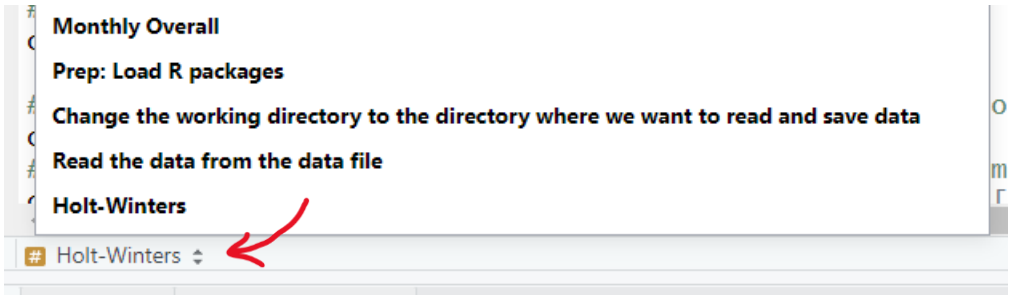
Forecast method used:

- Double exponential smoothing (Holt-Winters' seasonal method)
  - Time series forecasting
    - ```
      # Holt-Winters ##########################################
      # Estimate value of alpha parameter
      ccdata_forecast <- HoltWinters(ccdata_ts, gamma=FALSE)
      ```
  - Uses **alpha** and **beta** smoothing factors
    - ```
      Smoothing parameters:
       alpha: 0.794479
       beta : 0.2635335
       gamma: FALSE
      ```
  - Considers **trend** and **seasonality** of the data

Advantages of the forecast

1. Able to smooth out any unexpected fluctuations in dataset
2. Forecast **accuracy will increase** as newer data becomes available
3. Model gives **priority to most recent points** of dataset to be accurately predict future values
4. Model can be **easily adjusted** to incorporate other factors in the future (eg. Recession etc)
5. Ensure that there are no gaps in the time series data and forecast will run with some missing data in between
   a. ```
      # Assign 0 to missing days
      ccdata <- ccdata %>% complete(SumDate = seq.Date(min(SumDate), max(SumDate), by = "month"), fill = list(Revenue = 0))
      ```

Events the forecast will fail

1. Forecast will not be able to capture sudden shocks (e.g. Natural disaster, pandemic)
2. In the event of the column name being entered wrongly (capitalisation/spacing), the forecast will fail as the program will not be able to recognise the column name and retrieve the required data.
3. In the event the customer does not order in an upcoming month, this means there will be no data indicating this information. Thus, causing an inaccuracy in the forecast. (e.g. customer A made zero orders in May, the forecast will not be able to detect the absence of revenue in May and will still make a forecast for revenue in the next three months (May, June, and July) based on incomplete data. Hence, in this scenario, the model will fail to accurately predict the future revenue.

Code Guide

Installation Guide

1. Download R from the official website accordingly to your operating system
   a. Windows: https://cran.r-project.org/bin/windows/base/
   b. macOS: https://cran.r-project.org/bin/macosx/
2. Download RStudio: https://posit.co/download/rstudio-desktop/
3. Run the installer file and follow the instruction accordingly
4. Open the R file via RStudio

Annotation of Codes

Every line of R Code is annotated line using the "#"
Codes listed below can be edited to adjust the model accordingly to attain different datasets.
      ```

Navigate to the code section quickly by clicking on the tab



To get individual customers forecast, accurately enter the project name (customer name) exactly as it appears within the quotation marks (including capitalization and any special characters)