# Solution Design Project 1

### Calculating Best fit line on any Stock Ticker

Panko A.S.

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## 1. Objectives

1) Download data for last 1 month for user entered ticker from Yahoo! Finance website. Ensure proper error handling for wrong user inputs.

2) Using Interpolation techniques, fit a quadratic line through the data points and plot the same

3) Choose a quadratic equation of your choice and using SciPy leastsq() optimization method calculate the best fit line with respect to the downloaded data

4) Plot the best fit line and the actual data points together with error bars.

## 2. Project Structure

The listed objectives form the project steps, namely:

1) Download data

2) Perform Interpolation

3) Perform Optimization

4) Plot the result

## 3. User input and data Downloading

To download the stock data from Yahoo! Finance website stock ticker is required. A user inputs a valid ticker, after what the program automatically downloads historical data of a chosen stock. User input can be wrong, so program checks user input and ask the user to enter a new ticker in case the provided one was wrong.

# 4. Interpolation

After historical data are downloaded, program analyzes the data. The purpose of analysis is to provide a quadratic function (polynomial of degree 2), which can approximate the stock prices.

# 5. Optimization

There is an alternative way of finding such a function. The function can be not only polynomial type. To determine it special optimizer can be used. To check the previous result, the optimizer finds the same type of function: polynomial of degree 2, using the least squares method.

# 6. Visualization

In terms of result, visualization is one of the most important parts of any project. The program displays two plots:

1) Plot with original stock prices and polynomial approximation function

2) Plot with original stock prices with error bars and the function from least squares optimization method (best fit quadratic line)