

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
## [19,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
## [20,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
## [21,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
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## [23,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE

##	[186,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
##	[187,]	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
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##	[12,]	FALSE		FALSE		FALSE		
##	[13,]	FALSE		FALSE		FALSE		
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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
## [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

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

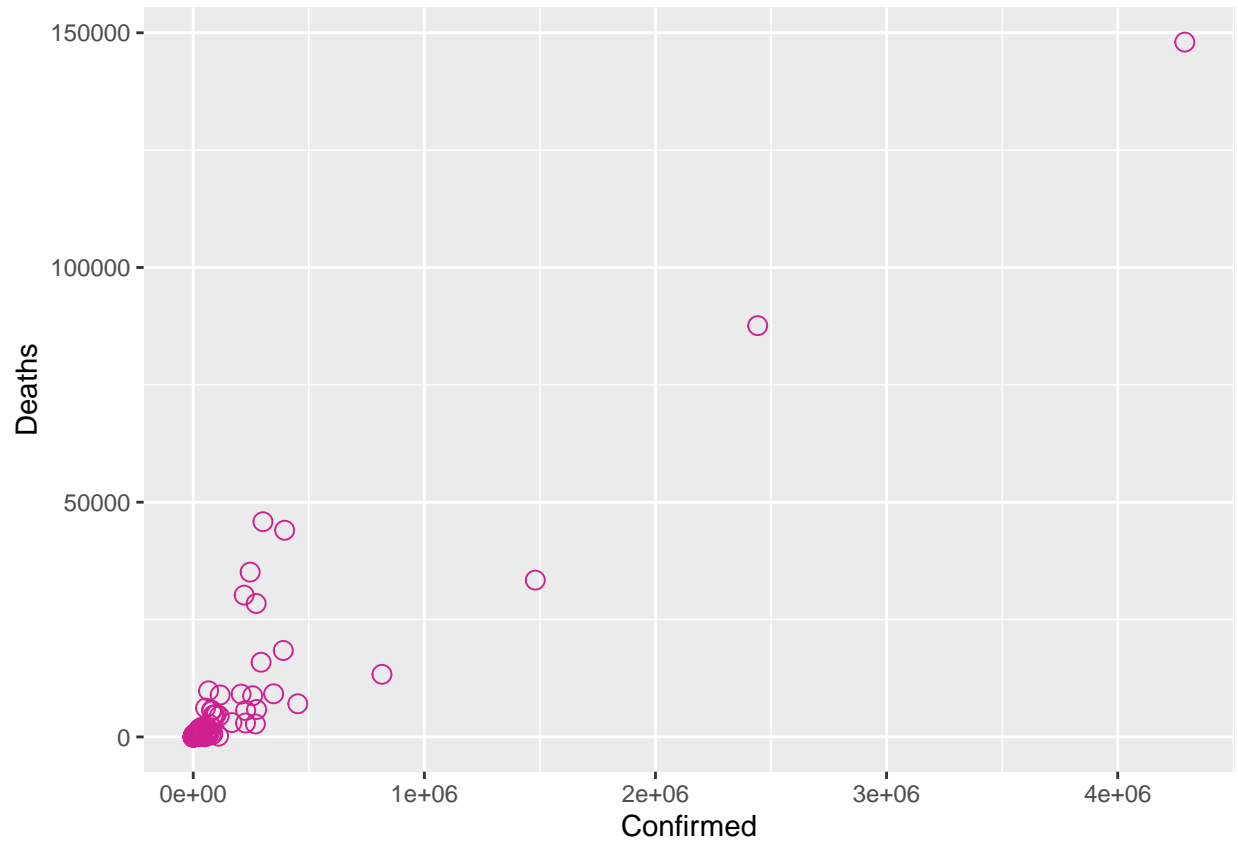
```
rangeConfirmed <- range(covid_data$Confirmed)
rangeConfirmed
```

```
## [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)
```

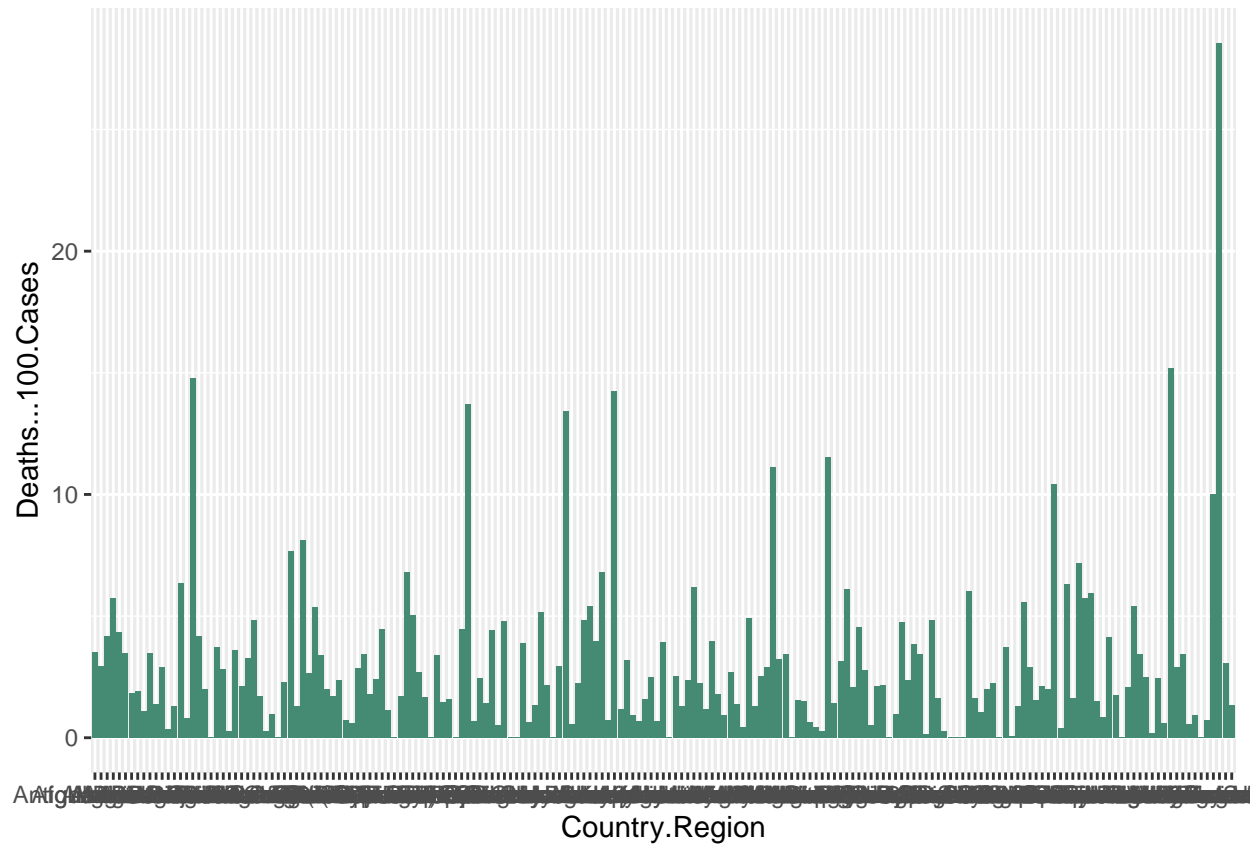


Question 16

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
```