## 112             13.19              Americas
## 113              9.66                Europe
## 114              6.42                Europe
## 115              0.70       Western Pacific
## 116             32.22                Europe
## 117             18.93 Eastern Mediterranean
## 118             12.87                Africa
## 119             37.13                Africa
## 120              5.09       South-East Asia
## 121              2.46                Europe
## 122              0.13       Western Pacific
## 123              9.28              Americas
## 124              2.44                Africa
## 125             10.62                Africa
## 126             10.42                Europe
## 127              1.08                Europe
## 128             12.66 Eastern Mediterranean
## 129              3.08 Eastern Mediterranean
## 130             12.89              Americas
## 131            226.32       Western Pacific
## 132             21.34              Americas
## 133              8.96              Americas
## 134             19.07       Western Pacific
## 135              7.48                Europe
## 136              3.13                Europe
## 137              2.39 Eastern Mediterranean
## 138             20.35                Europe
## 139              5.21                Europe
## 140             15.35                Africa
## 141              0.00              Americas
## 142              4.35              Americas
## 143              4.00              Americas
## 144              0.00                Europe
## 145             15.95                Africa
## 146              6.15 Eastern Mediterranean
## 147              9.12                Africa
## 148             13.59                Europe
## 149              5.56                Africa
## 150              4.21                Africa
## 151              5.84       Western Pacific
## 152             10.15                Europe
## 153              6.86                Europe
## 154              2.11 Eastern Mediterranean
## 155             21.12                Africa
## 156              2.80       Western Pacific
## 157              4.25                Africa
## 158              2.86                Europe
## 159              2.75       South-East Asia
```

```
## 160               3.93 Eastern Mediterranean
## 161              37.44              Americas
## 162               1.73                Europe
## 163               2.51                Europe
## 164              29.12 Eastern Mediterranean
## 165               2.44       Western Pacific
## 166               4.54                Europe
## 167               0.00                Africa
## 168               1.45       South-East Asia
## 169               0.00       South-East Asia
## 170              11.62                Africa
## 171               8.03              Americas
## 172               5.36 Eastern Mediterranean
## 173               2.92                Europe
## 174              11.88              Americas
## 175               5.52                Africa
## 176              10.42                Europe
## 177               3.47 Eastern Mediterranean
## 178               1.60                Europe
## 179              12.97              Americas
## 180              23.67                Europe
## 181              29.63              Americas
## 182              12.24       Western Pacific
## 183              19.12 Eastern Mediterranean
## 184               0.00                Africa
## 185               4.45 Eastern Mediterranean
## 186              36.86                Africa
## 187              57.85                Africa
```

Question 8

Identify duplicated data in the dataset.

```
duplicated(covid_data)
```

```
##   [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [13] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [25] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [37] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [49] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [61] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [73] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [85] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [97] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [109] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [121] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [133] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [145] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [157] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
## [169] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [181] FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

Remove duplicated data and store in a subset.

```
data_unique = covid_data[!duplicated(covid_data),]
data_unique
```

```
##                       Country.Region Confirmed Deaths Recovered  Active
## 1                        Afghanistan     36263   1269     25198    9796
## 2                            Albania      4880    144      2745    1991
## 3                            Algeria     27973   1163     18837    7973
## 4                            Andorra       907     52       803      52
## 5                             Angola       950     41       242     667
## 6                Antigua and Barbuda        86      3        65      18
## 7                          Argentina    167416   3059     72575   91782
## 8                            Armenia     37390    711     26665   10014
## 9                          Australia     15303    167      9311    5825
## 10                           Austria     20558    713     18246    1599
## 11                        Azerbaijan     30446    423     23242    6781
## 12                           Bahamas       382     11        91     280
## 13                           Bahrain     39482    141     36110    3231
## 14                        Bangladesh    226225   2965    125683   97577
## 15                          Barbados       110      7        94       9
## 16                           Belarus     67251    538     60492    6221
## 17                           Belgium     66428   9822     17452   39154
## 18                            Belize        48      2        26      20
## 19                             Benin      1770     35      1036     699
## 20                            Bhutan        99      0        86      13
## 21                           Bolivia     71181   2647     21478   47056
## 22             Bosnia and Herzegovina     10498    294      4930    5274
## 23                          Botswana       739      2        63     674
## 24                            Brazil   2442375  87618   1846641  508116
## 25                            Brunei       141      3       138       0
## 26                          Bulgaria     10621    347      5585    4689
## 27                      Burkina Faso      1100     53       926     121
## 28                             Burma       350      6       292      52
## 29                           Burundi       378      1       301      76
## 30                        Cabo Verde      2328     22      1550     756
## 31                          Cambodia       226      0       147      79
## 32                          Cameroon     17110    391     14539    2180
## 33                            Canada    116458   8944         0  107514
## 34           Central African Republic      4599     59      1546    2994
## 35                              Chad       922     75       810      37
## 36                             Chile    347923   9187    319954   18782
## 37                             China     86783   4656     78869    3258
## 38                          Colombia    257101   8777    131161  117163
## 39                           Comoros       354      7       328      19
## 40               Congo (Brazzaville)      3200     54       829    2317
## 41                  Congo (Kinshasa)      8844    208      5700    2936
## 42                        Costa Rica     15841    115      3824   11902
## 43                     Cote d'Ivoire     15655     96     10361    5198
## 44                           Croatia      4881    139      3936     806
```

```
## 45                          Cuba      2532     87      2351      94
## 46                        Cyprus      1060     19       852     189
## 47                       Czechia     15516    373     11428    3715
## 48                       Denmark     13761    613     12605     543
## 49                      Djibouti      5059     58      4977      24
## 50                      Dominica        18      0        18       0
## 51            Dominican Republic     64156   1083     30204   32869
## 52                       Ecuador     81161   5532     34896   40733
## 53                         Egypt     92482   4652     34838   52992
## 54                   El Salvador     15035    408      7778    6849
## 55             Equatorial Guinea      3071     51       842    2178
## 56                       Eritrea       265      0       191      74
## 57                       Estonia      2034     69      1923      42
## 58                      Eswatini      2316     34      1025    1257
## 59                      Ethiopia     14547    228      6386    7933
## 60                          Fiji        27      0        18       9
## 61                       Finland      7398    329      6920     149
## 62                        France    220352  30212     81212  108928
## 63                         Gabon      7189     49      4682    2458
## 64                        Gambia       326      8        66     252
## 65                       Georgia      1137     16       922     199
## 66                       Germany    207112   9125    190314    7673
## 67                         Ghana     33624    168     29801    3655
## 68                        Greece      4227    202      1374    2651
## 69                     Greenland        14      0        13       1
## 70                       Grenada        23      0        23       0
## 71                     Guatemala     45309   1761     32455   11093
## 72                        Guinea      7055     45      6257     753
## 73                 Guinea-Bissau      1954     26       803    1125
## 74                        Guyana       389     20       181     188
## 75                         Haiti      7340    158      4365    2817
## 76                      Holy See        12      0        12       0
## 77                      Honduras     39741   1166      5039   33536
## 78                       Hungary      4448    596      3329     523
## 79                       Iceland      1854     10      1823      21
## 80                         India   1480073  33408    951166  495499
## 81                     Indonesia    100303   4838     58173   37292
## 82                          Iran    293606  15912    255144   22550
## 83                          Iraq    112585   4458     77144   30983
## 84                       Ireland     25892   1764     23364     764
## 85                        Israel     63985    474     27133   36378
## 86                         Italy    246286  35112    198593   12581
## 87                       Jamaica       853     10       714     129
## 88                         Japan     31142    998     21970    8174
## 89                        Jordan      1176     11      1041     124
## 90                    Kazakhstan     84648    585     54404   29659
## 91                         Kenya     17975    285      7833    9857
## 92                        Kosovo      7413    185      4027    3201
## 93                        Kuwait     64379    438     55057    8884
## 94                     Kyrgyzstan     33296   1301     21205   10790
## 95                          Laos        20      0        19       1
## 96                        Latvia      1219     31      1045     143
## 97                       Lebanon      3882     51      1709    2122
## 98                       Lesotho       505     12       128     365
```

```
## 99                            Liberia      1167     72       646     449
## 100                             Libya      2827     64       577    2186
## 101                     Liechtenstein        86      1        81       4
## 102                         Lithuania      2019     80      1620     319
## 103                        Luxembourg      6321    112      4825    1384
## 104                        Madagascar      9690     91      6260    3339
## 105                            Malawi      3664     99      1645    1920
## 106                          Malaysia      8904    124      8601     179
## 107                          Maldives      3369     15      2547     807
## 108                              Mali      2513    124      1913     476
## 109                             Malta       701      9       665      27
## 110                        Mauritania      6208    156      4653    1399
## 111                         Mauritius       344     10       332       2
## 112                            Mexico    395489  44022    303810   47657
## 113                           Moldova     23154    748     16154    6252
## 114                            Monaco       116      4       104       8
## 115                          Mongolia       289      0       222      67
## 116                        Montenegro      2893     45       809    2039
## 117                           Morocco     20887    316     16553    4018
## 118                        Mozambique      1701     11         0    1690
## 119                           Namibia      1843      8       101    1734
## 120                             Nepal     18752     48     13754    4950
## 121                       Netherlands     53413   6160       189   47064
## 122                       New Zealand      1557     22      1514      21
## 123                         Nicaragua      3439    108      2492     839
## 124                             Niger      1132     69      1027      36
## 125                           Nigeria     41180    860     18203   22117
## 126                   North Macedonia     10213    466      5564    4183
## 127                            Norway      9132    255      8752     125
## 128                              Oman     77058    393     57028   19637
## 129                          Pakistan    274289   5842    241026   27421
## 130                            Panama     61442   1322     35086   25034
## 131                  Papua New Guinea        62      0        11      51
## 132                          Paraguay      4548     43      2905    1600
## 133                              Peru    389717  18418    272547   98752
## 134                       Philippines     82040   1945     26446   53649
## 135                            Poland     43402   1676     32856    8870
## 136                          Portugal     50299   1719     35375   13205
## 137                             Qatar    109597    165    106328    3104
## 138                           Romania     45902   2206     25794   17902
## 139                            Russia    816680  13334    602249  201097
## 140                            Rwanda      1879      5       975     899
## 141              Saint Kitts and Nevis        17      0        15       2
## 142                       Saint Lucia        24      0        22       2
## 143 Saint Vincent and the Grenadines        52      0        39      13
## 144                        San Marino       699     42       657       0
## 145              Sao Tome and Principe       865     14       734     117
## 146                      Saudi Arabia    268934   2760    222936   43238
## 147                           Senegal      9764    194      6477    3093
## 148                            Serbia     24141    543         0   23598
## 149                        Seychelles       114      0        39      75
## 150                      Sierra Leone      1783     66      1317     400
## 151                         Singapore     50838     27     45692    5119
## 152                           Slovakia      2181     28      1616     537
```

```
## 153                      Slovenia      2087    116      1733     238
## 154                       Somalia      3196     93      1543    1560
## 155                  South Africa    452529   7067    274925  170537
## 156                   South Korea     14203    300     13007     896
## 157                   South Sudan      2305     46      1175    1084
## 158                         Spain    272421  28432    150376   93613
## 159                     Sri Lanka      2805     11      2121     673
## 160                         Sudan     11424    720      5939    4765
## 161                      Suriname      1483     24       925     534
## 162                        Sweden     79395   5700         0   73695
## 163                   Switzerland     34477   1978     30900    1599
## 164                         Syria       674     40         0     634
## 165                        Taiwan*       462      7       440      15
## 166                    Tajikistan      7235     60      6028    1147
## 167                      Tanzania       509     21       183     305
## 168                      Thailand      3297     58      3111     128
## 169                   Timor-Leste        24      0         0      24
## 170                          Togo       874     18       607     249
## 171           Trinidad and Tobago       148      8       128      12
## 172                       Tunisia      1455     50      1157     248
## 173                        Turkey    227019   5630    210469   10920
## 174                            US   4290259 148011   1325804 2816444
## 175                        Uganda      1128      2       986     140
## 176                       Ukraine     67096   1636     37202   28258
## 177          United Arab Emirates     59177    345     52510    6322
## 178                United Kingdom    301708  45844      1437  254427
## 179                       Uruguay      1202     35       951     216
## 180                    Uzbekistan     21209    121     11674    9414
## 181                     Venezuela     15988    146      9959    5883
## 182                       Vietnam       431      0       365      66
## 183            West Bank and Gaza     10621     78      3752    6791
## 184                Western Sahara        10      1         8       1
## 185                         Yemen      1691    483       833     375
## 186                        Zambia      4552    140      2815    1597
## 187                      Zimbabwe      2704     36       542    2126
##     New.cases New.deaths New.recovered Deaths...100.Cases Recovered...100.Cases
## 1         106         10            18                3.50                 69.49
## 2         117          6            63                2.95                 56.25
## 3         616          8           749                4.16                 67.34
## 4          10          0             0                5.73                 88.53
## 5          18          1             0                4.32                 25.47
## 6           4          0             5                3.49                 75.58
## 7        4890        120          2057                1.83                 43.35
## 8          73          6           187                1.90                 71.32
## 9         368          6           137                1.09                 60.84
## 10         86          1            37                3.47                 88.75
## 11        396          6           558                1.39                 76.34
## 12         40          0             0                2.88                 23.82
## 13        351          1           421                0.36                 91.46
## 14       2772         37          1801                1.31                 55.56
## 15          0          0             0                6.36                 85.45
## 16        119          4            67                0.80                 89.95
## 17        402          1            14               14.79                 26.27
## 18          0          0             0                4.17                 54.17
```

```
## 19          0          0          0               1.98               58.53
## 20          4          0          1               0.00               86.87
## 21       1752         64        309               3.72               30.17
## 22        731         14        375               2.80               46.96
## 23         53          1         11               0.27                8.53
## 24      23284        614      33728               3.59               75.61
## 25          0          0          0               2.13               97.87
## 26        194          7        230               3.27               52.58
## 27         14          0          6               4.82               84.18
## 28          0          0          2               1.71               83.43
## 29         17          0         22               0.26               79.63
## 30         21          0        103               0.95               66.58
## 31          1          0          4               0.00               65.04
## 32        402          6          0               2.29               84.97
## 33        682         11          0               7.68                0.00
## 34          0          0          0               1.28               33.62
## 35          7          0          0               8.13               87.85
## 36       2133         75       1859               2.64               91.96
## 37        213          4          7               5.37               90.88
## 38      16306        508      11494               3.41               51.02
## 39          0          0          0               1.98               92.66
## 40        162          3         73               1.69               25.91
## 41         13          4        190               2.35               64.45
## 42        612         11         88               0.73               24.14
## 43         59          0        183               0.61               66.18
## 44         24          3         70               2.85               80.64
## 45         37          0          2               3.44               92.85
## 46          3          0          0               1.79               80.38
## 47        192          2          0               2.40               73.65
## 48        109          0         77               4.45               91.60
## 49          9          0         11               1.15               98.38
## 50          0          0          0               0.00              100.00
## 51       1248         20       1601               1.69               47.08
## 52        467         17          0               6.82               43.00
## 53        420         46       1007               5.03               37.67
## 54        405          8        130               2.71               51.73
## 55          0          0          0               1.66               27.42
## 56          2          0          2               0.00               72.08
## 57          0          0          1               3.39               94.54
## 58        109          2         39               1.47               44.26
## 59        579          5        170               1.57               43.90
## 60          0          0          0               0.00               66.67
## 61          5          0          0               4.45               93.54
## 62       2551         17        267              13.71               36.86
## 63        205          0        219               0.68               65.13
## 64         49          2          6               2.45               20.25
## 65          6          0          2               1.41               81.09
## 66        445          1        259               4.41               91.89
## 67        655          0        307               0.50               88.63
## 68         34          0          0               4.78               32.51
## 69          1          0          0               0.00               92.86
## 70          0          0          0               0.00              100.00
## 71        256         27        843               3.89               71.63
## 72         47          2        105               0.64               88.69
```

```
## 73          0          0          0          1.33          41.10
## 74         19          0          0          5.14          46.53
## 75         25          1          0          2.15          59.47
## 76          0          0          0          0.00         100.00
## 77        465         50        117          2.93          12.68
## 78         13          0          0         13.40          74.84
## 79          7          0          0          0.54          98.33
## 80      44457        637      33598          2.26          64.26
## 81       1525         57       1518          4.82          58.00
## 82       2434        212       1931          5.42          86.90
## 83       2553         96       1927          3.96          68.52
## 84         11          0          0          6.81          90.24
## 85       2029          4        108          0.74          42.41
## 86        168          5        147         14.26          80.64
## 87         11          0          0          1.17          83.70
## 88        594          0        364          3.20          70.55
## 89          8          0          0          0.94          88.52
## 90       1526          0       1833          0.69          64.27
## 91        372          5         90          1.59          43.58
## 92        496         16        274          2.50          54.32
## 93        606          5        684          0.68          85.52
## 94        483         24        817          3.91          63.69
## 95          0          0          0          0.00          95.00
## 96          0          0          0          2.54          85.73
## 97        132          0         17          1.31          44.02
## 98          0          0          0          2.38          25.35
## 99          5          0          5          6.17          55.36
## 100       158          4         24          2.26          20.41
## 101         0          0          0          1.16          94.19
## 102        11          0          4          3.96          80.24
## 103        49          0        178          1.77          76.33
## 104       395          6        681          0.94          64.60
## 105        24          0          6          2.70          44.90
## 106         7          0          1          1.39          96.60
## 107        67          0         19          0.45          75.60
## 108         3          1          2          4.93          76.12
## 109         1          0          0          1.28          94.86
## 110        37          0        223          2.51          74.95
## 111         0          0          0          2.91          96.51
## 112      4973        342       8588         11.13          76.82
## 113       120         13        245          3.23          69.77
## 114         0          0          0          3.45          89.66
## 115         1          0          4          0.00          76.82
## 116        94          2         70          1.56          27.96
## 117       609          3        115          1.51          79.25
## 118        32          0          0          0.65           0.00
## 119        68          0         26          0.43           5.48
## 120       139          3        626          0.26          73.35
## 121       419          1          0         11.53           0.35
## 122         1          0          1          1.41          97.24
## 123         0          0          0          3.14          72.46
## 124         0          0          0          6.10          90.72
## 125       648          2        829          2.09          44.20
## 126       127          6        137          4.56          54.48
```

```
## 127       15          0          0             2.79             95.84
## 128     1053          9       1729             0.51             74.01
## 129     1176         20       3592             2.13             87.87
## 130     1146         28        955             2.15             57.10
## 131        0          0          0             0.00             17.74
## 132      104          2        111             0.95             63.87
## 133    13756        575       4697             4.73             69.93
## 134     1592         13        336             2.37             32.24
## 135      337          5        103             3.86             75.70
## 136      135          2        158             3.42             70.33
## 137      292          0        304             0.15             97.02
## 138     1104         19        151             4.81             56.19
## 139     5607         85       3077             1.63             73.74
## 140       58          0         57             0.27             51.89
## 141        0          0          0             0.00             88.24
## 142        0          0          0             0.00             91.67
## 143        0          0          0             0.00             75.00
## 144        0          0          0             6.01             93.99
## 145        2          0         38             1.62             84.86
## 146     1993         27       2613             1.03             82.90
## 147       83          3         68             1.99             66.34
## 148      411          9          0             2.25              0.00
## 149        0          0          0             0.00             34.21
## 150        0          0          4             3.70             73.86
## 151      469          0        171             0.05             89.88
## 152        2          0         39             1.28             74.09
## 153        5          0         55             5.56             83.04
## 154       18          0         22             2.91             48.28
## 155     7096        298       9848             1.56             60.75
## 156       28          1        102             2.11             91.58
## 157       43          1          0             2.00             50.98
## 158        0          0          0            10.44             55.20
## 159       23          0         15             0.39             75.61
## 160       39          3         49             6.30             51.99
## 161       44          1         35             1.62             62.37
## 162      398          3          0             7.18              0.00
## 163       65          1        200             5.74             89.62
## 164       24          2          0             5.93              0.00
## 165        4          0          0             1.52             95.24
## 166       43          1         58             0.83             83.32
## 167        0          0          0             4.13             35.95
## 168        6          0          2             1.76             94.36
## 169        0          0          0             0.00              0.00
## 170        6          0          8             2.06             69.45
## 171        1          0          0             5.41             86.49
## 172        3          0         15             3.44             79.52
## 173      919         17        982             2.48             92.71
## 174    56336       1076      27941             3.45             30.90
## 175       13          0          4             0.18             87.41
## 176      835         11        317             2.44             55.45
## 177      264          1        328             0.58             88.73
## 178      688          7          3            15.19              0.48
## 179       10          1          3             2.91             79.12
## 180      678          5        569             0.57             55.04
```

```
## 181       525          4          213              0.91                62.29
## 182        11          0            0              0.00                84.69
## 183       152          2            0              0.73                35.33
## 184         0          0            0             10.00                80.00
## 185        10          4           36             28.56                49.26
## 186        71          1          465              3.08                61.84
## 187       192          2           24              1.33                20.04
##     Deaths...100.Recovered Confirmed.last.week X1.week.change
## 1                     5.04               35526            737
## 2                     5.25                4171            709
## 3                     6.17               23691           4282
## 4                     6.48                 884             23
## 5                    16.94                 749            201
## 6                     4.62                  76             10
## 7                     4.21              130774          36642
## 8                     2.67               34981           2409
## 9                     1.79               12428           2875
## 10                    3.91               19743            815
## 11                    1.82               27890           2556
## 12                   12.09                 174            208
## 13                    0.39               36936           2546
## 14                    2.36              207453          18772
## 15                    7.45                 106              4
## 16                    0.89               66213           1038
## 17                   56.28               64094           2334
## 18                    7.69                  40              8
## 19                    3.38                1602            168
## 20                    0.00                  90              9
## 21                   12.32               60991          10190
## 22                    5.96                8479           2019
## 23                    3.17                 522            217
## 24                    4.74             2118646         323729
## 25                    2.17                 141              0
## 26                    6.21                8929           1692
## 27                    5.72                1065             35
## 28                    2.05                 341              9
## 29                    0.33                 322             56
## 30                    1.42                2071            257
## 31                    0.00                 171             55
## 32                    2.69               16157            953
## 33                     Inf              112925           3533
## 34                    3.82                4548             51
## 35                    9.26                 889             33
## 36                    2.87              333029          14894
## 37                    5.90               85622           1161
## 38                    6.69              204005          53096
## 39                    2.13                 334             20
## 40                    6.51                2851            349
## 41                    3.65                8443            401
## 42                    3.01               11534           4307
## 43                    0.93               14312           1343
## 44                    3.53                4370            511
## 45                    3.70                2446             86
## 46                    2.23                1038             22
```

```
## 47                3.26             14098             1418
## 48                4.86             13453              308
## 49                1.17              5020               39
## 50                0.00                18                0
## 51                3.59             53956            10200
## 52               15.85             74620             6541
## 53               13.35             88402             4080
## 54                5.25             12207             2828
## 55                6.06              3071                0
## 56                0.00               251               14
## 57                3.59              2021               13
## 58                3.32              1826              490
## 59                3.57             10207             4340
## 60                0.00                27                0
## 61                4.75              7340               58
## 62               37.20            214023             6329
## 63                1.05              6433              756
## 64               12.12               112              214
## 65                1.74              1039               98
## 66                4.79            203325             3787
## 67                0.56             28430             5194
## 68               14.70              4012              215
## 69                0.00                13                1
## 70                0.00                23                0
## 71                5.43             39039             6270
## 72                0.72              6590              465
## 73                3.24              1949                5
## 74               11.05               337               52
## 75                3.62              7053              287
## 76                0.00                12                0
## 77               23.14             34611             5130
## 78               17.90              4339              109
## 79                0.55              1839               15
## 80                3.51           1155338           324735
## 81                8.32             88214            12089
## 82                6.24            276202            17404
## 83                5.78             94693            17892
## 84                7.55             25766              126
## 85                1.75             52003            11982
## 86               17.68            244624             1662
## 87                1.40               809               44
## 88                4.54             25706             5436
## 89                1.06              1223              -47
## 90                1.08             73468            11180
## 91                3.64             13771             4204
## 92                4.59              5877             1536
## 93                0.80             59763             4616
## 94                6.14             27143             6153
## 95                0.00                19                1
## 96                2.97              1192               27
## 97                2.98              2905              977
## 98                9.38               359              146
## 99               11.15              1107               60
## 100              11.09              1980              847
```

```
## 101                1.23                86                 0
## 102                4.94              1947                72
## 103                2.32              5639               682
## 104                1.45              7153              2537
## 105                6.02              2992               672
## 106                1.44              8800               104
## 107                0.59              2999               370
## 108                6.48              2475                38
## 109                1.35               677                24
## 110                3.35              5923               285
## 111                3.01               343                 1
## 112               14.49            349396             46093
## 113                4.63             21115              2039
## 114                3.85               109                 7
## 115                0.00               287                 2
## 116                5.56              2188               705
## 117                1.91             17562              3325
## 118                 Inf              1507               194
## 119                7.92              1344               499
## 120                0.35             17844               908
## 121             3259.26             52132              1281
## 122                1.45              1555                 2
## 123                4.33              3147               292
## 124                6.72              1105                27
## 125                4.72             37225              3955
## 126                8.38              9249               964
## 127                2.91              9034                98
## 128                0.69             68400              8658
## 129                2.42            266096              8193
## 130                3.77             54426              7016
## 131                0.00                19                43
## 132                1.48              3748               800
## 133                6.76            357681             32036
## 134                7.35             68898             13142
## 135                5.10             40383              3019
## 136                4.86             48771              1528
## 137                0.16            107037              2560
## 138                8.55             38139              7763
## 139                2.21            776212             40468
## 140                0.51              1629               250
## 141                0.00                17                 0
## 142                0.00                23                 1
## 143                0.00                50                 2
## 144                6.39               699                 0
## 145                1.91               746               119
## 146                1.24            253349             15585
## 147                3.00              8948               816
## 148                 Inf             21253              2888
## 149                0.00               108                 6
## 150                5.01              1711                72
## 151                0.06             48035              2803
## 152                1.73              1980               201
## 153                6.69              1953               134
## 154                6.03              3130                66
```

```
## 155                  2.57             373628          78901
## 156                  2.31              13816            387
## 157                  3.91               2211             94
## 158                 18.91             264836           7585
## 159                  0.52               2730             75
## 160                 12.12              10992            432
## 161                  2.59               1079            404
## 162                   Inf              78048           1347
## 163                  6.40              33634            843
## 164                   Inf                522            152
## 165                  1.59                451             11
## 166                  1.00               6921            314
## 167                 11.48                509              0
## 168                  1.86               3250             47
## 169                  0.00                 24              0
## 170                  2.97                783             91
## 171                  6.25                137             11
## 172                  4.32               1381             74
## 173                  2.67             220572           6447
## 174                 11.16            3834677         455582
## 175                  0.20               1069             59
## 176                  4.40              60767           6329
## 177                  0.66              57193           1984
## 178               3190.26             296944           4764
## 179                  3.68               1064            138
## 180                  1.04              17149           4060
## 181                  1.47              12334           3654
## 182                  0.00                384             47
## 183                  2.08               8916           1705
## 184                 12.50                 10              0
## 185                 57.98               1619             72
## 186                  4.97               3326           1226
## 187                  6.64               1713            991
##     X1.week...increase            WHO.Region
## 1                 2.07 Eastern Mediterranean
## 2                17.00                Europe
## 3                18.07                Africa
## 4                 2.60                Europe
## 5                26.84                Africa
## 6                13.16              Americas
## 7                28.02              Americas
## 8                 6.89                Europe
## 9                23.13       Western Pacific
## 10                4.13                Europe
## 11                9.16                Europe
## 12              119.54              Americas
## 13                6.89 Eastern Mediterranean
## 14                9.05       South-East Asia
## 15                3.77              Americas
## 16                1.57                Europe
## 17                3.64                Europe
## 18               20.00              Americas
## 19               10.49                Africa
## 20               10.00       South-East Asia
```

```
## 21               16.71              Americas
## 22               23.81                Europe
## 23               41.57                Africa
## 24               15.28              Americas
## 25                0.00       Western Pacific
## 26               18.95                Europe
## 27                3.29                Africa
## 28                2.64       South-East Asia
## 29               17.39                Africa
## 30               12.41                Africa
## 31               32.16       Western Pacific
## 32                5.90                Africa
## 33                3.13              Americas
## 34                1.12                Africa
## 35                3.71                Africa
## 36                4.47              Americas
## 37                1.36       Western Pacific
## 38               26.03              Americas
## 39                5.99                Africa
## 40               12.24                Africa
## 41                4.75                Africa
## 42               37.34              Americas
## 43                9.38                Africa
## 44               11.69                Europe
## 45                3.52              Americas
## 46                2.12                Europe
## 47               10.06                Europe
## 48                2.29                Europe
## 49                0.78 Eastern Mediterranean
## 50                0.00              Americas
## 51               18.90              Americas
## 52                8.77              Americas
## 53                4.62 Eastern Mediterranean
## 54               23.17              Americas
## 55                0.00                Africa
## 56                5.58                Africa
## 57                0.64                Europe
## 58               26.83                Africa
## 59               42.52                Africa
## 60                0.00       Western Pacific
## 61                0.79                Europe
## 62                2.96                Europe
## 63               11.75                Africa
## 64              191.07                Africa
## 65                9.43                Europe
## 66                1.86                Europe
## 67               18.27                Africa
## 68                5.36                Europe
## 69                7.69                Europe
## 70                0.00              Americas
## 71               16.06              Americas
## 72                7.06                Africa
## 73                0.26                Africa
## 74               15.43              Americas
```

```
## 75                4.07              Americas
## 76                0.00                Europe
## 77               14.82              Americas
## 78                2.51                Europe
## 79                0.82                Europe
## 80               28.11       South-East Asia
## 81               13.70       South-East Asia
## 82                6.30 Eastern Mediterranean
## 83               18.89 Eastern Mediterranean
## 84                0.49                Europe
## 85               23.04                Europe
## 86                0.68                Europe
## 87                5.44              Americas
## 88               21.15       Western Pacific
## 89               -3.84 Eastern Mediterranean
## 90               15.22                Europe
## 91               30.53                Africa
## 92               26.14                Europe
## 93                7.72 Eastern Mediterranean
## 94               22.67                Europe
## 95                5.26       Western Pacific
## 96                2.27                Europe
## 97               33.63 Eastern Mediterranean
## 98               40.67                Africa
## 99                5.42                Africa
## 100              42.78 Eastern Mediterranean
## 101               0.00                Europe
## 102               3.70                Europe
## 103              12.09                Europe
## 104              35.47                Africa
## 105              22.46                Africa
## 106               1.18       Western Pacific
## 107              12.34       South-East Asia
## 108               1.54                Africa
## 109               3.55                Europe
## 110               4.81                Africa
## 111               0.29                Africa
## 112              13.19              Americas
## 113               9.66                Europe
## 114               6.42                Europe
## 115               0.70       Western Pacific
## 116              32.22                Europe
## 117              18.93 Eastern Mediterranean
## 118              12.87                Africa
## 119              37.13                Africa
## 120               5.09       South-East Asia
## 121               2.46                Europe
## 122               0.13       Western Pacific
## 123               9.28              Americas
## 124               2.44                Africa
## 125              10.62                Africa
## 126              10.42                Europe
## 127               1.08                Europe
## 128              12.66 Eastern Mediterranean
```

```
## 129              3.08 Eastern Mediterranean
## 130             12.89              Americas
## 131            226.32       Western Pacific
## 132             21.34              Americas
## 133              8.96              Americas
## 134             19.07       Western Pacific
## 135              7.48                Europe
## 136              3.13                Europe
## 137              2.39 Eastern Mediterranean
## 138             20.35                Europe
## 139              5.21                Europe
## 140             15.35                Africa
## 141              0.00              Americas
## 142              4.35              Americas
## 143              4.00              Americas
## 144              0.00                Europe
## 145             15.95                Africa
## 146              6.15 Eastern Mediterranean
## 147              9.12                Africa
## 148             13.59                Europe
## 149              5.56                Africa
## 150              4.21                Africa
## 151              5.84       Western Pacific
## 152             10.15                Europe
## 153              6.86                Europe
## 154              2.11 Eastern Mediterranean
## 155             21.12                Africa
## 156              2.80       Western Pacific
## 157              4.25                Africa
## 158              2.86                Europe
## 159              2.75       South-East Asia
## 160              3.93 Eastern Mediterranean
## 161             37.44              Americas
## 162              1.73                Europe
## 163              2.51                Europe
## 164             29.12 Eastern Mediterranean
## 165              2.44       Western Pacific
## 166              4.54                Europe
## 167              0.00                Africa
## 168              1.45       South-East Asia
## 169              0.00       South-East Asia
## 170             11.62                Africa
## 171              8.03              Americas
## 172              5.36 Eastern Mediterranean
## 173              2.92                Europe
## 174             11.88              Americas
## 175              5.52                Africa
## 176             10.42                Europe
## 177              3.47 Eastern Mediterranean
## 178              1.60                Europe
## 179             12.97              Americas
## 180             23.67                Europe
## 181             29.63              Americas
## 182             12.24       Western Pacific
```

```
## 183              19.12 Eastern Mediterranean
## 184               0.00                Africa
## 185               4.45 Eastern Mediterranean
## 186              36.86                Africa
## 187              57.85                Africa
```

Question 9

Reorder multiple rows in descending order

```
desc_data = covid_data[order(covid_data$Confirmed, decreasing = TRUE),]
desc_data
```

```
##                       Country.Region Confirmed Deaths Recovered  Active
## 174                             US   4290259 148011   1325804 2816444
## 24                          Brazil   2442375  87618   1846641  508116
## 80                           India   1480073  33408    951166  495499
## 139                         Russia    816680  13334    602249  201097
## 155                   South Africa    452529   7067    274925  170537
## 112                         Mexico    395489  44022    303810   47657
## 133                           Peru    389717  18418    272547   98752
## 36                           Chile    347923   9187    319954   18782
## 178                 United Kingdom    301708  45844      1437  254427
## 82                            Iran    293606  15912    255144   22550
## 129                       Pakistan    274289   5842    241026   27421
## 158                          Spain    272421  28432    150376   93613
## 146                    Saudi Arabia    268934   2760    222936   43238
## 38                         Colombia    257101   8777    131161  117163
## 86                            Italy    246286  35112    198593   12581
## 173                          Turkey    227019   5630    210469   10920
## 14                        Bangladesh    226225   2965    125683   97577
## 62                            France    220352  30212     81212  108928
## 66                           Germany    207112   9125    190314    7673
## 7                          Argentina    167416   3059     72575   91782
## 33                            Canada    116458   8944         0  107514
## 83                              Iraq    112585   4458     77144   30983
## 137                             Qatar    109597    165    106328    3104
## 81                          Indonesia    100303   4838     58173   37292
## 53                              Egypt     92482   4652     34838   52992
## 37                              China     86783   4656     78869    3258
## 90                         Kazakhstan     84648    585     54404   29659
## 134                       Philippines     82040   1945     26446   53649
## 52                            Ecuador     81161   5532     34896   40733
## 162                            Sweden     79395   5700         0   73695
## 128                               Oman     77058    393     57028   19637
## 21                             Bolivia     71181   2647     21478   47056
## 16                             Belarus     67251    538     60492    6221
## 176                            Ukraine     67096   1636     37202   28258
## 17                             Belgium     66428   9822     17452   39154
```

```
## 93                        Kuwait     64379    438     55057    8884
## 51            Dominican Republic     64156   1083     30204   32869
## 85                        Israel     63985    474     27133   36378
## 130                       Panama     61442   1322     35086   25034
## 177          United Arab Emirates     59177    345     52510    6322
## 121                   Netherlands     53413   6160       189   47064
## 151                     Singapore     50838     27     45692    5119
## 136                      Portugal     50299   1719     35375   13205
## 138                       Romania     45902   2206     25794   17902
## 71                      Guatemala     45309   1761     32455   11093
## 135                        Poland     43402   1676     32856    8870
## 125                       Nigeria     41180    860     18203   22117
## 77                       Honduras     39741   1166      5039   33536
## 13                        Bahrain     39482    141     36110    3231
## 8                         Armenia     37390    711     26665   10014
## 1                     Afghanistan     36263   1269     25198    9796
## 163                   Switzerland     34477   1978     30900    1599
## 67                          Ghana     33624    168     29801    3655
## 94                      Kyrgyzstan     33296   1301     21205   10790
## 88                          Japan     31142    998     21970    8174
## 11                     Azerbaijan     30446    423     23242    6781
## 3                         Algeria     27973   1163     18837    7973
## 84                        Ireland     25892   1764     23364     764
## 148                        Serbia     24141    543         0   23598
## 113                       Moldova     23154    748     16154    6252
## 180                    Uzbekistan     21209    121     11674    9414
## 117                       Morocco     20887    316     16553    4018
## 10                        Austria     20558    713     18246    1599
## 120                         Nepal     18752     48     13754    4950
## 91                          Kenya     17975    285      7833    9857
## 32                       Cameroon     17110    391     14539    2180
## 181                     Venezuela     15988    146      9959    5883
## 42                     Costa Rica     15841    115      3824   11902
## 43                  Cote d'Ivoire     15655     96     10361    5198
## 47                        Czechia     15516    373     11428    3715
## 9                       Australia     15303    167      9311    5825
## 54                    El Salvador     15035    408      7778    6849
## 59                       Ethiopia     14547    228      6386    7933
## 156                   South Korea     14203    300     13007     896
## 48                       Denmark     13761    613     12605     543
## 160                        Sudan     11424    720      5939    4765
## 26                       Bulgaria     10621    347      5585    4689
## 183          West Bank and Gaza     10621     78      3752    6791
## 22     Bosnia and Herzegovina     10498    294      4930    5274
## 126           North Macedonia     10213    466      5564    4183
## 147                     Senegal      9764    194      6477    3093
## 104                  Madagascar      9690     91      6260    3339
## 127                      Norway      9132    255      8752     125
## 106                    Malaysia      8904    124      8601     179
## 41           Congo (Kinshasa)      8844    208      5700    2936
## 92                        Kosovo      7413    185      4027    3201
## 61                        Finland      7398    329      6920     149
## 75                          Haiti      7340    158      4365    2817
## 166                    Tajikistan      7235     60      6028    1147
```

```
## 63                          Gabon      7189     49      4682    2458
## 72                         Guinea      7055     45      6257     753
## 103                    Luxembourg      6321    112      4825    1384
## 110                    Mauritania      6208    156      4653    1399
## 49                       Djibouti      5059     58      4977      24
## 44                       Croatia       4881    139      3936     806
## 2                        Albania       4880    144      2745    1991
## 34     Central African Republic      4599     59      1546    2994
## 186                        Zambia      4552    140      2815    1597
## 132                      Paraguay      4548     43      2905    1600
## 78                        Hungary      4448    596      3329     523
## 68                         Greece      4227    202      1374    2651
## 97                        Lebanon      3882     51      1709    2122
## 105                       Malawi       3664     99      1645    1920
## 123                    Nicaragua       3439    108      2492     839
## 107                     Maldives       3369     15      2547     807
## 168                     Thailand       3297     58      3111     128
## 40          Congo (Brazzaville)        3200     54       829    2317
## 154                     Somalia        3196     93      1543    1560
## 55            Equatorial Guinea        3071     51       842    2178
## 116                  Montenegro        2893     45       809    2039
## 100                       Libya        2827     64       577    2186
## 159                   Sri Lanka        2805     11      2121     673
## 187                    Zimbabwe        2704     36       542    2126
## 45                         Cuba        2532     87      2351      94
## 108                        Mali        2513    124      1913     476
## 30                    Cabo Verde       2328     22      1550     756
## 58                     Eswatini        2316     34      1025    1257
## 157                  South Sudan       2305     46      1175    1084
## 152                     Slovakia       2181     28      1616     537
## 153                     Slovenia       2087    116      1733     238
## 57                       Estonia       2034     69      1923      42
## 102                     Lithuania      2019     80      1620     319
## 73                  Guinea-Bissau      1954     26       803    1125
## 140                        Rwanda      1879      5       975     899
## 79                         Iceland     1854     10      1823      21
## 119                       Namibia      1843      8       101    1734
## 150                   Sierra Leone     1783     66      1317     400
## 19                           Benin     1770     35      1036     699
## 118                    Mozambique      1701     11         0    1690
## 185                         Yemen      1691    483       833     375
## 122                   New Zealand      1557     22      1514      21
## 161                      Suriname      1483     24       925     534
## 172                      Tunisia       1455     50      1157     248
## 96                        Latvia       1219     31      1045     143
## 179                      Uruguay       1202     35       951     216
## 89                        Jordan       1176     11      1041     124
## 99                        Liberia      1167     72       646     449
## 65                        Georgia      1137     16       922     199
## 124                         Niger      1132     69      1027      36
## 175                        Uganda      1128      2       986     140
## 27                     Burkina Faso     1100     53       926     121
## 46                         Cyprus       1060     19       852     189
## 5                          Angola        950     41       242     667
```

```
## 35                              Chad       922     75       810      37
## 4                             Andorra       907     52       803      52
## 170                              Togo       874     18       607     249
## 145            Sao Tome and Principe       865     14       734     117
## 87                             Jamaica       853     10       714     129
## 23                            Botswana       739      2        63     674
## 109                              Malta       701      9       665      27
## 144                         San Marino       699     42       657       0
## 164                              Syria       674     40         0     634
## 167                           Tanzania       509     21       183     305
## 98                              Lesotho       505     12       128     365
## 165                             Taiwan*       462      7       440      15
## 182                             Vietnam       431      0       365      66
## 74                               Guyana       389     20       181     188
## 12                              Bahamas       382     11        91     280
## 29                              Burundi       378      1       301      76
## 39                              Comoros       354      7       328      19
## 28                                Burma       350      6       292      52
## 111                           Mauritius       344     10       332       2
## 64                               Gambia       326      8        66     252
## 115                             Mongolia       289      0       222      67
## 56                               Eritrea       265      0       191      74
## 31                              Cambodia       226      0       147      79
## 171               Trinidad and Tobago       148      8       128      12
## 25                                Brunei       141      3       138       0
## 114                               Monaco       116      4       104       8
## 149                          Seychelles       114      0        39      75
## 15                             Barbados       110      7        94       9
## 20                               Bhutan        99      0        86      13
## 6                  Antigua and Barbuda        86      3        65      18
## 101                      Liechtenstein        86      1        81       4
## 131                  Papua New Guinea        62      0        11      51
## 143 Saint Vincent and the Grenadines        52      0        39      13
## 18                               Belize        48      2        26      20
## 60                                 Fiji        27      0        18       9
## 142                         Saint Lucia        24      0        22       2
## 169                         Timor-Leste        24      0         0      24
## 70                              Grenada        23      0        23       0
## 95                                 Laos        20      0        19       1
## 50                             Dominica        18      0        18       0
## 141              Saint Kitts and Nevis        17      0        15       2
## 69                             Greenland        14      0        13       1
## 76                              Holy See        12      0        12       0
## 184                     Western Sahara        10      1         8       1
##     New.cases New.deaths New.recovered Deaths...100.Cases Recovered...100.Cases
## 174     56336       1076         27941                3.45                 30.90
## 24      23284        614         33728                3.59                 75.61
## 80      44457        637         33598                2.26                 64.26
## 139      5607         85          3077                1.63                 73.74
## 155      7096        298          9848                1.56                 60.75
## 112      4973        342          8588               11.13                 76.82
## 133     13756        575          4697                4.73                 69.93
## 36       2133         75          1859                2.64                 91.96
## 178       688          7             3               15.19                  0.48
```

```
## 82       2434        212        1931         5.42        86.90
## 129      1176         20        3592         2.13        87.87
## 158         0          0           0        10.44        55.20
## 146      1993         27        2613         1.03        82.90
## 38      16306        508       11494         3.41        51.02
## 86        168          5         147        14.26        80.64
## 173       919         17         982         2.48        92.71
## 14       2772         37        1801         1.31        55.56
## 62       2551         17         267        13.71        36.86
## 66        445          1         259         4.41        91.89
## 7        4890        120        2057         1.83        43.35
## 33        682         11           0         7.68         0.00
## 83       2553         96        1927         3.96        68.52
## 137       292          0         304         0.15        97.02
## 81       1525         57        1518         4.82        58.00
## 53        420         46        1007         5.03        37.67
## 37        213          4           7         5.37        90.88
## 90       1526          0        1833         0.69        64.27
## 134      1592         13         336         2.37        32.24
## 52        467         17           0         6.82        43.00
## 162       398          3           0         7.18         0.00
## 128      1053          9        1729         0.51        74.01
## 21       1752         64         309         3.72        30.17
## 16        119          4          67         0.80        89.95
## 176       835         11         317         2.44        55.45
## 17        402          1          14        14.79        26.27
## 93        606          5         684         0.68        85.52
## 51       1248         20        1601         1.69        47.08
## 85       2029          4         108         0.74        42.41
## 130      1146         28         955         2.15        57.10
## 177       264          1         328         0.58        88.73
## 121       419          1           0        11.53         0.35
## 151       469          0         171         0.05        89.88
## 136       135          2         158         3.42        70.33
## 138      1104         19         151         4.81        56.19
## 71        256         27         843         3.89        71.63
## 135       337          5         103         3.86        75.70
## 125       648          2         829         2.09        44.20
## 77        465         50         117         2.93        12.68
## 13        351          1         421         0.36        91.46
## 8          73          6         187         1.90        71.32
## 1         106         10          18         3.50        69.49
## 163        65          1         200         5.74        89.62
## 67        655          0         307         0.50        88.63
## 94        483         24         817         3.91        63.69
## 88        594          0         364         3.20        70.55
## 11        396          6         558         1.39        76.34
## 3         616          8         749         4.16        67.34
## 84         11          0           0         6.81        90.24
## 148       411          9           0         2.25         0.00
## 113       120         13         245         3.23        69.77
## 180       678          5         569         0.57        55.04
## 117       609          3         115         1.51        79.25
## 10         86          1          37         3.47        88.75
```

```
## 120        139          3          626          0.26          73.35
## 91         372          5           90          1.59          43.58
## 32         402          6            0          2.29          84.97
## 181        525          4          213          0.91          62.29
## 42         612         11           88          0.73          24.14
## 43          59          0          183          0.61          66.18
## 47         192          2            0          2.40          73.65
## 9          368          6          137          1.09          60.84
## 54         405          8          130          2.71          51.73
## 59         579          5          170          1.57          43.90
## 156         28          1          102          2.11          91.58
## 48         109          0           77          4.45          91.60
## 160         39          3           49          6.30          51.99
## 26         194          7          230          3.27          52.58
## 183        152          2            0          0.73          35.33
## 22         731         14          375          2.80          46.96
## 126        127          6          137          4.56          54.48
## 147         83          3           68          1.99          66.34
## 104        395          6          681          0.94          64.60
## 127         15          0            0          2.79          95.84
## 106          7          0            1          1.39          96.60
## 41          13          4          190          2.35          64.45
## 92         496         16          274          2.50          54.32
## 61           5          0            0          4.45          93.54
## 75          25          1            0          2.15          59.47
## 166         43          1           58          0.83          83.32
## 63         205          0          219          0.68          65.13
## 72          47          2          105          0.64          88.69
## 103         49          0          178          1.77          76.33
## 110         37          0          223          2.51          74.95
## 49           9          0           11          1.15          98.38
## 44          24          3           70          2.85          80.64
## 2          117          6           63          2.95          56.25
## 34           0          0            0          1.28          33.62
## 186         71          1          465          3.08          61.84
## 132        104          2          111          0.95          63.87
## 78          13          0            0         13.40          74.84
## 68          34          0            0          4.78          32.51
## 97         132          0           17          1.31          44.02
## 105         24          0            6          2.70          44.90
## 123          0          0            0          3.14          72.46
## 107         67          0           19          0.45          75.60
## 168          6          0            2          1.76          94.36
## 40         162          3           73          1.69          25.91
## 154         18          0           22          2.91          48.28
## 55           0          0            0          1.66          27.42
## 116         94          2           70          1.56          27.96
## 100        158          4           24          2.26          20.41
## 159         23          0           15          0.39          75.61
## 187        192          2           24          1.33          20.04
## 45          37          0            2          3.44          92.85
## 108          3          1            2          4.93          76.12
## 30          21          0          103          0.95          66.58
## 58         109          2           39          1.47          44.26
```

```
## 157        43          1           0             2.00            50.98
## 152         2          0          39             1.28            74.09
## 153         5          0          55             5.56            83.04
## 57          0          0           1             3.39            94.54
## 102        11          0           4             3.96            80.24
## 73          0          0           0             1.33            41.10
## 140        58          0          57             0.27            51.89
## 79          7          0           0             0.54            98.33
## 119        68          0          26             0.43             5.48
## 150         0          0           4             3.70            73.86
## 19          0          0           0             1.98            58.53
## 118        32          0           0             0.65             0.00
## 185        10          4          36            28.56            49.26
## 122         1          0           1             1.41            97.24
## 161        44          1          35             1.62            62.37
## 172         3          0          15             3.44            79.52
## 96          0          0           0             2.54            85.73
## 179        10          1           3             2.91            79.12
## 89          8          0           0             0.94            88.52
## 99          5          0           5             6.17            55.36
## 65          6          0           2             1.41            81.09
## 124         0          0           0             6.10            90.72
## 175        13          0           4             0.18            87.41
## 27         14          0           6             4.82            84.18
## 46          3          0           0             1.79            80.38
## 5          18          1           0             4.32            25.47
## 35          7          0           0             8.13            87.85
## 4          10          0           0             5.73            88.53
## 170         6          0           8             2.06            69.45
## 145         2          0          38             1.62            84.86
## 87         11          0           0             1.17            83.70
## 23         53          1          11             0.27             8.53
## 109         1          0           0             1.28            94.86
## 144         0          0           0             6.01            93.99
## 164        24          2           0             5.93             0.00
## 167         0          0           0             4.13            35.95
## 98          0          0           0             2.38            25.35
## 165         4          0           0             1.52            95.24
## 182        11          0           0             0.00            84.69
## 74         19          0           0             5.14            46.53
## 12         40          0           0             2.88            23.82
## 29         17          0          22             0.26            79.63
## 39          0          0           0             1.98            92.66
## 28          0          0           2             1.71            83.43
## 111         0          0           0             2.91            96.51
## 64         49          2           6             2.45            20.25
## 115         1          0           4             0.00            76.82
## 56          2          0           2             0.00            72.08
## 31          1          0           4             0.00            65.04
## 171         1          0           0             5.41            86.49
## 25          0          0           0             2.13            97.87
## 114         0          0           0             3.45            89.66
## 149         0          0           0             0.00            34.21
## 15          0          0           0             6.36            85.45
```

```
## 20          4          0             1              0.00                86.87
## 6           4          0             5              3.49                75.58
## 101         0          0             0              1.16                94.19
## 131         0          0             0              0.00                17.74
## 143         0          0             0              0.00                75.00
## 18          0          0             0              4.17                54.17
## 60          0          0             0              0.00                66.67
## 142         0          0             0              0.00                91.67
## 169         0          0             0              0.00                 0.00
## 70          0          0             0              0.00               100.00
## 95          0          0             0              0.00                95.00
## 50          0          0             0              0.00               100.00
## 141         0          0             0              0.00                88.24
## 69          1          0             0              0.00                92.86
## 76          0          0             0              0.00               100.00
## 184         0          0             0             10.00                80.00
##     Deaths...100.Recovered Confirmed.last.week X1.week.change
## 174                  11.16             3834677         455582
## 24                    4.74             2118646         323729
## 80                    3.51             1155338         324735
## 139                   2.21              776212          40468
## 155                   2.57              373628          78901
## 112                  14.49              349396          46093
## 133                   6.76              357681          32036
## 36                    2.87              333029          14894
## 178                3190.26              296944           4764
## 82                    6.24              276202          17404
## 129                   2.42              266096           8193
## 158                  18.91              264836           7585
## 146                   1.24              253349          15585
## 38                    6.69              204005          53096
## 86                   17.68              244624           1662
## 173                   2.67              220572           6447
## 14                    2.36              207453          18772
## 62                   37.20              214023           6329
## 66                    4.79              203325           3787
## 7                     4.21              130774          36642
## 33                     Inf              112925           3533
## 83                    5.78               94693          17892
## 137                   0.16              107037           2560
## 81                    8.32               88214          12089
## 53                   13.35               88402           4080
## 37                    5.90               85622           1161
## 90                    1.08               73468          11180
## 134                   7.35               68898          13142
## 52                   15.85               74620           6541
## 162                    Inf               78048           1347
## 128                   0.69               68400           8658
## 21                   12.32               60991          10190
## 16                    0.89               66213           1038
## 176                   4.40               60767           6329
## 17                   56.28               64094           2334
## 93                    0.80               59763           4616
## 51                    3.59               53956          10200
```

```
## 85                1.75            52003          11982
## 130               3.77            54426           7016
## 177               0.66            57193           1984
## 121            3259.26            52132           1281
## 151               0.06            48035           2803
## 136               4.86            48771           1528
## 138               8.55            38139           7763
## 71                5.43            39039           6270
## 135               5.10            40383           3019
## 125               4.72            37225           3955
## 77               23.14            34611           5130
## 13                0.39            36936           2546
## 8                 2.67            34981           2409
## 1                 5.04            35526            737
## 163               6.40            33634            843
## 67                0.56            28430           5194
## 94                6.14            27143           6153
## 88                4.54            25706           5436
## 11                1.82            27890           2556
## 3                 6.17            23691           4282
## 84                7.55            25766            126
## 148                Inf            21253           2888
## 113               4.63            21115           2039
## 180               1.04            17149           4060
## 117               1.91            17562           3325
## 10                3.91            19743            815
## 120               0.35            17844            908
## 91                3.64            13771           4204
## 32                2.69            16157            953
## 181               1.47            12334           3654
## 42                3.01            11534           4307
## 43                0.93            14312           1343
## 47                3.26            14098           1418
## 9                 1.79            12428           2875
## 54                5.25            12207           2828
## 59                3.57            10207           4340
## 156               2.31            13816            387
## 48                4.86            13453            308
## 160              12.12            10992            432
## 26                6.21             8929           1692
## 183               2.08             8916           1705
## 22                5.96             8479           2019
## 126               8.38             9249            964
## 147               3.00             8948            816
## 104               1.45             7153           2537
## 127               2.91             9034             98
## 106               1.44             8800            104
## 41                3.65             8443            401
## 92                4.59             5877           1536
## 61                4.75             7340             58
## 75                3.62             7053            287
## 166               1.00             6921            314
## 63                1.05             6433            756
## 72                0.72             6590            465
```

```
## 103                2.32              5639              682
## 110                3.35              5923              285
## 49                 1.17              5020               39
## 44                 3.53              4370              511
## 2                  5.25              4171              709
## 34                 3.82              4548               51
## 186                4.97              3326             1226
## 132                1.48              3748              800
## 78                17.90              4339              109
## 68                14.70              4012              215
## 97                 2.98              2905              977
## 105                6.02              2992              672
## 123                4.33              3147              292
## 107                0.59              2999              370
## 168                1.86              3250               47
## 40                 6.51              2851              349
## 154                6.03              3130               66
## 55                 6.06              3071                0
## 116                5.56              2188              705
## 100               11.09              1980              847
## 159                0.52              2730               75
## 187                6.64              1713              991
## 45                 3.70              2446               86
## 108                6.48              2475               38
## 30                 1.42              2071              257
## 58                 3.32              1826              490
## 157                3.91              2211               94
## 152                1.73              1980              201
## 153                6.69              1953              134
## 57                 3.59              2021               13
## 102                4.94              1947               72
## 73                 3.24              1949                5
## 140                0.51              1629              250
## 79                 0.55              1839               15
## 119                7.92              1344              499
## 150                5.01              1711               72
## 19                 3.38              1602              168
## 118                 Inf              1507              194
## 185               57.98              1619               72
## 122                1.45              1555                2
## 161                2.59              1079              404
## 172                4.32              1381               74
## 96                 2.97              1192               27
## 179                3.68              1064              138
## 89                 1.06              1223              -47
## 99                11.15              1107               60
## 65                 1.74              1039               98
## 124                6.72              1105               27
## 175                0.20              1069               59
## 27                 5.72              1065               35
## 46                 2.23              1038               22
## 5                 16.94               749              201
## 35                 9.26               889               33
## 4                  6.48               884               23
```

```
## 170                  2.97                783             91
## 145                  1.91                746            119
## 87                   1.40                809             44
## 23                   3.17                522            217
## 109                  1.35                677             24
## 144                  6.39                699              0
## 164                   Inf                522            152
## 167                 11.48                509              0
## 98                   9.38                359            146
## 165                  1.59                451             11
## 182                  0.00                384             47
## 74                  11.05                337             52
## 12                  12.09                174            208
## 29                   0.33                322             56
## 39                   2.13                334             20
## 28                   2.05                341              9
## 111                  3.01                343              1
## 64                  12.12                112            214
## 115                  0.00                287              2
## 56                   0.00                251             14
## 31                   0.00                171             55
## 171                  6.25                137             11
## 25                   2.17                141              0
## 114                  3.85                109              7
## 149                  0.00                108              6
## 15                   7.45                106              4
## 20                   0.00                 90              9
## 6                    4.62                 76             10
## 101                  1.23                 86              0
## 131                  0.00                 19             43
## 143                  0.00                 50              2
## 18                   7.69                 40              8
## 60                   0.00                 27              0
## 142                  0.00                 23              1
## 169                  0.00                 24              0
## 70                   0.00                 23              0
## 95                   0.00                 19              1
## 50                   0.00                 18              0
## 141                  0.00                 17              0
## 69                   0.00                 13              1
## 76                   0.00                 12              0
## 184                 12.50                 10              0
##     X1.week...increase            WHO.Region
## 174              11.88              Americas
## 24               15.28              Americas
## 80               28.11       South-East Asia
## 139               5.21                Europe
## 155              21.12                Africa
## 112              13.19              Americas
## 133               8.96              Americas
## 36                4.47              Americas
## 178               1.60                Europe
## 82                6.30 Eastern Mediterranean
## 129               3.08 Eastern Mediterranean
```

```
## 158               2.86                Europe
## 146               6.15 Eastern Mediterranean
## 38               26.03              Americas
## 86                0.68                Europe
## 173               2.92                Europe
## 14                9.05       South-East Asia
## 62                2.96                Europe
## 66                1.86                Europe
## 7                28.02              Americas
## 33                3.13              Americas
## 83               18.89 Eastern Mediterranean
## 137               2.39 Eastern Mediterranean
## 81               13.70       South-East Asia
## 53                4.62 Eastern Mediterranean
## 37                1.36       Western Pacific
## 90               15.22                Europe
## 134              19.07       Western Pacific
## 52                8.77              Americas
## 162               1.73                Europe
## 128              12.66 Eastern Mediterranean
## 21               16.71              Americas
## 16                1.57                Europe
## 176              10.42                Europe
## 17                3.64                Europe
## 93                7.72 Eastern Mediterranean
## 51               18.90              Americas
## 85               23.04                Europe
## 130              12.89              Americas
## 177               3.47 Eastern Mediterranean
## 121               2.46                Europe
## 151               5.84       Western Pacific
## 136               3.13                Europe
## 138              20.35                Europe
## 71               16.06              Americas
## 135               7.48                Europe
## 125              10.62                Africa
## 77               14.82              Americas
## 13                6.89 Eastern Mediterranean
## 8                 6.89                Europe
## 1                 2.07 Eastern Mediterranean
## 163               2.51                Europe
## 67               18.27                Africa
## 94               22.67                Europe
## 88               21.15       Western Pacific
## 11                9.16                Europe
## 3                18.07                Africa
## 84                0.49                Europe
## 148              13.59                Europe
## 113               9.66                Europe
## 180              23.67                Europe
## 117              18.93 Eastern Mediterranean
## 10                4.13                Europe
## 120               5.09       South-East Asia
## 91               30.53                Africa
```

```
## 32                5.90                Africa
## 181              29.63              Americas
## 42               37.34              Americas
## 43                9.38                Africa
## 47               10.06                Europe
## 9                23.13       Western Pacific
## 54               23.17              Americas
## 59               42.52                Africa
## 156               2.80       Western Pacific
## 48                2.29                Europe
## 160               3.93 Eastern Mediterranean
## 26               18.95                Europe
## 183              19.12 Eastern Mediterranean
## 22               23.81                Europe
## 126              10.42                Europe
## 147               9.12                Africa
## 104              35.47                Africa
## 127               1.08                Europe
## 106               1.18       Western Pacific
## 41                4.75                Africa
## 92               26.14                Europe
## 61                0.79                Europe
## 75                4.07              Americas
## 166               4.54                Europe
## 63               11.75                Africa
## 72                7.06                Africa
## 103              12.09                Europe
## 110               4.81                Africa
## 49                0.78 Eastern Mediterranean
## 44               11.69                Europe
## 2                17.00                Europe
## 34                1.12                Africa
## 186              36.86                Africa
## 132              21.34              Americas
## 78                2.51                Europe
## 68                5.36                Europe
## 97               33.63 Eastern Mediterranean
## 105              22.46                Africa
## 123               9.28              Americas
## 107              12.34       South-East Asia
## 168               1.45       South-East Asia
## 40               12.24                Africa
## 154               2.11 Eastern Mediterranean
## 55                0.00                Africa
## 116              32.22                Europe
## 100              42.78 Eastern Mediterranean
## 159               2.75       South-East Asia
## 187              57.85                Africa
## 45                3.52              Americas
## 108               1.54                Africa
## 30               12.41                Africa
## 58               26.83                Africa
## 157               4.25                Africa
## 152              10.15                Europe
```

```
## 153              6.86               Europe
## 57               0.64               Europe
## 102              3.70               Europe
## 73               0.26               Africa
## 140             15.35               Africa
## 79               0.82               Europe
## 119             37.13               Africa
## 150              4.21               Africa
## 19              10.49               Africa
## 118             12.87               Africa
## 185              4.45 Eastern Mediterranean
## 122              0.13       Western Pacific
## 161             37.44              Americas
## 172              5.36 Eastern Mediterranean
## 96               2.27               Europe
## 179             12.97              Americas
## 89              -3.84 Eastern Mediterranean
## 99               5.42               Africa
## 65               9.43               Europe
## 124              2.44               Africa
## 175              5.52               Africa
## 27               3.29               Africa
## 46               2.12               Europe
## 5               26.84               Africa
## 35               3.71               Africa
## 4                2.60               Europe
## 170             11.62               Africa
## 145             15.95               Africa
## 87               5.44              Americas
## 23              41.57               Africa
## 109              3.55               Europe
## 144              0.00               Europe
## 164             29.12 Eastern Mediterranean
## 167              0.00               Africa
## 98              40.67               Africa
## 165              2.44       Western Pacific
## 182             12.24       Western Pacific
## 74              15.43              Americas
## 12             119.54              Americas
## 29              17.39               Africa
## 39               5.99               Africa
## 28               2.64       South-East Asia
## 111              0.29               Africa
## 64             191.07               Africa
## 115              0.70       Western Pacific
## 56               5.58               Africa
## 31              32.16       Western Pacific
## 171              8.03              Americas
## 25               0.00       Western Pacific
## 114              6.42               Europe
## 149              5.56               Africa
## 15               3.77              Americas
## 20              10.00       South-East Asia
## 6               13.16              Americas
```

```
## 101               0.00               Europe
## 131             226.32       Western Pacific
## 143               4.00              Americas
## 18               20.00              Americas
## 60                0.00       Western Pacific
## 142               4.35              Americas
## 169               0.00       South-East Asia
## 70                0.00              Americas
## 95                5.26       Western Pacific
## 50                0.00              Americas
## 141               0.00              Americas
## 69                7.69               Europe
## 76                0.00               Europe
## 184               0.00               Africa
```

Question 10

Rename some of the column names in your dataset.

Renaming columns using dplyr function rename() and saving new column names in dataset.

```
covid_data <- covid_data %>% rename(One_Week_Change = X1.week.change,
One_Week_Percentage_Increase = X1.week...increase, WHO_Region = WHO.Region)
```

Displaying new column names.

```
names(covid_data)
```

```
##  [1] "Country.Region"               "Confirmed"
##  [3] "Deaths"                       "Recovered"
##  [5] "Active"                       "New.cases"
##  [7] "New.deaths"                   "New.recovered"
##  [9] "Deaths...100.Cases"           "Recovered...100.Cases"
## [11] "Deaths...100.Recovered"       "Confirmed.last.week"
## [13] "One_Week_Change"              "One_Week_Percentage_Increase"
## [15] "WHO_Region"
```

Question 11

Add new variables in your data frame by using a mathematical function (for e.g. – multiply an existing column by 2 and add it as a new variable to your data frame)

```
covid_data %>% mutate(Two_Weeks_Change = One_Week_Change*2)
```

```
##                       Country.Region Confirmed Deaths Recovered  Active
## 1                        Afghanistan     36263   1269     25198    9796
## 2                            Albania      4880    144      2745    1991
## 3                            Algeria     27973   1163     18837    7973
## 4                            Andorra       907     52       803      52
## 5                             Angola       950     41       242     667
## 6                Antigua and Barbuda        86      3        65      18
## 7                          Argentina    167416   3059     72575   91782
## 8                            Armenia     37390    711     26665   10014
## 9                          Australia     15303    167      9311    5825
## 10                           Austria     20558    713     18246    1599
## 11                        Azerbaijan     30446    423     23242    6781
## 12                           Bahamas       382     11        91     280
## 13                           Bahrain     39482    141     36110    3231
## 14                        Bangladesh    226225   2965    125683   97577
## 15                          Barbados       110      7        94       9
## 16                           Belarus     67251    538     60492    6221
## 17                           Belgium     66428   9822     17452   39154
## 18                            Belize        48      2        26      20
## 19                             Benin      1770     35      1036     699
## 20                            Bhutan        99      0        86      13
## 21                           Bolivia     71181   2647     21478   47056
## 22            Bosnia and Herzegovina     10498    294      4930    5274
## 23                          Botswana       739      2        63     674
## 24                            Brazil   2442375  87618   1846641  508116
## 25                            Brunei       141      3       138       0
## 26                          Bulgaria     10621    347      5585    4689
## 27                      Burkina Faso      1100     53       926     121
## 28                             Burma       350      6       292      52
## 29                           Burundi       378      1       301      76
## 30                        Cabo Verde      2328     22      1550     756
## 31                          Cambodia       226      0       147      79
## 32                          Cameroon     17110    391     14539    2180
## 33                            Canada    116458   8944         0  107514
## 34          Central African Republic      4599     59      1546    2994
## 35                              Chad       922     75       810      37
## 36                             Chile    347923   9187    319954   18782
## 37                             China     86783   4656     78869    3258
## 38                          Colombia    257101   8777    131161  117163
## 39                           Comoros       354      7       328      19
## 40               Congo (Brazzaville)      3200     54       829    2317
## 41                  Congo (Kinshasa)      8844    208      5700    2936
## 42                        Costa Rica     15841    115      3824   11902
## 43                    Cote d'Ivoire      15655     96     10361    5198
## 44                          Croatia      4881    139      3936     806
## 45                             Cuba      2532     87      2351      94
## 46                           Cyprus      1060     19       852     189
## 47                          Czechia     15516    373     11428    3715
## 48                          Denmark     13761    613     12605     543
## 49                         Djibouti      5059     58      4977      24
## 50                         Dominica        18      0        18       0
## 51                 Dominican Republic     64156   1083     30204   32869
## 52                          Ecuador     81161   5532     34896   40733
## 53                            Egypt     92482   4652     34838   52992
```

```
## 54                  El Salvador     15035    408      7778    6849
## 55            Equatorial Guinea      3071     51       842    2178
## 56                      Eritrea       265      0       191      74
## 57                      Estonia      2034     69      1923      42
## 58                     Eswatini      2316     34      1025    1257
## 59                     Ethiopia     14547    228      6386    7933
## 60                         Fiji        27      0        18       9
## 61                      Finland      7398    329      6920     149
## 62                       France    220352  30212     81212  108928
## 63                        Gabon      7189     49      4682    2458
## 64                       Gambia       326      8        66     252
## 65                      Georgia      1137     16       922     199
## 66                      Germany    207112   9125    190314    7673
## 67                        Ghana     33624    168     29801    3655
## 68                       Greece      4227    202      1374    2651
## 69                    Greenland        14      0        13       1
## 70                      Grenada        23      0        23       0
## 71                    Guatemala     45309   1761     32455   11093
## 72                       Guinea      7055     45      6257     753
## 73                Guinea-Bissau      1954     26       803    1125
## 74                       Guyana       389     20       181     188
## 75                        Haiti      7340    158      4365    2817
## 76                     Holy See        12      0        12       0
## 77                     Honduras     39741   1166      5039   33536
## 78                      Hungary      4448    596      3329     523
## 79                      Iceland      1854     10      1823      21
## 80                        India   1480073  33408    951166  495499
## 81                    Indonesia    100303   4838     58173   37292
## 82                         Iran    293606  15912    255144   22550
## 83                         Iraq    112585   4458     77144   30983
## 84                      Ireland     25892   1764     23364     764
## 85                       Israel     63985    474     27133   36378
## 86                        Italy    246286  35112    198593   12581
## 87                      Jamaica       853     10       714     129
## 88                        Japan     31142    998     21970    8174
## 89                       Jordan      1176     11      1041     124
## 90                   Kazakhstan     84648    585     54404   29659
## 91                        Kenya     17975    285      7833    9857
## 92                       Kosovo      7413    185      4027    3201
## 93                       Kuwait     64379    438     55057    8884
## 94                    Kyrgyzstan     33296   1301     21205   10790
## 95                         Laos        20      0        19       1
## 96                       Latvia      1219     31      1045     143
## 97                      Lebanon      3882     51      1709    2122
## 98                      Lesotho       505     12       128     365
## 99                      Liberia      1167     72       646     449
## 100                       Libya      2827     64       577    2186
## 101               Liechtenstein        86      1        81       4
## 102                   Lithuania      2019     80      1620     319
## 103                  Luxembourg      6321    112      4825    1384
## 104                  Madagascar      9690     91      6260    3339
## 105                      Malawi      3664     99      1645    1920
## 106                    Malaysia      8904    124      8601     179
## 107                     Maldives      3369     15      2547     807
```

```
## 108                            Mali      2513    124      1913     476
## 109                           Malta       701      9       665      27
## 110                      Mauritania      6208    156      4653    1399
## 111                       Mauritius       344     10       332       2
## 112                          Mexico    395489  44022    303810   47657
## 113                         Moldova     23154    748     16154    6252
## 114                          Monaco       116      4       104       8
## 115                        Mongolia       289      0       222      67
## 116                      Montenegro      2893     45       809    2039
## 117                         Morocco     20887    316     16553    4018
## 118                      Mozambique      1701     11         0    1690
## 119                         Namibia      1843      8       101    1734
## 120                           Nepal     18752     48     13754    4950
## 121                     Netherlands     53413   6160       189   47064
## 122                     New Zealand      1557     22      1514      21
## 123                       Nicaragua      3439    108      2492     839
## 124                           Niger      1132     69      1027      36
## 125                         Nigeria     41180    860     18203   22117
## 126                 North Macedonia     10213    466      5564    4183
## 127                          Norway      9132    255      8752     125
## 128                            Oman     77058    393     57028   19637
## 129                        Pakistan    274289   5842    241026   27421
## 130                          Panama     61442   1322     35086   25034
## 131              Papua New Guinea          62      0        11      51
## 132                        Paraguay      4548     43      2905    1600
## 133                            Peru    389717  18418    272547   98752
## 134                     Philippines     82040   1945     26446   53649
## 135                          Poland     43402   1676     32856    8870
## 136                        Portugal     50299   1719     35375   13205
## 137                           Qatar    109597    165    106328    3104
## 138                         Romania     45902   2206     25794   17902
## 139                          Russia    816680  13334    602249  201097
## 140                          Rwanda      1879      5       975     899
## 141           Saint Kitts and Nevis        17      0        15       2
## 142                     Saint Lucia        24      0        22       2
## 143 Saint Vincent and the Grenadines        52      0        39      13
## 144                      San Marino       699     42       657       0
## 145           Sao Tome and Principe       865     14       734     117
## 146                     Saudi Arabia    268934   2760    222936   43238
## 147                          Senegal      9764    194      6477    3093
## 148                           Serbia     24141    543         0   23598
## 149                       Seychelles       114      0        39      75
## 150                     Sierra Leone      1783     66      1317     400
## 151                        Singapore     50838     27     45692    5119
## 152                         Slovakia      2181     28      1616     537
## 153                         Slovenia      2087    116      1733     238
## 154                          Somalia      3196     93      1543    1560
## 155                     South Africa    452529   7067    274925  170537
## 156                      South Korea     14203    300     13007     896
## 157                      South Sudan      2305     46      1175    1084
## 158                            Spain    272421  28432    150376   93613
## 159                        Sri Lanka      2805     11      2121     673
## 160                            Sudan     11424    720      5939    4765
## 161                         Suriname      1483     24       925     534
```

```
## 162                          Sweden     79395   5700        0   73695
## 163                     Switzerland     34477   1978    30900    1599
## 164                           Syria       674     40        0     634
## 165                          Taiwan*       462      7      440      15
## 166                      Tajikistan      7235     60     6028    1147
## 167                        Tanzania       509     21      183     305
## 168                        Thailand      3297     58     3111     128
## 169                     Timor-Leste        24      0        0      24
## 170                            Togo       874     18      607     249
## 171              Trinidad and Tobago       148      8      128      12
## 172                         Tunisia      1455     50     1157     248
## 173                          Turkey    227019   5630   210469   10920
## 174                              US   4290259 148011  1325804 2816444
## 175                          Uganda      1128      2      986     140
## 176                         Ukraine     67096   1636    37202   28258
## 177             United Arab Emirates     59177    345    52510    6322
## 178                  United Kingdom    301708  45844     1437  254427
## 179                         Uruguay      1202     35      951     216
## 180                      Uzbekistan     21209    121    11674    9414
## 181                       Venezuela     15988    146     9959    5883
## 182                         Vietnam       431      0      365      66
## 183                West Bank and Gaza     10621     78     3752    6791
## 184                    Western Sahara        10      1        8       1
## 185                             Yemen      1691    483      833     375
## 186                            Zambia      4552    140     2815    1597
## 187                          Zimbabwe      2704     36      542    2126
##     New.cases New.deaths New.recovered Deaths...100.Cases Recovered...100.Cases
## 1         106         10            18                3.50                 69.49
## 2         117          6            63                2.95                 56.25
## 3         616          8           749                4.16                 67.34
## 4          10          0             0                5.73                 88.53
## 5          18          1             0                4.32                 25.47
## 6           4          0             5                3.49                 75.58
## 7        4890        120          2057                1.83                 43.35
## 8          73          6           187                1.90                 71.32
## 9         368          6           137                1.09                 60.84
## 10         86          1            37                3.47                 88.75
## 11        396          6           558                1.39                 76.34
## 12         40          0             0                2.88                 23.82
## 13        351          1           421                0.36                 91.46
## 14       2772         37          1801                1.31                 55.56
## 15          0          0             0                6.36                 85.45
## 16        119          4            67                0.80                 89.95
## 17        402          1            14               14.79                 26.27
## 18          0          0             0                4.17                 54.17
## 19          0          0             0                1.98                 58.53
## 20          4          0             1                0.00                 86.87
## 21       1752         64           309                3.72                 30.17
## 22        731         14           375                2.80                 46.96
## 23         53          1            11                0.27                  8.53
## 24      23284        614         33728                3.59                 75.61
## 25          0          0             0                2.13                 97.87
## 26        194          7           230                3.27                 52.58
## 27         14          0             6                4.82                 84.18
```

```
## 28          0          0          2          1.71          83.43
## 29         17          0         22          0.26          79.63
## 30         21          0        103          0.95          66.58
## 31          1          0          4          0.00          65.04
## 32        402          6          0          2.29          84.97
## 33        682         11          0          7.68           0.00
## 34          0          0          0          1.28          33.62
## 35          7          0          0          8.13          87.85
## 36       2133         75       1859          2.64          91.96
## 37        213          4          7          5.37          90.88
## 38      16306        508      11494          3.41          51.02
## 39          0          0          0          1.98          92.66
## 40        162          3         73          1.69          25.91
## 41         13          4        190          2.35          64.45
## 42        612         11         88          0.73          24.14
## 43         59          0        183          0.61          66.18
## 44         24          3         70          2.85          80.64
## 45         37          0          2          3.44          92.85
## 46          3          0          0          1.79          80.38
## 47        192          2          0          2.40          73.65
## 48        109          0         77          4.45          91.60
## 49          9          0         11          1.15          98.38
## 50          0          0          0          0.00         100.00
## 51       1248         20       1601          1.69          47.08
## 52        467         17          0          6.82          43.00
## 53        420         46       1007          5.03          37.67
## 54        405          8        130          2.71          51.73
## 55          0          0          0          1.66          27.42
## 56          2          0          2          0.00          72.08
## 57          0          0          1          3.39          94.54
## 58        109          2         39          1.47          44.26
## 59        579          5        170          1.57          43.90
## 60          0          0          0          0.00          66.67
## 61          5          0          0          4.45          93.54
## 62       2551         17        267         13.71          36.86
## 63        205          0        219          0.68          65.13
## 64         49          2          6          2.45          20.25
## 65          6          0          2          1.41          81.09
## 66        445          1        259          4.41          91.89
## 67        655          0        307          0.50          88.63
## 68         34          0          0          4.78          32.51
## 69          1          0          0          0.00          92.86
## 70          0          0          0          0.00         100.00
## 71        256         27        843          3.89          71.63
## 72         47          2        105          0.64          88.69
## 73          0          0          0          1.33          41.10
## 74         19          0          0          5.14          46.53
## 75         25          1          0          2.15          59.47
## 76          0          0          0          0.00         100.00
## 77        465         50        117          2.93          12.68
## 78         13          0          0         13.40          74.84
## 79          7          0          0          0.54          98.33
## 80      44457        637      33598          2.26          64.26
## 81       1525         57       1518          4.82          58.00
```

```
## 82       2434        212        1931              5.42              86.90
## 83       2553         96        1927              3.96              68.52
## 84         11          0           0              6.81              90.24
## 85       2029          4         108              0.74              42.41
## 86        168          5         147             14.26              80.64
## 87         11          0           0              1.17              83.70
## 88        594          0         364              3.20              70.55
## 89          8          0           0              0.94              88.52
## 90       1526          0        1833              0.69              64.27
## 91        372          5          90              1.59              43.58
## 92        496         16         274              2.50              54.32
## 93        606          5         684              0.68              85.52
## 94        483         24         817              3.91              63.69
## 95          0          0           0              0.00              95.00
## 96          0          0           0              2.54              85.73
## 97        132          0          17              1.31              44.02
## 98          0          0           0              2.38              25.35
## 99          5          0           5              6.17              55.36
## 100       158          4          24              2.26              20.41
## 101         0          0           0              1.16              94.19
## 102        11          0           4              3.96              80.24
## 103        49          0         178              1.77              76.33
## 104       395          6         681              0.94              64.60
## 105        24          0           6              2.70              44.90
## 106         7          0           1              1.39              96.60
## 107        67          0          19              0.45              75.60
## 108         3          1           2              4.93              76.12
## 109         1          0           0              1.28              94.86
## 110        37          0         223              2.51              74.95
## 111         0          0           0              2.91              96.51
## 112      4973        342        8588             11.13              76.82
## 113       120         13         245              3.23              69.77
## 114         0          0           0              3.45              89.66
## 115         1          0           4              0.00              76.82
## 116        94          2          70              1.56              27.96
## 117       609          3         115              1.51              79.25
## 118        32          0           0              0.65               0.00
## 119        68          0          26              0.43               5.48
## 120       139          3         626              0.26              73.35
## 121       419          1           0             11.53               0.35
## 122         1          0           1              1.41              97.24
## 123         0          0           0              3.14              72.46
## 124         0          0           0              6.10              90.72
## 125       648          2         829              2.09              44.20
## 126       127          6         137              4.56              54.48
## 127        15          0           0              2.79              95.84
## 128      1053          9        1729              0.51              74.01
## 129      1176         20        3592              2.13              87.87
## 130      1146         28         955              2.15              57.10
## 131         0          0           0              0.00              17.74
## 132       104          2         111              0.95              63.87
## 133     13756        575        4697              4.73              69.93
## 134      1592         13         336              2.37              32.24
## 135       337          5         103              3.86              75.70
```

```
## 136       135          2          158              3.42                70.33
## 137       292          0          304              0.15                97.02
## 138      1104         19          151              4.81                56.19
## 139      5607         85         3077              1.63                73.74
## 140        58          0           57              0.27                51.89
## 141         0          0            0              0.00                88.24
## 142         0          0            0              0.00                91.67
## 143         0          0            0              0.00                75.00
## 144         0          0            0              6.01                93.99
## 145         2          0           38              1.62                84.86
## 146      1993         27         2613              1.03                82.90
## 147        83          3           68              1.99                66.34
## 148       411          9            0              2.25                 0.00
## 149         0          0            0              0.00                34.21
## 150         0          0            4              3.70                73.86
## 151       469          0          171              0.05                89.88
## 152         2          0           39              1.28                74.09
## 153         5          0           55              5.56                83.04
## 154        18          0           22              2.91                48.28
## 155      7096        298         9848              1.56                60.75
## 156        28          1          102              2.11                91.58
## 157        43          1            0              2.00                50.98
## 158         0          0            0             10.44                55.20
## 159        23          0           15              0.39                75.61
## 160        39          3           49              6.30                51.99
## 161        44          1           35              1.62                62.37
## 162       398          3            0              7.18                 0.00
## 163        65          1          200              5.74                89.62
## 164        24          2            0              5.93                 0.00
## 165         4          0            0              1.52                95.24
## 166        43          1           58              0.83                83.32
## 167         0          0            0              4.13                35.95
## 168         6          0            2              1.76                94.36
## 169         0          0            0              0.00                 0.00
## 170         6          0            8              2.06                69.45
## 171         1          0            0              5.41                86.49
## 172         3          0           15              3.44                79.52
## 173       919         17          982              2.48                92.71
## 174     56336       1076        27941              3.45                30.90
## 175        13          0            4              0.18                87.41
## 176       835         11          317              2.44                55.45
## 177       264          1          328              0.58                88.73
## 178       688          7            3             15.19                 0.48
## 179        10          1            3              2.91                79.12
## 180       678          5          569              0.57                55.04
## 181       525          4          213              0.91                62.29
## 182        11          0            0              0.00                84.69
## 183       152          2            0              0.73                35.33
## 184         0          0            0             10.00                80.00
## 185        10          4           36             28.56                49.26
## 186        71          1          465              3.08                61.84
## 187       192          2           24              1.33                20.04
##     Deaths...100.Recovered Confirmed.last.week One_Week_Change
## 1                     5.04               35526             737
```

```
## 2                5.25             4171              709
## 3                6.17            23691             4282
## 4                6.48              884               23
## 5               16.94              749              201
## 6                4.62               76               10
## 7                4.21           130774            36642
## 8                2.67            34981             2409
## 9                1.79            12428             2875
## 10               3.91            19743              815
## 11               1.82            27890             2556
## 12              12.09              174              208
## 13               0.39            36936             2546
## 14               2.36           207453            18772
## 15               7.45              106                4
## 16               0.89            66213             1038
## 17              56.28            64094             2334
## 18               7.69               40                8
## 19               3.38             1602              168
## 20               0.00               90                9
## 21              12.32            60991            10190
## 22               5.96             8479             2019
## 23               3.17              522              217
## 24               4.74          2118646           323729
## 25               2.17              141                0
## 26               6.21             8929             1692
## 27               5.72             1065               35
## 28               2.05              341                9
## 29               0.33              322               56
## 30               1.42             2071              257
## 31               0.00              171               55
## 32               2.69            16157              953
## 33                Inf           112925             3533
## 34               3.82             4548               51
## 35               9.26              889               33
## 36               2.87           333029            14894
## 37               5.90            85622             1161
## 38               6.69           204005            53096
## 39               2.13              334               20
## 40               6.51             2851              349
## 41               3.65             8443              401
## 42               3.01            11534             4307
## 43               0.93            14312             1343
## 44               3.53             4370              511
## 45               3.70             2446               86
## 46               2.23             1038               22
## 47               3.26            14098             1418
## 48               4.86            13453              308
## 49               1.17             5020               39
## 50               0.00               18                0
## 51               3.59            53956            10200
## 52              15.85            74620             6541
## 53              13.35            88402             4080
## 54               5.25            12207             2828
## 55               6.06             3071                0
```

```
## 56                0.00              251              14
## 57                3.59             2021              13
## 58                3.32             1826             490
## 59                3.57            10207            4340
## 60                0.00               27               0
## 61                4.75             7340              58
## 62               37.20           214023            6329
## 63                1.05             6433             756
## 64               12.12              112             214
## 65                1.74             1039              98
## 66                4.79           203325            3787
## 67                0.56            28430            5194
## 68               14.70             4012             215
## 69                0.00               13               1
## 70                0.00               23               0
## 71                5.43            39039            6270
## 72                0.72             6590             465
## 73                3.24             1949               5
## 74               11.05              337              52
## 75                3.62             7053             287
## 76                0.00               12               0
## 77               23.14            34611            5130
## 78               17.90             4339             109
## 79                0.55             1839              15
## 80                3.51          1155338          324735
## 81                8.32            88214            12089
## 82                6.24           276202            17404
## 83                5.78            94693            17892
## 84                7.55            25766              126
## 85                1.75            52003            11982
## 86               17.68           244624             1662
## 87                1.40              809               44
## 88                4.54            25706             5436
## 89                1.06             1223              -47
## 90                1.08            73468            11180
## 91                3.64            13771             4204
## 92                4.59             5877             1536
## 93                0.80            59763             4616
## 94                6.14            27143             6153
## 95                0.00               19               1
## 96                2.97             1192               27
## 97                2.98             2905              977
## 98                9.38              359              146
## 99               11.15             1107               60
## 100              11.09             1980              847
## 101               1.23               86               0
## 102               4.94             1947               72
## 103               2.32             5639              682
## 104               1.45             7153             2537
## 105               6.02             2992              672
## 106               1.44             8800              104
## 107               0.59             2999              370
## 108               6.48             2475               38
## 109               1.35              677               24
```

```
## 110                3.35             5923              285
## 111                3.01              343                1
## 112               14.49           349396            46093
## 113                4.63            21115             2039
## 114                3.85              109                7
## 115                0.00              287                2
## 116                5.56             2188              705
## 117                1.91            17562             3325
## 118                 Inf             1507              194
## 119                7.92             1344              499
## 120                0.35            17844              908
## 121             3259.26            52132             1281
## 122                1.45             1555                2
## 123                4.33             3147              292
## 124                6.72             1105               27
## 125                4.72            37225             3955
## 126                8.38             9249              964
## 127                2.91             9034               98
## 128                0.69            68400             8658
## 129                2.42           266096             8193
## 130                3.77            54426             7016
## 131                0.00               19               43
## 132                1.48             3748              800
## 133                6.76           357681            32036
## 134                7.35            68898            13142
## 135                5.10            40383             3019
## 136                4.86            48771             1528
## 137                0.16           107037             2560
## 138                8.55            38139             7763
## 139                2.21           776212            40468
## 140                0.51             1629              250
## 141                0.00               17                0
## 142                0.00               23                1
## 143                0.00               50                2
## 144                6.39              699                0
## 145                1.91              746              119
## 146                1.24           253349            15585
## 147                3.00             8948              816
## 148                 Inf            21253             2888
## 149                0.00              108                6
## 150                5.01             1711               72
## 151                0.06            48035             2803
## 152                1.73             1980              201
## 153                6.69             1953              134
## 154                6.03             3130               66
## 155                2.57           373628            78901
## 156                2.31            13816              387
## 157                3.91             2211               94
## 158               18.91           264836             7585
## 159                0.52             2730               75
## 160               12.12            10992              432
## 161                2.59             1079              404
## 162                 Inf            78048             1347
## 163                6.40            33634              843
```

```
## 164                     Inf                 522             152
## 165                    1.59                 451              11
## 166                    1.00                6921             314
## 167                   11.48                 509               0
## 168                    1.86                3250              47
## 169                    0.00                  24               0
## 170                    2.97                 783              91
## 171                    6.25                 137              11
## 172                    4.32                1381              74
## 173                    2.67              220572            6447
## 174                   11.16             3834677          455582
## 175                    0.20                1069              59
## 176                    4.40               60767            6329
## 177                    0.66               57193            1984
## 178                 3190.26              296944            4764
## 179                    3.68                1064             138
## 180                    1.04               17149            4060
## 181                    1.47               12334            3654
## 182                    0.00                 384              47
## 183                    2.08                8916            1705
## 184                   12.50                  10               0
## 185                   57.98                1619              72
## 186                    4.97                3326            1226
## 187                    6.64                1713             991
##     One_Week_Percentage_Increase            WHO_Region Two_Weeks_Change
## 1                           2.07 Eastern Mediterranean             1474
## 2                          17.00                Europe             1418
## 3                          18.07                Africa             8564
## 4                           2.60                Europe               46
## 5                          26.84                Africa              402
## 6                          13.16              Americas               20
## 7                          28.02              Americas            73284
## 8                           6.89                Europe             4818
## 9                          23.13       Western Pacific             5750
## 10                          4.13                Europe             1630
## 11                          9.16                Europe             5112
## 12                        119.54              Americas              416
## 13                          6.89 Eastern Mediterranean             5092
## 14                          9.05       South-East Asia            37544
## 15                          3.77              Americas                8
## 16                          1.57                Europe             2076
## 17                          3.64                Europe             4668
## 18                         20.00              Americas               16
## 19                         10.49                Africa              336
## 20                         10.00       South-East Asia               18
## 21                         16.71              Americas            20380
## 22                         23.81                Europe             4038
## 23                         41.57                Africa              434
## 24                         15.28              Americas           647458
## 25                          0.00       Western Pacific                0
## 26                         18.95                Europe             3384
## 27                          3.29                Africa               70
## 28                          2.64       South-East Asia               18
## 29                         17.39                Africa              112
```

```
## 30                    12.41                Africa             514
## 31                    32.16       Western Pacific             110
## 32                     5.90                Africa            1906
## 33                     3.13              Americas            7066
## 34                     1.12                Africa             102
## 35                     3.71                Africa              66
## 36                     4.47              Americas           29788
## 37                     1.36       Western Pacific            2322
## 38                    26.03              Americas          106192
## 39                     5.99                Africa              40
## 40                    12.24                Africa             698
## 41                     4.75                Africa             802
## 42                    37.34              Americas            8614
## 43                     9.38                Africa            2686
## 44                    11.69                Europe            1022
## 45                     3.52              Americas             172
## 46                     2.12                Europe              44
## 47                    10.06                Europe            2836
## 48                     2.29                Europe             616
## 49                     0.78 Eastern Mediterranean              78
## 50                     0.00              Americas               0
## 51                    18.90              Americas           20400
## 52                     8.77              Americas           13082
## 53                     4.62 Eastern Mediterranean            8160
## 54                    23.17              Americas            5656
## 55                     0.00                Africa               0
## 56                     5.58                Africa              28
## 57                     0.64                Europe              26
## 58                    26.83                Africa             980
## 59                    42.52                Africa            8680
## 60                     0.00       Western Pacific               0
## 61                     0.79                Europe             116
## 62                     2.96                Europe           12658
## 63                    11.75                Africa            1512
## 64                   191.07                Africa             428
## 65                     9.43                Europe             196
## 66                     1.86                Europe            7574
## 67                    18.27                Africa           10388
## 68                     5.36                Europe             430
## 69                     7.69                Europe               2
## 70                     0.00              Americas               0
## 71                    16.06              Americas           12540
## 72                     7.06                Africa             930
## 73                     0.26                Africa              10
## 74                    15.43              Americas             104
## 75                     4.07              Americas             574
## 76                     0.00                Europe               0
## 77                    14.82              Americas           10260
## 78                     2.51                Europe             218
## 79                     0.82                Europe              30
## 80                    28.11       South-East Asia          649470
## 81                    13.70       South-East Asia           24178
## 82                     6.30 Eastern Mediterranean           34808
## 83                    18.89 Eastern Mediterranean           35784
```

```
## 84                    0.49                Europe            252
## 85                   23.04                Europe          23964
## 86                    0.68                Europe           3324
## 87                    5.44              Americas             88
## 88                   21.15       Western Pacific          10872
## 89                   -3.84 Eastern Mediterranean            -94
## 90                   15.22                Europe          22360
## 91                   30.53                Africa           8408
## 92                   26.14                Europe           3072
## 93                    7.72 Eastern Mediterranean           9232
## 94                   22.67                Europe          12306
## 95                    5.26       Western Pacific              2
## 96                    2.27                Europe             54
## 97                   33.63 Eastern Mediterranean           1954
## 98                   40.67                Africa            292
## 99                    5.42                Africa            120
## 100                  42.78 Eastern Mediterranean           1694
## 101                   0.00                Europe              0
## 102                   3.70                Europe            144
## 103                  12.09                Europe           1364
## 104                  35.47                Africa           5074
## 105                  22.46                Africa           1344
## 106                   1.18       Western Pacific            208
## 107                  12.34       South-East Asia            740
## 108                   1.54                Africa             76
## 109                   3.55                Europe             48
## 110                   4.81                Africa            570
## 111                   0.29                Africa              2
## 112                  13.19              Americas          92186
## 113                   9.66                Europe           4078
## 114                   6.42                Europe             14
## 115                   0.70       Western Pacific              4
## 116                  32.22                Europe           1410
## 117                  18.93 Eastern Mediterranean           6650
## 118                  12.87                Africa            388
## 119                  37.13                Africa            998
## 120                   5.09       South-East Asia           1816
## 121                   2.46                Europe           2562
## 122                   0.13       Western Pacific              4
## 123                   9.28              Americas            584
## 124                   2.44                Africa             54
## 125                  10.62                Africa           7910
## 126                  10.42                Europe           1928
## 127                   1.08                Europe            196
## 128                  12.66 Eastern Mediterranean          17316
## 129                   3.08 Eastern Mediterranean          16386
## 130                  12.89              Americas          14032
## 131                 226.32       Western Pacific             86
## 132                  21.34              Americas           1600
## 133                   8.96              Americas          64072
## 134                  19.07       Western Pacific          26284
## 135                   7.48                Europe           6038
## 136                   3.13                Europe           3056
## 137                   2.39 Eastern Mediterranean           5120
```

```
## 138                    20.35                Europe          15526
## 139                     5.21                Europe          80936
## 140                    15.35                Africa            500
## 141                     0.00              Americas              0
## 142                     4.35              Americas              2
## 143                     4.00              Americas              4
## 144                     0.00                Europe              0
## 145                    15.95                Africa            238
## 146                     6.15 Eastern Mediterranean          31170
## 147                     9.12                Africa           1632
## 148                    13.59                Europe           5776
## 149                     5.56                Africa             12
## 150                     4.21                Africa            144
## 151                     5.84       Western Pacific           5606
## 152                    10.15                Europe            402
## 153                     6.86                Europe            268
## 154                     2.11 Eastern Mediterranean            132
## 155                    21.12                Africa         157802
## 156                     2.80       Western Pacific            774
## 157                     4.25                Africa            188
## 158                     2.86                Europe          15170
## 159                     2.75       South-East Asia            150
## 160                     3.93 Eastern Mediterranean            864
## 161                    37.44              Americas            808
## 162                     1.73                Europe           2694
## 163                     2.51                Europe           1686
## 164                    29.12 Eastern Mediterranean            304
## 165                     2.44       Western Pacific             22
## 166                     4.54                Europe            628
## 167                     0.00                Africa              0
## 168                     1.45       South-East Asia             94
## 169                     0.00       South-East Asia              0
## 170                    11.62                Africa            182
## 171                     8.03              Americas             22
## 172                     5.36 Eastern Mediterranean            148
## 173                     2.92                Europe          12894
## 174                    11.88              Americas         911164
## 175                     5.52                Africa            118
## 176                    10.42                Europe          12658
## 177                     3.47 Eastern Mediterranean           3968
## 178                     1.60                Europe           9528
## 179                    12.97              Americas            276
## 180                    23.67                Europe           8120
## 181                    29.63              Americas           7308
## 182                    12.24       Western Pacific             94
## 183                    19.12 Eastern Mediterranean           3410
## 184                     0.00                Africa              0
## 185                     4.45 Eastern Mediterranean            144
## 186                    36.86                Africa           2452
## 187                    57.85                Africa           1982
```

Question 12

Create a training set using random number generator engine.

```
randomizedDataSet <- covid_data
set.seed(1234)
randomizedDataSet %>% sample_frac(0.75, replace = FALSE)
```

```
##                       Country.Region Confirmed Deaths Recovered  Active
## 1                              Burma       350      6       292      52
## 2                              India   1480073  33408    951166  495499
## 3                       Sierra Leone      1783     66      1317     400
## 4                      Liechtenstein        86      1        81       4
## 5                          Mauritius       344     10       332       2
## 6                              Qatar    109597    165    106328    3104
## 7                               Peru    389717  18418    272547   98752
## 8                         Tajikistan      7235     60      6028    1147
## 9                         San Marino       699     42       657       0
## 10                          Paraguay      4548     43      2905    1600
## 11                           Lesotho       505     12       128     365
## 12                        Luxembourg      6321    112      4825    1384
## 13                        Kazakhstan     84648    585     54404   29659
## 14                           Grenada        23      0        23       0
## 15                           Iceland      1854     10      1823      21
## 16                        Montenegro      2893     45       809    2039
## 17                        Bangladesh    226225   2965    125683   97577
## 18                    North Macedonia     10213    466      5564    4183
## 19                            France    220352  30212     81212  108928
## 20                           Andorra       907     52       803      52
## 21                     United Kingdom    301708  45844      1437  254427
## 22                         Seychelles       114      0        39      75
## 23                  Congo (Brazzaville)      3200     54       829    2317
## 24                             Kuwait     64379    438     55057    8884
## 25                        New Zealand      1557     22      1514      21
## 26                          Venezuela     15988    146      9959    5883
## 27                            Germany    207112   9125    190314    7673
## 28                          Nicaragua      3439    108      2492     839
## 29                            Denmark     13761    613     12605     543
## 30                               Mali      2513    124      1913     476
## 31                  Papua New Guinea        62      0        11      51
## 32                            Jamaica       853     10       714     129
## 33                  Congo (Kinshasa)      8844    208      5700    2936
## 34                           Mongolia       289      0       222      67
## 35                            Guinea      7055     45      6257     753
## 36                        Costa Rica     15841    115      3824   11902
## 37                     Cote d'Ivoire     15655     96     10361    5198
## 38                           Albania      4880    144      2745    1991
## 39                           Morocco     20887    316     16553    4018
## 40                            Turkey    227019   5630    210469   10920
## 41                          Djibouti      5059     58      4977      24
## 42                         Lithuania      2019     80      1620     319
## 43                  Dominican Republic     64156   1083     30204   32869
## 44                       Philippines     82040   1945     26446   53649
## 45                           Senegal      9764    194      6477    3093
```

```
## 46  Saint Vincent and the Grenadines       52      0       39      13
## 47                             Estonia     2034     69     1923      42
## 48                            Portugal    50299   1719    35375   13205
## 49                            Bulgaria    10621    347     5585    4689
## 50                               Sudan    11424    720     5939    4765
## 51                             Armenia    37390    711    26665   10014
## 52                              Latvia     1219     31     1045     143
## 53            Bosnia and Herzegovina     10498    294     4930    5274
## 54                                Chad      922     75      810      37
## 55                        South Africa   452529   7067   274925  170537
## 56                         South Sudan     2305     46     1175    1084
## 57                               Italy   246286  35112   198593   12581
## 58             Saint Kitts and Nevis        17      0       15       2
## 59                             Austria    20558    713    18246    1599
## 60                 Equatorial Guinea      3071     51      842    2178
## 61                              Poland    43402   1676    32856    8870
## 62                               Nepal    18752     48    13754    4950
## 63                               Malta      701      9      665      27
## 64                              Brunei      141      3      138       0
## 65                             Algeria    27973   1163    18837    7973
## 66                                Iraq   112585   4458    77144   30983
## 67                            Dominica       18      0       18       0
## 68                          Uzbekistan    21209    121    11674    9414
## 69                              Uganda     1128      2      986     140
## 70                         South Korea    14203    300    13007     896
## 71                                  US  4290259 148011  1325804 2816444
## 72                              Bhutan       99      0       86      13
## 73                              Sweden    79395   5700        0   73695
## 74                               Gabon     7189     49     4682    2458
## 75                           Guatemala    45309   1761    32455   11093
## 76                             Finland     7398    329     6920     149
## 77                              Rwanda     1879      5      975     899
## 78             Sao Tome and Principe        865     14      734     117
## 79                                Togo      874     18      607     249
## 80                      Western Sahara       10      1        8       1
## 81                        Burkina Faso     1100     53      926     121
## 82                            Holy See       12      0       12       0
## 83                            Slovenia    2087    116     1733     238
## 84                           Sri Lanka    2805     11     2121     673
## 85                                Fiji       27      0       18       9
## 86                             Georgia     1137     16      922     199
## 87                               Chile   347923   9187   319954   18782
## 88                            Zimbabwe     2704     36      542    2126
## 89                               Benin     1770     35     1036     699
## 90                           Australia    15303    167     9311    5825
## 91                          Cabo Verde     2328     22     1550     756
## 92                              Monaco      116      4      104       8
## 93                             Belgium    66428   9822    17452   39154
## 94                            Tanzania      509     21      183     305
## 95                            Eswatini     2316     34     1025    1257
## 96                Antigua and Barbuda        86      3       65      18
## 97                              Israel    63985    474    27133   36378
## 98                               Kenya    17975    285     7833    9857
## 99                            Cameroon    17110    391    14539    2180
```

```
## 100                         Honduras     39741   1166      5039    33536
## 101                             Laos        20      0        19        1
## 102                         Suriname      1483     24       925      534
## 103                           Kosovo      7413    185      4027     3201
## 104                            Syria       674     40         0      634
## 105                            Yemen      1691    483       833      375
## 106                            Egypt     92482   4652     34838    52992
## 107                           Zambia      4552    140      2815     1597
## 108                       Azerbaijan     30446    423     23242     6781
## 109                          Ukraine     67096   1636     37202    28258
## 110                          Uruguay      1202     35       951      216
## 111                          Bolivia     71181   2647     21478    47056
## 112                         Slovakia      2181     28      1616      537
## 113                          Namibia      1843      8       101     1734
## 114              United Arab Emirates     59177    345     52510     6322
## 115                        Singapore     50838     27     45692     5119
## 116                          Liberia      1167     72       646      449
## 117                           Norway      9132    255      8752      125
## 118                           Cyprus      1060     19       852      189
## 119                          Taiwan*       462      7       440       15
## 120                          Burundi       378      1       301       76
## 121                           Panama     61442   1322     35086    25034
## 122                          Belarus     67251    538     60492     6221
## 123                         Colombia    257101   8777    131161   117163
## 124                           Brazil   2442375  87618   1846641   508116
## 125                          Lebanon      3882     51      1709     2122
## 126                    Guinea-Bissau      1954     26       803     1125
## 127                            Haiti      7340    158      4365     2817
## 128                West Bank and Gaza     10621     78      3752     6791
## 129                           Malawi      3664     99      1645     1920
## 130                             Oman     77058    393     57028    19637
## 131                         Barbados       110      7        94        9
## 132                             Iran    293606  15912    255144    22550
## 133                          Moldova     23154    748     16154     6252
## 134              Trinidad and Tobago       148      8       128       12
## 135                         Botswana       739      2        63      674
## 136                         Ethiopia     14547    228      6386     7933
## 137                          Ecuador     81161   5532     34896    40733
## 138                        Argentina    167416   3059     72575    91782
## 139                           Guyana       389     20       181      188
## 140                       Madagascar      9690     91      6260     3339
##     New.cases New.deaths New.recovered Deaths...100.Cases Recovered...100.Cases
## 1           0          0             2                1.71                 83.43
## 2       44457        637         33598                2.26                 64.26
## 3           0          0             4                3.70                 73.86
## 4           0          0             0                1.16                 94.19
## 5           0          0             0                2.91                 96.51
## 6         292          0           304                0.15                 97.02
## 7       13756        575          4697                4.73                 69.93
## 8          43          1            58                0.83                 83.32
## 9           0          0             0                6.01                 93.99
## 10        104          2           111                0.95                 63.87
## 11          0          0             0                2.38                 25.35
## 12         49          0           178                1.77                 76.33
```

```
## 13       1526          0          1833              0.69              64.27
## 14          0          0             0              0.00             100.00
## 15          7          0             0              0.54              98.33
## 16         94          2            70              1.56              27.96
## 17       2772         37          1801              1.31              55.56
## 18        127          6           137              4.56              54.48
## 19       2551         17           267             13.71              36.86
## 20         10          0             0              5.73              88.53
## 21        688          7             3             15.19               0.48
## 22          0          0             0              0.00              34.21
## 23        162          3            73              1.69              25.91
## 24        606          5           684              0.68              85.52
## 25          1          0             1              1.41              97.24
## 26        525          4           213              0.91              62.29
## 27        445          1           259              4.41              91.89
## 28          0          0             0              3.14              72.46
## 29        109          0            77              4.45              91.60
## 30          3          1             2              4.93              76.12
## 31          0          0             0              0.00              17.74
## 32         11          0             0              1.17              83.70
## 33         13          4           190              2.35              64.45
## 34          1          0             4              0.00              76.82
## 35         47          2           105              0.64              88.69
## 36        612         11            88              0.73              24.14
## 37         59          0           183              0.61              66.18
## 38        117          6            63              2.95              56.25
## 39        609          3           115              1.51              79.25
## 40        919         17           982              2.48              92.71
## 41          9          0            11              1.15              98.38
## 42         11          0             4              3.96              80.24
## 43       1248         20          1601              1.69              47.08
## 44       1592         13           336              2.37              32.24
## 45         83          3            68              1.99              66.34
## 46          0          0             0              0.00              75.00
## 47          0          0             1              3.39              94.54
## 48        135          2           158              3.42              70.33
## 49        194          7           230              3.27              52.58
## 50         39          3            49              6.30              51.99
## 51         73          6           187              1.90              71.32
## 52          0          0             0              2.54              85.73
## 53        731         14           375              2.80              46.96
## 54          7          0             0              8.13              87.85
## 55       7096        298          9848              1.56              60.75
## 56         43          1             0              2.00              50.98
## 57        168          5           147             14.26              80.64
## 58          0          0             0              0.00              88.24
## 59         86          1            37              3.47              88.75
## 60          0          0             0              1.66              27.42
## 61        337          5           103              3.86              75.70
## 62        139          3           626              0.26              73.35
## 63          1          0             0              1.28              94.86
## 64          0          0             0              2.13              97.87
## 65        616          8           749              4.16              67.34
## 66       2553         96          1927              3.96              68.52
```

```
## 67          0          0          0          0.00          100.00
## 68        678          5        569          0.57           55.04
## 69         13          0          4          0.18           87.41
## 70         28          1        102          2.11           91.58
## 71      56336       1076      27941          3.45           30.90
## 72          4          0          1          0.00           86.87
## 73        398          3          0          7.18            0.00
## 74        205          0        219          0.68           65.13
## 75        256         27        843          3.89           71.63
## 76          5          0          0          4.45           93.54
## 77         58          0         57          0.27           51.89
## 78          2          0         38          1.62           84.86
## 79          6          0          8          2.06           69.45
## 80          0          0          0         10.00           80.00
## 81         14          0          6          4.82           84.18
## 82          0          0          0          0.00          100.00
## 83          5          0         55          5.56           83.04
## 84         23          0         15          0.39           75.61
## 85          0          0          0          0.00           66.67
## 86          6          0          2          1.41           81.09
## 87       2133         75       1859          2.64           91.96
## 88        192          2         24          1.33           20.04
## 89          0          0          0          1.98           58.53
## 90        368          6        137          1.09           60.84
## 91         21          0        103          0.95           66.58
## 92          0          0          0          3.45           89.66
## 93        402          1         14         14.79           26.27
## 94          0          0          0          4.13           35.95
## 95        109          2         39          1.47           44.26
## 96          4          0          5          3.49           75.58
## 97       2029          4        108          0.74           42.41
## 98        372          5         90          1.59           43.58
## 99        402          6          0          2.29           84.97
## 100       465         50        117          2.93           12.68
## 101         0          0          0          0.00           95.00
## 102        44          1         35          1.62           62.37
## 103       496         16        274          2.50           54.32
## 104        24          2          0          5.93            0.00
## 105        10          4         36         28.56           49.26
## 106       420         46       1007          5.03           37.67
## 107        71          1        465          3.08           61.84
## 108       396          6        558          1.39           76.34
## 109       835         11        317          2.44           55.45
## 110        10          1          3          2.91           79.12
## 111      1752         64        309          3.72           30.17
## 112         2          0         39          1.28           74.09
## 113        68          0         26          0.43            5.48
## 114       264          1        328          0.58           88.73
## 115       469          0        171          0.05           89.88
## 116         5          0          5          6.17           55.36
## 117        15          0          0          2.79           95.84
## 118         3          0          0          1.79           80.38
## 119         4          0          0          1.52           95.24
## 120        17          0         22          0.26           79.63
```

```
## 121      1146         28          955              2.15                57.10
## 122       119          4           67              0.80                89.95
## 123     16306        508        11494              3.41                51.02
## 124     23284        614        33728              3.59                75.61
## 125       132          0           17              1.31                44.02
## 126         0          0            0              1.33                41.10
## 127        25          1            0              2.15                59.47
## 128       152          2            0              0.73                35.33
## 129        24          0            6              2.70                44.90
## 130      1053          9         1729              0.51                74.01
## 131         0          0            0              6.36                85.45
## 132      2434        212         1931              5.42                86.90
## 133       120         13          245              3.23                69.77
## 134         1          0            0              5.41                86.49
## 135        53          1           11              0.27                 8.53
## 136       579          5          170              1.57                43.90
## 137       467         17            0              6.82                43.00
## 138      4890        120         2057              1.83                43.35
## 139        19          0            0              5.14                46.53
## 140       395          6          681              0.94                64.60
##     Deaths...100.Recovered Confirmed.last.week One_Week_Change
## 1                     2.05                341              9
## 2                     3.51            1155338         324735
## 3                     5.01               1711             72
## 4                     1.23                 86              0
## 5                     3.01                343              1
## 6                     0.16             107037           2560
## 7                     6.76             357681          32036
## 8                     1.00               6921            314
## 9                     6.39                699              0
## 10                    1.48               3748            800
## 11                    9.38                359            146
## 12                    2.32               5639            682
## 13                    1.08              73468          11180
## 14                    0.00                 23              0
## 15                    0.55               1839             15
## 16                    5.56               2188            705
## 17                    2.36             207453          18772
## 18                    8.38               9249            964
## 19                   37.20             214023           6329
## 20                    6.48                884             23
## 21                 3190.26             296944           4764
## 22                    0.00                108              6
## 23                    6.51               2851            349
## 24                    0.80              59763           4616
## 25                    1.45               1555              2
## 26                    1.47              12334           3654
## 27                    4.79             203325           3787
## 28                    4.33               3147            292
## 29                    4.86              13453            308
## 30                    6.48               2475             38
## 31                    0.00                 19             43
## 32                    1.40                809             44
## 33                    3.65               8443            401
```

```
## 34                0.00              287              2
## 35                0.72             6590            465
## 36                3.01            11534           4307
## 37                0.93            14312           1343
## 38                5.25             4171            709
## 39                1.91            17562           3325
## 40                2.67           220572           6447
## 41                1.17             5020             39
## 42                4.94             1947             72
## 43                3.59            53956          10200
## 44                7.35            68898          13142
## 45                3.00             8948            816
## 46                0.00               50              2
## 47                3.59             2021             13
## 48                4.86            48771           1528
## 49                6.21             8929           1692
## 50               12.12            10992            432
## 51                2.67            34981           2409
## 52                2.97             1192             27
## 53                5.96             8479           2019
## 54                9.26              889             33
## 55                2.57           373628          78901
## 56                3.91             2211             94
## 57               17.68           244624           1662
## 58                0.00               17              0
## 59                3.91            19743            815
## 60                6.06             3071              0
## 61                5.10            40383           3019
## 62                0.35            17844            908
## 63                1.35              677             24
## 64                2.17              141              0
## 65                6.17            23691           4282
## 66                5.78            94693          17892
## 67                0.00               18              0
## 68                1.04            17149           4060
## 69                0.20             1069             59
## 70                2.31            13816            387
## 71               11.16          3834677         455582
## 72                0.00               90              9
## 73                 Inf            78048           1347
## 74                1.05             6433            756
## 75                5.43            39039           6270
## 76                4.75             7340             58
## 77                0.51             1629            250
## 78                1.91              746            119
## 79                2.97              783             91
## 80               12.50               10              0
## 81                5.72             1065             35
## 82                0.00               12              0
## 83                6.69             1953            134
## 84                0.52             2730             75
## 85                0.00               27              0
## 86                1.74             1039             98
## 87                2.87           333029          14894
```

```
## 88                    6.64              1713             991
## 89                    3.38              1602             168
## 90                    1.79             12428            2875
## 91                    1.42              2071             257
## 92                    3.85               109               7
## 93                   56.28             64094            2334
## 94                   11.48               509               0
## 95                    3.32              1826             490
## 96                    4.62                76              10
## 97                    1.75             52003           11982
## 98                    3.64             13771            4204
## 99                    2.69             16157             953
## 100                  23.14             34611            5130
## 101                   0.00                19               1
## 102                   2.59              1079             404
## 103                   4.59              5877            1536
## 104                    Inf               522             152
## 105                  57.98              1619              72
## 106                  13.35             88402            4080
## 107                   4.97              3326            1226
## 108                   1.82             27890            2556
## 109                   4.40             60767            6329
## 110                   3.68              1064             138
## 111                  12.32             60991           10190
## 112                   1.73              1980             201
## 113                   7.92              1344             499
## 114                   0.66             57193            1984
## 115                   0.06             48035            2803
## 116                  11.15              1107              60
## 117                   2.91              9034              98
## 118                   2.23              1038              22
## 119                   1.59               451              11
## 120                   0.33               322              56
## 121                   3.77             54426            7016
## 122                   0.89             66213            1038
## 123                   6.69            204005           53096
## 124                   4.74           2118646          323729
## 125                   2.98              2905             977
## 126                   3.24              1949               5
## 127                   3.62              7053             287
## 128                   2.08              8916            1705
## 129                   6.02              2992             672
## 130                   0.69             68400            8658
## 131                   7.45               106               4
## 132                   6.24            276202           17404
## 133                   4.63             21115            2039
## 134                   6.25               137              11
## 135                   3.17               522             217
## 136                   3.57             10207            4340
## 137                  15.85             74620            6541
## 138                   4.21            130774           36642
## 139                  11.05               337              52
## 140                   1.45              7153            2537
##     One_Week_Percentage_Increase            WHO_Region
```

```
## 1                          2.64       South-East Asia
## 2                         28.11       South-East Asia
## 3                          4.21                Africa
## 4                          0.00                Europe
## 5                          0.29                Africa
## 6                          2.39 Eastern Mediterranean
## 7                          8.96              Americas
## 8                          4.54                Europe
## 9                          0.00                Europe
## 10                        21.34              Americas
## 11                        40.67                Africa
## 12                        12.09                Europe
## 13                        15.22                Europe
## 14                         0.00              Americas
## 15                         0.82                Europe
## 16                        32.22                Europe
## 17                         9.05       South-East Asia
## 18                        10.42                Europe
## 19                         2.96                Europe
## 20                         2.60                Europe
## 21                         1.60                Europe
## 22                         5.56                Africa
## 23                        12.24                Africa
## 24                         7.72 Eastern Mediterranean
## 25                         0.13       Western Pacific
## 26                        29.63              Americas
## 27                         1.86                Europe
## 28                         9.28              Americas
## 29                         2.29                Europe
## 30                         1.54                Africa
## 31                       226.32       Western Pacific
## 32                         5.44              Americas
## 33                         4.75                Africa
## 34                         0.70       Western Pacific
## 35                         7.06                Africa
## 36                        37.34              Americas
## 37                         9.38                Africa
## 38                        17.00                Europe
## 39                        18.93 Eastern Mediterranean
## 40                         2.92                Europe
## 41                         0.78 Eastern Mediterranean
## 42                         3.70                Europe
## 43                        18.90              Americas
## 44                        19.07       Western Pacific
## 45                         9.12                Africa
## 46                         4.00              Americas
## 47                         0.64                Europe
## 48                         3.13                Europe
## 49                        18.95                Europe
## 50                         3.93 Eastern Mediterranean
## 51                         6.89                Europe
## 52                         2.27                Europe
## 53                        23.81                Europe
## 54                         3.71                Africa
```

```
## 55                        21.12                Africa
## 56                         4.25                Africa
## 57                         0.68                Europe
## 58                         0.00              Americas
## 59                         4.13                Europe
## 60                         0.00                Africa
## 61                         7.48                Europe
## 62                         5.09       South-East Asia
## 63                         3.55                Europe
## 64                         0.00       Western Pacific
## 65                        18.07                Africa
## 66                        18.89 Eastern Mediterranean
## 67                         0.00              Americas
## 68                        23.67                Europe
## 69                         5.52                Africa
## 70                         2.80       Western Pacific
## 71                        11.88              Americas
## 72                        10.00       South-East Asia
## 73                         1.73                Europe
## 74                        11.75                Africa
## 75                        16.06              Americas
## 76                         0.79                Europe
## 77                        15.35                Africa
## 78                        15.95                Africa
## 79                        11.62                Africa
## 80                         0.00                Africa
## 81                         3.29                Africa
## 82                         0.00                Europe
## 83                         6.86                Europe
## 84                         2.75       South-East Asia
## 85                         0.00       Western Pacific
## 86                         9.43                Europe
## 87                         4.47              Americas
## 88                        57.85                Africa
## 89                        10.49                Africa
## 90                        23.13       Western Pacific
## 91                        12.41                Africa
## 92                         6.42                Europe
## 93                         3.64                Europe
## 94                         0.00                Africa
## 95                        26.83                Africa
## 96                        13.16              Americas
## 97                        23.04                Europe
## 98                        30.53                Africa
## 99                         5.90                Africa
## 100                       14.82              Americas
## 101                        5.26       Western Pacific
## 102                       37.44              Americas
## 103                       26.14                Europe
## 104                       29.12 Eastern Mediterranean
## 105                        4.45 Eastern Mediterranean
## 106                        4.62 Eastern Mediterranean
## 107                       36.86                Africa
## 108                        9.16                Europe
```

```
## 109                       10.42                Europe
## 110                       12.97              Americas
## 111                       16.71              Americas
## 112                       10.15                Europe
## 113                       37.13                Africa
## 114                        3.47 Eastern Mediterranean
## 115                        5.84       Western Pacific
## 116                        5.42                Africa
## 117                        1.08                Europe
## 118                        2.12                Europe
## 119                        2.44       Western Pacific
## 120                       17.39                Africa
## 121                       12.89              Americas
## 122                        1.57                Europe
## 123                       26.03              Americas
## 124                       15.28              Americas
## 125                       33.63 Eastern Mediterranean
## 126                        0.26                Africa
## 127                        4.07              Americas
## 128                       19.12 Eastern Mediterranean
## 129                       22.46                Africa
## 130                       12.66 Eastern Mediterranean
## 131                        3.77              Americas
## 132                        6.30 Eastern Mediterranean
## 133                        9.66                Europe
## 134                        8.03              Americas
## 135                       41.57                Africa
## 136                       42.52                Africa
## 137                        8.77              Americas
## 138                       28.02              Americas
## 139                       15.43              Americas
## 140                       35.47                Africa
```

Question 13

Print the summary statistics of your dataset.

```
summary(covid_data)
```

```
##  Country.Region       Confirmed           Deaths           Recovered
##  Length:187         Min.   :     10   Min.   :     0.0   Min.   :      0.0
##  Class :character   1st Qu.:   1114   1st Qu.:    18.5   1st Qu.:    626.5
##  Mode  :character   Median :   5059   Median :   108.0   Median :   2815.0
##                     Mean   :  88131   Mean   :  3497.5   Mean   :  50631.5
##                     3rd Qu.:  40460   3rd Qu.:   734.0   3rd Qu.:  22606.0
##                     Max.   :4290259   Max.   :148011.0   Max.   :1846641.0
##      Active            New.cases         New.deaths      New.recovered
##  Min.   :      0.0   Min.   :    0.0   Min.   :   0.00   Min.   :    0.0
##  1st Qu.:    141.5   1st Qu.:    4.0   1st Qu.:   0.00   1st Qu.:    0.0
##  Median :   1600.0   Median :   49.0   Median :   1.00   Median :   22.0
##  Mean   :  34001.9   Mean   : 1223.0   Mean   :  28.96   Mean   :  933.8
##  3rd Qu.:   9149.0   3rd Qu.:  419.5   3rd Qu.:   6.00   3rd Qu.:  221.0
##  Max.   :2816444.0   Max.   :56336.0   Max.   :1076.00   Max.   :33728.0
##  Deaths...100.Cases Recovered...100.Cases Deaths...100.Recovered
##  Min.   : 0.000     Min.   :  0.00        Min.   :0.00
##  1st Qu.: 0.945     1st Qu.: 48.77        1st Qu.:1.45
##  Median : 2.150     Median : 71.32        Median :3.62
##  Mean   : 3.020     Mean   : 64.82        Mean   : Inf
##  3rd Qu.: 3.875     3rd Qu.: 86.89        3rd Qu.:6.44
##  Max.   :28.560     Max.   :100.00        Max.   : Inf
##  Confirmed.last.week One_Week_Change  One_Week_Percentage_Increase
##  Min.   :     10     Min.   :   -47   Min.   : -3.840
##  1st Qu.:   1052     1st Qu.:    49   1st Qu.:  2.775
##  Median :   5020     Median :   432   Median :  6.890
##  Mean   :  78682     Mean   :  9448   Mean   : 13.606
##  3rd Qu.:  37080     3rd Qu.:  3172   3rd Qu.: 16.855
##  Max.   :3834677     Max.   :455582   Max.   :226.320
##   WHO_Region
##  Length:187
##  Class :character
##  Mode  :character
##
##
##
```

Question 14

Use any of the numerical variables from the dataset and perform the following statistical functions.

14(a) Mean

```
meanDeaths <- mean(covid_data$Deaths)
meanDeaths
```

```
## [1] 3497.519
```

14(b) Median

```
medianRecovered <- median(covid_data$New.recovered)
medianRecovered
```

```
## [1] 22
```

14(c) Mode

```
calcMode <- function(colName){
  tempValues <- table(as.vector(colName))
  names(tempValues)[tempValues == max(tempValues)]
}

calcMode(covid_data$Active)
```

```
## [1] "0"
```

14(d) Range

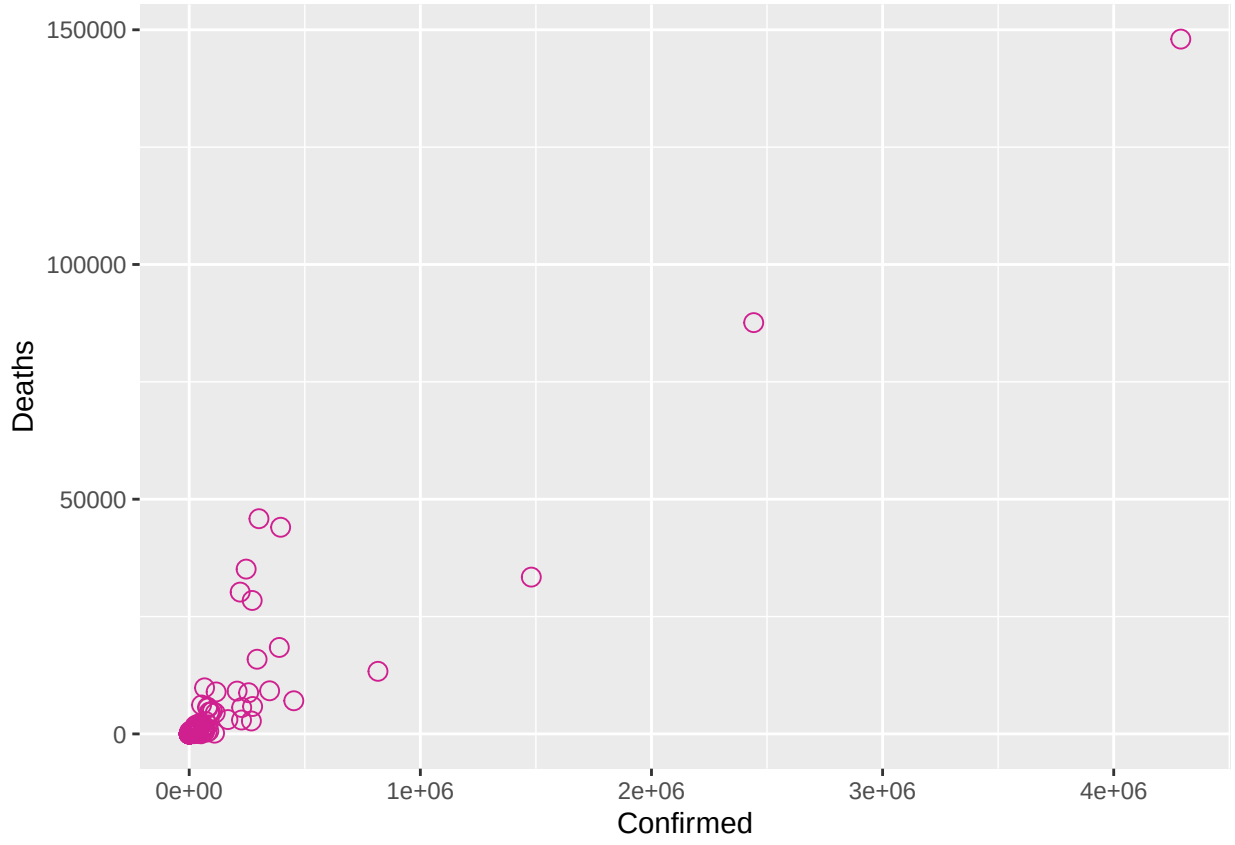
```
rangeConfirmed <- range(covid_data$Confirmed)
rangeConfirmed
```

```
## [1]      10 4290259
```

Question 15

Plot a scatter plot for any 2 variables in your dataset.

```
ggplot(covid_data,aes(x = Confirmed,y = Deaths))+geom_point(size = 3, color = "violetred",
shape = 21)
```

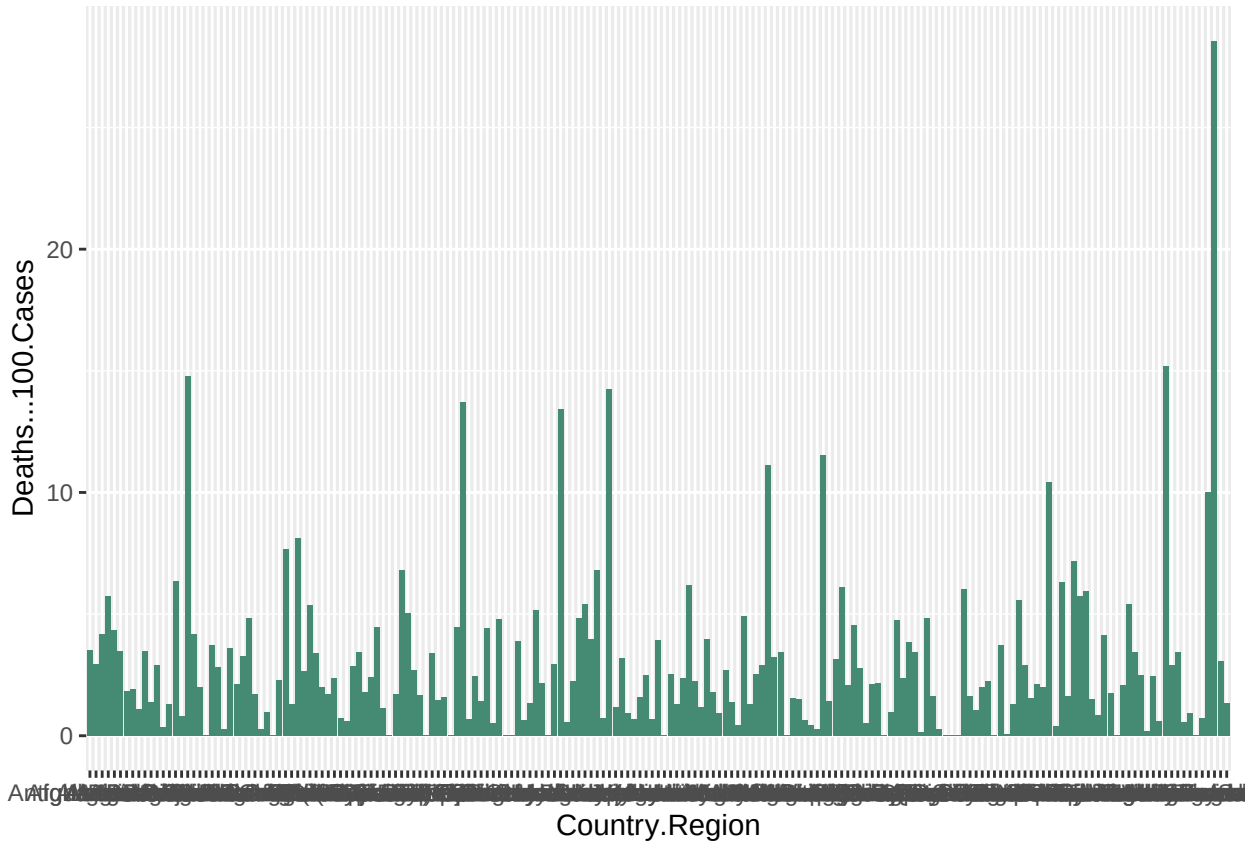


Question 16

Plot a bar plot for any 2 variables in your dataset.

We included stat='identity', to provide the y-values for the bar plot.

```
ggplot(covid_data,aes(x = Country.Region, y = Deaths...100.Cases))+geom_bar(stat='identity',
fill = "aquamarine4")
```



Question 17

Find correlation between any 2 variables by applying least square linear regression model.

```
x <- covid_data[,"Confirmed"]
y <- covid_data[,"Deaths"]
head(x)
```

```
## [1] 36263  4880 27973   907   950    86
```

```
head(y)
```

```
## [1] 1269  144 1163   52   41    3
```

```
xycorrec=cor(y,x,method = "pearson")
xycorrec
```

```
## [1] 0.9346984
```