```
library(readxl)
library(tidymodels)
library(modeltime)
library(timetk)
library(lubridate)
library(tidyverse)
library(forecast)
library (ggfortify)
library(xlsx)
library(tseries)
library(fpp2)
library(dplyr)
library(tidyr)
library(ggplot2)
flu_data <- read_excel("flu.xlsx")
flu_ts <- ts(flu_data$cases, start = c(2013, 1), frequency = 12)

##Fig1#######
autoplot(flu_ts,col=2) +ggtitle ("Time series of influenza cases in Fuzhou")

# pretreatment#######
# To omthe influenza time series
flu_decomposed <- decompose(flu_ts)
##Fig2##
plot(flu_decomposed, xlim=c(2013,2023))

# With 2013.1-2021.12 as the training set
flu_ts_train <- window (flu_ts,end=c(2021,12))
# With 20122.1-2022.12 as the training set
flu_ts_test <- window (flu_ts,star=c (2022,1))

# Data stationarity analysis- - - - - - - - - -ADF test
adf.test(flu_ts_train)

#The ACF and PACF plots of the modeled data were plotted to determine the values of p, q, p, and q in the model
flu_ts_train1 <-diff(flu_ts_train)
#The autocorrelation coefficient and the partial autocorrelation coefficient of the sequences were analyzed, determining the parameters p and q
par(mfrow = c(1, 2))    # Set the subgraph layout to 4 lines and 1 column
acf(flu_ts_train, main = "", xlab = "Lags",lag.max=120, ylab = "ACF", col = "black",ylim=c(-0.5,1))
pacf(flu_ts_train, main = "", xlab = "Lags",lag.max=120, ylab = "PACF", col = "black",ylim=c(-0.5,1))
```