The aim of this bachelor thesis is to introduce the algorithm for analysis of the linear regression model with autocorrelated residuals, which is applicable to time series data. For residuals, we assume the ARMA model, eventually ARIMA model, which enlarges the possibilities of application. The analysis of such regression models includes detection of autocorrelation and related tests, detection of stationarity and related unit root test, followed by model identification for residuals and maximum likelihood estimation of identified regression model.