

Project 1

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```
#Import Libraries  
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --  
## v dplyr      1.1.4      v readr      2.1.5  
## v forcats    1.0.0      v stringr   1.5.1  
## v ggplot2    3.5.1      v tibble    3.2.1  
## v lubridate  1.9.3      v tidyr     1.3.1  
## v purrr      1.0.2  
## -- Conflicts ----- tidyverse_conflicts() --  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag()    masks stats::lag()  
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(readxl)  
library(writexl)  
library(scales)
```

```
##  
## Attaching package: 'scales'  
##  
## The following object is masked from 'package:purrr':  
##  
##   discard  
##  
## The following object is masked from 'package:readr':  
##  
##   col_factor
```

```
#File path for excel outputs to create charts in PPT  
file_path = '~/MM/DSE5002/Week_5/Project 1/proj_1_summary_stats.xlsx'
```

Load and prepare data for use

```
#Load Data  
raw_data = read.csv('~/MM/DSE5002/Week_5/Project 1/r project data.csv')  
  
#Update name and begin data cleaning
```

```

data = raw_data

#dropping unnecessary columns
drop_cols = c('X', 'salary', 'salary_currency')

data = data |>
  select(-all_of(drop_cols))

#Rename salary column
data = data |>
  rename(
    salary = salary_in_usd
  )

#Select only FT roles
data = data |>
  filter(
    employment_type == "FT"
  )

```

#EDA

```

#Determine how many submissions we have for each role
summarystats = data |>
  group_by(job_title) |>
  summarise(
    count = n(),
    .groups = 'drop'
  )

```

We will analyze the following roles: Data Scientist, Data Engineer, Data Analyst, and Machine Learning Engineer. These account for 70% of full-time submissions, with the rest being variations of these roles.

```

#Isolating the 4 roles above for the rest of the analysis
kept_roles = c('Data Scientist', 'Data Engineer', 'Data Analyst', 'Machine Learning Engineer')
ds_data = data |>
  filter(
    job_title %in% kept_roles
  )

#Distinguish which submissions are US based vs Offshore
ds_data = ds_data |>
  mutate(
    off_onshore = ifelse(employee_residence == 'US', 'On', 'Off')
  )

```

Aggregations for Slide 1

```
# Determine the average onshore vs offshore salary for each role in 2020, 2022 and the growth rate
avg_salary = ds_data |>
  filter(
    work_year != '2021'
  ) |>
  group_by(job_title, off_onshore, work_year) |>
  summarize(
    avg_salary = round(mean(salary),0),
    .groups = 'drop'
  ) |>
  pivot_wider(
    names_from = work_year,
    values_from = avg_salary,
    names_prefix = 'year_'
  ) |>
  mutate(
    cagr = round(((year_2022 / year_2020)^(1/2)) - 1,2)
  )

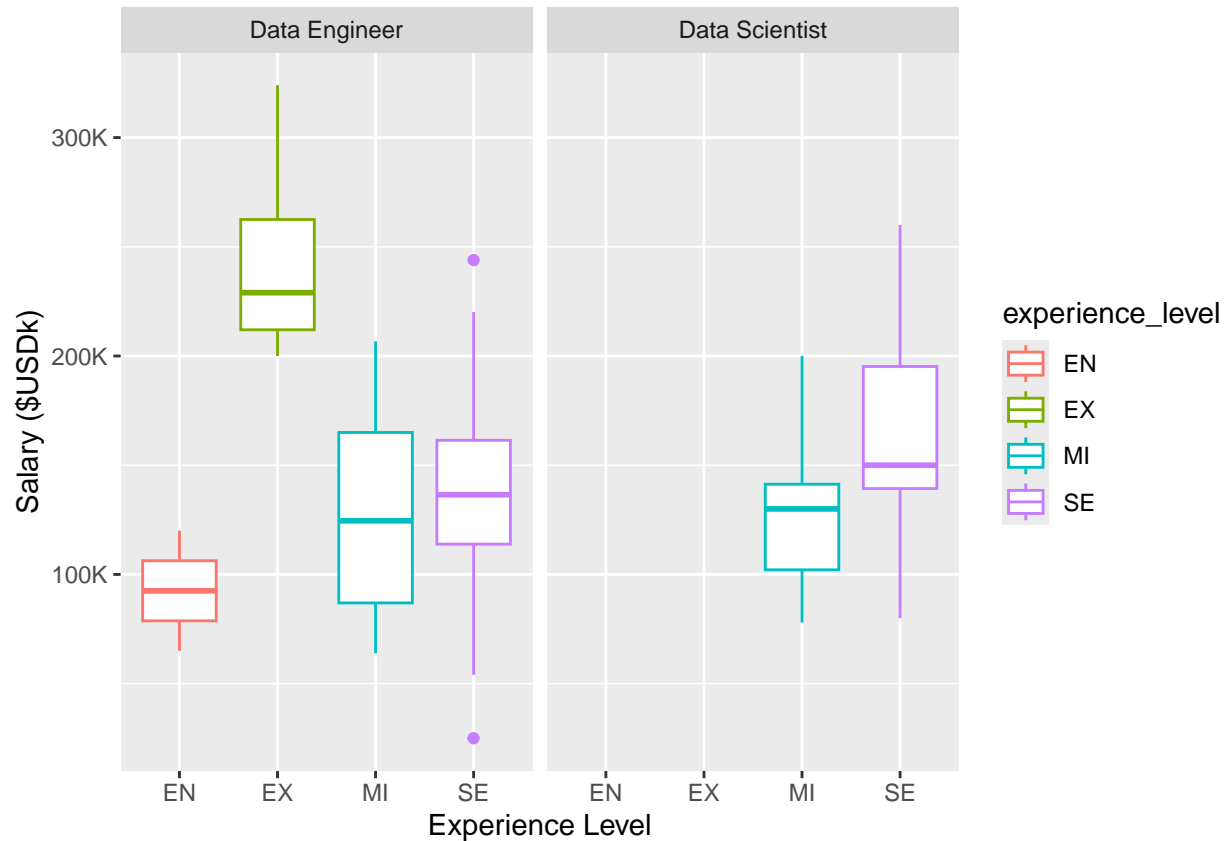
#write data to excel to create chart in ppt
write_xlsx(avg_salary, path = '~/MM/DSE5002/Week_5/Project 1/slide1.xlsx')
```

Aggregations for Slide 2

```
#Filter for only 2022 Data for DS and DE roles in the US for small and medium sized companies
slide2 = ds_data |>
  filter(
    work_year == '2022',
    job_title %in% c('Data Scientist', 'Data Engineer'),
    employee_residence == 'US',
    company_size %in% c('S', 'M')
  )

# Calculate the mean and median salaries for each of these roles, these will serve as the salary ranges
salary_ranges = slide2 |>
  group_by(job_title, experience_level) |>
  summarize(
    median_salary = median(salary),
    avg_salary = mean(salary),
    .groups = 'drop'
  )

#Create a histogram, faceted by job type showing the salaries for each of these roles
ggplot(slide2, aes(x = experience_level, y = salary, colour = experience_level)) +
  geom_boxplot() +
  scale_y_continuous(labels = label_number(scale = 1e-3, suffix = "K")) +
  labs(y = "Salary ($USDk)", x = 'Experience Level') +
  facet_wrap(~job_title)
```



```
#Work from home % by job title and experience level
wfh = slide2 |>
  group_by(job_title, experience_level, remote_ratio) |>
  summarize(
    count = n(),
    .groups = 'drop'
  )

#write data to excel to create chart in ppt
write_xlsx(salary_ranges, path = '~/MM/DSE5002/Week_5/Project 1/slide2.xlsx')
```

Aggregations for Slide 3

```
#Looking to fill out the rest of the team with a mid level analyst and data engineer who lives offshore
slide3 = ds_data |>
  filter(
    job_title %in% c('Data Analyst', 'Data Engineer', 'Machine Learning Engineer'),
    company_size %in% c('S', 'M'),
    experience_level == "MI",
    work_year != '2020',
    employee_residence != 'US'
  ) |>
  group_by(job_title, employee_residence) |>
```

```
summarise(  
  avg_salary = mean(salary),  
  median_salary = median(salary),  
  .groups = 'drop'  
)  
  
#write data to excel to create chart in ppt  
write_xlsx(slide3, path = '~/MM/DSE5002/Week_5/Project 1/slide3.xlsx')
```