

# DA1

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Course Name	Financial Analytics
Course Code	PMDS610L
Assessment	Digital Assignment 1

## 1 Problem Statement

We need to design an investment portfolio for an individual with no initial corpus, investing 20,000 per month via a Systematic Investment Plan (SIP) for 15 years. The portfolio will consist of: - 2 Mutual Funds - 5 Stocks

```
[5]: import yfinance as yf
import warnings
warnings.filterwarnings("ignore")
tickers = ['ASIANPAINT.BO', 'BAJFINANCE.BO', 'MARUTI.BO', 'TITAN.BO', 'HINDUNILVR.BO']

for ticker in tickers:
    stock = yf.Ticker(ticker)
    df = stock.history(period="10y")

    if df.empty:
        print(f"{ticker}: No data found.")
        continue

    df['Return'] = df['Close'].pct_change()
    start_price = df['Close'].iloc[0]
    end_price = df['Close'].iloc[-1]
    cagr = (end_price / start_price) ** (1/10) - 1

    print(f"{ticker}: CAGR over 10 years = {cagr:.2%}")
```

```
ASIANPAINT.BO: CAGR over 10 years = 11.97%
BAJFINANCE.BO: CAGR over 10 years = 36.58%
MARUTI.BO: CAGR over 10 years = 13.08%
```

TITAN.BO: CAGR over 10 years = 23.07%  
HINDUNILVR.BO: CAGR over 10 years = 11.17%

### 1.0.1 Defining investment details

```
[9]: sip_per_month = 20000
years = 15
total_invested = sip_per_month * years * 12

allocation = {
    "Mtilal Oswal Midcap FDG": 0.20, # 20% allocation
    "SBI PSU": 0.20, # 20% allocation
    "ASIANPAINT.BO": 0.12, # 12% allocation
    "BAJFINANCE.BO": 0.12,
    "MARUTI.BO": 0.12,
    "TITAN.BO": 0.12,
    "HINDUNILVR.BO": 0.12
}

historical_returns = {
    "Mtilal Oswal Midcap FDG": 23.19, # last 10 year avg return
    "SBI PSU": 11.50,
    "ASIANPAINT.BO": 11.97,
    "BAJFINANCE.BO": 36.58,
    "MARUTI.BO": 13.08,
    "TITAN.BO": 23.07,
    "HINDUNILVR.BO": 11.17
}
```

### 1.0.2 Defining a function to calculate the future value by SIP investment

```
[10]: def calculate_future_value(sip, years, annual_return):
    months = years * 12
    monthly_rate = (1 + annual_return / 100) ** (1 / 12) - 1
    # Future value formula:  $FV = P * [((1 + r)^n - 1) / r] * (1 + r)$  (Assuming
    ↪ SIP is paid at the beginning of the month)
    future_value = sip * (((1 + monthly_rate) ** months - 1) / monthly_rate) *
    ↪ (1 + monthly_rate)
    return future_value
```

### 1.0.3 Calculating future value for each investment

```
[12]: portfolio_value = 0
print(f"\nSIP Portfolio ( {sip_per_month:} per month for {years} years)")
for asset, weight in allocation.items():
    sip_amount = sip_per_month * weight
```

```

    future_val = calculate_future_value(sip_amount, years,
↪historical_returns[asset])
    portfolio_value += future_val
    print(f"Future Value of {asset}: {future_val:.2f}")

# Calculating total return
total_return = portfolio_value - total_invested

print("\nSummary:")
print(f"Monthly SIP Amount           : {sip_per_month}")
print(f"Investment Duration           : {years} years")
print(f"Total Invested Amount           : {total_invested:,.2f}")
print(f"Expected Portfolio Value        : {portfolio_value:,.2f}")
print(f"Estimated Total Return           : {total_return:,.2f}")

```

SIP Portfolio ( 20000 per month for 15 years)  
 Future Value of Mtilal Oswal Midcap FDG: 5069544.67  
 Future Value of SBI PSU: 1824223.80  
 Future Value of ASIANPAINT.BO: 1139311.16  
 Future Value of BAJFINANCE.BO: 9953378.47  
 Future Value of MARUTI.BO: 1253049.56  
 Future Value of TITAN.BO: 3009504.64  
 Future Value of HINDUNILVR.BO: 1064229.64

Summary:

Monthly SIP Amount	: 20000
Investment Duration	: 15 years
Total Invested Amount	: 3,600,000.00
Expected Portfolio Value	: 23,313,241.94
Estimated Total Return	: 19,713,241.94

## 1.1 Conclusion

Total portfolio value after 15 Years is 2,33,13,241.94

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Asset Name	Allocation (%)	SIP Amount (₹)	Annual Return (%)	Monthly Return	Future Value (₹)
Mtilal Oswal Midcap FDG	20.00%	4000	23.19%	1.75%	₹ 50,69,544.67
SBI PSU	20.00%	4000	11.50%	0.91%	₹ 18,24,223.80
ASIANPAINT	12.00%	2400	11.97%	0.95%	₹ 11,39,311.16
BAJFINANCE	12.00%	2400	36.58%	2.63%	₹ 99,53,378.47
MARUTI	12.00%	2400	13.08%	1.03%	₹ 12,53,049.56
TITAN	12.00%	2400	23.07%	1.74%	₹ 30,09,504.64
HINDUNILVR	12.00%	2400	11.17%	0.89%	₹ 10,64,229.64

Total invested ₹ 36,00,000.00

**Total Portfolio Value ₹ 2,33,13,241.94**

Total Return (Profit) ₹ 1,97,13,241.94