Homework 3: Databases, web scraping, and a basic Shiny app

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# Money in UK politics

[The Westminster Accounts](https://news.sky.com/story/the-westminster-accounts-12786091), a recent collaboration between Sky News and Tortoise Media, examines the flow of money through UK politics. It does so by combining data from three key sources:

1. [Register of Members’ Financial Interests](https://www.parliament.uk/mps-lords-and-offices/standards-and-financial-interests/parliamentary-commissioner-for-standards/registers-of-interests/register-of-members-financial-interests/),
2. [Electoral Commission records of donations to parties](http://search.electoralcommission.org.uk/English/Search/Donations), and
3. [Register of All-Party Parliamentary Groups](https://www.parliament.uk/mps-lords-and-offices/standards-and-financial-interests/parliamentary-commissioner-for-standards/registers-of-interests/register-of-all-party-party-parliamentary-groups/).

You can [search and explore the results](https://news.sky.com/story/westminster-accounts-search-for-your-mp-or-enter-your-full-postcode-12771627) through the collaboration’s interactive database. Simon Willison [has extracted a database](https://til.simonwillison.net/shot-scraper/scraping-flourish) and this is what we will be working with. If you want to read more about [the project’s methodology](https://www.tortoisemedia.com/2023/01/08/the-westminster-accounts-methodology/).

## Open a connection to the database

The database made available by Simon Willison is an SQLite database

sky\_westminster <- DBI::dbConnect(  
 drv = RSQLite::SQLite(),  
 dbname = here::here("data", "sky-westminster-files.db")  
)

How many tables does the database have?

#Identify the number of tables in the remote database  
num\_tables <- length(DBI::dbListTables(sky\_westminster))

**Answer:** The are 7 tables in the sky\_westminster database.

## Which MP has received the most amount of money?

#Browse tables in the database  
DBI::dbListTables(sky\_westminster)

## [1] "appg\_donations" "appgs" "member\_appgs" "members"   
## [5] "parties" "party\_donations" "payments"

#Store the 'payments' table as a database object  
payments\_db <- dplyr::tbl(sky\_westminster, "payments")  
  
#Glimpse payments\_db to check for contents  
glimpse(payments\_db)

## Rows: ??  
## Columns: 13  
## Database: sqlite 3.41.2 [C:\Users\Mike\Desktop\dsbrepo2023\data\sky-westminster-files.db]  
## $ category <chr> "4. Visits outside the UK", "2. (b) Any other sup…  
## $ category\_name <chr> "Gifts and other benefits", "Cash donations", "Gi…  
## $ charity <chr> "", "", "", "", "", "", "", "", "", "", "", "", "…  
## $ date <chr> "Registered in November 2021", "Registered in Jan…  
## $ date\_visited <chr> "Dates of visit: 5-12 November 2021", "", "Dates …  
## $ description <chr> "International flights £805.07; accommodation £1,…  
## $ destination\_of\_visit <chr> "Accra, Ghana", "", "Kingston, Jamaica", "", "", …  
## $ entity <chr> "GUBA Foundation", "Mahir Kilic", "People's Natio…  
## $ hours <chr> "", "", "", "", "", "", "", "", "", "", "", "", "…  
## $ id <chr> "44a5c7f837d9df230b8c1e7f72eea188", "b9f40bd69ac2…  
## $ member\_id <chr> "m172", "m172", "m172", "m172", "m172", "m44", "m…  
## $ purpose\_of\_visit <chr> "To participate in the GUBA Foundation Yaa Asante…  
## $ value <dbl> 2631.51, 2000.00, 2574.57, 2000.00, 500.00, 1800.…

#Store the 'members' table as a database object  
members\_db <- dplyr::tbl(sky\_westminster, "members")  
  
#Glimpse members\_db to check for contents  
glimpse(members\_db)

## Rows: ??  
## Columns: 7  
## Database: sqlite 3.41.2 [C:\Users\Mike\Desktop\dsbrepo2023\data\sky-westminster-files.db]  
## $ id <chr> "m8", "m1508", "m1423", "m4514", "m1211", "m3958", "m14",…  
## $ name <chr> "Theresa May", "Sir Geoffrey Cox", "Boris Johnson", "Keir…  
## $ gender <chr> "F", "M", "M", "M", "M", "F", "M", "M", "F", "M", "F", "M…  
## $ constituency <chr> "Maidenhead", "Torridge and West Devon", "Uxbridge and So…  
## $ party\_id <chr> "p4", "p4", "p4", "p15", "p4", "p4", "p4", "p4", "p4", "p…  
## $ short\_name <chr> "Mrs May", "Sir Geoffrey", "Mr Johnson", "Mr Starmer", "M…  
## $ status <chr> "active", "active", "active", "active", "active", "active…

#Compute for the amounts that each MP received  
mp\_amount\_summary <- payments\_db %>%   
   
#Group by member id  
 group\_by(member\_id) %>%  
   
#Compute for the sum of donations for each member id  
 summarize(total\_value = sum(value)) %>%   
   
#Arrange in descending order  
 arrange(desc(total\_value))  
  
#Extract the member ID of the MP with the most amount  
mp\_with\_most\_money <- mp\_amount\_summary %>%   
 head(1)  
  
#Identify the name of the MP using left\_join  
mp\_name <- left\_join(mp\_with\_most\_money, members\_db, by = c("member\_id" = "id")) %>%   
 collect()

## Warning: Missing values are always removed in SQL aggregation functions.  
## Use `na.rm = TRUE` to silence this warning  
## This warning is displayed once every 8 hours.

**Answer:** Theresa May was the MP who has received the most amount of money with 2809765.

## Any entity that accounts for more than 5% of all donations?

Is there any entity whose donations account for more than 5% of the total payments given to MPs over the 2020-2022 interval? Who are they and who did they give money to?

#Identify sum of total payments made to MPs and store into a variable  
total\_payments <- payments\_db %>%   
 summarize(total\_payments = sum(value)) %>%   
   
#Extract only the value for total payments  
 pull(total\_payments)  
  
#Compute for donations made by each entity and store into a variable  
entity\_donations <- payments\_db %>%   
   
#Group by entity name and member id of the MP  
 group\_by(entity, member\_id) %>%   
  
#Compute for the total value of payments for each entity  
 summarize(total\_donations = sum(value)) %>%   
   
#Add a new column for the percentage of the donation for each entity over the total payments  
 mutate(percentage = (total\_donations / total\_payments) \* 100, .groups = 'drop') %>%   
   
#Ungroup data  
 ungroup() %>%  
   
#Use left join to combine with the members\_db dataset  
 left\_join(collect(members\_db), by = c("member\_id" = "id"), copy = TRUE)  
  
#Identify entities that have made the highest contributions and store into a variable  
high\_donation\_entities <- entity\_donations %>%  
   
#Filter for the entities that made more than 5% in contributions  
 filter(percentage > 5) %>%   
 collect()

## `summarise()` has grouped output by "entity". You can override using the  
## `.groups` argument.

**Answer:** Withers LLP made more than 5% in donations or 1812732 in nominal amount to Sir Geoffrey Cox over the 2020-2022 period.

## Do entity donors give to a single party or not?

* How many distinct entities who paid money to MPs are there?
* How many (as a number and %) donated to MPs belonging to a single party only?

#Store the 'parties' table as a database object  
parties\_db <- dplyr::tbl(sky\_westminster, "parties")  
  
#Store the 'party\_donations' table as a database object  
party\_donations\_db <- dplyr::tbl(sky\_westminster, "party\_donations")  
  
#Determine the number of distinct entities and store into a variable  
num\_entities <- party\_donations\_db %>%   
   
#Identify the distinct entities  
 distinct(entity) %>%   
   
#Count the number of distinct entities  
 summarize(num\_entities = n()) %>%   
   
#Extract the value of the number of entities  
 pull(num\_entities)  
  
  
#Identify the entities that donated to a single party and store into a variable  
entities\_single\_party <- party\_donations\_db %>%   
   
#Group by entity  
 group\_by(entity) %>%  
   
#Compute for the number of distinct party id  
 summarize(num\_parties = n\_distinct(party\_id)) %>%   
   
#Filter to obtain the entity that donated to a single party  
 filter(num\_parties == 1)  
  
#Identify the number of entities that donated to a single party and store into a variable  
num\_entites\_single\_party <- entities\_single\_party %>%  
   
#Compute for the number of these entities  
 summarize(num\_entites\_single\_party = n()) %>%   
   
#Extract only the number of these entities  
 pull(num\_entites\_single\_party)  
  
#Compute for the percentage and store into a variable  
percentage\_entities\_single\_party <- (num\_entites\_single\_party/num\_entities)\*100

**Answer:** There are 1077 distinct entities that donated money to MPs. Out of these entities, 1068 (99%) donated to MPs belonging to a single party.

## Which party has raised the greatest amount of money in each of the years 2020-2022?

#Compute for the total amounts raised per year by each party and store into a variable  
party\_year\_amounts <- party\_donations\_db %>%  
   
#Group by year and party id  
 group\_by(year = substr(date, 1, 4), party\_id) %>%  
   
#Compute for the sum for each party per year  
 summarise(total\_amount = sum(value), .groups = "drop")  
  
#Identify the party with the highest amount per year and store into a variable  
max\_party\_per\_year <- party\_year\_amounts %>%  
   
#Group by year  
 group\_by(year) %>%  
   
#Filter for the maximum amount  
 filter(total\_amount == max(total\_amount)) %>%  
   
#Use inner join to combine with the parties\_db dataset  
 inner\_join(parties\_db, by = c("party\_id" = "id"), copy = TRUE) %>%   
   
#Select relevant columns  
 select(year, party\_name = name, total\_amount) %>%  
   
#Collect the data  
 collect()

**Answer:** For each of the years from 2020 to 2022, the Conservative party has raised the most amount of money: 42770782 for 2020, 17718212 for 2021, and 15568476 for 2022.

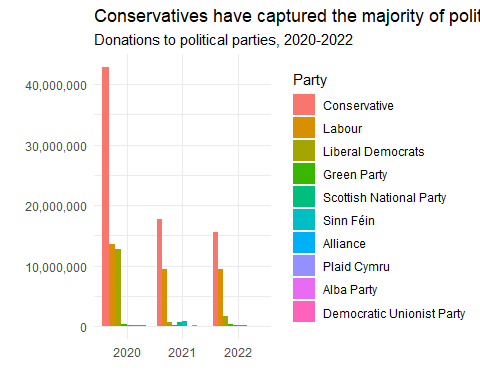
I would like you to write code that generates the following table.

#Use inner join to combine the party\_donations\_db and parties\_db datasets  
result <- party\_donations\_db %>%  
 inner\_join(parties\_db, by = c("party\_id" = "id")) %>%  
   
#Group by year and party name  
 group\_by(year = substr(date, 1, 4), name) %>%  
   
#Compute for the total donations per year for each party  
 summarise(total\_year\_donations = sum(value))   
  
#Calculate the total year donations for each year and store into a variable  
total\_year\_donations <- result %>%  
   
#Group by year  
 group\_by(year) %>%  
   
#Compute for the total donations per year and convert to numeric  
 summarise(total\_donations = sum(as.numeric(total\_year\_donations)))  
  
#Use inner join to combine data with total yearly donations by year  
result <- result %>%  
 inner\_join(total\_year\_donations, by = "year", copy = TRUE) %>%  
   
#Add another column for the proportion of total donations per party by the total donations per year  
 mutate(  
 prop = as.numeric(total\_year\_donations) / total\_donations  
 ) %>%  
   
#Ungroup the data  
 ungroup() %>%  
   
#Remove the total donations column  
 select(-total\_donations) %>%   
   
#Collect the data  
 collect()

## `summarise()` has grouped output by "year". You can override using the  
## `.groups` argument.  
## `summarise()` has grouped output by "year". You can override using the  
## `.groups` argument.

… and then, based on this data, plot the following graph.

#Arrange amount of total donations per year by party in descending order  
result <- result %>%  
 mutate(name = fct\_reorder(name, total\_year\_donations, .desc = TRUE))  
  
#Use ggplot to create graph  
result %>%   
ggplot() +  
   
#Set year as the x-axis, total donations per year by party as the y-axis, and the party name as the fill  
 aes(x = year, y = total\_year\_donations, fill = name) +  
   
#Create the bar graph and set position  
 geom\_col(position = "dodge") +  
   
#Create labels for the graph  
 labs(x = "", y = "",   
 title = "Conservatives have captured the majority of political donations",  
 subtitle = "Donations to political parties, 2020-2022", fill = "Party") +  
   
#Set theme  
 theme\_minimal() +  
   
#Make the labels of the y-axis into integers  
 scale\_y\_continuous(labels = scales::comma)



dbDisconnect(sky\_westminster)

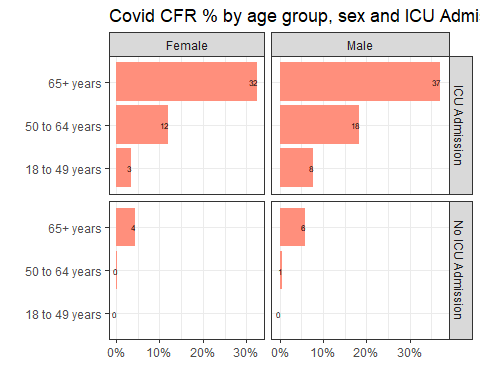
# Anonymised Covid patient data from the CDC

## 0.03 sec elapsed

## FileSystemDataset with 1 Parquet file  
## 97,799,772 rows x 19 columns  
## $ case\_month <string> "2021-09", "2022-09", "2022-01", "2020…  
## $ res\_state <string> "TX", "TX", "TX", "CA", "IL", "CA", "N…  
## $ state\_fips\_code <int32> 48, 48, 48, 6, 17, 6, 36, 36, 36, 53, …  
## $ res\_county <string> "TARRANT", NA, "HARRIS", "SAN BERNARDI…  
## $ county\_fips\_code <int32> 48439, NA, 48201, 6071, 17031, 6085, 3…  
## $ age\_group <string> "18 to 49 years", "18 to 49 years", "1…  
## $ sex <string> "Male", "Male", "Female", "Female", "F…  
## $ race <string> "White", "White", "Unknown", "Asian", …  
## $ ethnicity <string> "Non-Hispanic/Latino", "Non-Hispanic/L…  
## $ case\_positive\_specimen\_interval <int32> NA, NA, NA, NA, 0, NA, 0, 0, 0, 0, 0, …  
## $ case\_onset\_interval <int32> NA, NA, -1, NA, 0, NA, NA, NA, NA, 0, …  
## $ process <string> "Missing", "Missing", "Missing", "Miss…  
## $ exposure\_yn <string> "Missing", "Missing", "Missing", "Miss…  
## $ current\_status <string> "Laboratory-confirmed case", "Probable…  
## $ symptom\_status <string> "Missing", "Missing", "Symptomatic", "…  
## $ hosp\_yn <string> "Missing", "Missing", "No", "No", "No"…  
## $ icu\_yn <string> "Missing", "Missing", "Missing", "Miss…  
## $ death\_yn <string> "Missing", "Missing", "Missing", "Miss…  
## $ underlying\_conditions\_yn <string> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA…

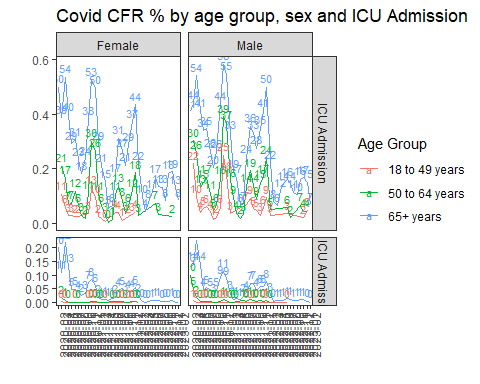
Can you query the database and replicate the following plot?

#Calculate the number of deaths from the database and store into a variable  
deaths\_data <- cdc\_data %>%  
   
#Filter the data to select relevant columns within age group, sex, and ICU admission  
 filter(sex %in% c("Male", "Female"), icu\_yn %in% c("Yes", "No"), death\_yn == "Yes") %>%  
 select(age\_group, sex, icu\_yn)  
  
#Group the number of deaths and store into a variable  
grouped\_deaths <- deaths\_data %>%  
   
#Group by sex, age group, and ICU admission  
 group\_by(sex, age\_group, icu\_yn) %>%  
   
#Count the number of rows  
 summarize(count = n()) %>%  
   
#Collect the data  
 collect()  
  
#Calculate the number of cases from the database and store into a variable  
cases\_data <- cdc\_data %>%  
   
#Filter the data to select relevant columns within age group, sex, and ICU admission  
 filter(sex %in% c("Male", "Female"), icu\_yn %in% c("Yes", "No")) %>%  
 select(age\_group, sex, icu\_yn)  
  
#Group the number of deaths and store into a variable  
grouped\_cases <- cases\_data %>%  
   
#Group by sex, age group, and ICU admission  
 group\_by(sex, age\_group, icu\_yn) %>%  
   
#Count the number of rows  
 summarize(count = n()) %>%  
   
#Collect the data  
 collect()  
  
#Calculate the CFR % and store into a variable  
CFR\_data <- grouped\_deaths %>%   
   
#Use left join the combine with the grouped cases  
 left\_join(grouped\_cases, by = c("sex", "age\_group", "icu\_yn")) %>%   
   
#Add another column to compute for the CFR %  
 mutate(cfr = (count.x / count.y))  
  
#Rename the data to ICU Admission/No ICU Admission  
CFR\_data <- CFR\_data %>%  
 mutate(icu\_yn = recode(icu\_yn, "Yes" = "ICU Admission", "No" = "No ICU Admission"))  
  
#Plot the CFR % data using ggplot  
CFR\_data %>%   
ggplot() +  
   
#Use the CFR % as the x-axis and age group as the y-axis  
 aes(x = cfr, y = age\_group) +  
   
#Create the bar graph  
 geom\_bar(stat = "identity", fill = "#FF8F7C") +  
   
#Include data labels in the graph and set desired positioning  
 geom\_text(aes(label = sprintf("%.0f", cfr \* 100)), vjust = 0.5, hjust = 1, size = 2) +  
   
#Facet grid by ICU Admission and sex  
 facet\_grid(icu\_yn ~ sex, scales = "free", space = "free") +  
   
#Remove axis labels and include title for the graph  
 labs(x = "", y = "", title = "Covid CFR % by age group, sex and ICU Admission") +  
   
#Set theme  
 theme\_bw() +   
   
#Set scale for the x-axis and title positioning  
 scale\_x\_continuous(labels = scales::percent) +  
 theme(plot.title = element\_text(hjust = 0))



The previous plot is an aggregate plot for all three years of data. What if we wanted to plot Case Fatality Ratio (CFR) over time? Write code that collects the relevant data from the database and plots the following

#Calculate the number of deaths from the database and store into a variable  
deaths\_data1 <- cdc\_data %>%  
   
#Filter the data and select relevant columns within case month, age group, sex, and ICU admission  
 filter(sex %in% c("Male", "Female"), icu\_yn %in% c("Yes", "No"), death\_yn == "Yes") %>%  
 select(case\_month, age\_group, sex, icu\_yn)  
  
#Group the number of deaths and store into a variable  
grouped\_deaths1 <- deaths\_data1 %>%  
   
#Group by case month, sex, age group, and ICU admission  
 group\_by(case\_month, sex, age\_group, icu\_yn) %>%  
   
#Count the number of rows  
 summarize(count = n()) %>%  
   
#Collect the data  
 collect()  
  
#Calculate the number of cases and store into a variable  
cases\_data1 <- cdc\_data %>%  
   
#Filter the data and select relevant columns within case month, age group, sex, and ICU admission  
 filter(sex %in% c("Male", "Female"), icu\_yn %in% c("Yes", "No")) %>%  
 select(case\_month, age\_group, sex, icu\_yn)  
  
#Group the number of cases and store into a variable  
grouped\_cases1 <- cases\_data1 %>%  
   
#Group by case month, sex, age group, and ICU admission  
 group\_by(case\_month, sex, age\_group, icu\_yn) %>%  
   
#Count the number of rows  
 summarize(count = n()) %>%  
   
#Collect the data  
 collect()  
  
#Calculate the CFR% and store into a variable  
CFR\_data1 <- grouped\_deaths1 %>%   
   
#Use left join to combine with grouped cases  
 left\_join(grouped\_cases1, by = c("case\_month", "sex", "age\_group", "icu\_yn")) %>%   
   
#Add another column to compute for the CFR %  
 mutate(cfr = (count.x / count.y))  
  
#Rename the data to ICU Admission/No ICU Admission  
CFR\_data1 <- CFR\_data1 %>%  
 mutate(icu\_yn = recode(icu\_yn, "Yes" = "ICU Admission", "No" = "No ICU Admission"))  
  
#Plot the CFR % data using ggplot  
CFR\_data1 %>%   
ggplot() +  
  
#Set case month as the x-axis, CFR % as the y-axis, and age group as the grouping category  
 aes(x = case\_month, y = cfr, group = age\_group, color = age\_group) +  
   
#Create the line graph  
 geom\_line() +  
   
#Include data labels and set positioning  
 geom\_text(aes(label = sprintf("%.0f", cfr \* 100)), vjust = -0.5, size = 3) +  
   
#Use facet grid with ICU Admission and sex  
 facet\_grid(icu\_yn ~ sex, scales = "free\_y", space = "free") +  
   
#Remove axis labels and include title for the graph  
 labs(x = "", y = "", color = "Age Group", title = "Covid CFR % by age group, sex and ICU Admission") +  
   
#Set theme  
 theme\_bw() +  
   
#Adjust positioning of the case month and plot title, and remove the panel grids  
 theme(axis.text.x = element\_text(angle = 90, hjust = 1), plot.title = element\_text(hjust = 0), panel.grid.major = element\_blank(),panel.grid.minor = element\_blank())



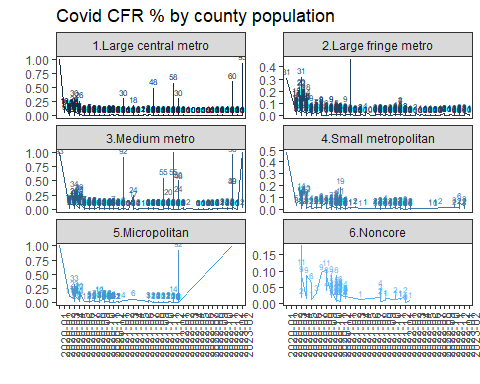
urban\_rural <- read\_xlsx(here::here("data", "NCHSURCodes2013.xlsx")) %>%   
 janitor::clean\_names()

Can you query the database, extract the relevant information, and reproduce the following two graphs that look at the Case Fatality ratio (CFR) in different counties, according to their population?

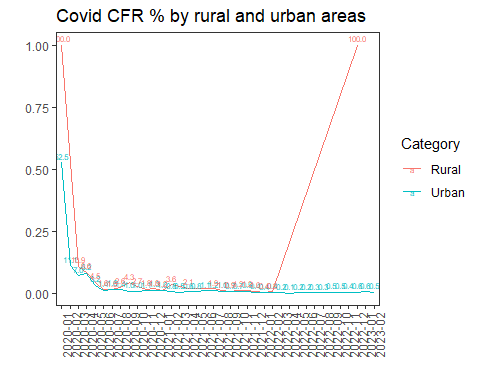
#Calculate the number of deaths from the database and store into a variable  
deaths\_data2 <- cdc\_data %>%  
   
#Filter for deaths  
 filter(death\_yn == "Yes") %>%  
   
#Select relevant columns  
 select(case\_month, county\_fips\_code)  
  
#Group the deaths and store into a variable  
grouped\_deaths2 <- deaths\_data2 %>%  
   
#Group by case month and county fips code  
 group\_by(case\_month, county\_fips\_code) %>%  
   
#Count the number of deaths per case month and county fips code  
 summarize(count = n()) %>%  
   
#Collect the data  
 collect()  
  
#Calculate the total case from the database and store into a variable  
cases\_data2 <- cdc\_data %>%  
   
#Select the relevant columns  
 select(case\_month, county\_fips\_code)  
  
#Group the cases and store into a variable  
grouped\_cases2 <- cases\_data2 %>%  
   
#Group by case month and country fips code  
 group\_by(case\_month, county\_fips\_code) %>%  
   
#Count the number of cases by case month and county fips code  
 summarize(count = n()) %>%  
   
#Collect the data  
 collect()  
  
#Combine grouped deaths and cases into a single dataframe  
CFR\_data2 <- grouped\_deaths2 %>%   
   
#Use left join to combined the data by case month and county fips code  
 left\_join(grouped\_cases2, by = c("case\_month", "county\_fips\_code")) %>%   
   
#Add new column to compute for the CFR %  
 mutate(cfr = (count.x / count.y))  
  
#Combine CFR data with the urban\_rural dataframe  
combined\_data <- left\_join(CFR\_data2, urban\_rural, by = c("county\_fips\_code" = "fips\_code")) %>%   
   
#Filter out the NA values  
 filter(!is.na(x2013\_code))   
  
#Group the combined data and store into a new variable  
combined\_data1 <- combined\_data %>%   
   
#Group by case month, country fips code, and category name  
 group\_by(case\_month, county\_fips\_code, x2013\_code)%>%   
   
#Compute the CFR %  
 summarize(cfr = sum(count.x) / sum(count.y))

## `summarise()` has grouped output by 'case\_month', 'county\_fips\_code'. You can  
## override using the `.groups` argument.

#Use ggplot to graph the data  
combined\_data1 %>%   
 ggplot() +  
   
#Set case month as the x-axis, CFR % as the y-axis, and the category name as the grouping as color  
 aes(x = case\_month, y = cfr, group = x2013\_code, color = x2013\_code) +  
   
#Create the line graph  
 geom\_line() +  
   
#Use facet wrap to create grids by category name and recode the category names  
 facet\_wrap(~ x2013\_code, ncol = 2, scales = "free\_y", labeller = labeller(x2013\_code = c("1" = "1.Large central metro", "2" = "2.Large fringe metro", "3" = "3.Medium metro", "4" = "4.Small metropolitan", "5" = "5.Micropolitan", "6" = "6.Noncore"))) +  
   
#Include labels for the graph  
 labs(x = "", y = "", color = "x2013\_code", title = "Covid CFR % by county population") +  
   
#Include data labels and adjust positioning  
 geom\_text(aes(label = sprintf("%.0f", cfr \* 100)), vjust = -0.5, size = 2) +  
   
#Set theme  
 theme\_bw() +  
   
#Adjust the positioning of the labels and remove panel grids  
 theme(axis.text.x = element\_text(angle = 90, hjust = 1), plot.title = element\_text(hjust = 0), panel.grid.major = element\_blank(),panel.grid.minor = element\_blank(), legend.position = "none")



#Create a new column to identify category names according to urban/rural  
urban\_rural <- combined\_data %>%  
 mutate(category = ifelse(x2013\_code %in% c(1, 2, 3, 4), "Urban", "Rural"))  
  
#Filter for urban values  
urban\_data <- urban\_rural %>%   
 filter(category == "Urban")  
  
#Filter for rural values  
rural\_data <- urban\_rural %>%   
 filter(category == "Rural")  
  
# Calculate CFR % for urban and rural areas  
urban\_cfr <- urban\_data %>%  
   
#Group by case month  
 group\_by(case\_month) %>%  
   
#Compute for the CFR %  
 summarize(cfr = sum(count.x) / sum(count.y))  
  
#Calculate the CFR % for rural areas and store into a variable  
rural\_cfr <- rural\_data %>%  
   
#Group by case month  
 group\_by(case\_month) %>%  
   
#Compute for the CFR %  
 summarize(cfr = sum(count.x) / sum(count.y))  
  
#Combine the CFR % and for both urban and rural areas   
cfr\_data <- bind\_rows(  
 urban\_cfr %>% mutate(category = "Urban"),  
 rural\_cfr %>% mutate(category = "Rural")  
)  
  
#Use ggplot to create the graph  
cfr\_data %>%   
 ggplot() +  
   
#Set case month as the x-axis, CFR % as the y-axis, and the category name as the grouping and color  
 aes(x = case\_month, y = cfr, color = category, group = category) +  
   
#Create the line graph  
 geom\_line() +  
   
#Include data labels and adjusting positioning  
 geom\_text(aes(label = sprintf("%.1f", cfr \* 100)), vjust = -0.5, size = 2) +  
   
#Include labels for the graph  
 labs(x = "", y = "", color = "Category", title = "Covid CFR % by rural and urban areas") +  
   
#Set theme  
 theme\_bw() +  
   
#Adjust the positioning of the labels and remove panel grid  
 theme(axis.text.x = element\_text(angle = 90, hjust = 1), plot.title = element\_text(hjust = 0), panel.grid.major = element\_blank(),panel.grid.minor = element\_blank())



# Money in US politics

library(robotstxt)  
paths\_allowed("https://www.opensecrets.org")

## [1] TRUE

base\_url <- "https://www.opensecrets.org/political-action-committees-pacs/foreign-connected-pacs/2022"  
  
contributions\_tables <- base\_url %>%  
 read\_html()

* First, make sure you can scrape the data for 2022. Use janitor::clean\_names() to rename variables scraped using snake\_case naming.

#Rename variables using snake\_case naming  
contributions\_tables <- contributions\_tables %>%   
 janitor::clean\_names(case = "snake")

* Clean the data:

# write a function to parse\_currency  
parse\_currency <- function(x){  
 x %>%  
   
 # remove dollar signs  
 str\_remove("\\$") %>%  
   
 # remove all occurrences of commas  
 str\_remove\_all(",") %>%  
   
 # convert to numeric  
 as.numeric()  
}  
  
#Extract the contributions table from the web page  
contributions <- contributions\_tables %>%   
   
#Select table element  
 html\_element("#main > div.Main-wrap.l-padding.u-mt2 > div > div > div.l-primary > div:nth-child(1) > div > div:nth-child(5)") %>%   
   
#Convert to dataframe  
 html\_table()  
  
#Use janitor to clean column names  
contributions <- contributions %>%   
 janitor::clean\_names()  
  
# clean country/parent co and contributions   
contributions <- contributions %>%  
 separate(country\_of\_origin\_parent\_company,   
 into = c("country", "parent"),   
 sep = "/",   
 extra = "merge") %>%  
 mutate(  
 total = parse\_currency(total),  
 dems = parse\_currency(dems),  
 repubs = parse\_currency(repubs)  
 )

* Write a function called scrape\_pac() that scrapes information from the Open Secrets webpage for foreign-connected PAC contributions in a given year.

#Create a function to scrape information from the Open Secrets webpage  
scrape\_pac <- function(url) {  
 #Extract year from URL  
 year <- str\_sub(url, -4)  
   
 #Print the URL being processed  
 cat("Scraping data for year:", year, "\n")  
   
 #Read the HTML content  
 page <- read\_html(url)  
   
 #Extract the table  
 table <- page %>%   
 html\_table(header = TRUE) %>%   
 .[[1]]  
   
 #Clean column names  
 table <- table %>%   
 janitor::clean\_names()  
   
 #Convert contribution amounts to numeric  
 table <- table %>%   
 mutate(  
 total = parse\_currency(total),  
 dems = parse\_currency(dems),  
 repubs = parse\_currency(repubs)  
 )  
   
 #Add year column  
 table$year <- year  
   
 return(table)  
}

* Define the URLs for 2022, 2020, and 2000 contributions. Then, test your function using these URLs as inputs. Does the function seem to do what you expected it to do?

#Define the URLs  
url\_2022 <- "https://www.opensecrets.org/political-action-committees-pacs/foreign-connected-pacs/2022"  
url\_2020 <- "https://www.opensecrets.org/political-action-committees-pacs/foreign-connected-pacs/2020"  
url\_2000 <- "https://www.opensecrets.org/political-action-committees-pacs/foreign-connected-pacs/2000"  
  
#Test the function for 2022 contributions  
data\_2022 <- scrape\_pac(url\_2022)

## Scraping data for year: 2022

print(head(data\_2022))

## # A tibble: 6 × 6  
## pac\_name\_affiliate country\_of\_origin\_pa…¹ total dems repubs year   
## <chr> <chr> <dbl> <dbl> <dbl> <chr>  
## 1 Accenture (Accenture) Ireland/Accenture plc 3000 0 3000 2022   
## 2 Acreage Holdings Canada/Acreage Holdin… 0 0 0 2022   
## 3 Air Liquide America France/L'Air Liquide … 17300 14800 2500 2022   
## 4 Airbus Group Netherlands/Airbus Gr… 193500 82500 111000 2022   
## 5 Alexion Pharmaceuticals (As… UK/AstraZeneca PLC 186250 104000 82250 2022   
## 6 Alkermes Inc Ireland/Alkermes Plc 84500 34500 50000 2022   
## # ℹ abbreviated name: ¹​country\_of\_origin\_parent\_company

#Test the function for 2020 contributions  
data\_2020 <- scrape\_pac(url\_2020)

## Scraping data for year: 2020

print(head(data\_2020))

## # A tibble: 6 × 6  
## pac\_name\_affiliate country\_of\_origin\_parent\_com…¹ total dems repubs year   
## <chr> <chr> <dbl> <dbl> <dbl> <chr>  
## 1 7-Eleven Japan/Seven & I Holdings 20000 1000 19000 2020   
## 2 ABB Group (ABB Group) Switzerland/Asea Brown Boveri 16900 6800 10100 2020   
## 3 Accenture (Accenture) Ireland/Accenture plc 83500 50500 33000 2020   
## 4 Air Liquide America France/L'Air Liquide SA 37800 15800 22000 2020   
## 5 Airbus Group Netherlands/Airbus Group 182000 79000 103000 2020   
## 6 Alkermes Inc Ireland/Alkermes Plc 94750 30750 64000 2020   
## # ℹ abbreviated name: ¹​country\_of\_origin\_parent\_company

#Test the function for 2000 contributions  
data\_2000 <- scrape\_pac(url\_2000)

## Scraping data for year: 2000

print(head(data\_2000))

## # A tibble: 6 × 6  
## pac\_name\_affiliate country\_of\_origin\_parent\_…¹ total dems repubs year   
## <chr> <chr> <dbl> <dbl> <dbl> <chr>  
## 1 7-Eleven Japan/Ito-Yokado 8500 1500 7000 2000   
## 2 ABB Group Switzerland/Asea Brown Bov… 46000 17000 28500 2000   
## 3 Accenture UK/Accenture plc 75984 23000 52984 2000   
## 4 ACE INA UK/ACE Group 38500 12500 26000 2000   
## 5 Acuson Corp (Siemens AG) Germany/Siemens AG 2000 2000 0 2000   
## 6 Adtranz (DaimlerChrysler) Germany/DaimlerChrysler AG 10500 10000 500 2000   
## # ℹ abbreviated name: ¹​country\_of\_origin\_parent\_company

* Construct a vector called urls that contains the URLs for each webpage that contains information on foreign-connected PAC contributions for a given year.

#Define the base URL  
base\_url <- "https://www.opensecrets.org/political-action-committees-pacs/foreign-connected-pacs/"  
  
#Define the years  
years <- c(2022, 2020, 2000)  
  
#Construct the vector of URLs  
urls <- paste0(base\_url, years)

* Map the scrape\_pac() function over urls in a way that will result in a data frame called contributions\_all.

#Map the scrape\_pac function over the URLs  
contributions\_all <- map\_dfr(urls, scrape\_pac)

## Scraping data for year: 2022   
## Scraping data for year: 2020   
## Scraping data for year: 2000

* Write the data frame to a csv file called contributions-all.csv in the data folder.

#Set the file path for the CSV file  
file\_path <- "data/contributions-all.csv"  
  
#Write the data frame to a CSV file  
write.csv(contributions\_all, file = file\_path, row.names = FALSE)

# Scraping consulting jobs

The website [https://www.consultancy.uk/jobs/](https://www.consultancy.uk/jobs) lists job openings for consulting jobs.

library(robotstxt)  
paths\_allowed("https://www.consultancy.uk") #is it ok to scrape?  
  
base\_url <- "https://www.consultancy.uk/jobs/page/1"  
  
listings\_html <- base\_url %>%  
 read\_html()

* Write a function called scrape\_jobs() that scrapes information from the webpage for consulting positions.

#Create a function that would scrape information on the Consultancy UK webpage  
scrape\_jobs <- function(url) {  
   
 #Read the HTML content of the webpage  
 listings\_html <- read\_html(url)  
   
 #Extract information from the HTML content using CSS selectors and clean the texts if necessary  
 job <- listings\_html %>%   
 html\_nodes(css = ".title") %>%   
 html\_text()  
   
 firm <- listings\_html %>%   
 html\_nodes(css = "td.hide-phone") %>%   
 html\_text() %>%   
 str\_remove("\n")  
   
 functional\_area <- listings\_html %>%   
 html\_nodes(css = "td.hide-tablet-and-less") %>%  
 html\_text() %>%  
 str\_remove\_all("\n|\\+1|\\+2|\\+3|\\+4|\\+5|\\+6") %>%  
 str\_replace\_all("(?<=[a-z])(?=[A-Z])", " ")  
  
 type <- listings\_html %>%   
 html\_nodes(css = "td.hide-tablet-landscape") %>%  
 html\_text() %>%   
 str\_trim()  
   
 # Create a data frame with the extracted information  
 job\_data <- data.frame(job, firm, functional\_area, type)  
   
 return(job\_data)  
}  
  
#Test the scrape\_jobs() function with a specific URL  
url <- "https://www.consultancy.uk/jobs/page/1"  
job\_data <- scrape\_jobs(url)  
  
#Print the scraped job data  
print(job\_data)

## job  
## 1 Senior Infrastructure & Cloud Services Advisor  
## 2 Senior 3D/Motion Designer  
## 3 Manager - Technology  
## 4 HR Manager  
## 5 Analyst, satellite and space markets  
## 6 PH-4804; Test Automation Manager, Python / Azure  
## 7 Director Client Services - Life Sciences  
## 8 Internships  
## 9 Senior Business Development Manager  
## 10 PMO Lead  
## 11 M&A Managing Partner UK  
## 12 Senior Consultant - Local Government Strategy  
## 13 Data Scientist  
## 14 Director - Supply Chain Strategy & Transformation  
## 15 Consultants and Senior Consultants  
## 16 Sourcing & Commercial Role  
## 17 Management Consultants  
## 18 Experienced Hire  
## 19 Internship / Work Placement  
## 20   
## 21 AWS Principal Architect  
## 22 Associate  
## 23 Healthcare consultant  
## 24 Independent Consultant   
## 25 Principal Consultants  
## 26 Strategy& - Strategy Senior Associate  
## 27 Analyst  
## 28 Analyst  
## 29 Consultant Roles (at all levels) – IT Advisory  
## 30 Intermediate Quantity Surveyor  
## 31 Consultant Treasury Technology  
## 32 Data Engineer  
## 33 Senior Analyst  
## 34 Senior Consultant | Energy & Natural Resources | Strategic Communications  
## 35 Associate Consultant  
## 36 Senior Strategist  
## 37 Business Analyst  
## 38 Business Development Manager UK  
## 39 Operational Technology Cyber Security Expert | Senior Manager | Dublin or Cork  
## 40 Marketing Executive/Manager  
## 41 Manager  
## 42 Internship Business Development UK  
## 43 Technology and Architecture Roles   
## 44 Manager and Senior Manager  
## 45 Senior Manager Treasury Technology  
## firm  
## 1 West Monroe  
## 2 Yonder Consulting  
## 3 First Consulting  
## 4 BearingPoint  
## 5 Analysys Mason  
## 6 B2E Consulting  
## 7 Genioo  
## 8 Simon-Kucher  
## 9 Ayming  
## 10 ThreeTwoFour  
## 11 Marktlink  
## 12 Campbell Tickell  
## 13 Digital Power  
## 14 Capgemini Invent  
## 15 Procura Consulting  
## 16 Coeus Consulting  
## 17 Collinson Grant  
## 18 Fairgrove Partners  
## 19 Skarbek Associates  
## 20 Alvarez & Marsal  
## 21 PA Consulting  
## 22 McKinsey & Company  
## 23 Develop Consulting  
## 24 dss+  
## 25 Q5  
## 26 PwC  
## 27 Change Management Group  
## 28 Enfuse Group  
## 29 Mason Advisory  
## 30 Panoptic Consultancy Group  
## 31 Zanders  
## 32 Valcon  
## 33 CIL Management Consultants  
## 34 FTI Consulting  
## 35 Bain & Company  
## 36 The Upside  
## 37 Humatica  
## 38 COMATCH  
## 39 PwC  
## 40 Panoptic Consultancy Group  
## 41 CIL Management Consultants  
## 42 COMATCH  
## 43 Coeus Consulting  
## 44 Procura Consulting  
## 45 Zanders  
## functional\_area  
## 1 Cloud IT Architecture  
## 2 Marketing Digital  
## 3 Mobile & Apps Project Management Business Intelligence Cloud IT Architecture Software More  
## 4 Human Resources  
## 5 Strategy Digital Innovation IT Strategy Data Science  
## 6 Unknown  
## 7 Strategy Management Sales  
## 8 Pricing  
## 9 Sales  
## 10 Project Management  
## 11 Unknown  
## 12 Strategy  
## 13 Data Science  
## 14 Strategy Supply Chain  
## 15 Project Management Supply Chain Finance  
## 16 Project Management IT Strategy IT Architecture Outsourcing & Shared Services  
## 17 Process Management Performance Management Supply Chain Change Management  
## 18 Strategy Mergers & Acquisitions  
## 19 Marketing Digital Project Management Data Science  
## 20 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma  
## 21 Unknown  
## 22 Strategy Digital  
## 23 Lean & Six Sigma Change Management  
## 24 Sustainability  
## 25 Strategy Sales Project Management  
## 26 Strategy  
## 27 Process Management Change Management Data Science  
## 28 Digital Innovation Process Management  
## 29 Digital IT Strategy Data Science Cloud IT Architecture  
## 30 Project Management Risk & Compliance  
## 31 Corporate Finance Finance  
## 32 Data Science Business Intelligence IT Architecture Software  
## 33 Strategy Data Science  
## 34 Unknown  
## 35 Strategy  
## 36 Strategy Marketing Innovation  
## 37 Data Science  
## 38 Sales  
## 39 IT Strategy Cyber Security  
## 40 Marketing  
## 41 Strategy Mergers & Acquisitions Data Science  
## 42 Sales  
## 43 Digital IT Strategy Business Intelligence Cloud IT Architecture  
## 44 Project Management Procurement  
## 45 Corporate Finance Finance  
## type  
## 1 Job  
## 2 Job  
## 3 Job  
## 4 Job  
## 5 Job  
## 6 Job  
## 7 Job  
## 8 Internship  
## 9 Job  
## 10 Job  
## 11 Job  
## 12 Job  
## 13 Job  
## 14 Job  
## 15 Job  
## 16 Job  
## 17 Job  
## 18 Job  
## 19 Internship  
## 20 Job  
## 21 Job  
## 22 Job  
## 23 Job  
## 24 Job  
## 25 Job  
## 26 Job  
## 27 Job  
## 28 Job  
## 29 Job  
## 30 Job  
## 31 Job  
## 32 Job  
## 33 Job  
## 34 Job  
## 35 Job  
## 36 Job  
## 37 Job  
## 38 Job  
## 39 Job  
## 40 Job  
## 41 Job  
## 42 Internship  
## 43 Job  
## 44 Job  
## 45 Job

#Test the function with other pages, e.g., https://www.consultancy.uk/jobs/page/2  
url\_2 <- "https://www.consultancy.uk/jobs/page/2"  
job\_data\_2 <- scrape\_jobs(url\_2)  
  
#Print the scraped job data from page 2  
print(job\_data\_2)

## job  
## 1 Consulting Roles  
## 2 Consultant Data Governance & Data Quality  
## 3 Consultant  
## 4 Customer Experience Specialist  
## 5 Experienced Consultant, Mergers & Acquisitions  
## 6 Business Development Manager – R&D Incentives  
## 7 Consultant  
## 8 PH-4779; German Speaking PMO Consultant  
## 9 Principal consultant  
## 10 Business Analyst  
## 11 Principal Strategist  
## 12 GCP Cloud Engineer  
## 13 Associate Director  
## 14 Marketing Assistant  
## 15 Independent Consultants  
## 16 Consultant Business & Technology  
## 17 Manufacturing and construction consultant  
## 18 Director, Business Intelligence | Forensic & Litigation Consulting  
## 19 Marketing Executive  
## 20 Supply Chain Operations Analyst  
## 21 Associate Consultant  
## 22 Programme Director - Energy & Utilities  
## 23 Cyber | Incident Response - Senior Manager  
## 24 Cyber Security Consultant - Manager  
## 25 Consultant, Business Intelligence | Forensic & Litigation Consulting  
## 26 Supply Chain Operations Consultant  
## 27 Senior Data Principal  
## 28 Generalist role  
## 29 Senior Statistical / Data Analyst  
## 30 Consultant  
## 31 Senior Consultant  
## 32 Data Analyst  
## 33 Contracts Manager  
## 34 Consultant: Operations Performance  
## 35 RE-4803; Procurement Consultant with SC Clearance  
## 36 Junior Associate  
## 37 Junior Talent Acquisition Specialist  
## 38 Director - Energy Transition  
## 39 Project Manager - Life Sciences  
## 40 Lean consultant  
## 41 Strategy Director  
## 42 Managing Director, Mergers & Acquisitions  
## 43 Networks Consultant  
## 44 Business Analytics Engineer  
## 45 Managing Consultant - Networks/Telecoms  
## firm  
## 1 Q5  
## 2 Valcon  
## 3 Enfuse Group  
## 4 Digital Power  
## 5 West Monroe  
## 6 Ayming  
## 7 Bain & Company  
## 8 B2E Consulting  
## 9 Change Management Group  
## 10 McKinsey & Company  
## 11 The Upside  
## 12 PA Consulting  
## 13 Yonder Consulting  
## 14 ThreeTwoFour  
## 15 Fairgrove Partners  
## 16 First Consulting  
## 17 Develop Consulting  
## 18 FTI Consulting  
## 19 Genioo  
## 20 BearingPoint  
## 21 Analysys Mason  
## 22 Capgemini Invent  
## 23 PwC  
## 24 ThreeTwoFour  
## 25 FTI Consulting  
## 26 BearingPoint  
## 27 Valcon  
## 28 Coeus Consulting  
## 29 Yonder Consulting  
## 30 Change Management Group  
## 31 Enfuse Group  
## 32 Digital Power  
## 33 Panoptic Consultancy Group  
## 34 Ayming  
## 35 B2E Consulting  
## 36 McKinsey & Company  
## 37 Zanders  
## 38 Capgemini Invent  
## 39 Genioo  
## 40 Develop Consulting  
## 41 The Upside  
## 42 West Monroe  
## 43 PA Consulting  
## 44 Valcon  
## 45 PA Consulting  
## functional\_area  
## 1 Strategy Process Management Human Resources Change Management  
## 2 Data Science  
## 3 Digital Innovation Project Management Process Management  
## 4 CRM  
## 5 Mergers & Acquisitions  
## 6 Sales Finance Data Science  
## 7 Strategy  
## 8 Unknown  
## 9 Strategy Project Management Change Management  
## 10 Strategy Digital  
## 11 Strategy Marketing Innovation  
## 12 Cloud  
## 13 Project Management Data Science  
## 14 Marketing  
## 15 Strategy Mergers & Acquisitions  
## 16 Digital Process Management Cloud IT Architecture Agile  
## 17 Lean & Six Sigma Change Management  
## 18 Forensic & Litigation Business Intelligence  
## 19 Marketing  
## 20 Supply Chain  
## 21 Digital IT Strategy Data Science  
## 22 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma  
## 23 Cyber Security  
## 24 Project Management Cyber Security  
## 25 Forensic & Litigation Business Intelligence  
## 26 Supply Chain  
## 27 Project Management Data Science Business Intelligence Cloud IT Architecture  
## 28 Strategy Project Management IT Strategy  
## 29 Data Science  
## 30 Strategy Supply Chain Change Management  
## 31 Digital Innovation Project Management Process Management  
## 32 Data Science  
## 33 Project Management  
## 34 Procurement Supply Chain  
## 35 Procurement  
## 36 Strategy Digital  
## 37 Recruitment  
## 38 Unknown  
## 39 Project Management  
## 40 Lean & Six Sigma Change Management  
## 41 Strategy Marketing Innovation  
## 42 Mergers & Acquisitions  
## 43 Unknown  
## 44 Data Science  
## 45 Unknown  
## type  
## 1 Job  
## 2 Job  
## 3 Job  
## 4 Job  
## 5 Job  
## 6 Job  
## 7 Job  
## 8 Job  
## 9 Job  
## 10 Job  
## 11 Job  
## 12 Job  
## 13 Job  
## 14 Job  
## 15 Job  
## 16 Job  
## 17 Job  
## 18 Job  
## 19 Job  
## 20 Job  
## 21 Job  
## 22 Job  
## 23 Job  
## 24 Job  
## 25 Job  
## 26 Job  
## 27 Job  
## 28 Job  
## 29 Job  
## 30 Job  
## 31 Job  
## 32 Job  
## 33 Job  
## 34 Job  
## 35 Job  
## 36 Job  
## 37 Job  
## 38 Job  
## 39 Job  
## 40 Job  
## 41 Job  
## 42 Job  
## 43 Job  
## 44 Job  
## 45 Job

#Join strings using str\_c()  
page <- 8  
url <- str\_c("https://www.consultancy.uk/jobs/page/", page)

base\_url <- "https://www.consultancy.uk/jobs/page/1"  
url <- str\_c(base\_url, page)

* Construct a vector called pages that contains the numbers for each page available

#Create a vector of pages  
pages <- seq(1,8)

* Map the scrape\_jobs() function over pages in a way that will result in a data frame called all\_consulting\_jobs.

# Define the URL pattern  
base\_url <- "https://www.consultancy.uk/jobs/page/"  
  
# Map the scrape\_jobs() function over pages and combine the results into a data frame  
all\_consulting\_jobs <- map\_df(pages, ~scrape\_jobs(str\_c(base\_url, .x)))  
  
# Print the resulting data frame  
print(all\_consulting\_jobs)

## job  
## 1 Senior Infrastructure & Cloud Services Advisor  
## 2 Senior 3D/Motion Designer  
## 3 Manager - Technology  
## 4 HR Manager  
## 5 Analyst, satellite and space markets  
## 6 PH-4804; Test Automation Manager, Python / Azure  
## 7 Director Client Services - Life Sciences  
## 8 Internships  
## 9 Senior Business Development Manager  
## 10 PMO Lead  
## 11 M&A Managing Partner UK  
## 12 Senior Consultant - Local Government Strategy  
## 13 Data Scientist  
## 14 Director - Supply Chain Strategy & Transformation  
## 15 Consultants and Senior Consultants  
## 16 Sourcing & Commercial Role  
## 17 Management Consultants  
## 18 Experienced Hire  
## 19 Internship / Work Placement  
## 20   
## 21 AWS Principal Architect  
## 22 Associate  
## 23 Healthcare consultant  
## 24 Independent Consultant   
## 25 Principal Consultants  
## 26 Strategy& - Strategy Senior Associate  
## 27 Analyst  
## 28 Analyst  
## 29 Consultant Roles (at all levels) – IT Advisory  
## 30 Intermediate Quantity Surveyor  
## 31 Consultant Treasury Technology  
## 32 Data Engineer  
## 33 Senior Analyst  
## 34 Senior Consultant | Energy & Natural Resources | Strategic Communications  
## 35 Associate Consultant  
## 36 Senior Strategist  
## 37 Business Analyst  
## 38 Business Development Manager UK  
## 39 Operational Technology Cyber Security Expert | Senior Manager | Dublin or Cork  
## 40 Marketing Executive/Manager  
## 41 Manager  
## 42 Internship Business Development UK  
## 43 Technology and Architecture Roles   
## 44 Manager and Senior Manager  
## 45 Senior Manager Treasury Technology  
## 46 Consulting Roles  
## 47 Consultant Data Governance & Data Quality  
## 48 Consultant  
## 49 Customer Experience Specialist  
## 50 Experienced Consultant, Mergers & Acquisitions  
## 51 Business Development Manager – R&D Incentives  
## 52 Consultant  
## 53 PH-4779; German Speaking PMO Consultant  
## 54 Principal consultant  
## 55 Business Analyst  
## 56 Principal Strategist  
## 57 GCP Cloud Engineer  
## 58 Associate Director  
## 59 Marketing Assistant  
## 60 Independent Consultants  
## 61 Consultant Business & Technology  
## 62 Manufacturing and construction consultant  
## 63 Director, Business Intelligence | Forensic & Litigation Consulting  
## 64 Marketing Executive  
## 65 Supply Chain Operations Analyst  
## 66 Associate Consultant  
## 67 Programme Director - Energy & Utilities  
## 68 Cyber | Incident Response - Senior Manager  
## 69 Cyber Security Consultant - Manager  
## 70 Consultant, Business Intelligence | Forensic & Litigation Consulting  
## 71 Supply Chain Operations Consultant  
## 72 Senior Data Principal  
## 73 Generalist role  
## 74 Senior Statistical / Data Analyst  
## 75 Consultant  
## 76 Senior Consultant  
## 77 Data Analyst  
## 78 Contracts Manager  
## 79 Consultant: Operations Performance  
## 80 RE-4803; Procurement Consultant with SC Clearance  
## 81 Junior Associate  
## 82 Junior Talent Acquisition Specialist  
## 83 Director - Energy Transition  
## 84 Project Manager - Life Sciences  
## 85 Lean consultant  
## 86 Strategy Director  
## 87 Managing Director, Mergers & Acquisitions  
## 88 Networks Consultant  
## 89 Business Analytics Engineer  
## 90 Managing Consultant - Networks/Telecoms  
## 91 Transactions Tax, Senior Consultant   
## 92 PH-4762; Senior Project Manager - Sales Expansion, EMEA  
## 93 Senior Consultant - Cyber Security  
## 94 Salesforce System Administrator  
## 95 Deals | Forensic Accounting - Senior Manager  
## 96 Director, Research Practice  
## 97 Director - ER&D Strategy & Transformation (Discrete/ Process industries)  
## 98 Senior Consultant, Mergers & Acquisitions  
## 99 Senior Consultant Treasury Technology  
## 100 Innovation Consultants: All levels  
## 101 Technical Web Analyst  
## 102 Cyber Security Consultant  
## 103 Senior Project Manager - Life Sciences  
## 104 Consultant- Programme and Change Acceleration  
## 105 MM-4797; Data Analyst, S&P  
## 106 Data Engineer  
## 107 Tax Depreciation, Senior Consultant  
## 108 Manager | Portfolio & Programme Management | Advisory | Dublin/Cork  
## 109 Accounts Receivable Specialist  
## 110 Cyber Security Analyst  
## 111 Lead Technical Reviewer  
## 112 Business & Technology Consultant  
## 113 Management Consultants: All levels  
## 114 Identitiy & Access Management Project Manager  
## 115 Business Development Director  
## 116 Senior Python Specialist  
## 117 Transactions Tax, Senior Director  
## 118 Vice President Client Services - Life Sciences  
## 119 Cyber Security Consultant | Cyber Consulting | Dublin or Cork  
## 120 Manager/Senior Manager - Energy & Utilities - Programme Management & Project Controls  
## 121 Wireless Technology Intellectual Property (IP) Specialist  
## 122 MM-4810; Senior Professional Services / Consultancy Procurement Manager  
## 123 Associate Director, Research Practice  
## 124 Consultant / Senior Consultant - DevOps Architect - Business Technology (London/Manchester/Glasgow)  
## 125 Consultant Business & Technology  
## 126 GCP Cloud Engineer  
## 127 PH-4808; Platform Engineer - AWS & Terraform  
## 128 Consultant - Valuations, Disputes and Arbitration | Economic and Financial Consulting  
## 129 Supply Chain Manager - Advisory Consulting - Dublin  
## 130 PH-4806; Senior Back End Developers  
## 131 Associate Director, Consulting Practice  
## 132 Senior Director | Industrials & Special Situations | Strategic Communications  
## 133 Senior Manager | Operational Excellence | Advisory | Dublin/Cork  
## 134 Resource Co-ordinator  
## 135 Cloud Economics - Managing Consultant / Senior Manager (London/Manchester/Glasgow)  
## 136 Senior DevOps Specialist  
## 137 Full Stack Engineer  
## 138 CyberArk Architect - Manager  
## 139 Senior Director | Analytics | Strategic Communications | London  
## 140 Cloud Strategy - Managing Consultant / Senior Manager (London/Manchester/Glasgow)  
## 141 MM-4817; Business Analysts, Fixed Voice IMS & Mobile  
## 142 Full Stack Engineer  
## 143 Cloud Operating Model - Managing Consultant / Senior Manager (London/Manchester/Glasgow)  
## 144 Senior Consultant, Managed Document Review | Technology  
## 145 Cyber | Azure IAM architect - Senior Manager  
## 146 Physicist - Defence & Security  
## 147 SAP Implementation Lead | Senior Manager | Technology Consulting | Advisory | Dublin/Cork  
## 148 Manager/Senior Manager - Energy & Utilities - Equipment & Asset Management Advisory  
## 149 Senior Consultant I |Regulated Industries & Energy Markets| Economic & Financial Consulting  
## 150 Director, Export Controls & Sanctions | Forensic & Litigation Consulting  
## 151 SAP Solution Architect | Senior Manager | Technology Consulting | Advisory | Dublin/Cork  
## 152 Manager/Senior Manager - Energy & Utilities - Digital Engineering (London/Manchester/Glasgow)  
## 153 Third Party Risk Management Consultant  
## 154 Digital Workplace - Low Code No Code Consultant (London/Manchester/Glasgow)  
## 155 Technical Support Engineer | Technology  
## 156 Solution Architect  
## 157 Finance Transformation - Senior Associate  
## 158 Senior Manager - Energy & Utilities - Transformation (Digital Strategy/Platform Architecture)  
## 159 Finance Transformation - Manager  
## 160 Revenue Accountant | Finance & Accounting | Core Operations  
## 161 AWS Engineer  
## 162 Senior Revenue Accountant | Finance & Accounting | Core Operations  
## 163 Manager/Senior Manager - Energy & Utilities - Customer Experience (London/Manchester/Glasgow)  
## 164 GCP-Cloud Architect  
## 165 Advisory Senior Manager | Portfolio and Programme Management | Dublin/Cork  
## 166 Data Scientist  
## 167 Manager/Senior Manager - Energy & Utilities - Sector Transformation  
## 168 Consultant | Industrials & Special Situations | Strategic Communications  
## 169 Financial Services Advisory | Senior Associate | Banking (Risk)  
## 170 AWS Alliance Manager  
## 171 Financial Services Advisory | Senior Associate | Banking (Digital Banking)  
## 172 Consultant / Senior Consultant - Digital Business Architect (London/Manchester/Glasgow)  
## 173 Team Assistant | Regional Leads | Core Operations  
## 174 Service Designer - Digital Factory (London/Manchester/Glasgow)  
## 175 Software Engineer - C ++  
## 176 Consultant - Valuations, Disputes and Arbitration | Energy |Economic and Financial Consulting  
## 177 Financial Services Advisory | Manager | Banking (Risk)  
## 178 DevOps Engineer Consultant (London/Manchester/Glasgow)  
## 179 Hardware Engineer  
## 180 Financial Services Advisory | Senior Associate | Banking (Retail Banking Operations)  
## 181 Benefits Advisor | Human Resources | Core Operations  
## 182 Finance Associate - Accounts Payable, 12 month contract  
## 183 Marketing Executive | Forensic & Litigation Consulting  
## 184 Financial Services Advisory | Manager | Banking (Transaction Enablement and Migration)  
## 185 Cloud Operating Model - Consultant / Senior Consultant (London/Manchester/Glasgow)  
## 186 Financial Services Advisory | Manager | Banking (Corporate Banking Operations)  
## 187 Cloud Strategy - Consultant / Senior Consultant (London/Manchester/Glasgow)  
## 188 PR Manager  
## 189 Executive Assistant, Business Transformation, London  
## 190 Director, Managed Document Review | Technology  
## 191 Lead Software Engineer  
## 192 Advisory - Asset & Wealth Management - Senior Manager  
## 193 Cloud Economics - Consultant / Senior Consultant (London/Manchester/Glasgow)  
## 194 Dynamics 365 CRM Developer  
## 195 Cloud Security Senior Manager | Cyber Advisory | Dublin or Cork  
## 196 Manager/Senior Manager - Energy & Utilities - Water (London/Manchester/Glasgow)  
## 197 EMEA Benefits Manager | Human Resources | Core Operations  
## 198 Manager/Senior Manager - Energy & Utilities - Water (Glasgow)  
## 199 Senior Consultant, Transaction Advisory Services | Corporate Finance & Restructuring  
## 200 Strategy& - Strategy Senior Manager I Dublin  
## 201 Commercial & Procurement Specialist  
## 202 AWS DevOps Engineer  
## 203 HR Business Partner (15 month FTC maternity cover)  
## 204 Financial Services - Advisory | Senior Manager | Dublin or Cork  
## 205 Content Designer - Digital Factory (London/Manchester/Glasgow)  
## 206 Operations, Project Delivery & Customer Service Specialist - Advisory Operate - Dublin/Cork, Ireland  
## 207 AWS Engineer  
## 208 Senior Director | Sustainability Communications | Strategic Communications | London  
## 209 Management Consultant -Retail Commercial Transformation - London/Manchester/Glasgow  
## 210 Full Stack Engineer Consultant (London/Manchester/Glasgow)  
## 211 AWS Data Engineer  
## 212 Technical Business Analyst | Senior Associate | Technology Consulting | Advisory Dublin/Cork  
## 213 Executive Assistant (9-month Fixed Term Maternity Contract) | Financial & Professional Services | Strategic Communications   
## 214 QA Engineer  
## 215 Technology Consulting | Senior Associate | Advisory | Dublin/Cork  
## 216 Senior Legal Counsel | Legal & Risk | Core Operations  
## 217 GCP Cloud Architect  
## 218 Technology Consulting | Senior Associate, Manager & Senior Manager | Advisory | Cork  
## 219 Legal Counsel (12 month FTC)| Legal & Risk | Core Operations  
## 220 Sustainable Finance Regulation Implementation | Manager Consulting | Dublin or Cork  
## 221 DevOps Engineer  
## 222 Director, Forensic Accounting Advisory Services | Forensic and Litigation Consulting  
## 223 Supply Chain Senior Manager | Advisory Consulting | Dublin/Cork  
## 224 Senior Consultant | Forensic Accounting Advisory Services | Forensic & Litigation Consulting  
## 225 Lead Software Engineer  
## 226 Director | Financial Services, Strategic Communications  
## 227 Senior Support Enginner  
## 228 Advisory Senior Associates | Portfolio and Programme Management Dublin  
## 229 Marketing Executive | Communications & Marketing | Core Operations  
## 230 Technology Solution Architect | Manager | Advisory Consulting - Dublin/Cork  
## 231 Support Engineer  
## 232 Consultant | Financial Services, Strategic Communications  
## 233 Pre-Sales Application Engineer  
## 234 MC - AWS Pre-Sales - Alliance  
## 235 Consultant | Energy | Strategic Communications   
## 236 Consultant | Technology, Media & Telecom, Strategic Communications  
## 237 IT Sourcing Consultant  
## 238 MC - Intellectual Property Advisory - Networks  
## 239 Consultant - Economics, Econometrics and Disputes | Economic & Financial Consulting  
## 240 Executive Assistant (12 Months FTC)| People and Transformation, Strategic Communications  
## 241 Operational Resilience Consultant - Financial Services  
## 242 Data Privacy Specialist  
## 243 Director | Financial Services, Strategic Communications  
## 244 Senior HR Advisor | Human Resources | Core Operations  
## 245 Cloud security Architect  
## 246 Digital Campaigns and Social Media Lead  
## 247 Executive Assistant (12 months fixed term contract)| Economic and Financial Consulting  
## 248 Senior Advisor | Human Resources | Core Operations  
## 249 DevOps Engineer  
## 250 Consultant | Financial Services, Strategic Communications  
## 251 Lead Software Engineer  
## 252 Workday HCM Lead  
## 253 Senior Consultant, e-Discovery | Technology  
## 254 Senior Consultant, Restructuring Tax  
## 255 Customer Success & Support Manager  
## 256 Consultant/Senior Consultant, Data Science   
## 257 Service Desk Analyst  
## 258 Senior Director | ESG, Strategic Communications  
## 259 Accounts Assistant  
## 260 Sourcing and Procurement Consultant  
## 261 Project Assistant, Business Intelligence | Forensic & Litigation Consulting  
## 262 Senior Consultant/Consultant - Valuations, Disputes and Arbitration | Economic and Financial Consulting  
## 263 UX/UI Designer  
## 264 Consultant - Valuations, Disputes and Arbitration | Economic and Financial Consulting  
## 265 Lead UX/UI Designer  
## 266 Global Data Privacy Director  
## 267 Senior/Principal Fraud Consultant  
## 268 Hydrogen Technology Expert  
## 269 Manager, Risk and Compliance | Legal |Core Operations  
## 270 Global Performance Appraisal Specialist  
## 271 Senior Consultant, Life Actuarial Consulting | Forensic & Litigation Consulting  
## 272 Penetration Tester  
## 273 Director, Digital Forensics | Technology  
## 274 Senior Financial Crime Transformation Consultant  
## 275 Consultant | Digital and Insights | Strategic Communications  
## 276 Penetration Tester  
## 277 Senior Recruiter | Core Operations  
## 278 Digital Delivery Lead  
## 279 Corporate Accountant, Finance & Accounting | Core Operations   
## 280 EMEA Senior Recruiter | Core Ops  
## 281 Java Engineer  
## 282 AWS DevOps Engineer  
## 283 Lead Sourcing Specialist (Talent Acquisition)  
## 284 Java Engineer  
## 285 Real Estate Tax Advisory, Senior Consultant   
## 286 AWS Engineer  
## 287 Director, Digital Science | Corporate Finance & Restructuring  
## 288 Managing Director Digital Delivery/Transformation | Corporate Finance & Restructuring  
## 289 Conduct Risk Consultant – Risk & Regulation  
## 290 Managing Director | Forensic Accounting & Advisory Services, Forensic & Litigation Consulting  
## 291 Software Development Consultant Apprentice  
## 292 HR Business Partner, Human Resources | Core Operations  
## 293 Financial Crime Technology Consultant  
## 294 Senior Consultant | Capital Markets |Economic and Financial Consulting  
## 295 Managing Consultant - Financial Services - Insurance (non-Life)  
## 296 Consultant | Capital Markets | Economic and Financial Consulting  
## 297 Managing Consultant - Financial Services - Life and Pensions  
## 298 VAT Director/Senior Director (Full-time/Part-time)  
## 299 Project, Programme and Portfolio Managers and Business Case Experts - PST  
## 300 QA Engineer  
## 301 Director, Clean Energy | Corporate Finance & Restructuring  
## 302 Finance Manager, LLP Accounting | Core Operations  
## 303 Senior Technical Project Administrator  
## 304 Senior Director, Transaction Advisory Services | Corporate Finance & Restructuring  
## 305 Agile Consultant - Lean Portfolio Management  
## 306 Senior Consultant | Analytics | Strategic Communications  
## 307 Systems Engineering Consultant  
## 308 Senior Director | Data Science | Strategic Communications  
## 309 Java Engineer  
## 310 Commercial Finance Project Administrator  
## 311 Legal Counsel EMEA, Legal & Risk | Core Operations   
## 312 AWS Analytics and Machine Learning Engineer  
## 313 Senior Consultant (IT), Business Transformation | Corporate Finance & Restructuring   
## 314 Commercial Finance Project Administrator  
## 315 International/Corporate Tax, Senior Director  
## 316 Consultant, Business Transformation | Corporate Finance & Restructuring   
## 317 Data Scientist Consultant  
## 318 Group Financial Accountant  
## 319 Enterprise Solutions Director  
## 320 Cloud Security Controls Expert  
## 321 Senior Data Analyst  
## 322 Senior Data Strategist  
## 323 Data Manager Consultant  
## 324 Commercial Finance Project Administrator (FTC)  
## 325 Systems Architect  
## 326 Employment Tax Manager  
## 327 AWS Data Engineer  
## 328 Operational Technology Cyber Security Consultant  
## 329 Senior Data Manager  
## 330 Data Analyst Consultant  
## 331 Principal Data Strategist Consultant  
## 332 IT Strategy Consultant  
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## 1 West Monroe  
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## 5 Analysys Mason  
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## 29 Mason Advisory  
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## functional\_area  
## 1 Cloud IT Architecture  
## 2 Marketing Digital  
## 3 Mobile & Apps Project Management Business Intelligence Cloud IT Architecture Software More  
## 4 Human Resources  
## 5 Strategy Digital Innovation IT Strategy Data Science  
## 6 Unknown  
## 7 Strategy Management Sales  
## 8 Pricing  
## 9 Sales  
## 10 Project Management  
## 11 Unknown  
## 12 Strategy  
## 13 Data Science  
## 14 Strategy Supply Chain  
## 15 Project Management Supply Chain Finance  
## 16 Project Management IT Strategy IT Architecture Outsourcing & Shared Services  
## 17 Process Management Performance Management Supply Chain Change Management  
## 18 Strategy Mergers & Acquisitions  
## 19 Marketing Digital Project Management Data Science  
## 20 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma  
## 21 Unknown  
## 22 Strategy Digital  
## 23 Lean & Six Sigma Change Management  
## 24 Sustainability  
## 25 Strategy Sales Project Management  
## 26 Strategy  
## 27 Process Management Change Management Data Science  
## 28 Digital Innovation Process Management  
## 29 Digital IT Strategy Data Science Cloud IT Architecture  
## 30 Project Management Risk & Compliance  
## 31 Corporate Finance Finance  
## 32 Data Science Business Intelligence IT Architecture Software  
## 33 Strategy Data Science  
## 34 Unknown  
## 35 Strategy  
## 36 Strategy Marketing Innovation  
## 37 Data Science  
## 38 Sales  
## 39 IT Strategy Cyber Security  
## 40 Marketing  
## 41 Strategy Mergers & Acquisitions Data Science  
## 42 Sales  
## 43 Digital IT Strategy Business Intelligence Cloud IT Architecture  
## 44 Project Management Procurement  
## 45 Corporate Finance Finance  
## 46 Strategy Process Management Human Resources Change Management  
## 47 Data Science  
## 48 Digital Innovation Project Management Process Management  
## 49 CRM  
## 50 Mergers & Acquisitions  
## 51 Sales Finance Data Science  
## 52 Strategy  
## 53 Unknown  
## 54 Strategy Project Management Change Management  
## 55 Strategy Digital  
## 56 Strategy Marketing Innovation  
## 57 Cloud  
## 58 Project Management Data Science  
## 59 Marketing  
## 60 Strategy Mergers & Acquisitions  
## 61 Digital Process Management Cloud IT Architecture Agile  
## 62 Lean & Six Sigma Change Management  
## 63 Forensic & Litigation Business Intelligence  
## 64 Marketing  
## 65 Supply Chain  
## 66 Digital IT Strategy Data Science  
## 67 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma  
## 68 Cyber Security  
## 69 Project Management Cyber Security  
## 70 Forensic & Litigation Business Intelligence  
## 71 Supply Chain  
## 72 Project Management Data Science Business Intelligence Cloud IT Architecture  
## 73 Strategy Project Management IT Strategy  
## 74 Data Science  
## 75 Strategy Supply Chain Change Management  
## 76 Digital Innovation Project Management Process Management  
## 77 Data Science  
## 78 Project Management  
## 79 Procurement Supply Chain  
## 80 Procurement  
## 81 Strategy Digital  
## 82 Recruitment  
## 83 Unknown  
## 84 Project Management  
## 85 Lean & Six Sigma Change Management  
## 86 Strategy Marketing Innovation  
## 87 Mergers & Acquisitions  
## 88 Unknown  
## 89 Data Science  
## 90 Unknown  
## 91 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma  
## 92 Sales  
## 93 Cyber Security  
## 94 Data Science ERP  
## 95 Forensic & Litigation  
## 96 Strategy Management Project Management Data Science  
## 97 Strategy Lean & Six Sigma  
## 98 Mergers & Acquisitions  
## 99 Corporate Finance Finance  
## 100 Finance Data Science Software  
## 101 Digital  
## 102 Cyber Security  
## 103 Project Management  
## 104 Change Management  
## 105 Data Science  
## 106 Data Science  
## 107 Finance  
## 108 Management  
## 109 Finance General  
## 110 Risk & Compliance Cyber Security IT Architecture  
## 111 Unknown  
## 112 Process Management Cloud Agile  
## 113 Change Management  
## 114 Project Management ERPSoftware  
## 115 Sales Marketing  
## 116 Software  
## 117 Unknown  
## 118 Strategy Management Sales  
## 119 Cyber Security  
## 120 Management  
## 121 Property Management IT Strategy  
## 122 Procurement  
## 123 Strategy Innovation Data Science  
## 124 IT Strategy Software  
## 125 Process Management Agile  
## 126 Cloud  
## 127 Unknown  
## 128 Unknown  
## 129 Supply Chain  
## 130 Unknown  
## 131 Strategy Sales  
## 132 Unknown  
## 133 Unknown  
## 134 Unknown  
## 135 Cloud  
## 136 Software  
## 137 Unknown  
## 138 Unknown  
## 139 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma More  
## 140 Strategy Cloud  
## 141 Mobile & Apps  
## 142 Unknown  
## 143 Cloud  
## 144 IT Strategy  
## 145 Cyber Security  
## 146 Cyber Security  
## 147 IT Strategy ERP  
## 148 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma  
## 149 Unknown  
## 150 Forensic & Litigation  
## 151 IT Strategy ERP  
## 152 Digital  
## 153 Management Risk & Compliance  
## 154 Digital  
## 155 IT Strategy  
## 156 Unknown  
## 157 Finance  
## 158 Unknown  
## 159 Finance  
## 160 Finance  
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## 162 Finance  
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## 165 Management  
## 166 Data Science  
## 167 Unknown  
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## 172 Digital  
## 173 Unknown  
## 174 Digital  
## 175 Software  
## 176 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma  
## 177 Unknown  
## 178 Software  
## 179 Unknown  
## 180 Unknown  
## 181 Human Resources  
## 182 Finance  
## 183 Marketing Forensic & Litigation  
## 184 Unknown  
## 185 Cloud  
## 186 Unknown  
## 187 Strategy Cloud  
## 188 Unknown  
## 189 Unknown  
## 190 IT Strategy  
## 191 Software  
## 192 Management  
## 193 Cloud  
## 194 CRMSoftware  
## 195 Cyber Security Cloud  
## 196 Unknown  
## 197 Human Resources  
## 198 Unknown  
## 199 Corporate Finance Restructuring Finance  
## 200 Strategy  
## 201 Procurement  
## 202 Software  
## 203 Human Resources  
## 204 Unknown  
## 205 Digital  
## 206 Unknown  
## 207 Unknown  
## 208 Unknown  
## 209 Management  
## 210 Unknown  
## 211 Data Science  
## 212 IT Strategy  
## 213 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma  
## 214 Unknown  
## 215 IT Strategy  
## 216 Risk & Compliance  
## 217 Cloud  
## 218 IT Strategy  
## 219 Risk & Compliance  
## 220 Finance  
## 221 Software  
## 222 Forensic & Litigation  
## 223 Supply Chain  
## 224 Forensic & Litigation  
## 225 Software  
## 226 Unknown  
## 227 Unknown  
## 228 Management  
## 229 Marketing  
## 230 IT Strategy  
## 231 Unknown  
## 232 Unknown  
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## 235 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma  
## 236 Unknown  
## 237 Procurement Supply Chain  
## 238 Property Management  
## 239 Unknown  
## 240 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma More  
## 241 Unknown  
## 242 Data Science  
## 243 Unknown  
## 244 Human Resources  
## 245 Cyber Security Cloud  
## 246 Digital Social Media  
## 247 Unknown  
## 248 Human Resources  
## 249 Software  
## 250 Unknown  
## 251 Software  
## 252 Human Resources ERP  
## 253 IT Strategy  
## 254 Restructuring Finance  
## 255 Unknown  
## 256 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma More  
## 257 Unknown  
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## 260 Procurement Supply Chain  
## 261 Forensic & Litigation Business Intelligence  
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## 266 Data Science  
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## 268 IT Strategy  
## 269 Risk & Compliance  
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## 273 Digital Forensic & Litigation IT Strategy  
## 274 Unknown  
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## 279 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma More  
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## 281 Software  
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## 283 Procurement Supply Chain  
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## 285 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma More  
## 286 Unknown  
## 287 Corporate Finance Restructuring Digital Finance  
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## 289 Risk & Compliance  
## 290 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma More  
## 291 Software  
## 292 Human Resources  
## 293 IT Strategy  
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## 301 Corporate Finance Restructuring Finance  
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## 304 Corporate Finance Restructuring Finance  
## 305 Management Lean & Six Sigma  
## 306 Data Science  
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## 309 Software  
## 310 Finance  
## 311 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma More  
## 312 Human Resources Data Science  
## 313 Management+8Mergers & Acquisitions Corporate Finance Restructuring Ecommerce Mobile & Apps More  
## 314 Finance  
## 315 Management Mergers & Acquisitions Ecommerce Mobile & Apps Corporate Governance Lean & Six Sigma  
## 316 Management+8Mergers & Acquisitions Corporate Finance Restructuring Ecommerce Mobile & Apps More  
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## 320 Cyber Security Cloud  
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* Write the data frame to a csv file called all\_consulting\_jobs.csv in the data folder.

#Define the file path  
file\_path <- "data/all\_consulting\_jobs.csv"  
  
#Write the data frame to the CSV file  
write\_csv(all\_consulting\_jobs, file\_path)

# Details

* Who did you collaborate with: N/A
* Approximately how much time did you spend on this problem set: three days
* What, if anything, gave you the most trouble: Last two Covid graphs, a little on finding the appropriate CSS selector