MATH2270/MATH2237/MATH2404 Assignment 3

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Assignment URL

https://rpubs.com/PallaviKollipara/1195701

References

[1] Australian Bureau of statisctics. (2024). Prisoners in Australia. https://www.abs.gov.au/statistics/people/crime-and-justice/prisoners-australia/2023#data-downloads

[2] Plotly. (2024). Plotly R Open Source Graphing Library. https://plotly.com/r/

[3] RStudio. (2023). Layouts in Flexdashboard. RStudio. https://pkgs.rstudio.com/flexdashboard/articles/layouts.html

[4] Data Visualisation.(n.d). Chapter 8 Adding Interactivity. https://dark-star-161610.appspot.com/secured/_book/adding-interactivity.html

[5] Data Visualisation. (n.d). Chapter 10 Dashboards. https://dark-star-161610.appspot.com/secured/_book/dashboards.html

Assignment Code

```{r}
library(ozmaps)

library(ggplot2)

library(plotly)

library(dplyr)

library(viridis)

library(readxl)

library(highcharter)

library(tidyr)

data <- read_excel("Prisoners.xlsx",sheet = "State")

australia_map <- ozmaps::ozmap_states
```

```
map_data <- australia_map %>%
  left_join(data, by = c("NAME" = "States"))
AgeSexImp <- read_excel("Prisoners.xlsx", sheet = "AgeSexImp", skip = 1)
AgeSexImp_long <- AgeSexImp %>%
  pivot_longer(cols = c("Males", "Females"), names_to = "Gender", values_to = "Count") %>%
  mutate(Age = factor(Age, levels = unique(Age)))
Prisoners_data <- read_excel("Prisoners.xlsx", sheet = "Years", skip = 1)
Prisoners_long <- tidyr::pivot_longer(Prisoners_data, cols = -State, names_to = "Year", values_to = "Prisoners")
Prisoners_long$Year <- as.numeric(Prisoners_long$Year)
OffenceState <- read_excel("Prisoners.xlsx", sheet = "OffenceState")
offence_data_long <- tidyr::pivot_longer(OffenceState, cols = -Offence, names_to = "State", values_to = "Count")
charge_data  <- read_excel("Prisoners.xlsx", sheet = "Charge",skip=1)
charge_data_long <- tidyr::pivot_longer(charge_data, cols = c(Sentenced, Unsentenced), names_to = "Status", values_to = "Count")
SenLength <- read_excel("Prisoners.xlsx", sheet = "SenLength", skip = 1)
sentence_levels <- c("Under 3 months", "3 & under 6 months", "6 & under 12 months", "1 & under 2 years",
                     "2 & under 5 years", "5 & under 10 years", "10 & under 15 years", "15 & under 20 years",
                     "20 years & over", "Life", "Other")
SenLength$Sentence_Length <- factor(SenLength$Sentence_Length, levels = sentence_levels)
sen_length_long <- pivot_longer(SenLength, cols = -Sentence_Length, names_to = "State", values_to = "Count")
```

PRISONERS, state/territory 2023

```{r, fig.width=10}
p <- ggplot(map_data) +
```

```
  geom_sf(aes(fill = Total_Prisoners, geometry = geometry, text = paste(NAME, ":", Total_Prisoners)), color = "black") +
  scale_fill_gradient(low = "#d3c1e5", high = "#5e3c99") +
  geom_sf_label(aes(label = NAME), fill = "white", color = "black", size = 6, alpha = 0.7) +
  labs(fill = "Total Prisoners") +
  theme_classic()+
  theme_void()+
  theme(
    axis.title = element_blank(),
    axis.text = element_blank(),
    axis.ticks = element_blank(),
    axis.line = element_blank(),
    legend.position = "right",
    plot.title = element_text(hjust = 0.5, size = 20)  # Center and increase title size
  )

p_interactive <- ggplotly(p, tooltip = "text") %>%
  layout(
    hoverlabel = list(font = list(size = 16))
  )
p_interactive
```

PRISONERS, age by sex 2023

```{r}
bar_plot <- plot_ly(AgeSexImp_long, x = ~Age, y = ~Count, color = ~Gender, colors = c("#ff7f0e", "#1f77b4"), type = 'bar') %>%
  layout(barmode = 'group',
         xaxis = list(title = "Age"),
         yaxis = list(title = "Number of Prisoners"))
```

bar_plot

```

### PRISONERS, state/territory, 2013–2023

```{r}

line_plot <- plot_ly(Prisoners_long, x = ~Year, y = ~Prisoners, color = ~State, type = 'scatter', mode = 'lines+markers')

line_plot <- line_plot %>%

  layout( xaxis = list(title = "Year"),

        yaxis = list(title = "Number of Prisoners"),

        legend = list(title = "State"))

line_plot

```

PRISONERS, Indigenous status and most serious offence/charge by state/territory

```{r}

plot_ly(offence_data_long, x =~reorder(Offence, -Count), y = ~Count, color = ~State, type = 'bar') %>%

  layout(xaxis = list(title = "Offence"),

        yaxis = list(title = "Number of Prisoners"),

        barmode = 'stack')

```

Distribution of Sentenced and Unsentenced Charges by Offense Type

```{r}

plot_ly(charge_data_long, x = ~reorder(Charge, -Count), y = ~Count, color = ~Status, type = 'bar', split = ~Status) %>%

  layout(xaxis = list(title = "Offense Type"),

        yaxis = list(title = "Number of Prisoners"),

        barmode = 'group')

```

SENTENCED PRISONERS, Indigenous status and aggregate sentence length by state/territory

```{r}
plot_ly(sen_length_long, x = ~Sentence_Length, y = ~Count, color = ~State, type = 'bar') %>%
  layout(xaxis = list(title = "Sentence Length"),
         yaxis = list(title = "Number of Prisoners"),
         barmode = 'stack')

```
```