SMiB
Homework/Labwork 4
Due April 21st, 2024 EOD

Problem 1. The data file wisla.csv contains daily observations of the water level of the river Wisła made in the town of Wisła. They date from 1981 till present. You can choose the data resolution most appropriate for the analysis. Please, identify the trend and the seasonality in the data (if present). Check the stationarity. Fit the best ARMA model to the data. Perform the prediction not just for the next 5 observations, but for the entire time period (overlay the forecast with the actual data in the plot, based on a 1-lag ahead forecast). What are the major departures from the forecast?

Please notice that the date of the observation refers to the so called hydrological year which lasts from Nov 1 of the previous calendar year, to Oct 31 of the given calendar year. The data contains both the hydrological month and the calendar month.
(20pts)

Problem 2. A researcher is planning a study to demonstrate that an app with smart reminders will increase a person's adherence to the blood sugar monitoring. A typical person with chronic diabetes adheres to blood sugar test regimen independently with a probability $p_1 = 0.55$. Based on earlier studies the researcher is expecting the app to raise the adherence to $p_2 = 0.62$. On average 5% of study participants randomly drop out from the study. What should be the sample size in each group (treatment and control) to achieve a 0.8 power for the study in question.
(Optional, 10 pts)