In [1]:
```
'.libPaths'()
```

'C:/Users/user/anaconda3/envs/r-base/Lib/R/library'

In [1]:
```
#install the necessary libraries
install.packages("lubridate")
install.packages('plotly')
install.packages('tidyverse')
```

```
package 'lubridate' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\user\AppData\Local\Temp\RtmpE1UF26\downloaded_packages

  There is a binary version available but the source version is later:
       binary  source needs_compilation
plotly  4.9.3 4.9.4.1             FALSE


installing the source package 'plotly'

also installing the dependency 'jsonlite'


package 'jsonlite' successfully unpacked and MD5 sums checked

Warning message:
"cannot remove prior installation of package 'jsonlite'"Warning message in file.copy(savedcopy, lib, recursive = TRUE):
"problem copying C:\Users\user\anaconda3\envs\r-base\Lib\R\library\00LOCK\jsonlite\libs\x64\jsonlite.dll to C:\Users\user\anaconda3\envs\r-base\Lib\R\library\jsonlite\libs\x64\json
lite.dll: Permission denied"Warning message:
"restored 'jsonlite'"

package 'tidyverse' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\user\AppData\Local\Temp\RtmpE1UF26\downloaded_packages
```

In [23]:
```
#Load packages
library('lubridate') #to modify the date
library('plotly') #for graphing
library('tidyverse') #for data preprocessing
```

```
Warning message:
"package 'lubridate' was built under R version 3.6.3"
Attaching package: 'lubridate'

The following objects are masked from 'package:base':

    date, intersect, setdiff, union

Loading required package: ggplot2

Attaching package: 'plotly'

The following object is masked from 'package:ggplot2':

    last_plot

The following object is masked from 'package:stats':

    filter

The following object is masked from 'package:graphics':

    layout

Warning message:
"package 'tidyverse' was built under R version 3.6.3"

Error: package or namespace load failed for 'tidyverse' in loadNamespace(j <- i[[1L]], c(lib.loc, .libPaths()), versionCheck = vI[[j]]):
 namespace 'jsonlite' 1.6 is already loaded, but >= 1.7.2 is required
Traceback:

1. library("tidyverse")
2. tryCatch({
 .     attr(package, "LibPath") <- which.lib.loc
 .     ns <- loadNamespace(package, lib.loc)
 .     env <- attachNamespace(ns, pos = pos, deps, exclude, include.only)
 . }, error = function(e) {
 .     P <- if (!is.null(cc <- conditionCall(e)))
 .         paste(" in", deparse(cc)[1L])
 .     else ""
 .     msg <- gettextf("package or namespace load failed for %s%s:\n %s",
 .         sQuote(package), P, conditionMessage(e))
 .     if (logical.return)
 .         message(paste("Error:", msg), domain = NA)
 .     else stop(msg, call. = FALSE, domain = NA)
 . })
3. tryCatchList(expr, classes, parentenv, handlers)
4. tryCatchOne(expr, names, parentenv, handlers[[1L]])
5. value[[3L]](cond)
6. stop(msg, call. = FALSE, domain = NA)
```

In [24]:
```
covid <- read.csv('https://raw.githubusercontent.com/makena-yvonne/Covid-19-Data-Analysis-using-plotly/main/Dataset/country_daywise.csv')
```

In [25]:
```
head(covid)
```

Date	Country	Confirmed	Deaths	Recovered	Active	New.Cases	New.Recovered	New.Deaths
2020-01-23	Afghanistan	0	0	0	0	0	0	0
2020-01-24	Afghanistan	0	0	0	0	0	0	0
2020-01-25	Afghanistan	0	0	0	0	0	0	0
2020-01-26	Afghanistan	0	0	0	0	0	0	0
2020-01-27	Afghanistan	0	0	0	0	0	0	0
2020-01-28	Afghanistan	0	0	0	0	0	0	0

In [26]:
```
dim(covid)
```

106275 9

In [27]:
```
covid$Date <- ymd(covid$Date)
```

In [28]:
```
head(covid)
```

Date	Country	Confirmed	Deaths	Recovered	Active	New.Cases	New.Recovered	New.Deaths
2020-01-23	Afghanistan	0	0	0	0	0	0	0
2020-01-24	Afghanistan	0	0	0	0	0	0	0
2020-01-25	Afghanistan	0	0	0	0	0	0	0
2020-01-26	Afghanistan	0	0	0	0	0	0	0
2020-01-27	Afghanistan	0	0	0	0	0	0	0
2020-01-28	Afghanistan	0	0	0	0	0	0	0

In [29]:
```
covid <- arrange(covid, Date)
```

In [30]:
```
tail(covid)
```

	Date	Country	Confirmed	Deaths	Recovered	Active	New.Cases	New.Recovered	New.Deaths
106270	2021-07-20	Venezuela	293866	3392	276952	13522	0	0	0
106271	2021-07-20	Vietnam	65607	334	11443	53830	5427	396	0
106272	2021-07-20	West Bank and Gaza	315761	3589	310601	1571	0	0	0
106273	2021-07-20	Yemen	6992	1371	4162	1459	5	0	1
106274	2021-07-20	Zambia	187602	3138	174728	9736	1323	1408	25
106275	2021-07-20	Zimbabwe	88415	2747	58155	27513	2683	2441	50

Line Plot

In [31]:
```
daywise <- read.csv('https://raw.githubusercontent.com/makena-yvonne/Covid-19-Data-Analysis-using-plotly/main/Dataset/daywise.csv')
```

In [32]:
```
head(daywise)
```

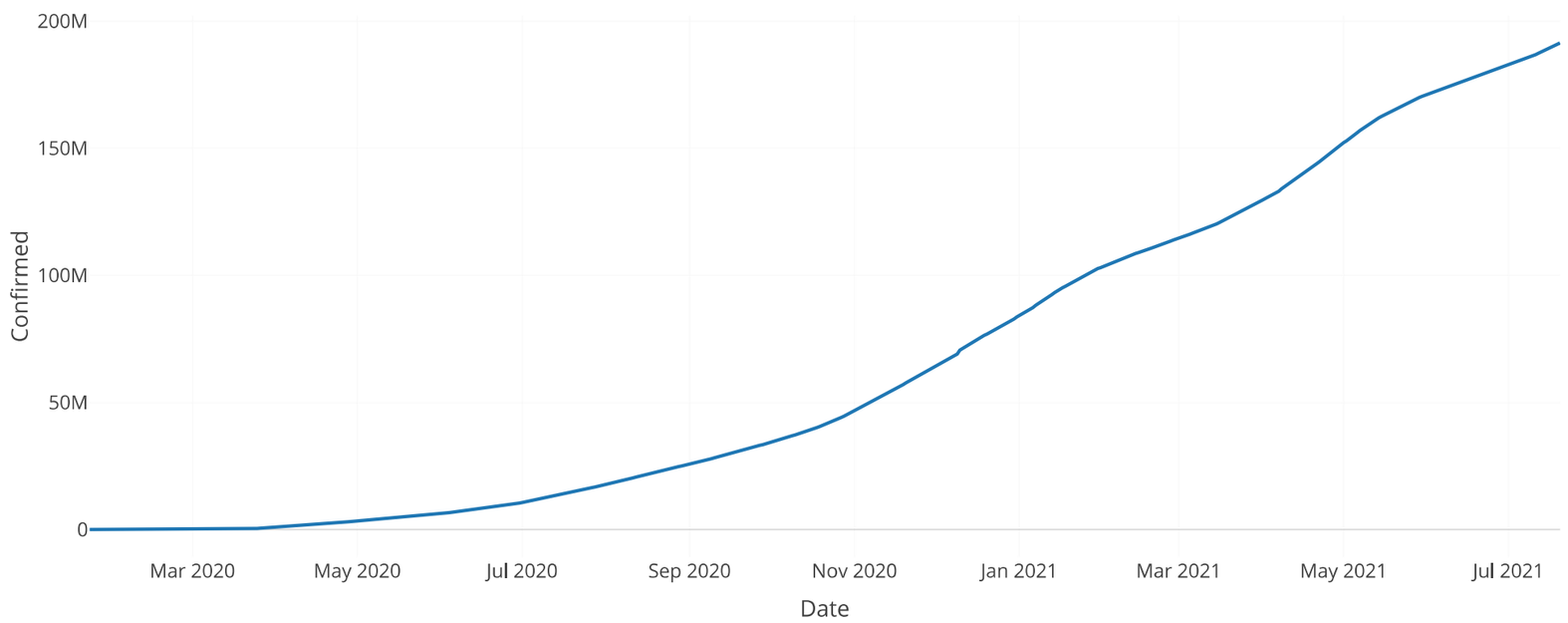
Date	Confirmed	Deaths	Recovered	Active	New.Cases	Deaths...100.Cases	Recovered...100.Cases	Deaths...100.Recovered	No..of.Countries
2020-01-23	655	18	32	605	99	2.75	4.89	56.25	8
2020-01-24	941	26	39	876	287	2.76	4.14	66.67	9
2020-01-25	1433	42	42	1349	494	2.93	2.93	100.00	11
2020-01-26	2118	56	56	2006	685	2.64	2.64	100.00	13
2020-01-27	2927	82	65	2780	809	2.80	2.22	126.15	16
2020-01-28	5578	131	108	5339	2653	2.35	1.94	121.30	16

In [33]:
```
daywise$Date <- ymd(daywise$Date)
daywise <- arrange(daywise, Date)
```

In [34]:
```
head(daywise)
```

Date	Confirmed	Deaths	Recovered	Active	New.Cases	Deaths...100.Cases	Recovered...100.Cases	Deaths...100.Recovered	No..of.Countries
2020-01-23	655	18	32	605	99	2.75	4.89	56.25	8
2020-01-24	941	26	39	876	287	2.76	4.14	66.67	9
2020-01-25	1433	42	42	1349	494	2.93	2.93	100.00	11
2020-01-26	2118	56	56	2006	685	2.64	2.64	100.00	13
2020-01-27	2927	82	65	2780	809	2.80	2.22	126.15	16
2020-01-28	5578	131	108	5339	2653	2.35	1.94	121.30	16

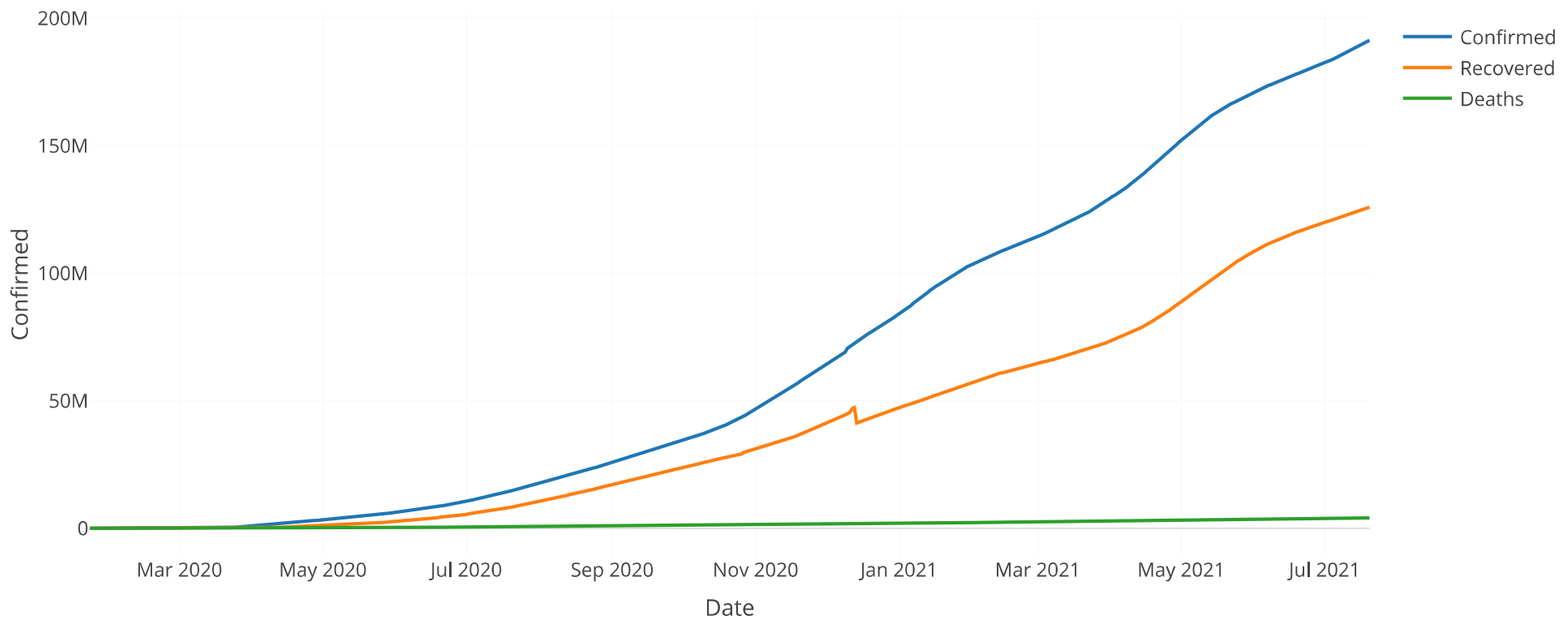
In [35]:
```
#plot a scatter plot
plot_ly(daywise, x=~Date, y=~Confirmed, type='scatter', mode='lines')
```



In [36]:
```
#names of columns in the daywise data
names(daywise)
```

'Date' 'Confirmed' 'Deaths' 'Recovered' 'Active' 'New.Cases' 'Deaths...100.Cases' 'Recovered...100.Cases' 'Deaths...100.Recovered' 'No..of.Countries'

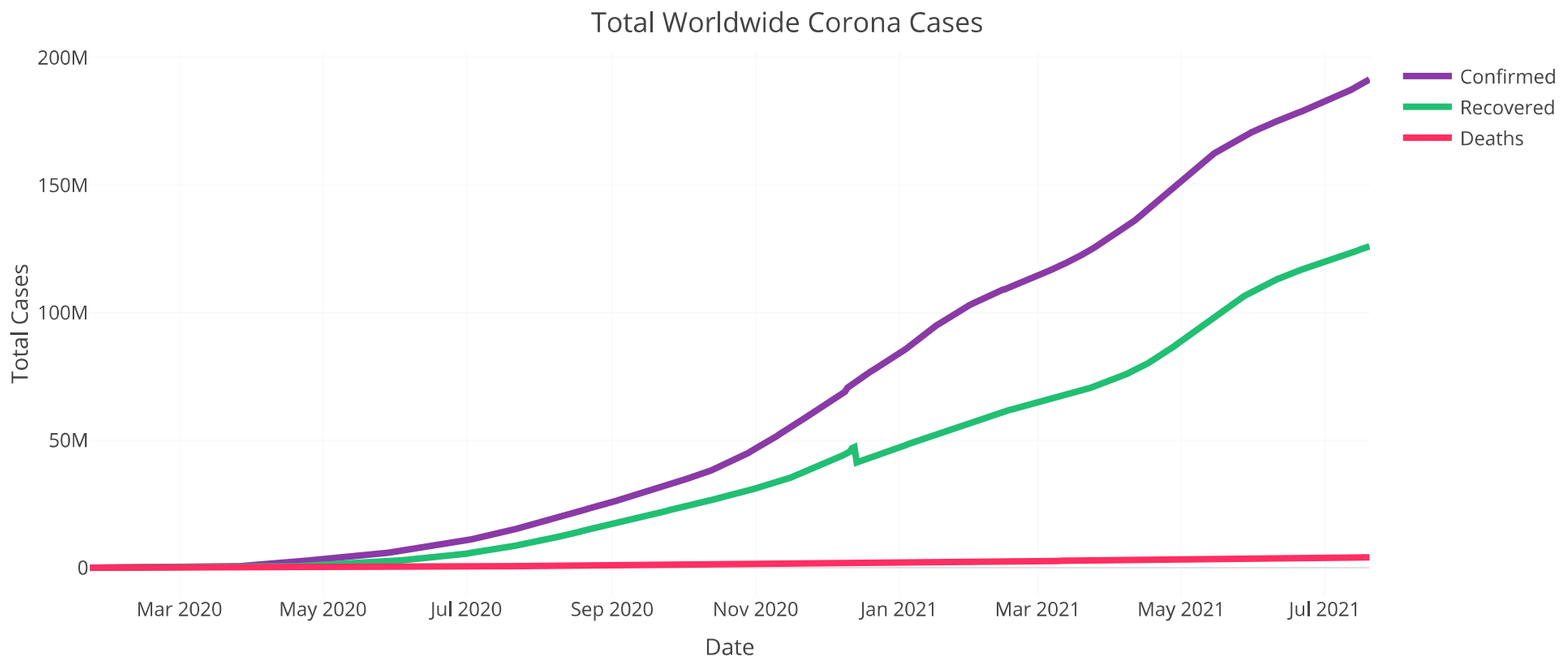
In [37]:
```
fig <- plot_ly(daywise, x=~Date)

fig <- fig %>% add_trace(y=~Confirmed, name='Confirmed', mode='lines', type='scatter')
fig <- fig %>% add_trace(y=~Recovered, name='Recovered', mode='lines', type='scatter')
fig <- fig %>% add_trace(y=~Deaths, name='Deaths', mode='lines', type='scatter')
fig
```



Style Line Plots

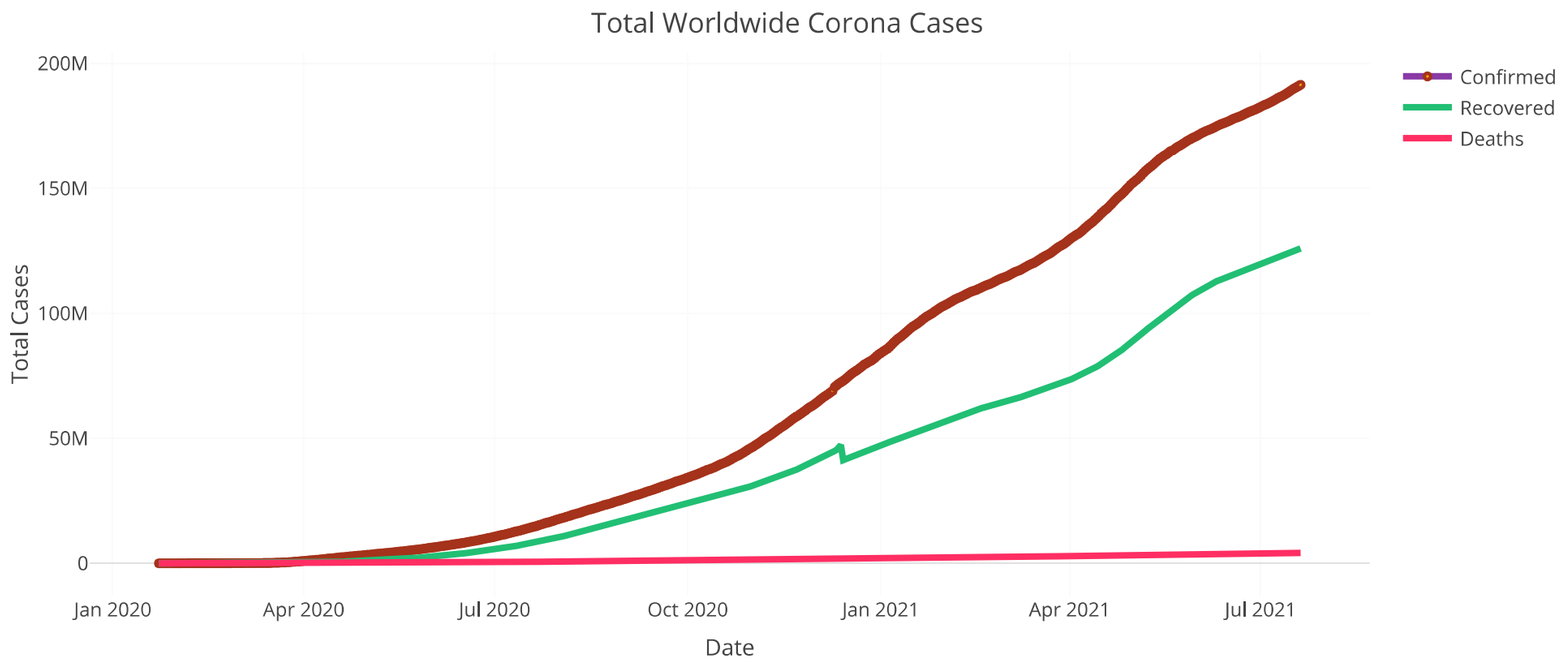
In [38]:
```
cnf <- '#893aa6'
dth <- '#ff2e63'
rec <- '#21bf73'
act <- '#fe9801'
```

In [39]:
```
fig <- plot_ly(daywise, x=~Date)

cnf.line <- list(color=cnf,width=4)
dth.line <- list(color=dth,width=4)
rec.line <- list(color=rec,width=4)

fig <- fig %>% add_trace(y=~Confirmed, name='Confirmed', mode='lines', type='scatter', line=cnf.line)
fig <- fig %>% add_trace(y=~Recovered, name='Recovered', mode='lines', type='scatter', line=rec.line)
fig <- fig %>% add_trace(y=~Deaths, name='Deaths', mode='lines', type='scatter', line=dth.line)

fig <- fig %>% layout(title='Total Worldwide Corona Cases',
                      xaxis=list(title='Date'),
                      yaxis=list(title='Total Cases'))
fig
```



Marker Styling in R

In [40]:
```
fig <- plot_ly(daywise, x=~Date)

cnf.line <- list(color=cnf,width=4)
dth.line <- list(color=dth,width=4)
rec.line <- list(color=rec,width=4)

cnf.marker <- list(color=act, size=2, opacity=1,
                   line=list(color='#A5321a', width=4))

fig <- fig %>% add_trace(y=~Confirmed, name='Confirmed', mode='lines+markers', type='scatter', line=cnf.line, marker=cnf.marker)
fig <- fig %>% add_trace(y=~Recovered, name='Recovered', mode='lines', type='scatter', line=rec.line)
fig <- fig %>% add_trace(y=~Deaths, name='Deaths', mode='lines', type='scatter', line=dth.line)

fig <- fig %>% layout(title='Total Worldwide Corona Cases',
                      xaxis=list(title='Date'),
                      yaxis=list(title='Total Cases'))
fig
```



Bar Chart

Top 10 worst hit countries by Covid 19

In [41]:
```
1 head(covid)
```

Date	Country	Confirmed	Deaths	Recovered	Active	New.Cases	New.Recovered	New.Deaths
2020-01-23	Afghanistan	0	0	0	0	0	0	0
2020-01-23	Albania	0	0	0	0	0	0	0
2020-01-23	Algeria	0	0	0	0	0	0	0
2020-01-23	Andorra	0	0	0	0	0	0	0
2020-01-23	Angola	0	0	0	0	0	0	0
2020-01-23	Antigua and Barbuda	0	0	0	0	0	0	0

In [42]:
```
1 tail(covid)
```

	Date	Country	Confirmed	Deaths	Recovered	Active	New.Cases	New.Recovered	New.Deaths
106270	2021-07-20	Venezuela	293866	3392	276952	13522	0	0	0
106271	2021-07-20	Vietnam	65607	334	11443	53830	5427	396	0
106272	2021-07-20	West Bank and Gaza	315761	3589	310601	1571	0	0	0
106273	2021-07-20	Yemen	6992	1371	4162	1459	5	0	1
106274	2021-07-20	Zambia	187602	3138	174728	9736	1323	1408	25
106275	2021-07-20	Zimbabwe	88415	2747	58155	27513	2683	2441	50

In [43]:
```
1 latest <- covid %>% filter(Date==max(Date)) %>% arrange(desc(Confirmed))
```

In [44]:
```
1 top10 <- latest %>% slice(1:10)
```

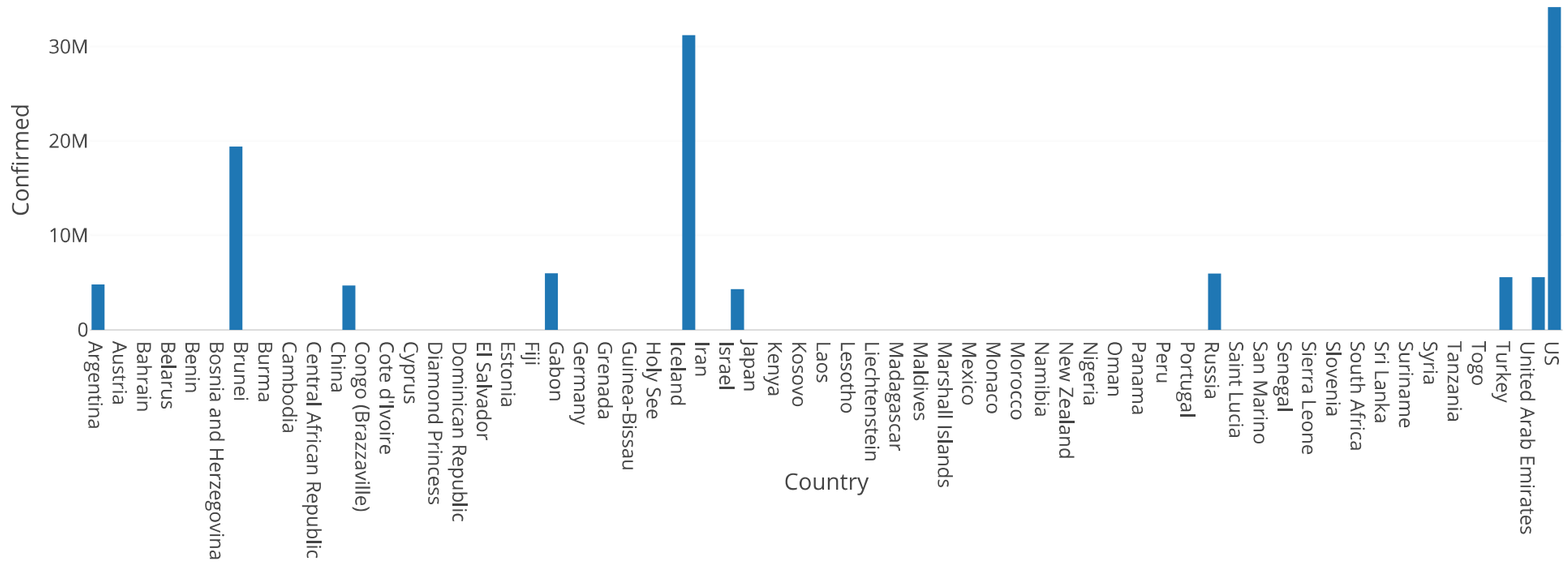
In [45]:
```
1 top10
```

Date	Country	Confirmed	Deaths	Recovered	Active	New.Cases	New.Recovered	New.Deaths
2021-07-20	US	34174774	609529	0	33565245	42703	0	298
2021-07-20	India	31216337	418480	30390687	407170	42015	36977	3998
2021-07-20	Brazil	19419437	544180	17371065	1504192	27592	51736	1424
2021-07-20	France	5952339	111715	409403	5431221	18217	430	33
2021-07-20	Russia	5931925	147457	5318062	466406	23234	21812	771
2021-07-20	Turkey	5546166	50650	5395300	100216	8780	4561	46
2021-07-20	United Kingdom	5542635	129109	16686	5396840	46688	199	102
2021-07-20	Argentina	4784219	102381	4420995	260843	15077	13180	426
2021-07-20	Colombia	4668750	117131	4422866	128753	12829	14840	378
2021-07-20	Italy	4293083	127884	4115889	49310	3555	1760	10

In [46]:
```
summary(top10)
```

```
     Date                Country    Confirmed           Deaths
Min.   :2021-07-20   Argentina:1   Min.   : 4293083   Min.   : 50650
1st Qu.:2021-07-20   Brazil   :1   1st Qu.: 4973823   1st Qu.:113069
Median :2021-07-20   Colombia :1   Median : 5739046   Median :128497
Mean   :2021-07-20   France   :1   Mean   :12152966   Mean   :235852
3rd Qu.:2021-07-20   India    :1   3rd Qu.:16052662   3rd Qu.:350724
Max.   :2021-07-20   Italy    :1   Max.   :34174774   Max.   :609529
                     (Other)  :4
  Recovered            Active           New.Cases     New.Recovered
Min.   :       0   Min.   :   49310   Min.   : 3555   Min.   :    0.0
1st Qu.: 1336024   1st Qu.:  161776   1st Qu.:13391   1st Qu.:  762.5
Median : 4421930   Median :  436788   Median :20726   Median : 8870.5
Mean   : 7186095   Mean   : 4731020   Mean   :24069   Mean   :14549.5
3rd Qu.: 5375990   3rd Qu.: 4423678   3rd Qu.:38409   3rd Qu.:20069.0
Max.   :30390687   Max.   :33565245   Max.   :46688   Max.   :51736.0

  New.Deaths
Min.   :  10.0
1st Qu.:  60.0
Median : 338.0
Mean   : 748.6
3rd Qu.: 684.8
Max.   :3998.0
```

In [47]:
```
plot_ly(top10, x= ~Country, y= ~Confirmed, type='bar', name='Confirmed Cases')
```

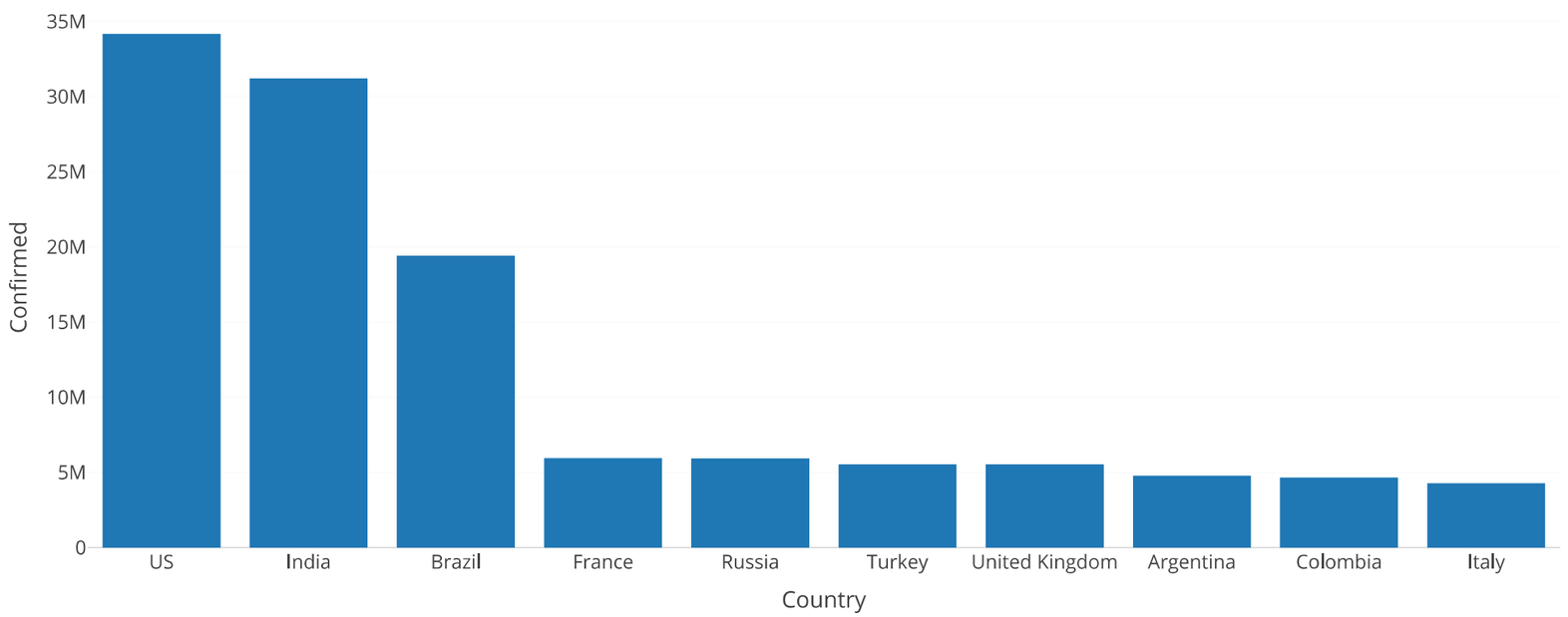


In [48]:
```
factor(top10$Country, levels=c(as.character(top10$Country)))
```

US India Brazil France Russia Turkey United Kingdom Argentina Colombia Italy

▶ **Levels**:

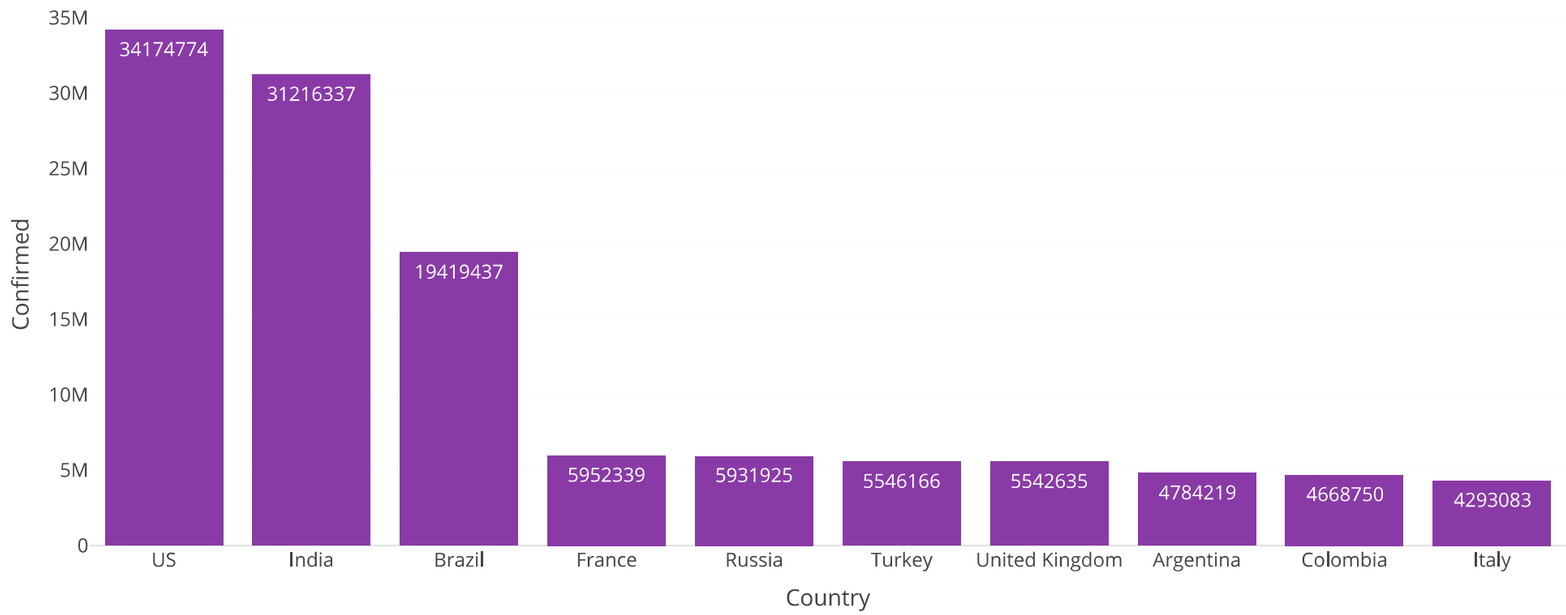
In [49]:
```
top10$Country <- factor(top10$Country, levels=c(as.character(top10$Country)))

plot_ly(top10, x=~Country, y=~Confirmed, type='bar', name='Confirmed Cases')
```



Bar Chart with Direct Labels

In [50]:
```
values <- as.character(top10$Confirmed)
```

In [51]:
```
plot_ly(top10, x=~Country, y=~Confirmed, type='bar', name='Confirmed Cases',
        text=values, textposition='auto', marker=list(color=cnf, line=list(color='magenta', width=0)))
```

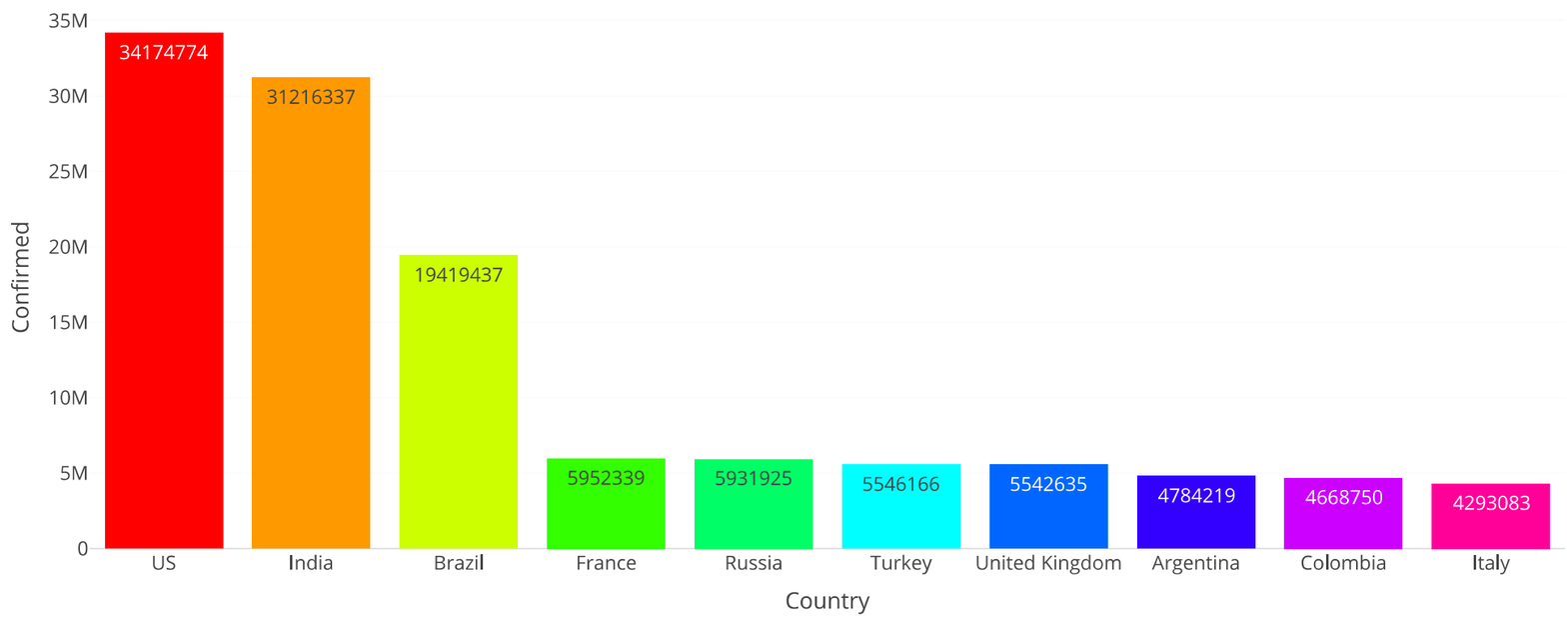


Customize Individual Bar Colors

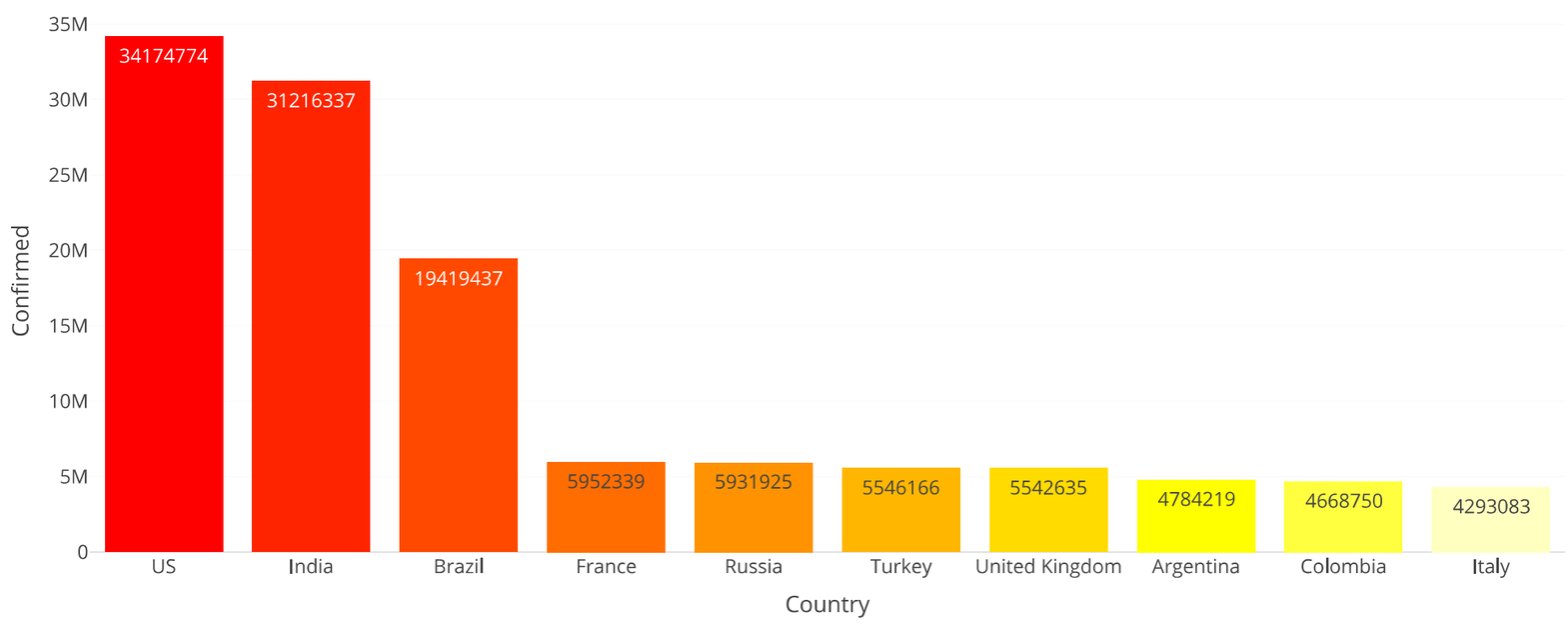
In [52]:
```
rainbow(n=10)
```

'#FF0000FF' '#FF9900FF' '#CCFF00FF' '#33FF00FF' '#00FF66FF' '#00FFFFFF' '#0066FFFF' '#3300FFFF' '#CC00FFFF' '#FF0099FF'

In [53]:
```
plot_ly(top10, x=~Country, y=~Confirmed, type='bar', name='Confirmed Cases',
        text=values, textposition='auto', marker=list(color=rainbow(n=10)))
```



In [54]:
```
plot_ly(top10, x=~Country, y=~Confirmed, type='bar', name='Confirmed Cases',
        text=values, textposition='auto', marker=list(color=heat.colors(n=10)))
```



subplots() | Complete Case nalysis for USA

In [55]:
```
us <- covid%>% filter(Country=='US') %>% arrange(Date)
```

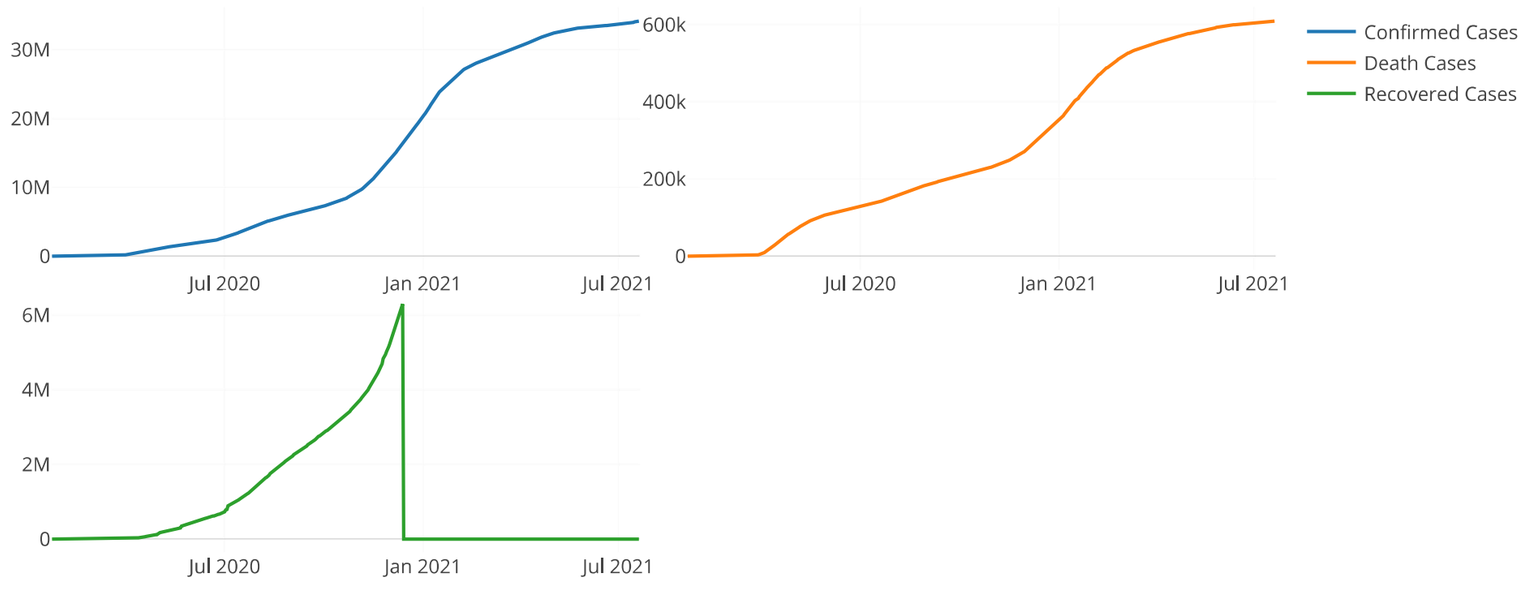
In [56]:
```
head(us)
```

	Date	Country	Confirmed	Deaths	Recovered	Active	New.Cases	New.Recovered	New.Deaths
2020-01-23	US	1	0	0	1	0	0	0
2020-01-24	US	2	0	0	2	1	0	0
2020-01-25	US	2	0	0	2	0	0	0
2020-01-26	US	5	0	0	5	3	0	0
2020-01-27	US	5	0	0	5	0	0	0
2020-01-28	US	5	0	0	5	0	0	0

In [57]:
```
tail(us)
```

	Date	Country	Confirmed	Deaths	Recovered	Active	New.Cases	New.Recovered	New.Deaths
540	2021-07-15	US	33975642	608424	0	33367218	28412	0	283
541	2021-07-16	US	34054952	608815	0	33446137	79310	0	391
542	2021-07-17	US	34067912	608884	0	33459028	12960	0	69
543	2021-07-18	US	34079960	609019	0	33470941	12048	0	135
544	2021-07-19	US	34132071	609231	0	33522840	52111	0	212
545	2021-07-20	US	34174774	609529	0	33565245	42703	0	298

In [58]:
```
fig1 <- plot_ly(us, x=~Date, y=~Confirmed, type='scatter', mode='lines', name='Confirmed Cases')
fig2 <- plot_ly(us, x=~Date, y=~Recovered, type='scatter', mode='lines', name='Recovered Cases')
fig3 <- plot_ly(us, x=~Date, y=~Deaths, type='scatter', mode='lines', name='Death Cases')

subplot(fig1, fig3, fig2, nrows=2, shareX=FALSE)
```

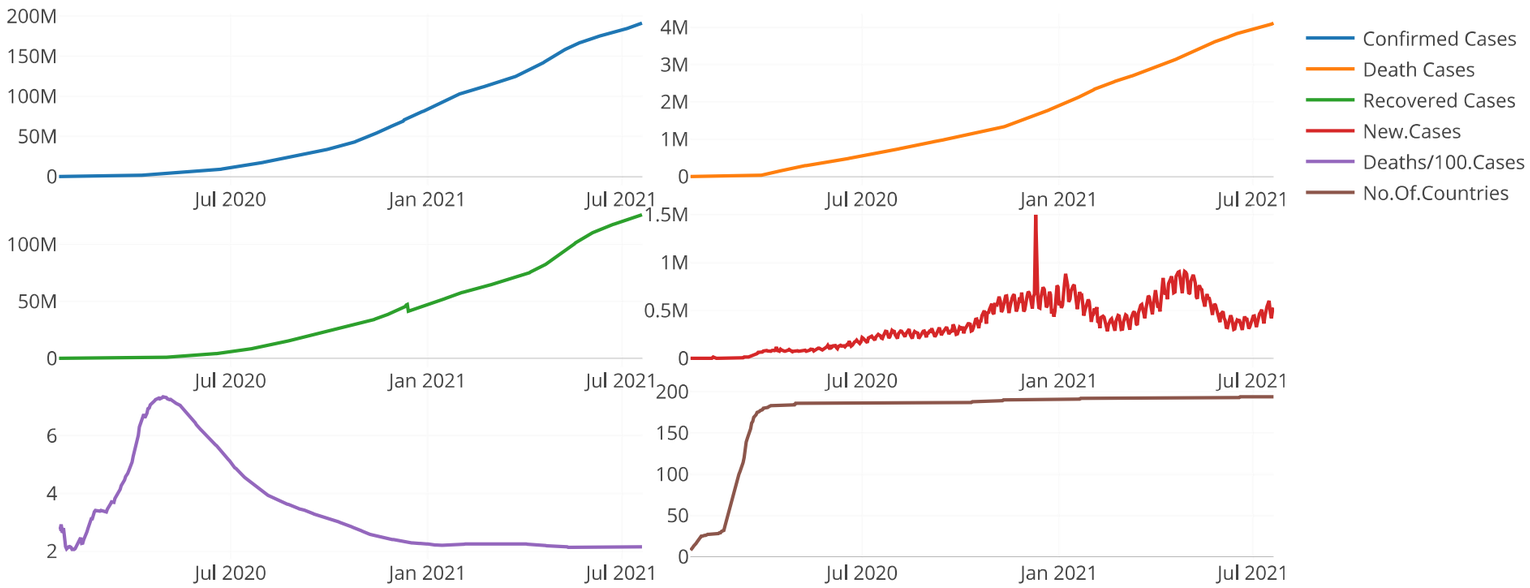


Daywise Case Analysis with Subplot()

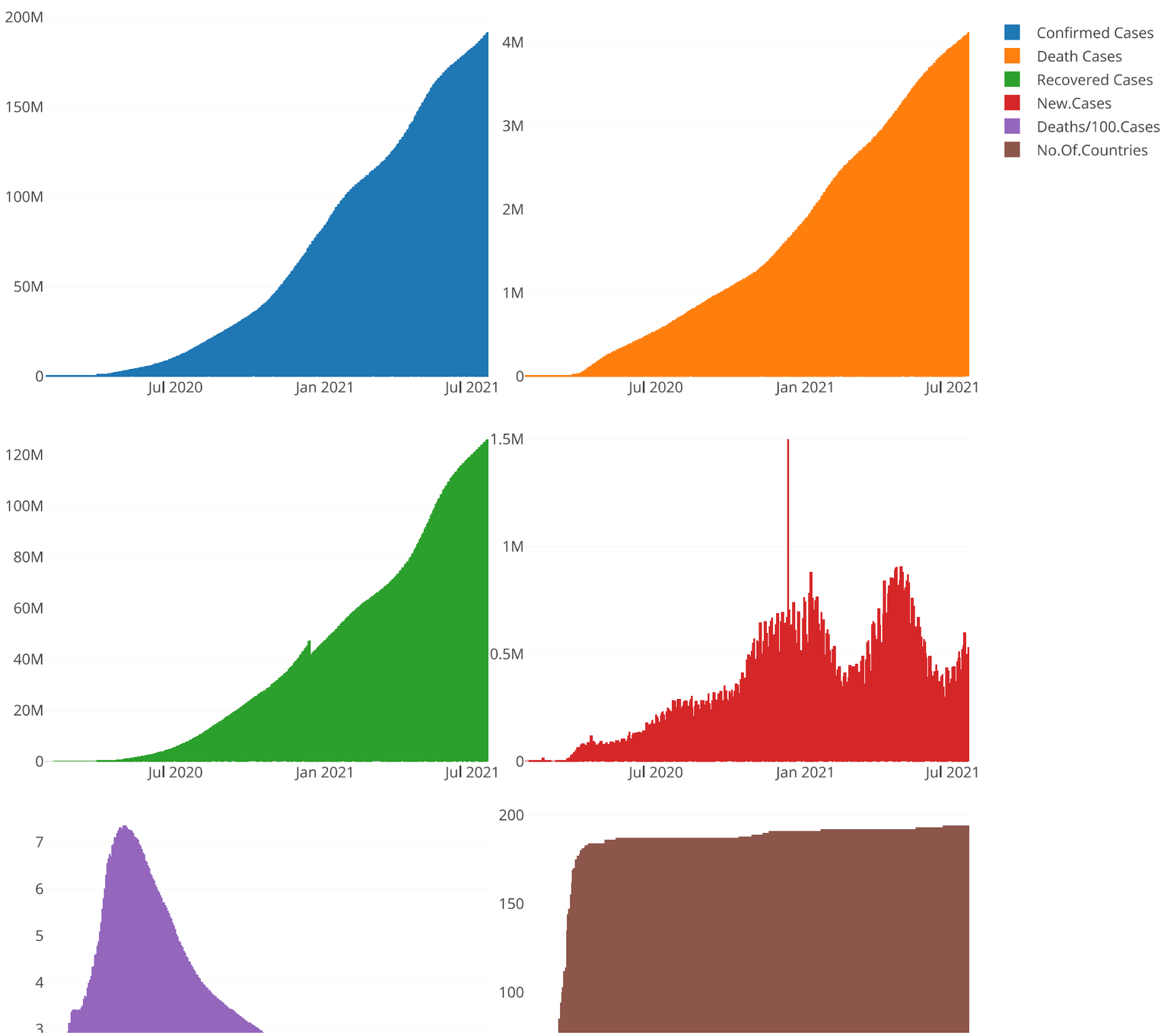
In [59]:
```
head(daywise)
```

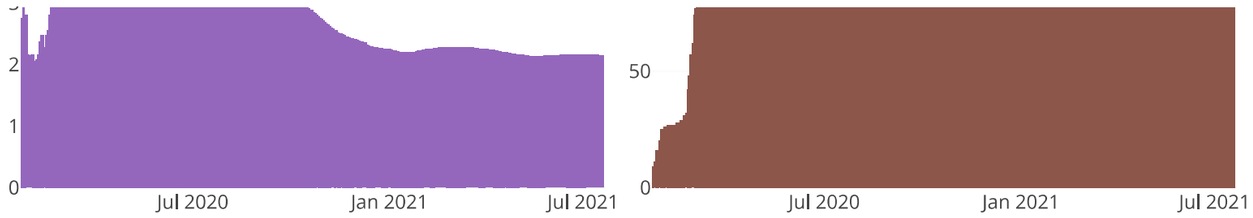
Date	Confirmed	Deaths	Recovered	Active	New.Cases	Deaths...100.Cases	Recovered...100.Cases	Deaths...100.Recovered	No..of.Countries
2020-01-23	655	18	32	605	99	2.75	4.89	56.25	8
2020-01-24	941	26	39	876	287	2.76	4.14	66.67	9
2020-01-25	1433	42	42	1349	494	2.93	2.93	100.00	11
2020-01-26	2118	56	56	2006	685	2.64	2.64	100.00	13
2020-01-27	2927	82	65	2780	809	2.80	2.22	126.15	16
2020-01-28	5578	131	108	5339	2653	2.35	1.94	121.30	16

In [60]:
```
fig1 <- plot_ly(daywise, x=~Date, y=~Confirmed, type='scatter', mode='lines', name='Confirmed Cases')
fig2 <- plot_ly(daywise, x=~Date, y=~Recovered, type='scatter', mode='lines', name='Recovered Cases')
fig3 <- plot_ly(daywise, x=~Date, y=~Deaths, type='scatter', mode='lines', name='Death Cases')

fig4 <- plot_ly(daywise, x=~Date, y=~New.Cases, type='scatter', mode='lines', name='New.Cases')

fig5 <- plot_ly(daywise, x=~Date, y=~Deaths...100.Cases, type='scatter', mode='lines', name='Deaths/100.Cases')
fig6 <- plot_ly(daywise, x=~Date, y=~No..of.Countries, type='scatter', mode='lines', name='No.Of.Countries')

subplot(fig1, fig3, fig2, fig4, fig5, fig6, nrows=3, shareX=FALSE)
```



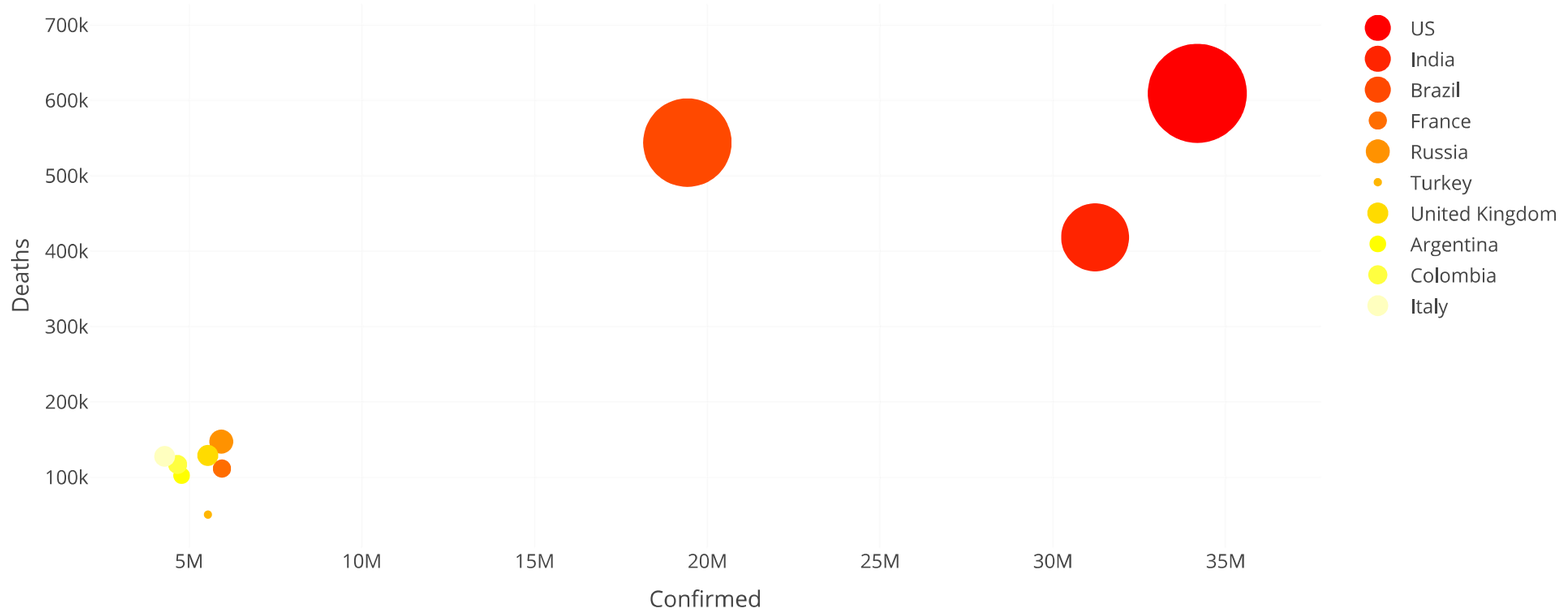
In [61]:
```
fig1 <- plot_ly(daywise, x=~Date, y=~Confirmed, type='bar', name='Confirmed Cases', height=1000)
fig2 <- plot_ly(daywise, x=~Date, y=~Recovered, type='bar', name='Recovered Cases')
fig3 <- plot_ly(daywise, x=~Date, y=~Deaths, type='bar', name='Death Cases')

fig4 <- plot_ly(daywise, x=~Date, y=~New.Cases, type='bar', name='New.Cases')

fig5 <- plot_ly(daywise, x=~Date, y=~Deaths...100.Cases, type='bar', name='Deaths/100.Cases')
fig6 <- plot_ly(daywise, x=~Date, y=~No..of.Countries, type='bar', name='No.Of.Countries')

subplot(fig1, fig3, fig2, fig4, fig5, fig6, nrows=3, shareX=FALSE)
```





Scatter Plot for Deaths vs Confirmed Cases

In [62]:
```
plot_ly(top10, x=~Confirmed, y=~Deaths, type='scatter', mode='markers',
        color=~Country, colors=heat.colors(n=10), size=~Confirmed,
        marker=list(size=~1e-4*Deaths))
```

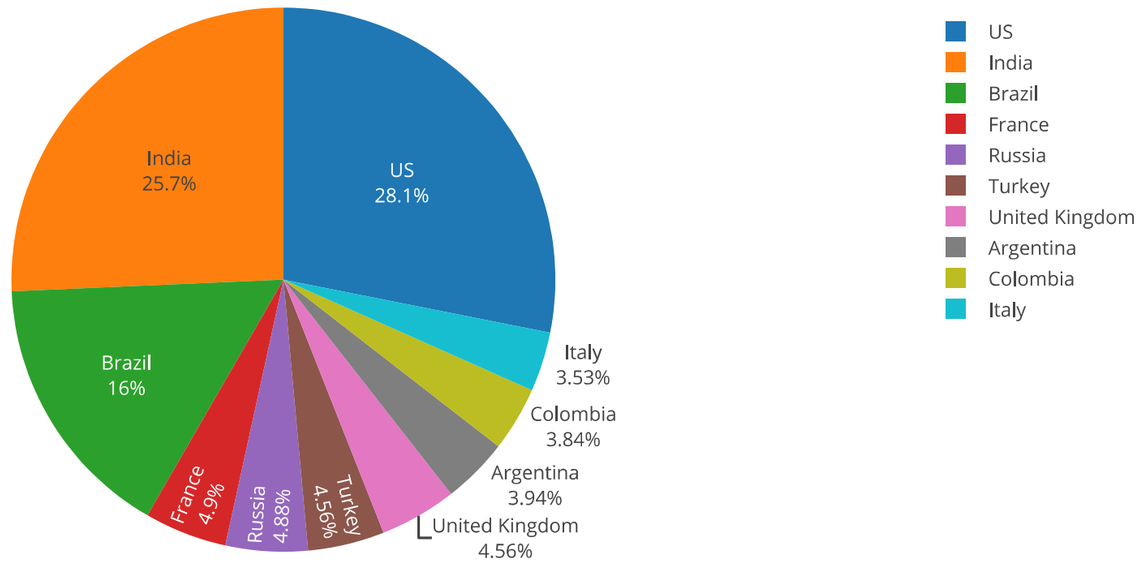


Pie Chart

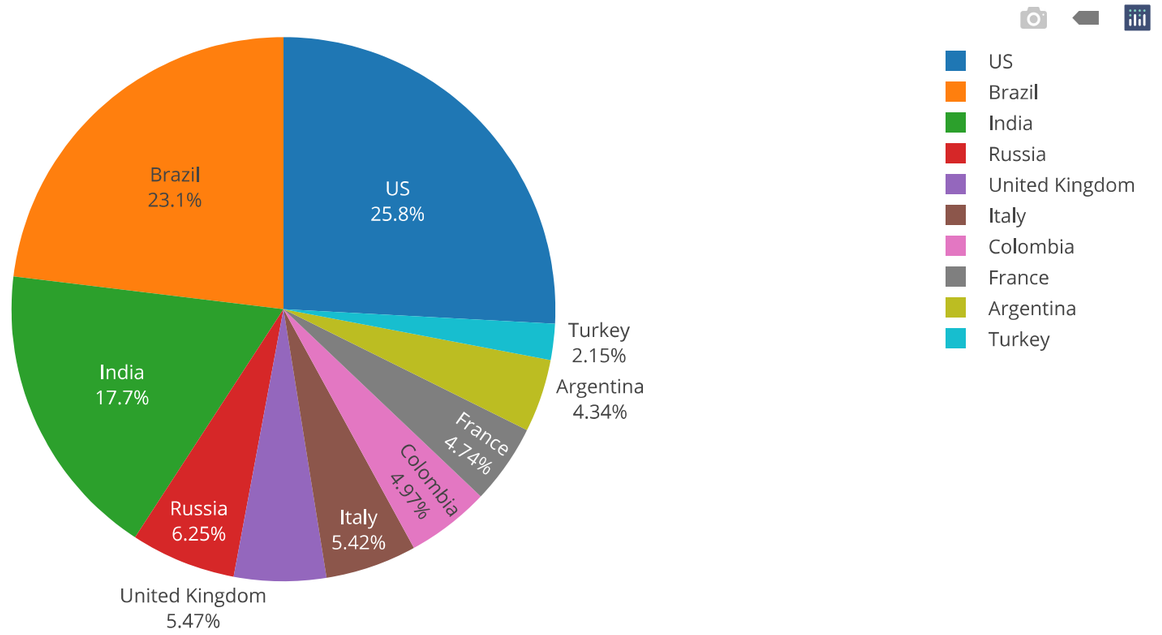
In [63]:
```
head(top10)
```

Date	Country	Confirmed	Deaths	Recovered	Active	New.Cases	New.Recovered	New.Deaths
2021-07-20	US	34174774	609529	0	33565245	42703	0	298
2021-07-20	India	31216337	418480	30390687	407170	42015	36977	3998
2021-07-20	Brazil	19419437	544180	17371065	1504192	27592	51736	1424
2021-07-20	France	5952339	111715	409403	5431221	18217	430	33
2021-07-20	Russia	5931925	147457	5318062	466406	23234	21812	771
2021-07-20	Turkey	5546166	50650	5395300	100216	8780	4561	46

In [64]:
```
fig1 <- plot_ly(top10, labels=~Country, values=~Confirmed, type='pie', textinfo='label+percent')
fig1

```

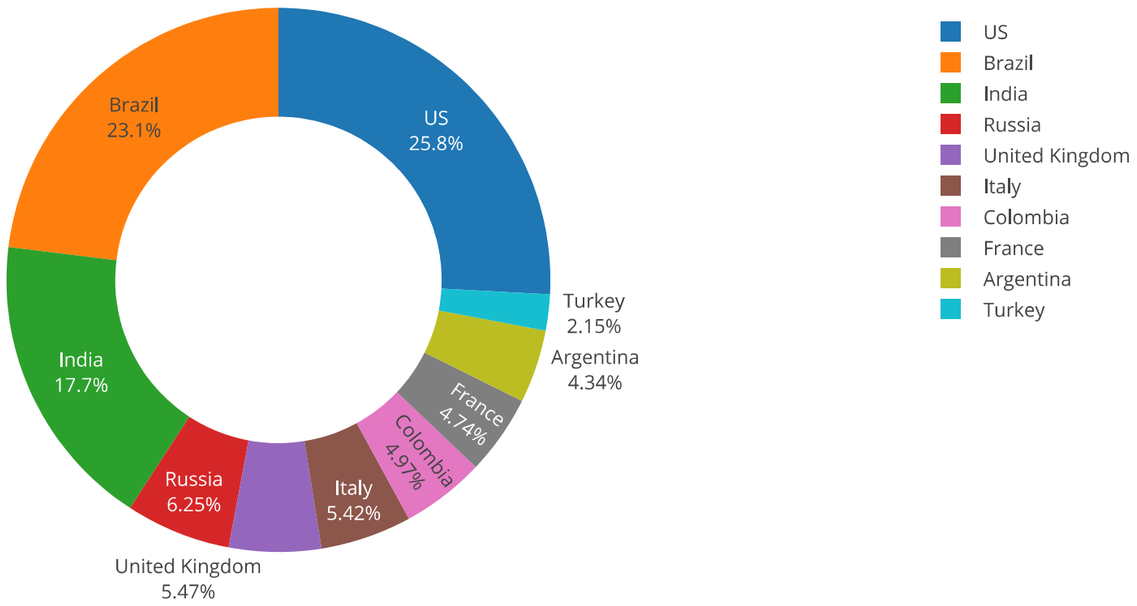


In [65]:
```
fig2 <- plot_ly(top10, labels=~Country, values=~Deaths, type='pie', textinfo='label+percent')
fig2
```



Donut Chart

In [66]:
```
fig <- plot_ly(top10, labels=~Country, values=~Deaths, textinfo='label+percent')
fig <- fig %>% add_pie(hole=0.6)
fig

```



Source
https://www.youtube.com/watch?v=cdSKN3LozbM&t=494s (https://www.youtube.com/watch?v=cdSKN3LozbM&t=494s)