Project-1 Financial Analytics

Given a corpus of ₹50,00,000, we need to construct a portfolio of stocks from NIFTY 50 (Given in Table 3 on page 2).

Instructions:

1. Select at least 5 and at most 20 companies to form a portfolio from Table 1.
2. Use their daily closing prices for your analysis. Use historical data for past 3 years, split the first two and half years for training and the remaining half year for testing your portfolio.

Questions:

1. Calculate the expected return and std deviation for each stock and the portfolio. How do these numbers compare between test and train data set?
2. Calculate beta and R^2 for each stock, identify high and low beta stocks, is there something common between the high beta stocks and low beta stocks?
3. Using the Markowitz's optimal portfolio allocation method, compute the optimal weights for your portfolio.
   a. Plot the efficient frontier. What method did you use for obtaining the efficient frontier?
   b. Compute the performance of your portfolio in the train and the test period. What metrics can you use to measure the performance of the portfolio?
   c. How does your portfolio perform against the market portfolio in the same period?
4. Mention the practical challenges you faced while implementing and evaluating your portfolio.
5. Compute the beta of your portfolio, is it equal to the weighted average of the individual stocks beta in the portfolio?

Table 1: NIFTY 50 stocks

Sl.No.	Company Name	Industry	Weightage
1	Reliance Industries Ltd.	OIL & GAS	12.94%

2	HDFC Bank Ltd.	FINANCIAL SERVICES	8.55%
3	Infosys Ltd.	IT	7.73%
4	ICICI Bank Ltd.	FINANCIAL SERVICES	7.11%
5	Housing Development Finance Corporation Ltd.	FINANCIAL SERVICES	5.68%
6	Tata Consultancy Services Ltd.	IT	4.89%
7	Kotak Mahindra Bank Ltd.	FINANCIAL SERVICES	3.53%
8	ITC Ltd.	FMCG	3.46%
9	Hindustan Unilever Ltd.	FMCG	2.88%
10	Larsen & Toubro Ltd.	CONSTRUCTION	2.72%
11	State Bank Of India	FINANCIAL SERVICES	2.58%
12	AXIS Bank Ltd.	FINANCIAL SERVICES	2.43%
13	Bharti Airtel Ltd.	TELECOM	2.39%
14	Bajaj Finance Ltd.	FINANCIAL SERVICES	2.08%
15	Asian Paints	CONSUMER DURABLES	1.76%

16	Maruti Suzuki India Ltd.	AUTOMOBILE & AUTO COMPONENTS	1.63%
17	Mahindra & Mahindra Ltd.	AUTOMOBILE & AUTO COMPONENTS	1.51%
18	HCL Technologies Ltd.	IT	1.49%
19	Sun Pharmaceutical Industries Ltd.	HEALTHCARE	1.30%
20	Titan	CONSUMER DURABLES	1.17%
21	Tata Motors Ltd.	AUTOMOBILE & AUTO COMPONENTS	1.07%
22	Power Grid Corporation of India Ltd.	POWER	1.05%
23	Tata Steel Ltd.	METALS & MINING	1.01%
24	NTPC Ltd.	POWER	0.98%
25	Bajaj Finserv Ltd.	FINANCIAL SERVICES	0.96%
26	UltraTech Cement Ltd.	CONSTRUCTION MATERIALS	0.94%
27	Tech Mahindra Ltd.	IT	0.91%
28	Nestle India Ltd.	FMCG	0.90%

29	Wipro Ltd.	IT	0.89%
30	Oil And Natural Gas Corporation Ltd.	OIL & GAS	0.85%
31	JSW Steel Ltd.	METALS & MINING	0.79%
32	Dr. Reddy's Laboratories Ltd.	HEALTHCARE	0.77%
33	IndusInd Bank Ltd.	FINANCIAL SERVICES	0.75%
34	HDFC Life Insurance Co.	FINANCIAL SERVICES	0.74%
35	Grasim Industries Ltd.	CONSTRUCTION MATERIALS	0.72%
36	Cipla Ltd.	HEALTHCARE	0.72%
37	Hindalco Industries Ltd.	METALS & MINING	0.71%
38	Adani Port and Special Economic Zone Ltd.	SERVICES	0.70%
39	SBI Life Insurance Co.	FINANCIAL SERVICES	0.70%
40	Bajaj Auto Ltd.	AUTOMOBILE & AUTO COMPONENTS	0.70%
41	Divi's Laboratories Ltd.	HEALTHCARE	0.67%

42	Tata Consumer Products Ltd.	FMCG	0.61%
43	Britannia Industries Ltd.	FMCG	0.59%
44	Coal India Ltd	OIL & GAS	0.56%
45	Eicher Motors Ltd.	AUTOMOBILE & AUTO COMPONENTS	0.56%
46	Appolo Hospital	HEALTHCARE	0.54%
47	Hero MotoCorp Ltd.	AUTOMOBILE & AUTO COMPONENTS	0.51%
48	UPL Ltd.	CHEMICALS	0.49%
49	Bharat Petroleum Corp. Ltd.	OIL & GAS	0.43%
50	Shree Cement Ltd.	CONSTRUCTION MATERIALS	0.37%