

# MSDS Hackathon 2020

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## Load packages

```
library(tidyverse)
library(lubridate)
library(ggthemes)
```

## Load and tidy data

```
covid_dat <- read_csv("data/owid-covid-data.csv") %>%
  select(location, date, total_cases_per_million) %>%
  mutate(date = mdy(date)) %>%
  filter(date <= as_date("2020-05-08") &
         date >= as_date("2020-01-20"))

# Find diffs between country labels
world_dat <- map_data("world")

world_grp <- world_dat %>%
  group_by(region) %>%
  tally()

diff_world <- setdiff(world_grp$region, covid_dat$location)
diff_covid <- setdiff(covid_dat$location, world_grp$region)

# Re-coded these manually by inspecting the diffs!
join_names <- covid_dat %>%
  mutate(location = recode(str_trim(location),
    "United States" = "USA",
    "United States Virgin Islands" = "Virgin Islands",
    "British Virgin Islands" = "Virgin Islands",
    "United Kingdom" = "UK",
    "Democratic Republic of Congo" =
      "Democratic Republic of the Congo",
    "Congo" = "Republic of Congo",
    "Trinidad and Tobago" = "Trinidad",
    "Timor" = "Timor-Leste",
    "Saint Maarten (Dutch part)" = "Saint Maarten",
    "Saint Vincent and the Grenadines" = "Saint Vincent",
```

```

    "Saint Kitts and Nevis" = "Saint Kitts",
    "Faeroe Islands" = "Faroe Islands",
    "Bonaire Sint Eustatius and Saba" = "Bonaire",
    "Antigua and Barbuda" = "Antigua"
  ))

map_dat <- map_data("world") %>%
  rename(location = region) %>%
  inner_join(join_names, by = "location") %>%
  filter(date == as_date("2020-05-08")) %>%
  select(-order, -location, -subregion) %>%
  rename(y = total_cases_per_million) %>%
  mutate(binned_cases = case_when(
    y < 5 ~ 1, y < 10 ~ 2, y < 50 ~ 3, y < 100 ~ 4,
    y < 500 ~ 5, y < 1000 ~ 6, y < 2000 ~ 7, y < 5000 ~ 8,
    y >= 5000 ~ 9
  )
)

```

## Set global plot parameters

```

titles <- c("Total confirmed COVID-19 cases per million people",
  paste("The number of confirmed cases is lower than the",
    "number of total cases. The main reason for this",
    "is limited testing.")
)

covid_caption <- paste("Source: European CDC- Situation Update",
  "Worldwide - Last updated 7th May, 11:15",
  "(London time)",
  "\nOurWorldInData.org/coronavirus * CC BY"
)

hack_theme <- theme(
  text = element_text(family = "serif"),
  plot.title = element_text(size = 16),
  plot.subtitle = element_text(size = 8),
  plot.caption = element_text(hjust = 0, size = 8),
  plot.title.position = "plot",
  plot.caption.position = "plot",
)

```

## Set parameters for line-plot figure

```

loc_fig1 <- c("United States", "United Kingdom",
  "World", "South Korea", "China")

hex <- RColorBrewer::brewer.pal(n = length(loc_fig1), name = "Set1")
hex_colors <- hex[c(4, 5, 3, 1, 2)]

```

```

date_breaks <- paste0("2020-",
                      c("01-22", "03-01", "04-10", "05-08")) %>%
  as_date()
date_labels <- paste0(c("Jan 22", "Mar 1", "Apr 10", "May 8"), ", 2020")

```

## Create the line-plot figure

```

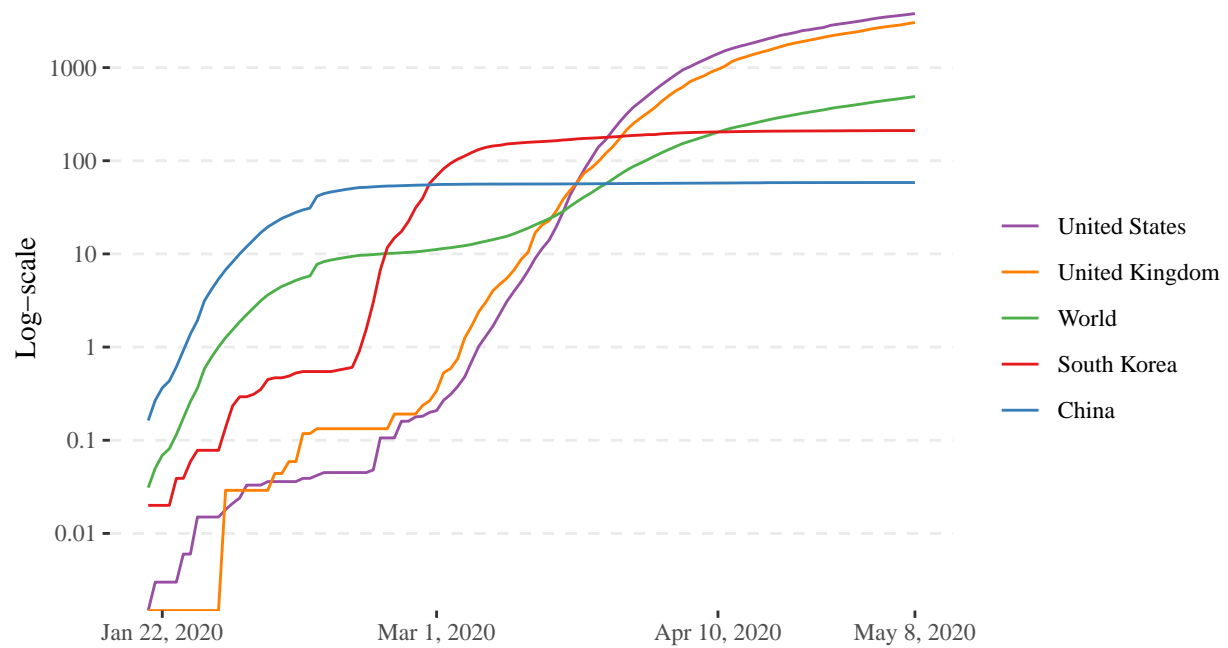
line_plot <- covid_dat %>%
  filter(location %in% loc_fig1) %>%
  mutate(location = fct_relevel(
    as_factor(location), loc_fig1)
  ) %>%
  ggplot(aes(x = date, y = total_cases_per_million,
    color = location)) +
  geom_line() +
  scale_x_continuous(breaks = date_breaks,
    labels = date_labels) +
  scale_y_log10(n.breaks = 6,
    labels = function(x) sprintf("%g", x)) +
  scale_color_manual(values = hex_colors) +
  labs(x = "", y = "Log-scale", color = "",
    title = titles[1], subtitle = titles[2],
    caption = covid_caption) +
  theme_classic() +
  theme(panel.grid.major.y = element_line(linetype = "dashed"),
    axis.line = element_blank()) +
  hack_theme

ggsave("output/line_plot.png", scale = 0.5)
line_plot

```

## Total confirmed COVID-19 cases per million people

The number of confirmed cases is lower than the number of total cases. The main reason for this is limited testing.



Source: European CDC— Situation Update Worldwide – Last updated 7th May, 11:15 (London time)  
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## Set parameters for map figure

```
map_breaks <- 1:9

map_labels <- c(0, 5, 10, 50, 100, 500, 1000, 2000, 5000) %>%
  as.character()
map_labels[length(map_labels)] <- ">5000"
```

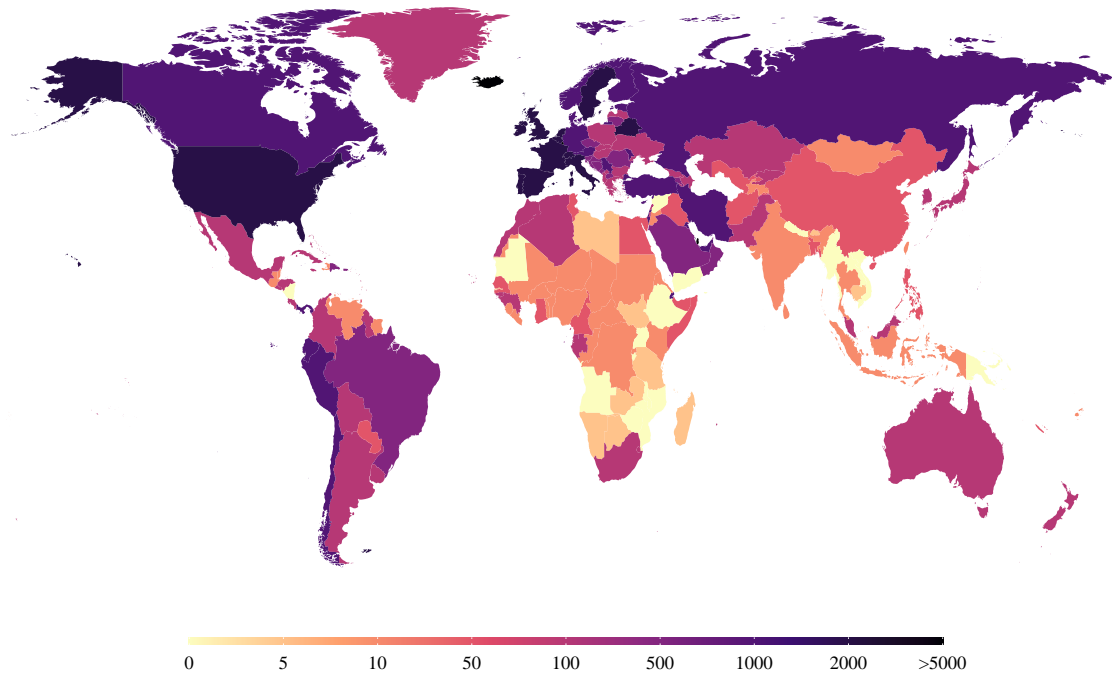
## Create the map figure

```
map_fig <- map_dat %>%
  ggplot(aes(x = long, y = lat, group = group)) +
  geom_polygon(aes(fill = binned_cases)) +
  scale_fill_viridis_c(option = "magma", direction = -1,
    breaks = map_breaks, labels = map_labels) +
  labs(fill = "",
    title = paste0(titles[1], ", May 8, 2020"),
    subtitle = titles[2],
    caption = covid_caption) +
  theme_map() +
  theme(legend.position = "bottom",
    legend.justification = "center",
    legend.key.height = unit(0.1, "cm"),
    legend.key.width = unit(2, "cm")) +
  hack_theme

ggsave("output/world_map.png", scale = 0.5)
map_fig
```

## Total confirmed COVID–19 cases per million people, May 8, 2020

The number of confirmed cases is lower than the number of total cases. The main reason for this is limited testing.



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