DA1

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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

```python
[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

```python
[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

```python
[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