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AIFBA EEXPERIMENT : 02

```
import pandas as pd
import matplotlib.pyplot as plt

# Updated portfolio data
portfolio_data = pd.DataFrame({
    'Fund': ['Fund A', 'Fund B', 'Fund C', 'Fund D', 'Fund E'],
    'Return': [0.18, 0.12, 0.15, 0.22, 0.09],
    'Standard Deviation': [0.08, 0.18, 0.11, 0.16, 0.06]
})

# Updated risk-free rate
risk_free_return = 0.05

# Calculate Sharpe Ratio
portfolio_data['Sharpe Ratio'] = (
    portfolio_data['Return'] - risk_free_return
) / portfolio_data['Standard Deviation']

# Print portfolio details
print("Portfolio Details with Calculated Sharpe Ratios:\n")
print(portfolio_data)
print(f"\nRisk-free rate: {risk_free_return}")

# -------------------- Scatter Plot --------------------
plt.figure(figsize=(10, 6))
plt.scatter(
    portfolio_data['Return'],
    portfolio_data['Sharpe Ratio'],
    color='purple',
    s=80
)

# Annotate each point
for i, fund in enumerate(portfolio_data['Fund']):
    plt.annotate(
        fund,
        (portfolio_data['Return'][i], portfolio_data['Sharpe Ratio'][i]),
        textcoords="offset points",
        xytext=(0, 7),
        ha='center'
    )

plt.title('Sharpe Ratio vs. Return')
plt.xlabel('Return')
plt.ylabel('Sharpe Ratio')
plt.grid(True, linestyle='--', alpha=0.6)
plt.show()

# -------------------- Line Plot --------------------
plt.figure(figsize=(10, 6))
plt.plot(
    portfolio_data['Fund'],
    portfolio_data['Sharpe Ratio'],
    marker='o',
    linestyle='-',
    color='teal'
)

plt.title('Sharpe Ratio by Fund')
plt.xlabel('Fund')
plt.ylabel('Sharpe Ratio')
plt.grid(True, linestyle='--', alpha=0.6)
plt.show()
```

```
Portfolio Details with Calculated Sharpe Ratios:

     Fund  Return  Standard Deviation  Sharpe Ratio
0  Fund A    0.18                0.08      1.625000
1  Fund B    0.12                0.18      0.388889
2  Fund C    0.15                0.11      0.909091
3  Fund D    0.22                0.16      1.062500
4  Fund E    0.09                0.06      0.666667

Risk-free rate: 0.05
```