rank

ryang273

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```
library(tidyverse)
```

```
## -- Attaching packages ---------------------------------------------------------------------------
## v ggplot2 3.3.2     v purrr   0.3.4
## v tibble  3.0.3     v dplyr   1.0.2
## v tidyr   1.1.2     v stringr 1.4.0
## v readr   1.4.0     v forcats 0.5.0
## -- Conflicts ------------------------------------------------------------------------------------
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(reshape2)
```

```
##
## Attaching package: 'reshape2'
## The following object is masked from 'package:tidyr':
##
##     smiths
```

```
library(ggplot2)
require(cowplot)
```

```
## Loading required package: cowplot
```

```
Confirmed <- read_csv("/Users/yangruiqin/Desktop/2864/time_series_covid19_confirmed_global.csv")
```

```
##
## -- Column specification --------------------------------------------------------------------------
## cols(
##   .default = col_double(),
##   `Province/State` = col_character(),
##   `Country/Region` = col_character()
## )
## i Use `spec()` for the full column specifications.
```

```
Recovered <- read_csv("/Users/yangruiqin/Desktop/2864/time_series_covid19_recovered_global.csv")
```

```
##
## -- Column specification --------------------------------------------------------------------------
## cols(
##   .default = col_double(),
##   `Province/State` = col_character(),
##   `Country/Region` = col_character()
## )
```

```
## i Use `spec()` for the full column specifications.
```

```
Confirmed_data <- Confirmed %>%
  group_by(`Country/Region`) %>%
  summarise(Confirmed = sum(`11/22/20`, na.rm = TRUE)) %>%
  rename(Region = `Country/Region`)
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
Recovered_data <- Recovered %>%
  group_by(`Country/Region`) %>%
  summarise(Recovered = sum(`11/22/20`, na.rm = TRUE)) %>%
  rename(Region = `Country/Region`)
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
global <- left_join(Confirmed_data, Recovered_data, by = "Region")
data.confirmed <- Confirmed_data %>%
  select(Region, Confirmed,) %>%
  mutate(ranking = dense_rank(desc(Confirmed)))
top.countries_confirmed <- data.confirmed %>% filter(ranking <= 10) %>%
  arrange(ranking) %>% pull(Region) %>% as.character()
top.countries_confirmed  %>% print()
```

```
##  [1] "US"             "India"          "Brazil"         "France"
##  [5] "Russia"         "Spain"          "United Kingdom" "Italy"
##  [9] "Argentina"      "Colombia"
```

```
data.recovered <- Recovered_data %>%
  select(Region, Recovered,) %>%
  mutate(ranking = dense_rank(desc(Recovered)))
top.countries_recovered <- data.recovered %>% filter(ranking <= 10) %>%
  arrange(ranking) %>% pull(Region) %>% as.character()
top.countries_recovered  %>% print()
```

```
##  [1] "India"        "Brazil"       "US"           "Russia"       "Argentina"
##  [6] "Colombia"     "Peru"         "Mexico"       "South Africa" "Germany"
```

```
rank.countries_confirmed <- global[order(global$Confirmed,decreasing= T),]
top.countries_confirmed <- head(rank.countries_confirmed, 15)
top.countries_confirmed
```

```
## # A tibble: 15 x 3
##    Region         Confirmed Recovered
##    <chr>              <dbl>     <dbl>
##  1 US              12246849   4526513
##  2 India            9139865   8562641
##  3 Brazil           6071401   5457973
##  4 France           2191180    157259
##  5 Russia           2071858   1582768
##  6 Spain            1556730    150376
##  7 United Kingdom   1515802      3322
##  8 Italy            1408868    553098
##  9 Argentina        1370366   1195492
## 10 Colombia         1248417   1150932
## 11 Mexico           1041875    779104
## 12 Peru              948081    879439
## 13 Germany           932367    611627
```

```
## 14 Poland            861331    423971
## 15 Iran              854361    603445
```

```
overall <- top.countries_confirmed %>%
  melt(id.vars = "Region",
       measure.vars = c("Confirmed"))
options(scipen=220)
p1 <- ggplot(overall) +
  geom_bar(aes(x = Region, y = value, fill = variable),
           stat = "identity", position="identity") +geom_text(aes(x = Region, y = value,label = value),s
  theme(axis.text.x = element_text(angle = 45, hjust=0.5)) +
  labs(title = "Cases in Top 15 Countries", x = "Region", y = "") +
  guides(fill = guide_legend(title = NULL))
overall_recover <- top.countries_confirmed %>%
  melt(id.vars = "Region",
       measure.vars = c("Recovered"))
p2 <- ggplot(overall_recover) +
  geom_bar(aes(x = Region, y = value, fill = variable),
           stat = "identity", position="identity") +geom_text(aes(x = Region, y = value,label = value),s
  theme(axis.text.x = element_text(angle = 45, hjust=0.5)) +
  labs(title = "Recovered cases in Top 15 Countries", x = "Region", y = "") +
  guides(fill = guide_legend(title = NULL)) +
  scale_fill_discrete(labels = c("Recovered"))
new <-  top.countries_confirmed%>%mutate(recover.rate=(100 * Recovered/Confirmed) %>% round(1))
new
```

```
## # A tibble: 15 x 4
##    Region         Confirmed Recovered recover.rate
##    <chr>              <dbl>     <dbl>        <dbl>
##  1 US              12246849   4526513         37
##  2 India            9139865   8562641         93.7
##  3 Brazil           6071401   5457973         89.9
##  4 France           2191180    157259          7.2
##  5 Russia           2071858   1582768         76.4
##  6 Spain            1556730    150376          9.7
##  7 United Kingdom   1515802      3322          0.2
##  8 Italy            1408868    553098         39.3
##  9 Argentina        1370366   1195492         87.2
## 10 Colombia         1248417   1150932         92.2
## 11 Mexico           1041875    779104         74.8
## 12 Peru              948081    879439         92.8
## 13 Germany           932367    611627         65.6
## 14 Poland            861331    423971         49.2
## 15 Iran              854361    603445         70.6
```

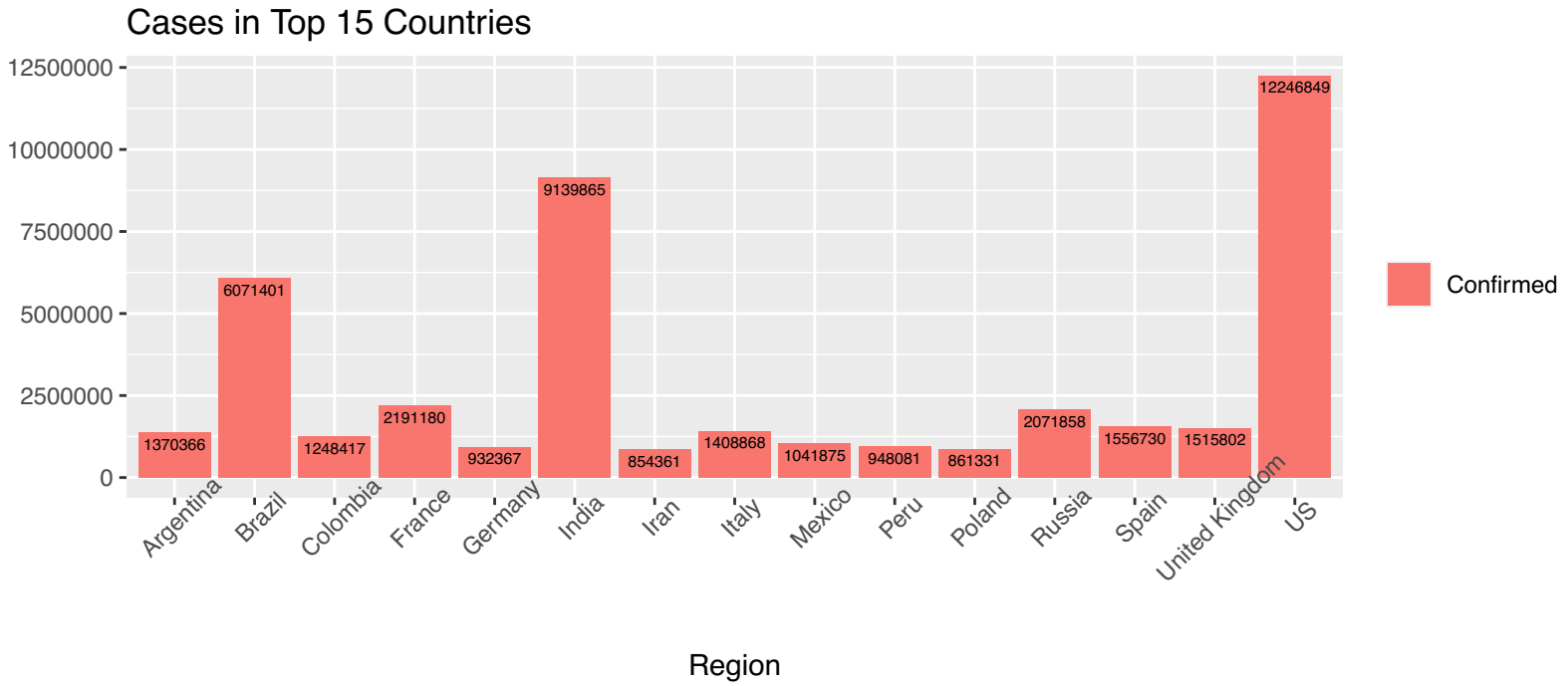
```
new_overall <- new %>%
  melt(id.vars = "Region",
       measure.vars = c("recover.rate"))
new_overall
```

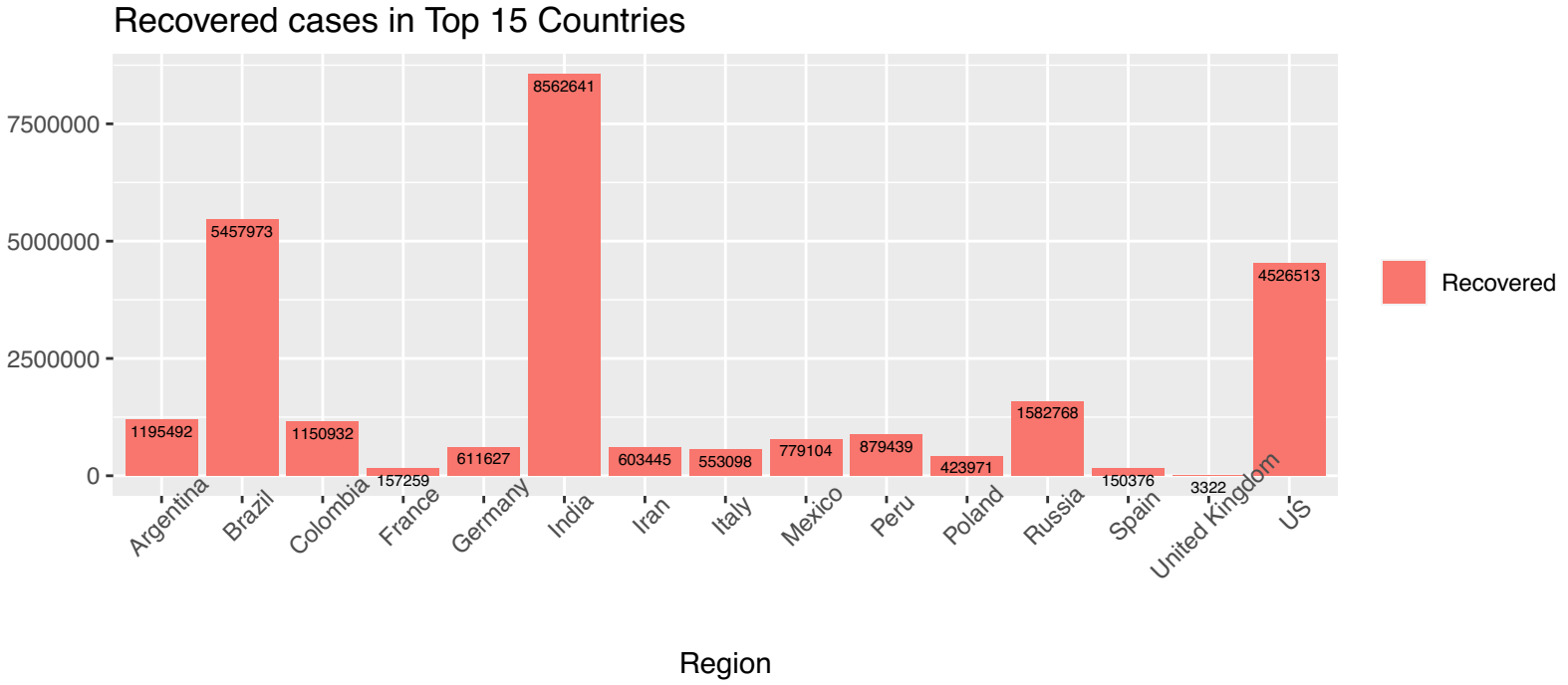
```
##            Region     variable value
## 1              US recover.rate  37.0
## 2           India recover.rate  93.7
## 3          Brazil recover.rate  89.9
## 4          France recover.rate   7.2
## 5          Russia recover.rate  76.4
```

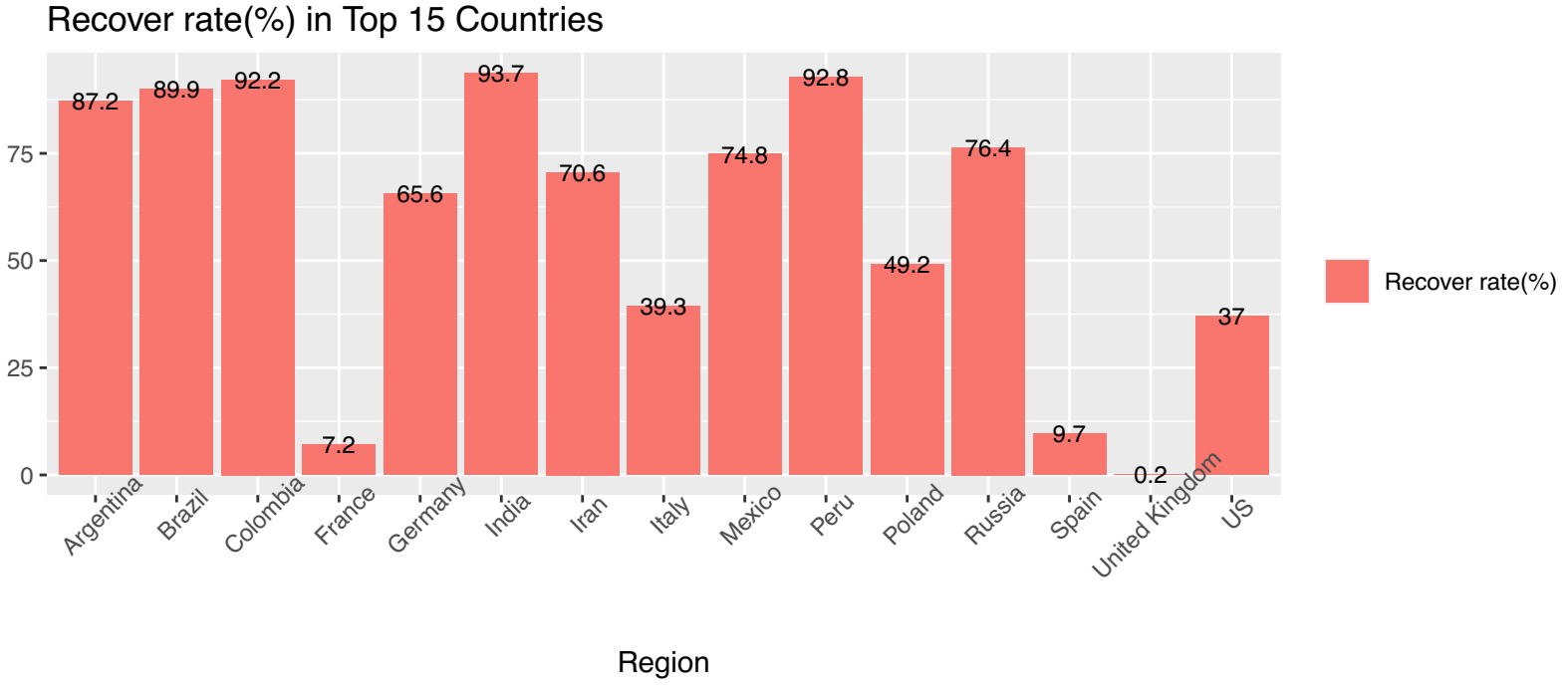
```
## 6           Spain recover.rate   9.7
## 7  United Kingdom recover.rate   0.2
## 8           Italy recover.rate  39.3
## 9       Argentina recover.rate  87.2
## 10       Colombia recover.rate  92.2
## 11         Mexico recover.rate  74.8
## 12           Peru recover.rate  92.8
## 13        Germany recover.rate  65.6
## 14         Poland recover.rate  49.2
## 15           Iran recover.rate  70.6
```

```r
p3 <- ggplot(new_overall) +
  geom_bar(aes(x = Region, y =value , fill=variable),
           stat = "identity", position="identity") +geom_text(aes(x = Region, y = value,label = value),s
  theme(axis.text.x = element_text(angle = 45, hjust=0.5)) +
  labs(title = "Recover rate(%) in Top 15 Countries", x = "Region", y = "") +
  guides(fill = guide_legend(title = NULL)) +
  scale_fill_discrete(labels = c("Recover rate(%)"))
multiplot <- function(..., plotlist = NULL, file, cols = 1, layout = NULL) {
  require(grid)

  plots <- c(list(...), plotlist)

  numPlots = length(plots)

  if (is.null(layout)) {
    layout <- matrix(seq(1, cols * ceiling(numPlots/cols)),
                     ncol = cols, nrow = ceiling(numPlots/cols))
  }

  if (numPlots == 1) {
    print(plots[[1]])

  } else {
    grid.newpage()
    pushViewport(viewport(layout = grid.layout(nrow(layout), ncol(layout))))

    for (i in 1:numPlots) {
      matchidx <- as.data.frame(which(layout == i, arr.ind = TRUE))

      print(plots[[i]], vp = viewport(layout.pos.row = matchidx$row,
                                      layout.pos.col = matchidx$col))
    }
  }
}
multiplot(p1, p2,p3, cols = 1)
```

```
## Loading required package: grid
```


Cases in Top 15 Countries
12500000
10000000
7500000
5000000
2500000
0
1370366
6071401
1248417
2191180
932367
9139865
854361
1408868
1041875
948081
861331
2071858
1556730
1515802
12246849
Argentina
Brazil
Colombia
France
Germany
India
Iran
Italy
Mexico
Peru
Poland
Russia
Spain
United Kingdom
US
Region
Confirmed


Recovered cases in Top 15 Countries
7500000
5000000
2500000
0
1195492
5457973
1150932
157259
611627
8562641
603445
553098
779104
879439
423971
1582768
150376
3322
4526513
Argentina
Brazil
Colombia
France
Germany
India
Iran
Italy
Mexico
Peru
Poland
Russia
Spain
United Kingdom
US
Region
Recovered


Recover rate(%) in Top 15 Countries
75
50
25
0
87.2
89.9
92.2
7.2
65.6
93.7
70.6
39.3
74.8
92.8
49.2
76.4
9.7
0.2
37
Argentina
Brazil
Colombia
France
Germany
India
Iran
Italy
Mexico
Peru
Poland
Russia
Spain
United Kingdom
US
Region
Recover rate(%)