**ADTA 5770: HW 2: Prompts & Responses**

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Domain Expertise Field: Finance/Investment

LLM: Google Gemini 2.0 Flash Thinking Experimental

# Prompt 1: Zero-Shot Prompting

## Prompt: Initial Version -

Analyze current market conditions and provide investment recommendations

## Prompt Design: Step by Step

### Step 1: Define the Objective

* Generate comprehensive investment strategy analysis
* Provide actionable portfolio recommendations
* Target audience: Professional investors and financial advisors
* Purpose: Create a structured market analysis with specific investment guidance
* Desired outcome: Clear, actionable investment strategy with risk considerations

### Step 2: Choose Prompt Type

* + Zero-shot prompting approach selected
  + No examples needed as task is clearly definable

### Step 3:Craft the Instruction

* Include specific metrics to be analyzed
* Set clear expectations for depth and breadth

### Step 4: Provide Context

* Professional context: As a senior investment analyst
* Investment horizon: 5-year investment horizon
* Risk profile: Moderate risk profile

### Step 5:Define Constraints

* Analysis length: 500-750 words
* Required sections specified
* Specific metrics to include

### Step 6: Review and Refine

* **Added specificity:** Detailed bullet points under each main section
* **Added practical elements:** Entry points, position sizing, and rebalancing considerations
* **Balanced structure:** Equal attention to analysis, recommendations, and risks

### Step 7:Final Verification

 Aligned with objective: Comprehensive structure covers all needed elements

 Clear expectations: Specific deliverables and metrics defined

 Professional standards: Appropriate financial terminology and structure

## PROMPT: Final Version

As a senior investment analyst, provide a comprehensive market analysis and investment strategy recommendation (500-750 words). Your analysis should include:

1. Market Condition Analysis:
   * Major indices performance (S&P 500, NASDAQ, DJIA)
2. Investment Recommendations:
   * Asset allocation strategy (specific percentages)
3. Risk Assessment:
   * Risk mitigation strategies

Format your response with clear sections, supporting data, and specific actionable recommendations. Target a 5-year investment horizon with a moderate risk profile. Include entry points, position sizing, and rebalancing considerations.

A screenshot of a computer program

AI-generated content may be incorrect.

## Response: Final Version

# Market Analysis and Investment Strategy Recommendation

## Market Condition Analysis

The major U.S. indices have shown mixed performance in recent months, with technology stocks leading the recovery while traditional sectors face ongoing headwinds. The S&P 500 has maintained its upward trajectory, returning approximately 6.2% year-to-date, while the tech-heavy NASDAQ has outperformed with gains around 9.8%. The Dow Jones Industrial Average has lagged behind with more modest returns of about 2.3%, reflecting investor preference for growth over value in the current environment.

Market volatility remains elevated compared to historical averages, with the VIX index hovering between 18-22, indicating continued uncertainty regarding inflation, interest rates, and global geopolitical tensions. Bond yields have stabilized somewhat but remain historically high, with the 10-year Treasury yielding approximately 4.3%.

## Investment Recommendations

Given the moderate risk profile and 5-year investment horizon, I recommend the following asset allocation strategy:

- \*\*Equities: 55%\*\*

- U.S. Large Cap: 25%

- U.S. Mid/Small Cap: 10%

- International Developed Markets: 12%

- Emerging Markets: 8%

- \*\*Fixed Income: 30%\*\*

- Investment Grade Corporate Bonds: 12%

- Treasury Securities: 10%

- High-Yield Bonds: 5%

- International Bonds: 3%

- \*\*Alternatives: 12%\*\*

- Real Estate Investment Trusts (REITs): 5%

- Commodities: 4%

- Infrastructure: 3%

- \*\*Cash: 3%\*\*

- High-yield savings or short-term Treasury bills

## Entry Points and Position Sizing

For equity positions, implement a dollar-cost averaging approach over the next 3-6 months rather than investing all capital immediately. This strategy helps mitigate timing risk given current market valuations. For fixed income, stagger entry points across different maturities to create a bond ladder, particularly focusing on the 2-7 year duration range.

Position sizing should follow a core-satellite approach:

- Core holdings (70-75% of each asset class allocation): Low-cost index funds or ETFs

- Satellite positions (25-30%): Selective active funds or individual securities in sectors with potential alpha generation

## Risk Assessment and Mitigation Strategies

Primary risks to this portfolio include:

1. \*\*Inflation persistence\*\*: While inflation has moderated, structural factors could reignite price pressures. Mitigation: Maintain TIPS allocation within fixed income and exposure to real assets.

2. \*\*Interest rate risk\*\*: Further rate increases or prolonged elevated rates could pressure both equity and fixed income. Mitigation: Emphasize quality companies with strong balance sheets and free cash flow, while maintaining shorter duration in the bond portfolio.

3. \*\*Geopolitical tensions\*\*: Ongoing conflicts and trade disputes create market uncertainty. Mitigation: Geographic diversification and maintaining the recommended cash position for opportunistic deployments.

4. \*\*Economic slowdown\*\*: Growing recession risks as tighter monetary policy impacts economic activity. Mitigation: Overweight defensive sectors (healthcare, consumer staples) within equity allocation and maintain quality bias across holdings.

## Rebalancing Considerations

Implement a hybrid rebalancing approach:

- Calendar-based: Semi-annual comprehensive portfolio review

- Threshold-based: Rebalance when any asset class deviates more than 5% from target allocation

Additionally, conduct tactical rebalancing during significant market dislocations to capitalize on opportunities, particularly if the cash position can be deployed into heavily discounted assets.

## Specific Tactical Recommendations

Within the strategic framework above, current market conditions suggest these tactical tilts:

1. Within equities, overweight quality growth companies with strong pricing power and sustainable competitive advantages. Specifically target companies in AI/semiconductor, healthcare innovation, and cybersecurity sectors.

2. In fixed income, favor investment-grade corporate credit and Treasury securities in the 3-5 year maturity range, which offer attractive yields with moderate duration risk.

3. Consider gradual dollar-cost averaging into emerging markets, which present value opportunities but warrant caution due to China's economic challenges and global rate pressures.

4. Within alternatives, emphasize infrastructure investments with inflation-linked revenue streams and select REITs focusing on industrial, data center, and healthcare properties.

This balanced approach should provide growth potential while preserving capital in various market environments, aligning with your moderate risk profile and 5-year investment horizon.

## Response Analysis and Evaluation

**… SHOULD BE BLANK FOR HW 2… WILL BE COMPLETED IN HW 3 …**

# Prompt 2: Zero-Shot Prompting

## Prompt: Initial Version

Explain how to analyze company financial statements.

## Prompt Design: Step by Step

### Step 1: …

* How it's reflected: Comprehensive guide to analyzing company financial statements
* Target audience: Senior financial analyst perspective indicates professional users
* Desired outcome: A practical framework for financial analysis

### Step 2: …

* Zero-shot approach: Clear structured instructions without examples
* Professional context: Financial analysis setting
* Methodological focus: Framework development rather than simple answers

### Step 3: …

* Professional terminology: Financial statement components specifically named
* Structured requirements: Three main categories with detailed sub-requirements
* Specific deliverables: Analysis framework, calculation methodologies, interpretation guidelines

### Step 4: …

* Professional role: As a senior financial analyst
* Purpose context: Comprehensive analysis approach
* Industry standard expectations: Integration of statements, ratios, and warning signs

### Step 5: …

* Comprehensive coverage: All three financial statements
* Specific metrics required: Multiple categories of financial ratios
* Format requirements: Structured format with specific examples
* Practical focus: Interpretation guidelines, common pitfalls, best practices

### Step 6: …

* Technical depth: Added red flag identification section
* Practical application: Added interpretation guidelines
* Risk awareness: Added common pitfalls to avoid

### Step 7: …

* Professional standards: Appropriate financial terminology and methodology
* Completeness check: Covers analysis, metrics, and warning signs
* Practical utility: Includes actionable frameworks and guidelines.

## PROMPT: Final Version

As a senior financial analyst, provide a comprehensive guide to analyzing company financial statements. Include:

1. Statement Integration Analysis:
   * Income Statement, Balance Sheet, Cash Flow relationships
   * Key interconnected metrics
   * Ratio analysis methodology
   * Working capital analysis
   * Cash conversion cycle
2. Key Performance Indicators:
   * Profitability metrics
   * Efficiency ratios
   * Liquidity measures
   * Solvency indicators
   * Growth metrics
3. Red Flag Identification:
   * Accounting irregularities
   * Financial distress signals
   * Quality of earnings assessment
   * Off-balance sheet analysis
   * Sustainability metrics

Present the analysis framework in a structured format with specific examples, calculation methodologies, and interpretation guidelines. Include common pitfalls to avoid and best practices for financial statement analysis.

## Response: Final Version

* **A Comprehensive Guide to Analyzing Company Financial Statements**

As a senior financial analyst, I've developed this guide to provide a structured framework for analyzing company financial statements. This process involves more than just calculating ratios; it requires understanding the interconnectedness of the statements and identifying potential red flags.

**1. Statement Integration Analysis:**

The three primary financial statements – the Income Statement, Balance Sheet, and Cash Flow Statement – are interconnected and tell a story about a company's financial health.

* **Income Statement, Balance Sheet, and Cash Flow Relationships:**
  + **Income Statement & Balance Sheet:** The income statement's net income flows into the retained earnings portion of the balance sheet's equity section. Changes in assets and liabilities on the balance sheet often drive revenues and expenses on the income statement (e.g., increased investment in PP&E might lead to higher depreciation expense and potentially higher revenue).
  + **Income Statement & Cash Flow Statement:** Net income is the starting point for the indirect method of the cash flow statement. Non-cash items on the income statement (like depreciation) are adjusted to reconcile net income to cash from operations.
  + **Balance Sheet & Cash Flow Statement:** Changes in balance sheet accounts (e.g., accounts receivable, inventory) impact the cash flow statement's operating activities section. Investing and financing activities on the cash flow statement directly affect balance sheet accounts.
* **Key Interconnected Metrics:**
  + **Return on Assets (ROA):** Net Income / Average Total Assets (Connects Income Statement and Balance Sheet)
  + **Return on Equity (ROE):** Net Income / Average Shareholders' Equity (Connects Income Statement and Balance Sheet)
  + **Free Cash Flow (FCF):** Cash from Operations - Capital Expenditures (Connects Cash Flow Statement and Balance Sheet)
* **Ratio Analysis Methodology:**
  + **Calculate the ratio:** Use the correct formula with data from the financial statements.
  + **Compare over time (trend analysis):** Is the ratio improving, declining, or stable?
  + **Compare to industry benchmarks (cross-sectional analysis):** How does the company's ratio compare to its competitors?
  + **Interpret the results:** What does the ratio tell you about the company's performance and financial health?
* **Working Capital Analysis:**
  + **Working Capital:** Current Assets - Current Liabilities. Measures a company's ability to meet its short-term obligations.
  + **Current Ratio:** Current Assets / Current Liabilities. A ratio below 1 may indicate liquidity problems.
  + **Quick Ratio (Acid-Test):** (Current Assets - Inventory) / Current Liabilities. A more conservative measure of liquidity.
* **Cash Conversion Cycle (CCC):**
  + **CCC:** Days Inventory Outstanding (DIO) + Days Sales Outstanding (DSO) - Days Payables Outstanding (DPO). Measures the time it takes a company to convert its investments in inventory into cash flows from sales. A shorter CCC is generally better.
  + **DIO:** (Average Inventory / Cost of Goods Sold) \* 365
  + **DSO:** (Average Accounts Receivable / Revenue) \* 365
  + **DPO:** (Average Accounts Payable / Cost of Goods Sold) \* 365

**2. Key Performance Indicators (KPIs):**

* **Profitability Metrics:**
  + **Gross Profit Margin:** (Revenue - Cost of Goods Sold) / Revenue
  + **Operating Profit Margin:** Operating Income / Revenue
  + **Net Profit Margin:** Net Income / Revenue
* **Efficiency Ratios:**
  + **Inventory Turnover:** Cost of Goods Sold / Average Inventory
  + **Asset Turnover:** Revenue / Average Total Assets
  + **Receivables Turnover:** Revenue / Average Accounts Receivable
* **Liquidity Measures:**
  + **Current Ratio** (See above)
  + **Quick Ratio** (See above)
  + **Cash Ratio:** (Cash + Cash Equivalents) / Current Liabilities
* **Solvency Indicators:**
  + **Debt-to-Equity Ratio:** Total Debt / Total Equity
  + **Debt-to-Asset Ratio:** Total Debt / Total Assets
  + **Interest Coverage Ratio:** EBIT / Interest Expense
* **Growth Metrics:**
  + **Revenue Growth:** (Current Year Revenue - Prior Year Revenue) / Prior Year Revenue
  + **Earnings Growth:** (Current Year Earnings - Prior Year Earnings) / Prior Year Earnings

**3. Red Flag Identification:**

* **Accounting Irregularities:**
  + Unusual changes in accounting methods.
  + Frequent restatements of earnings.
  + Complex or opaque transactions.
  + Aggressive revenue recognition practices.
* **Financial Distress Signals:**
  + Declining profitability and cash flow.
  + Increasing debt levels.
  + Difficulty meeting debt obligations.
  + Negative working capital.
* **Quality of Earnings Assessment:**
  + Analyze the sources of earnings. Are they sustainable?
  + Look for non-recurring items that inflate earnings.
  + Scrutinize the company's accounting policies.
* **Off-Balance Sheet Analysis:**
  + Identify contingent liabilities, operating leases, and special purpose entities (SPEs) that may not be reflected on the balance sheet but can impact the company's financial position.
* **Sustainability Metrics (ESG):**
  + Environmental impact (e.g., carbon emissions).
  + Social responsibility (e.g., labor practices).
  + Governance (e.g., board diversity). Increasingly important for long-term value creation.

**Common Pitfalls to Avoid:**

* **Focusing solely on ratios:** Ratios are just one piece of the puzzle. Consider the context and the company's industry.
* **Ignoring qualitative factors:** Management quality, competitive landscape, and industry trends are also crucial.
* **Using outdated data:** Financial statements should be as current as possible.
* **Not comparing to benchmarks:** Benchmarking against competitors and industry averages is essential.

**Best Practices for Financial Statement Analysis:**

* **Develop a systematic approach:** Follow a consistent framework for analyzing financial statements.
* **Use multiple sources of information:** Don't rely solely on financial statements. Read management's discussion and analysis (MD&A), analyst reports, and industry publications.
* **Be objective and skeptical:** Don't just accept the numbers at face value. Look for red flags and ask questions.
* **Consider the big picture:** Analyze the company's financial statements in the context of its overall business strategy and industry environment.
* **Regularly update your knowledge:** Accounting standards and best practices are constantly evolving.

By following this comprehensive guide, you can effectively analyze company financial statements, gain valuable insights into their financial health and performance, and make informed investment decisions. Remember that financial statement analysis is a continuous process that requires practice and experience.

## Response Analysis and Evaluation

**… SHOULD BE BLANK FOR HW 2… WILL BE COMPLETED IN HW 3 …**

# Prompt 3: Zero-Shot Prompting

## Prompt: Initial Version

Describe a comprehensive risk management framework for financial institutions

## Prompt Design: Step by Step

### Step 1: …

* How it's reflected: Design a comprehensive enterprise risk management framework
* Target audience: Chief Risk Officer perspective indicates senior risk professionals
* Desired outcome: A complete risk management system with implementation guidelines

### Step 2: …

* Zero-shot approach: Structured instructions for a complex framework
* Professional context: Financial institution risk management
* Systematic framework: Comprehensive coverage of risk types and processes

### Step 3: …

* Professional terminology: Specific risk categories and management components
* Structured requirements: Three main categories with detailed sub-requirements
* Technical expectations: Specific metrics, methodologies, and procedures

### Step 4: …

* Professional role: As a Chief Risk Officer
* Institutional setting: Large financial institution
* Regulatory context: Regulatory compliance considerations

### Step 5: …

* Comprehensive coverage: All major risk categories
* Specific components required: KRIs, limits, stress testing
* Implementation focus: Implementation guidelines
* Regulatory alignment: Compliance considerations

### Step 6: …

* Governance depth: Added organizational structure and roles
* Implementation focus: Added specific methodologies requirement
* Practical application: Added monitoring procedures and control mechanisms

### Step 7: …

* Professional standards: Appropriate risk management terminology and structure
* Completeness check: Covers identification, monitoring, and governance
* Practical utility: Includes actionable frameworks and implementation guidelines

## PROMPT: Final Version

As a Chief Risk Officer, design a comprehensive enterprise risk management framework for a large financial institution. Include:

1. Risk Identification and Assessment:
   * Credit risk measurement
   * Market risk quantification
   * Operational risk assessment
   * Liquidity risk monitoring
   * Systemic risk evaluation
2. Risk Monitoring and Control:
   * Key risk indicators (KRIs)
   * Risk limits and thresholds
   * Monitoring procedures
   * Control mechanisms
   * Stress testing methodologies
3. Governance and Reporting:
   * Organizational structure
   * Roles and responsibilities
   * Reporting requirements
   * Escalation procedures
   * Review processes

Provide specific metrics, methodologies, and procedures for each component. Include implementation guidelines and regulatory compliance considerations.

## Response: Final Version

* **Enterprise Risk Management (ERM) Framework for a Large Financial Institution**

This framework outlines a comprehensive ERM program for a large financial institution, addressing risk identification, assessment, monitoring, control, governance, and reporting.

**1. Risk Identification and Assessment:**

This phase focuses on identifying and evaluating potential risks across the institution.

* **Credit Risk Measurement:**
  + **Metrics:** Probability of Default (PD), Loss Given Default (LGD), Exposure at Default (EAD), Expected Loss (EL). Use of credit scoring models (e.g., logistic regression, machine learning) for retail portfolios. For corporate/wholesale lending, utilize internal risk ratings, external ratings (Moody's, S&P), and financial statement analysis.
  + **Methodologies:** Statistical models (e.g., Merton model, KMV model), expert judgment, stress testing of loan portfolios under various economic scenarios.
  + **Procedures:** Regular review of credit portfolios, loan grading, collateral valuation, and concentration analysis.
* **Market Risk Quantification:**
  + **Metrics:** Value-at-Risk (VaR), Expected Shortfall (ES), sensitivity analysis (e.g., Greeks for options), stress testing.
  + **Methodologies:** Historical simulation, Monte Carlo simulation, and parametric methods. Factor models for capturing systematic risk.
  + **Procedures:** Daily/weekly VaR calculations, backtesting of VaR models, stress testing of trading portfolios under adverse market conditions.
* **Operational Risk Assessment:**
  + **Metrics:** Number of operational incidents, losses incurred, near misses, key risk indicators (KRIs).
  + **Methodologies:** Loss event databases, scenario analysis, risk and control self-assessment (RCSA), key risk indicators (KRIs) monitoring. Use of Bayesian networks for modeling complex operational risks.
  + **Procedures:** Incident reporting system, regular RCSA reviews, development and monitoring of KRIs.
* **Liquidity Risk Monitoring:**
  + **Metrics:** Cash flow projections, liquidity coverage ratio (LCR), net stable funding ratio (NSFR), stress test results.
  + **Methodologies:** Cash flow modeling under various scenarios (e.g., market downturn, credit crunch), analysis of funding sources and maturities.
  + **Procedures:** Daily/weekly monitoring of liquidity positions, stress testing of liquidity under various scenarios, contingency funding plans.
* **Systemic Risk Evaluation:**
  + **Metrics:** Interconnectedness of financial institutions, concentration of exposures, potential for contagion.
  + **Methodologies:** Network analysis, stress testing of the financial system, analysis of common exposures.
  + **Procedures:** Regular monitoring of systemic risk indicators, participation in industry-wide stress tests, development of resolution plans.

**2. Risk Monitoring and Control:**

This component focuses on ongoing monitoring of risks and implementation of controls to mitigate them.

* **Key Risk Indicators (KRIs):**
  + Examples: Credit risk (loan delinquency rates), market risk (volatility of key market indices), operational risk (number of system outages), liquidity risk (LCR), compliance risk (number of regulatory breaches).
  + Establishment of thresholds for each KRI, triggering escalation procedures when thresholds are breached.
* **Risk Limits and Thresholds:**
  + Setting limits for credit exposures, market risk positions, operational risk losses, liquidity ratios, and other relevant metrics.
  + Regular review and adjustment of limits based on changing market conditions and risk appetite.
* **Monitoring Procedures:**
  + Regular reporting of KRIs, risk exposures, and limit utilization to senior management and the board risk committee.
  + Ongoing monitoring of the effectiveness of risk controls.
* **Control Mechanisms:**
  + Implementation of policies and procedures to mitigate identified risks.
  + Segregation of duties, authorization controls, and reconciliation procedures.
  + Use of technology and automation to improve the efficiency and effectiveness of risk controls.
* **Stress Testing Methodologies:**
  + Scenario analysis (e.g., severe recession, market crash, cyberattack).
  + Sensitivity analysis (e.g., impact of changes in interest rates, exchange rates).
  + Reverse stress testing (identifying scenarios that would lead to failure).

**3. Governance and Reporting:**

This section focuses on the organizational structure, roles, responsibilities, and reporting requirements for effective risk management.

* **Organizational Structure:**
  + Independent risk management function reporting directly to the board risk committee.
  + Clear lines of responsibility for risk management across the organization.
* **Roles and Responsibilities:**
  + Board Risk Committee: Oversight of the ERM program.
  + Chief Risk Officer (CRO): Responsible for the overall ERM program.
  + Business Unit Risk Managers: Responsible for managing risks within their respective units.
  + Risk Management Department: Develops and implements risk management policies and procedures.
* **Reporting Requirements:**
  + Regular reporting of key risk metrics, risk exposures, and limit utilization to senior management and the board risk committee.
  + Escalation procedures for reporting significant risk events and breaches of risk limits.
* **Escalation Procedures:**
  + Clear escalation paths for reporting risk events and breaches of risk limits to appropriate levels of management.
  + Timely communication of risk information to relevant stakeholders.
* **Review Processes:**
  + Regular review of the ERM framework and its effectiveness.
  + Independent reviews of risk management processes and controls.

**Implementation Guidelines:**

* **Phased implementation:** Start with key risks and gradually expand the scope of the ERM program.
* **Data management:** Establish robust data management systems to support risk identification, assessment, and monitoring.
* **Technology:** Leverage technology to automate risk management processes and improve efficiency.
* **Training:** Provide regular training to employees on risk management principles and procedures.
* **Communication:** Foster a strong risk culture through effective communication and training.

**Regulatory Compliance Considerations:**

* Compliance with relevant regulations (e.g., Basel Accords, Dodd-Frank Act).
* Regular reporting to regulatory authorities.
* Adherence to regulatory guidelines on risk management practices.

This framework provides a foundation for a robust ERM program. The specific details should be tailored to the institution's size, complexity, and risk profile. Continuous improvement and adaptation are crucial for maintaining an effective ERM program.

## Response Analysis and Evaluation

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# Prompt 4: Zero-Shot Prompting

## Prompt: Initial Version

Explain how to optimize an investment portfolio.

## Prompt Design: Step by Step

### Step 1: Define the Objective

* How it's reflected: Comprehensive framework for optimizing an investment portfolio
* Target audience: Portfolio manager perspective indicates investment professionals
* Desired outcome: A practical optimization framework with implementation steps

Step 2: Choose Prompt Type

* Zero-shot approach: Detailed instructions without examples
* Professional context: Portfolio management setting
* Theoretical and practical balance: Modern portfolio theory and practical considerations

Step 3: Craft the Instruction

* Technical terminology: Efficient frontier, correlation analysis, performance attribution
* Structured requirements: Three main categories with detailed sub-requirements
* Mathematical rigor: Specific mathematical models

Step 4: Provide Context

* Professional role: As a portfolio manager
* Theoretical foundation: Using modern portfolio theory
* Practical application: Practical considerations

Step 5: Define Constraints

* Comprehensive coverage: Analysis, methodology, and implementation
* Specific techniques required: Modern portfolio theory components
* Practical elements: Transaction costs, tax efficiency, rebalancing triggers
* Implementation focus: Practical implementation steps

Step 6: Review and Refine

* Added practical elements: Transaction costs, tax efficiency
* Implementation detail: Asset selection, position sizing, rebalancing triggers
* Monitoring requirements: Performance monitoring procedures

Step 7: Final Verification

* Professional standards: Appropriate portfolio management terminology
* Theory-practice balance: Combines theoretical models with practical implementation
* Actionable framework: Includes specific techniques and monitoring procedures

## PROMPT: Final Version

As a portfolio manager, provide a comprehensive framework for optimizing an investment portfolio using modern portfolio theory and practical considerations. Include:

1. Portfolio Analysis:
   * Asset allocation strategy
   * Risk-return optimization
   * Diversification metrics
   * Correlation analysis
   * Performance attribution
2. Optimization Methodology:
   * Efficient frontier calculation
   * Risk adjustment techniques
   * Rebalancing strategies
   * Transaction cost consideration
   * Tax efficiency analysis
3. Implementation Strategy:
   * Asset selection criteria
   * Position sizing methodology
   * Rebalancing triggers
   * Risk management constraints
   * Performance monitoring

Provide specific mathematical models, practical implementation steps, and monitoring procedures.

## Response: Final Version

* **Portfolio Optimization Framework using Modern Portfolio Theory (MPT)**

This framework outlines a comprehensive approach to optimizing an investment portfolio using MPT while incorporating practical considerations.

**1. Portfolio Analysis:**

* **Asset Allocation Strategy:**
  + **Strategic Asset Allocation (SAA):** Defines the long-term target allocation across major asset classes (e.g., equities, fixed income, real estate, alternatives) based on investor's risk tolerance, time horizon, and investment objectives. Example: 60% equities, 40% fixed income.
  + **Tactical Asset Allocation (TAA):** Dynamically adjusts asset allocation within a range around the SAA based on market conditions and valuation signals. Example: Shifting equity allocation between 50% and 70% based on perceived market opportunities.
* **Risk-Return Optimization:**
  + **Mean-Variance Optimization (MVO):** A mathematical process that identifies the portfolio with the highest expected return for a given level of risk (variance) or the lowest risk for a given expected return. Requires estimates of expected returns, volatilities, and correlations of assets.
* **Diversification Metrics:**
  + **Number of holdings:** A basic measure, but not sufficient on its own.
  + **Effective number of holdings:** Considers the correlation between assets. A portfolio with 20 highly correlated stocks offers less diversification than 10 uncorrelated stocks.
  + **Diversification ratio:** The ratio of the weighted average volatility of the individual assets to the portfolio volatility. A lower ratio indicates better diversification.
* **Correlation Analysis:**
  + **Correlation matrix:** A table showing the pairwise correlation coefficients between assets. Used to understand how assets move relative to each other.
  + **Visualizations:** Scatter plots and heat maps can help visualize correlation patterns.
  + **Factor analysis:** Identifies underlying factors that drive asset returns and helps understand the sources of correlation.
* **Performance Attribution:**
  + **Brinson model:** A common approach to attribute portfolio performance to asset allocation, security selection, and interaction effects.
  + **Factor-based attribution:** Attributes performance to exposures to different risk factors (e.g., market risk, size, value).

**2. Optimization Methodology:**

* **Efficient Frontier Calculation:**
  + **Quadratic programming:** A mathematical technique used to solve MVO problems and generate the efficient frontier, which represents the set of optimal portfolios that offer the highest expected return for each level of risk.
  + **Software tools:** Spreadsheets, statistical software (R, Python), and specialized portfolio optimization platforms.
* **Risk Adjustment Techniques:**
  + **Sharpe Ratio:** Measures risk-adjusted return, calculated as (Rp - Rf) / σp, where Rp is the portfolio return, Rf is the risk-free rate, and σp is the portfolio standard deviation.
  + **Sortino Ratio:** Similar to Sharpe Ratio, but only considers downside risk.
  + **Treynor Ratio:** Measures risk-adjusted return relative to systematic risk (beta).
* **Rebalancing Strategies:**
  + **Periodic rebalancing:** Rebalancing the portfolio at fixed intervals (e.g., quarterly, annually).
  + **Threshold-based rebalancing:** Rebalancing when asset allocation deviates from target weights by a certain percentage.
  + **Constant proportion portfolio insurance (CPPI):** A dynamic strategy that adjusts portfolio allocation based on market movements to protect a minimum portfolio value.
* **Transaction Cost Consideration:**
  + **Explicit costs:** Brokerage commissions, bid-ask spreads.
  + **Implicit costs:** Market impact, slippage.
  + **Optimization algorithms:** Can be modified to incorporate transaction costs.
* **Tax Efficiency Analysis:**
  + **Tax-managed investing:** Strategies to minimize taxes on investment gains and income.
  + **Asset location:** Placing tax-inefficient assets (e.g., bonds) in tax-deferred accounts (e.g., 401(k)s) and tax-efficient assets (e.g., stocks) in taxable accounts.

**3. Implementation Strategy:**

* **Asset Selection Criteria:**
  + **Fundamental analysis:** Evaluating the financial health and prospects of individual companies.
  + **Technical analysis:** Analyzing price and volume data to identify trading opportunities.
  + **Quantitative analysis:** Using statistical models and algorithms to identify undervalued or overvalued securities.
* **Position Sizing Methodology:**
  + **Optimal weights:** Determined by the MVO process.
  + **Constraints:** Limits on individual asset holdings, sector exposures, or other risk factors.
* **Rebalancing Triggers:**
  + **Deviation from target allocation:** Rebalance when asset weights drift beyond a predefined threshold.
  + **Time-based triggers:** Rebalance at regular intervals.
* **Risk Management Constraints:**
  + **Maximum drawdown:** Limit on the peak-to-trough decline in portfolio value.
  + **Tracking error:** Limit on the deviation of portfolio returns from a benchmark.
  + **Liquidity constraints:** Restrictions on investing in illiquid assets.
* **Performance Monitoring:**
  + **Regular performance reporting:** Tracking portfolio returns, risk metrics, and benchmark comparisons.
  + **Performance attribution analysis:** Understanding the sources of portfolio performance.
  + **Monitoring for style drift:** Ensuring the portfolio remains aligned with its investment objectives.

**Mathematical Models:**

* **Mean-Variance Optimization:** Maximize μp = wTμ subject to wTΣw ≤ σp2 and ∑wi = 1, where μp is the portfolio expected return, w is the vector of asset weights, μ is the vector of asset expected returns, Σ is the covariance matrix, and σp2 is the target portfolio variance.
* **Sharpe Ratio:** Sharpe Ratio = (Rp - Rf) / σp

**Practical Implementation Steps:**

1. Define investment objectives and risk tolerance.
2. Estimate expected returns, volatilities, and correlations for asset classes.
3. Generate the efficient frontier using MVO.
4. Select the optimal portfolio based on risk tolerance.
5. Implement the portfolio by selecting specific securities.
6. Monitor portfolio performance and rebalance as needed.

**Monitoring Procedures:**

* Regularly review asset allocation and portfolio performance.
* Track key risk metrics (e.g., volatility, tracking error, maximum drawdown).
* Conduct periodic performance attribution analysis.
* Rebalance the portfolio as needed.

This framework provides a structured approach to portfolio optimization. The specific parameters and techniques used should be tailored to the individual investor's circumstances and preferences. It is important to remember that MPT relies on estimates of future returns and risks, which are inherently uncertain. Therefore, ongoing monitoring and adjustments are crucial for successful portfolio management.

## Response Analysis and Evaluation

**… SHOULD BE BLANK FOR HW 2… WILL BE COMPLETED IN HW 3 …**

# Prompt 5: Zero-Shot Prompting

## Prompt: Initial Version

Explain key technical analysis strategies for trading.

## Prompt Design: Step by Step

### Step 1: Define the Objective

* **How it's reflected:** Comprehensive technical analysis framework for trading
* **Target audience:** Technical analyst perspective indicates trading professionals
* **Desired outcome:** A practical trading framework with specific rules

### Step 2: Choose Prompt Type

* **Zero-shot approach:** Structured instructions for trading methodology
* **Professional context:** Trading and technical analysis
* **Practical focus:** Trading strategy and implementation

### Step 3: Craft the Instruction

* **Technical terminology:** Price patterns, support/resistance, momentum indicators
* **Structured requirements:** Three main categories with detailed sub-requirements
* **Practical expectations:** Specific indicators, practical trading rules

### Step 4: Provide Context

* **Professional role:** As a technical analyst
* **Trading purpose:** Framework for market trading
* **Comprehensive approach:** Analysis, strategy, and implementation

### Step 5: Define Constraints

* **Comprehensive coverage:** Analysis, strategy development, and implementation
* **Specific components required:** Multiple technical indicators and methods
* **Risk focus:** Risk management parameters, risk control measures
* **Performance validation:** Backtesting methods, performance metrics

### Step 6: Review and Refine

* **Added implementation detail:** Backtesting and optimization techniques
* **Enhanced risk focus:** Position management rules, risk control measures
* **Performance validation:** Added metrics and optimization requirements

### Step 7: Final Verification

* **Professional standards:** Appropriate technical analysis terminology
* **Practical utility:** Includes actionable trading rules and risk parameters
* **Completeness check:** Covers analysis, strategy, and implementation

## PROMPT: Final Version

As a technical analyst, develop a comprehensive technical analysis framework for trading financial markets. Include:

1. Chart Analysis:
   * Price pattern identification
   * Trend analysis methodology
   * Support/resistance levels
   * Volume analysis
   * Momentum indicators
2. Trading Strategy Development:
   * Entry/exit criteria
   * Position sizing rules
   * Risk management parameters
   * Time frame considerations
   * Indicator combinations
3. Implementation Guidelines:
   * Strategy backtesting methods
   * Performance metrics
   * Risk control measures
   * Position management rules
   * Strategy optimization techniques

Provide specific indicators, calculation methods, and practical trading rules with risk management considerations.

## Response: Final Version

* **Comprehensive Technical Analysis Framework for Trading Financial Markets**

This framework outlines a comprehensive approach to technical analysis for trading, encompassing chart analysis, strategy development, and implementation guidelines.

**1. Chart Analysis:**

* **Price Pattern Identification:**
  + **Reversal Patterns:** Head and Shoulders, Inverse Head and Shoulders, Double Tops/Bottoms, Triangles (Ascending, Descending, Symmetrical), Wedges. Focus on breakout confirmations.
  + **Continuation Patterns:** Flags, Pennants, Rectangles. Signal a pause in the prevailing trend before it resumes.
  + **Candlestick Patterns:** Doji, Hammer, Hanging Man, Engulfing, Morning/Evening Star. Provide insights into short-term price action and sentiment.
* **Trend Analysis Methodology:**
  + **Trendlines:** Drawn connecting successive highs (uptrend) or lows (downtrend). Break of a trendline can signal a trend reversal.
  + **Moving Averages (MAs):** Used to smooth price data and identify trends. Commonly used: 50-day, 100-day, 200-day MAs. Crossovers of different MAs can generate trading signals.
  + **Dow Theory:** A framework for understanding market trends based on price action and volume.
* **Support/Resistance Levels:**
  + **Horizontal Lines:** Drawn connecting previous highs (resistance) or lows (support).
  + **Trendlines:** Can act as dynamic support/resistance levels.
  + **Fibonacci Levels:** Based on the Fibonacci sequence, used to identify potential support and resistance levels. Common levels: 38.2%, 50%, 61.8%.
  + **Pivot Points:** Calculated based on the previous day's high, low, and close, used to identify potential support and resistance levels for the current day.
* **Volume Analysis:**
  + **Volume Confirmation:** Increasing volume during price moves in the direction of the trend confirms the strength of the trend.
  + **Volume Divergence:** Volume decreasing during price moves in the direction of the trend can signal weakness.
  + **Volume Spikes:** Can indicate significant buying or selling pressure.
* **Momentum Indicators:**
  + **Relative Strength Index (RSI):** Measures the speed and change of price movements. Values above 70 are considered overbought, below 30 oversold.
  + **Moving Average Convergence Divergence (MACD):** Shows the relationship between two moving averages of a security's price. Crossovers of the MACD line and signal line can generate trading signals.
  + **Stochastic Oscillator:** Compares a security's closing price to its price range over a given period. Similar to RSI, used to identify overbought and oversold conditions.

**2. Trading Strategy Development:**

* **Entry/Exit Criteria:**
  + **Price Action:** Breakouts, reversals, bounces off support/resistance.
  + **Indicator Signals:** Crossovers, overbought/oversold conditions, divergences.
  + **Pattern Recognition:** Entry based on identified chart patterns.
* **Position Sizing Rules:**
  + **Fixed Fractional:** Risk a fixed percentage of capital on each trade (e.g., 1-2%).
  + **Volatility-Based:** Adjust position size based on the volatility of the asset.
* **Risk Management Parameters:**
  + **Stop-Loss Orders:** Limit potential losses on a trade.
  + **Maximum Drawdown:** Limit on the maximum percentage decline in portfolio value.
* **Time Frame Considerations:**
  + **Scalping:** Very short-term trading, holding positions for seconds or minutes.
  + **Day Trading:** Holding positions for a single day, closing all positions before the market close.
  + **Swing Trading:** Holding positions for a few days to weeks.
  + **Position Trading:** Holding positions for weeks to months or longer.
* **Indicator Combinations:**
  + Combining multiple indicators can improve the accuracy of trading signals. Example: Combining a trend-following indicator (e.g., moving average crossover) with a momentum indicator (e.g., RSI).

**3. Implementation Guidelines:**

* **Strategy Backtesting Methods:**
  + **Historical Data:** Testing the strategy on historical price data.
  + **Walk-Forward Analysis:** Optimizing the strategy on a portion of the data and testing it on the remaining data.
* **Performance Metrics:**
  + **Win Rate:** Percentage of winning trades.
  + **Average Win/Loss Ratio:** Ratio of the average winning trade to the average losing trade.
  + **Profit Factor:** Gross profit divided by gross loss.
  + **Maximum Drawdown:** Peak-to-trough decline in portfolio value.
  + **Sharpe Ratio:** Risk-adjusted return.
* **Risk Control Measures:**
  + **Diversification:** Spreading investments across different assets.
  + **Position Sizing:** Controlling the amount of capital risked on each trade.
  + **Stop-Loss Orders:** Limiting potential losses.
* **Position Management Rules:**
  + **Scaling In/Out:** Gradually entering or exiting a position.
  + **Trailing Stops:** Adjusting stop-loss orders as the price moves in a favorable direction.
* **Strategy Optimization Techniques:**
  + **Parameter Optimization:** Finding the optimal parameters for a trading strategy.
  + **Curve Fitting:** Over-optimizing a strategy to fit historical data, which can lead to poor performance in the future. Avoid over-optimization.

**Specific Indicators and Calculations:**

* **Moving Average (MA):** Simple Moving Average (SMA) = Sum of prices over a period / Number of periods. Exponential Moving Average (EMA) gives more weight to recent prices.
* **RSI:** 100 - (100 / (1 + Average Gain / Average Loss)).
* **MACD:** 12-day EMA - 26-day EMA. Signal line is a 9-day EMA of the MACD.

**Practical Trading Rules with Risk Management:**

* **Example:** Buy when the price breaks above a key resistance level with increasing volume, RSI is above 50, and MACD crosses above its signal line. Place a stop-loss order below the recent low. Risk no more than 1% of capital on the trade.

**Risk Management Considerations:**

* **No Holy Grail:** Technical analysis is not a perfect predictor of future price movements.
* **Risk Tolerance:** Understand your risk tolerance and adjust your trading strategy accordingly.
* **Capital Preservation:** The primary goal is to preserve capital.
* **Emotional Control:** Avoid emotional decision-making.

This framework provides a solid foundation for developing and implementing a technical trading strategy. Remember that continuous learning, adaptation, and risk management are essential for success in trading. Backtesting and paper trading are highly recommended before risking real capital.

## Response Analysis and Evaluation

**… SHOULD BE BLANK FOR HW 2… WILL BE COMPLETED IN HW 3 …**

# Prompt 6: Few-Shot Prompting

## Prompt: Initial Version

Analyze this stock: NVDA.

## Prompt Design: Step by Step

Step 1: Define the Objective

* How it's reflected: Request for structured stock analysis following examples
* Target audience: Investors and analysts who need standardized analysis
* Desired outcome: Consistent, comprehensive stock evaluation with recommendation

Step 2: Choose Prompt Type

* Few-shot approach: Two detailed examples provided before the task
* Pattern demonstration: Examples showing exact format and depth required
* Consistent structure: Template approach with clear sections

Step 3: Craft the Instruction

* Clear examples first: Detailed AAPL analysis as pattern
* Analysis components: Fundamental, technical, industry, and recommendation sections
* Follow-up instruction: Provide a complete analysis...following this exact template

Step 4: Provide Context

* Investment analysis context: Professional stock evaluation
* Comprehensive approach: Both quantitative and qualitative factors
* Decision-making purpose: Clear investment recommendation required

Step 5: Define Constraints

* Format matching: Following this exact template
* Analysis depth: Same structure and depth
* Comprehensive coverage: Multiple analysis dimensions required
* Specific metrics: Detailed financial and technical indicators

Step 6: Review and Refine

* Example clarity: Detailed metrics in each section
* Recommendation structure: Target price, risk level, catalysts, risk factors
* Comprehensive view: Balance of quantitative and qualitative factors

Step 7: Final Verification

* Pattern clarity: Examples provide clear template to follow
* Completeness check: All key analysis elements included
* Actionable output: Structured for clear recommendation

## PROMPT: Final Version

Following these example stock analyses, evaluate NVDA (NVIDIA Corporation) using the same structure and depth:

Example 1: AAPL (Apple Inc.)

* Fundamental Analysis:
  + Market Cap: $2.8T
  + P/E Ratio: 28.5 (Industry avg: 25.3)
  + Revenue Growth (YoY): 8.1%
  + Profit Margin: 25.3%
  + Debt-to-Equity: 1.5

Example 2: MSFT (Microsoft Corporation)

* Fundamental Analysis:
  + Market Cap: $2.8T
  + P/E Ratio: 28.5 (Industry avg: 25.3)
  + Revenue Growth (YoY): 8.1%
  + Profit Margin: 25.3%
  + Debt-to-Equity: 1.5

Now provide a complete analysis for NVDA (NVIDIA Corporation) following this exact template and analysis depth.

## Response: Final Version

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* **NVDA (NVIDIA Corporation) Analysis**

**Fundamental Analysis:**

* **Market Cap:** $1.1T (as of October 26, 2023 - *Note: Market cap fluctuates*)
* **P/E Ratio:** 115.5 (as of October 26, 2023 - *Note: P/E fluctuates significantly and can be misleading due to recent earnings volatility. It's crucial to understand why the P/E is high.*)
* **Revenue Growth (YoY):** Significant growth in recent periods, but highly variable. It's essential to look at trends and forward-looking estimates, not just one point in time. (e.g., Q2 2024 showed a substantial revenue increase after previous declines. This growth is a key driver of NVDA's valuation.)
* **Profit Margin:** Highly variable due to the cyclical nature of the semiconductor industry and R&D investments. Look at trends and future expectations. (e.g. Recent quarters have shown a significant rebound in profitability).
* **Debt-to-Equity:** Generally considered manageable, but it's important to monitor in relation to the company's growth and profitability. (It is important to look up the most recent D/E ratio as it can change).

**Technical Analysis:**

* **Price Pattern Identification:** NVDA's price action has been volatile. Identifying patterns requires careful chart analysis. Look for potential breakout levels, consolidation phases, and reversal patterns. (e.g., recent strong uptrend, but look for signs of consolidation or potential pullbacks).
* **Trend Analysis Methodology:** NVDA has demonstrated a strong uptrend in recent periods, interrupted by significant pullbacks. Utilize trendlines, moving averages (e.g., 50-day, 200-day), and other trend indicators to gauge the prevailing trend and potential trend reversals.
* **Support/Resistance Levels:** Identify key support and resistance levels based on previous price action. Fibonacci levels can also be helpful. (e.g., look for resistance levels that were broken during the recent surge and now may act as support during a pullback).
* **Volume Analysis:** Pay close attention to volume during price moves. Increasing volume on upswings and decreasing volume on downswings generally confirms the strength of the trend.
* **Momentum Indicators:** RSI and MACD can provide insights into the momentum of price movements. However, be aware of whipsaws, especially in volatile stocks like NVDA.

**Trading Strategy Development:**

* **Entry/Exit Criteria:** Define clear entry and exit criteria based on a combination of technical indicators, price action, and risk management rules. (e.g., entry on a breakout above a key resistance with confirming volume and RSI above a certain level. Exit if a stop-loss is triggered or profit target is reached).
* **Position Sizing Rules:** Use a fixed fractional position sizing strategy (e.g., risk no more than 1-2% of capital per trade).
* **Risk Management Parameters:** Set a stop-loss order to limit potential losses. Define a maximum drawdown level for your overall portfolio.
* **Time Frame Considerations:** NVDA can be traded across different time frames, from short-term swing trades to longer-term positions. Choose a time frame that aligns with your trading style and risk tolerance.
* **Indicator Combinations:** Combine multiple indicators to increase the probability of successful trades.

**Implementation Guidelines:**

* **Strategy Backtesting Methods:** Backtest your trading strategy on historical data to evaluate its performance. However, remember that past performance is not indicative of future results.
* **Performance Metrics:** Track key performance metrics, such as win rate, average win/loss ratio, profit factor, and maximum drawdown.
* **Risk Control Measures:** Implement strict risk control measures, including position sizing, stop-loss orders, and diversification.
* **Position Management Rules:** Define clear rules for managing your positions, including scaling in/out and using trailing stops.
* **Strategy Optimization Techniques:** Optimize your trading strategy based on backtesting results and market conditions. Be careful of over-optimization (curve fitting).

**Important Considerations Specific to NVDA:**

* **Semiconductor Industry Cyclicality:** NVDA's business is tied to the semiconductor industry, which is cyclical. Be aware of industry trends and potential downturns.
* **Competition:** NVDA faces intense competition from other semiconductor companies.
* **Technological Disruption:** The semiconductor industry is subject to rapid technological change.
* **High Valuation:** NVDA's valuation is high, which makes it more susceptible to price swings. Thoroughly assess if the current valuation is justified by projected future growth.

**Disclaimer:** This analysis is for informational purposes only and should not be consider

## Response Analysis and Evaluation

**… SHOULD BE BLANK FOR HW 2… WILL BE COMPLETED IN HW 3 …**

# Prompt 7: Few-Shot Prompting

## Prompt: Initial Version

Evaluate the credit risk of company AMZN

## Prompt Design: Step by Step

### Step 1: …

* Generate structured credit risk assessment
* Demonstrate consistent evaluation methodology
* Target audience: Credit analysts and risk managers
* Purpose: Establish standardized risk evaluation
* Outcome: Repeatable risk assessment framework

### Step 2: …

* Few-shot approach for structured assessment
* Example assessments provide pattern
* Consistent methodology demonstration
* Professional risk analysis context
* Standardized rating approach

### Step 3: …

* Provide example assessments first
* Specify risk evaluation components
* Define rating methodology
* Request similar format application
* Include risk mitigation considerations

### Step 4: …

* Credit analysis framework
* Professional risk analyst perspective
* Standardized methodology
* Industry benchmark context
* Decision-making purpose

### Step 5: …

* Match example format precisely
* Include required metrics
* Maintain consistent structure
* Provide rating justification
* Complete all assessment components

### Step 6: …

* Comprehensive risk view: Financial, industry, and specific risk factors
* Rating structure: Overall rating, outlook, key strengths/concerns
* Quantitative and qualitative balance: Metrics and judgment-based assessment

### Step 7: …

* Pattern clarity: Examples provide clear methodology
* Completeness check: All key risk elements included
* Actionable output: Clear rating and risk assessment

## PROMPT: Final Version

Using these example credit risk assessments, evaluate Retail Company AMZN following the same structure and methodology:

Example 1: Manufacturing Company MMM

* Financial Strength:
  + Current Ratio: 1.8
  + Debt-to-EBITDA: 2.5x
  + Interest Coverage Ratio: 4.2x
  + Operating Margin: 15%
  + Free Cash Flow: $180M

Example 2: Technology Company GM

* Financial Strength:
  + Current Ratio: 1.8
  + Debt-to-EBITDA: 2.5x
  + Interest Coverage Ratio: 4.2x
  + Operating Margin: 15%
  + Free Cash Flow: $180M

Now provide a complete credit risk assessment for Retail Company TSLA following this template and evaluation depth.

## Response: Final Version

Credit Risk Assessment for Retail Company AMZN

**Financial Strength:**

* **Current Ratio:** Amazon's current ratio has fluctuated but generally sits around 1.0-1.2. This indicates a potential short-term liquidity concern compared to the examples. *Evaluation: Weaker*
* **Debt-to-EBITDA:** Amazon's Debt-to-EBITDA has varied, but recent trends suggest it is around 2.0x - 2.5x. This is in line with the examples. *Evaluation: Similar*
* **Interest Coverage Ratio:** Amazon's interest coverage ratio is strong and typically above 10x. This is significantly better than the examples. *Evaluation: Stronger*
* **Operating Margin:** Amazon's operating margin has been increasing and is around 4-5% which is lower than the examples. *Evaluation: Weaker*
* **Free Cash Flow:** Amazon generates substantial free cash flow, in the tens of billions of dollars. This is much stronger than the examples. *Evaluation: Much Stronger*

**Overall Credit Risk Assessment for AMZN:**

While Amazon's current ratio and operating margin are weaker than the benchmark companies, its exceptionally strong free cash flow generation and robust interest coverage significantly mitigate these weaknesses. The debt-to-EBITDA is in line with the example companies.

* **Liquidity:** While the current ratio is a concern, Amazon's ability to quickly generate significant cash should allow it to meet its short-term obligations.
* **Leverage:** Amazon's leverage is manageable, and its ability to cover interest payments is very strong.
* **Profitability:** Operating margin is lower than the examples, but Amazon's business model focuses on growth and market share, which often comes at the expense of higher margins in the short term.
* **Cash Flow:** Amazon's free cash flow is a major strength. It provides the company with the flexibility to invest in growth initiatives, acquisitions, and manage debt obligations.

**Conclusion:**

Despite some relative weaknesses in current ratio and operating margin, Amazon's strong free cash flow and excellent interest coverage place it in a better overall credit risk position than the example companies. The company's scale, dominant market position, and continued growth prospects are also positive qualitative factors. Therefore, AMZN would be considered to have a lower credit risk.

## Response Analysis and Evaluation

**… SHOULD BE BLANK FOR HW 2… WILL BE COMPLETED IN HW 3 …**

# Prompt 8: Few-Shot Prompting

## Prompt: Initial Version

When should I rebalance my investment portfolio?

## Prompt Design: Step by Step

Step 1: Define the Objective

* How it's reflected: Request for portfolio rebalancing decision using examples
* Target audience: Investment managers and financial advisors
* Desired outcome: Structured decision-making process with specific recommendations

Step 2: Choose Prompt Type

* Few-shot approach: Detailed example of rebalancing process
* Decision framework demonstration: Systematic evaluation approach
* Pattern transfer: Apply same methodology to new portfolio

Step 3: Craft the Instruction

* Detailed example first: Complete rebalancing decision process
* Decision components: Initial targets, current allocation, market conditions, process, decision
* Follow-up task: Following the same structured approach

Step 4: Provide Context

* Portfolio management context: Professional investment management
* Decision methodology: Systematic evaluation approach
* Market conditions consideration: Including valuations and economic outlook

Step 5: Define Constraints

* Format matching: Following the same structured approach
* Process requirements: Step-by-step decision methodology
* Comprehensive factors: Allocation drift, taxes, market conditions, costs
* Specific recommendation: Clear action items required

Step 6: Review and Refine

* Process clarity: Step-by-step decision framework
* Implementation detail: Tax considerations, specific percentages
* Monitoring guidelines: Future reassessment criteria

Step 7: Final Verification

* Pattern clarity: Example provides clear decision methodology
* Completeness check: All key factors considered
* Actionable output: Specific rebalancing recommendations with rationale

## PROMPT: Final Version

Based on these example portfolio rebalancing decisions, analyze the given portfolio and recommend appropriate rebalancing actions:

Example 1: Conservative Portfolio

* Initial Target Allocation:
  + US Equities: 30% (Acceptable range: 25-35%)
  + International Equities: 15% (Acceptable range: 10-20%)
  + Fixed Income: 40% (Acceptable range: 35-45%)
  + Alternatives: 10% (Acceptable range: 5-15%)
  + Cash: 5% (Acceptable range: 2-8%)

Example 2: Conservative Portfolio

* Initial Target Allocation:
  + US Equities: 29% (Acceptable range: 25-75%)
  + International Equities: 15% (Acceptable range: 10-40%)
  + Fixed Income: 30% (Acceptable range: 25-45%)
  + Alternatives: 9% (Acceptable range: 0-15%)
  + Cash: 3% (Acceptable range: 2-7%)

Now analyze this Moderate Growth Portfolio and provide a comprehensive rebalancing recommendation following the same structured approach:

* Initial Target Allocation:
  + US Equities: 45% (Acceptable range: 40-50%)
  + International Equities: 25% (Acceptable range: 20-30%)
  + Fixed Income: 20% (Acceptable range: 15-25%)
  + Alternatives: 7% (Acceptable range: 5-10%)
  + Cash: 3% (Acceptable range: 1-5%)

## Response: Final Version

**Analysis of Moderate Growth Portfolio and Rebalancing Recommendation:**

Here's an analysis of the provided Moderate Growth Portfolio and a comprehensive rebalancing recommendation:

**Current Portfolio Allocation (Assumed - Needs Actual Data):**

* We need the *current* percentages for each asset class to make specific recommendations. I'll proceed with a hypothetical example and explain the process. Let's *assume* the following current allocation:
  + US Equities: 52%
  + International Equities: 28%
  + Fixed Income: 15%
  + Alternatives: 6%
  + Cash: 1%

**Comparison to Target Allocation:**

* **US Equities:** Current allocation (52%) is above the acceptable range (40-50%).
* **International Equities:** Current allocation (28%) is within the acceptable range (20-30%).
* **Fixed Income:** Current allocation (15%) is below the acceptable range (15-25%).
* **Alternatives:** Current allocation (6%) is within the acceptable range (5-10%).
* **Cash:** Current allocation (1%) is below the acceptable range (1-5%).

**Rebalancing Actions:**

Based on the *assumed* current allocation, the following rebalancing actions are recommended:

1. **Sell US Equities:** Reduce the US equity allocation to bring it within or closer to the target range (45%). This would involve selling approximately 7% of the US Equity holdings.
2. **Buy Fixed Income:** Increase the fixed income allocation to bring it within or closer to the target range (20%). This would involve purchasing approximately 5% of the Fixed Income holdings.
3. **Buy Cash:** Increase the Cash allocation to bring it within or closer to the target range (3%). This would involve purchasing approximately 2% of the Cash holdings.
4. **International Equities and Alternatives:** The current allocations for these asset classes are within their respective ranges, so no immediate action is needed. However, it's always good practice to monitor them and rebalance if they drift too far from the target.

**Implementation:**

* **Proportional Selling/Buying:** Sell a proportional amount of each US Equity holding and buy a proportional amount of each Fixed Income and Cash holding to maintain diversification within those asset classes.
* **Tax Considerations:** Be mindful of potential tax implications when selling assets, especially if they have appreciated significantly. Consult with a tax advisor if needed.
* **Transaction Costs:** Consider transaction costs (commissions, fees) when rebalancing. Small deviations from the target allocation might not warrant rebalancing if the costs outweigh the benefits.
* **Drift Tolerance:** Establish a "drift tolerance" (e.g., 5% deviation) before automatically rebalancing. This can help reduce unnecessary trading.
* **Regular Monitoring:** Review the portfolio allocation regularly (e.g., quarterly or annually) and rebalance as needed to maintain the desired asset allocation.

**Important Note:** This analysis and rebalancing recommendation are based on a *hypothetical* current portfolio allocation. You *must* use the *actual* current percentages for each asset class in your portfolio to determine the appropriate rebalancing actions. The process outlined above should then be followed using your real data.

## Response Analysis and Evaluation

**… SHOULD BE BLANK FOR HW 2… WILL BE COMPLETED IN HW 3 …**

# Prompt 9: In-Context Learning Prompting

## Prompt: Initial Version

Analyze this merger: Company A acquiring Company ABT (Abbott Laboratories)

## Prompt Design: Step by Step

Step 1: Define the Objective

* How it's reflected: Complex M&A analysis with pattern recognition
* Target audience: Investment bankers and M&A professionals
* Desired outcome: Comprehensive deal evaluation following established pattern

Step 2: Choose Prompt Type

* In-context learning approach: Detailed context setting with pattern examples
* Complex analysis framework: Multifaceted deal evaluation
* Pattern recognition goal: Apply established methodology to new case

Step 3: Craft the Instruction

* Detailed professional context: Senior investment banker advising on M&A
* Comprehensive pattern example: Five-part analysis structure with details
* Pattern transfer request: Using this analytical framework, evaluate...

Step 4: Provide Context

* Professional role context: Investment banking advisory
* Analysis framework context: Strategic, financial, and operational considerations
* Success pattern demonstration: Previous successful analysis structure

Step 5: Define Constraints

* Analysis structure: Five-component framework required
* Valuation methodology: Multiple approaches demonstrated
* Comprehensive considerations: Strategic, financial, operational, cultural
* Recommendation requirements: Decision, pricing, structure, implementation

Step 6: Review and Refine

* Detail level: Specific metrics and percentages in examples
* Comprehensive view: Strategic through implementation phases
* Decision framework: Clear recommendation structure

Step 7: Final Verification

* Pattern clarity: Complex but clear analysis structure
* Completeness check: All deal dimensions covered
* Actionable output: Framework leads to specific recommendation

## PROMPT: Final Version

Context: You are a senior investment banker advising on M&A transactions. Your analysis must evaluate strategic fit, valuation, synergies, and integration considerations.

Previous successful M&A analyses followed this pattern:

Case 1: Technology Sector Acquisition

1. Strategic Rationale Assessment
   * Market expansion: Target provides 25% new market access
   * Technology acquisition: Critical IP in AI algorithms
   * Talent acquisition: 150 engineers, 40% with specialized ML expertise
   * Competitive positioning: Eliminates emerging competitor
   * Strategic alternatives evaluation: Build vs. buy analysis

Case 2: Valuation Analysis

* + Transaction metrics: $2.5B purchase price, 12x revenue, 30x EBITDA
  + Comparable transactions: 25% premium to sector average
  + DCF analysis: 5-year projections, 12% WACC, 3% terminal growth
  + Synergy-adjusted valuation: $2.8B NPV with synergies
  + Sensitivity analysis: +/-20% scenarios on key variables

Using this analytical framework, evaluate the proposed acquisition of FinTech Startup VERO by Regional Bank BAC:

* Deal Overview: $500M all-cash offer
* FinTech XYZ: Digital payment platform, $50M revenue, 80% YoY growth
* Regional Bank ABC: $5B assets, traditional banking services
* Strategic Intent: Digital transformation and younger customer acquisition
* Market Context: Increasing competition from digital-only banks
* Key Concerns: Technology integration, culture clash, regulatory approval

## Response: Final Version

* **M&A Analysis: BAC Acquisition of VERO**

**1. Strategic Rationale Assessment:**

* **Market Expansion:** VERO offers BAC access to a younger demographic and expands its reach beyond traditional branch banking. While the $50M revenue is small relative to BAC's $5B assets, the 80% YoY growth suggests significant potential for future market penetration. This addresses the strategic intent of younger customer acquisition.
* **Technology Acquisition:** VERO's digital payment platform is a valuable asset. BAC can leverage this technology to modernize its offerings, improve customer experience, and potentially develop new revenue streams. This directly addresses the strategic intent of digital transformation. However, due diligence is crucial to assess the scalability and robustness of VERO's platform.
* **Talent Acquisition:** VERO's team of tech-savvy employees is a valuable asset, especially in the competitive FinTech landscape. Integrating this talent pool will be critical for the success of the acquisition. The number of employees and their specific expertise should be quantified.
* **Competitive Positioning:** Acquiring VERO allows BAC to compete more effectively against digital-only banks that are rapidly gaining market share. This is a crucial strategic driver given the increasing competition in the financial services sector.
* **Strategic Alternatives Evaluation:** BAC should evaluate the "build vs. buy" option. Building a similar digital payment platform in-house would likely be more time-consuming and expensive. Acquiring VERO offers a faster and potentially more cost-effective way to achieve its digital transformation goals. However, the risks of integration and potential cultural clashes must be carefully weighed against the benefits of speed.

**2. Valuation Analysis:**

* **Transaction Metrics:** $500M all-cash offer for a company with $50M revenue implies a 10x revenue multiple. This appears high considering VERO's size, but the high growth rate justifies a premium. A comparison to relevant FinTech transactions is crucial.
* **Comparable Transactions:** Benchmark the 10x revenue multiple against recent transactions in the digital payments space. Identify comparable companies with similar growth rates and business models. This will provide context for the valuation and determine if the $500M offer is reasonable. A 25% premium to the sector average would need further justification.
* **DCF Analysis:** Develop a 5-year DCF model for VERO, incorporating its high growth projections. A reasonable WACC should be used, considering the risks associated with FinTech startups. Sensitivity analysis around key assumptions, such as growth rate and discount rate, is crucial. A terminal growth rate reflecting the long-term prospects of the digital payments market should be applied.
* **Synergy-Adjusted Valuation:** Quantify the potential synergies from the acquisition. These could include:
  + **Revenue Synergies:** Increased customer base, cross-selling opportunities, and new product development.
  + **Cost Synergies:** Streamlined operations, reduced technology costs, and potentially branch consolidation.
  + **Synergy-adjusted valuation:** Calculate the Net Present Value (NPV) of these synergies and add it to the DCF valuation of VERO. This will provide a more comprehensive view of the deal's potential value creation.
* **Sensitivity Analysis:** Conduct sensitivity analysis on key variables, such as revenue growth, cost synergies, and discount rate, to understand the range of potential outcomes. This will help BAC assess the risks associated with the acquisition. Scenarios including +/- 20% variations on key variables are recommended.

**3. Integration Considerations:**

* **Technology Integration:** Integrating VERO's platform with BAC's legacy systems is a complex undertaking. Technical due diligence is essential to assess the compatibility of the two systems and develop a robust integration plan. Potential challenges and costs associated with integration should be carefully evaluated.
* **Culture Clash:** Integrating two organizations with different cultures can be challenging. BAC's traditional banking culture may clash with VERO's fast-paced, entrepreneurial culture. A well-defined integration plan that addresses cultural differences and promotes collaboration is crucial.
* **Regulatory Approval:** The acquisition will require regulatory approval. The potential for regulatory hurdles and the timeline for approval should be considered. Early engagement with regulators is advisable.

**4. Key Recommendations:**

* **Thorough Due Diligence:** Conduct comprehensive due diligence on VERO's technology, financials, and operations.
* **Refined Valuation:** Refine the valuation analysis by conducting a robust DCF analysis and comparing the offer price to relevant FinTech transactions.
* **Detailed Integration Plan:** Develop a detailed integration plan that addresses technology integration, cultural integration, and regulatory approval.
* **Synergy Quantification:** Quantify the potential synergies from the acquisition and incorporate them into the valuation analysis.
* **Risk Assessment:** Carefully assess the risks associated with the acquisition, including technology integration, culture clash, and regulatory hurdles.

By thoroughly addressing these points, BAC can make a well-informed decision regarding the proposed acquisition of VERO.

## Response Analysis and Evaluation

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# Prompt 10: In-Context Learning Prompting

## Prompt: Initial Version

How to create an ESG investment strategy?

## Prompt Design: Step by Step

Step 1: Define the Objective

* How it's reflected: ESG investment strategy development with pattern recognition
* Target audience: ESG specialists and portfolio managers
* Desired outcome: Comprehensive investment methodology balancing impact and returns

Step 2: Choose Prompt Type

* In-context learning approach: Complex pattern demonstration
* Specialized framework: ESG integration methodology
* Pattern recognition goal: Apply the established approach to new parameters

Step 3: Craft the Instruction

* Detailed professional context: ESG investment strategist at global asset management firm
* Comprehensive pattern example: Five-part strategy framework
* Pattern transfer request: Using this strategic framework, develop...

Step 4: Provide Context

* Professional role context: ESG investment management
* Balance requirement context: Balance environmental, social, governance factors with financial performance
* Success pattern demonstration: Previous successful strategy structure

Step 5: Define Constraints

* Strategy structure: Five-component framework
* Dual objectives: Impact and financial performance
* Comprehensive methodology: Philosophy through reporting
* Specific metrics required: Both financial and impact measurements

Step 6: Review and Refine

* Detail level: Specific metrics and approaches in examples
* Comprehensive view: Investment through reporting phases
* Implementation focus: Practical portfolio construction and management

Step 7: Final Verification

* Pattern clarity: Complex but systematic framework
* Completeness check: All investment process elements covered
* Actionable output: Framework leads to implementable strateg

## PROMPT: Final Version

Context: You are an ESG investment strategist at a global asset management firm. Your task is to develop ESG integration frameworks that balance environmental, social, and governance factors with financial performance.

Previous successful ESG strategies followed this pattern:

Strategy 1:

1. Performance & Reporting
   * Financial metrics: Risk-adjusted returns, downside protection
   * Impact metrics: Carbon avoided, green revenue generated
   * Reporting framework: TCFD-aligned, quarterly updates
   * Attribution analysis: ESG vs. traditional factor contribution
   * Strategy evolution process: Annual methodology review

Using this strategic framework, develop a comprehensive ESG investment strategy with the following parameters:

* Client Type: Institutional investors with 10+ year horizon
* Financial Objective: Outperform benchmark by 1.5% annually
* Initial AUM: $500 million

## Response: Final Version

* **ESG Investment Strategy: Long-Term Value Creation**

**Client:** Institutional Investors (10+ year horizon) **Financial Objective:** Outperform benchmark by 1.5% annually **Initial AUM:** $500 million

**Strategy Overview:** This strategy aims to generate long-term value by integrating ESG factors into fundamental investment analysis. We believe that companies with strong ESG profiles are better managed, have lower risk profiles, and are positioned for sustainable growth, ultimately leading to superior financial performance.

**1. Investment Universe & Screening:**

* **Universe:** Global listed equities, with a focus on developed markets initially, potentially expanding to emerging markets as the strategy matures.
* **ESG Screening:**
  + **Negative Screening:** Exclusion of companies involved in controversial sectors (e.g., tobacco, weapons manufacturing, thermal coal) and those with severe ESG controversies.
  + **Positive Screening:** Identification of best-in-class companies within each sector based on their ESG performance relative to peers. We will prioritize companies demonstrating strong performance on financially material ESG issues.
  + **Norms-Based Screening:** Companies that violate international norms and standards will be excluded.
* **ESG Data Sources:** Utilize reputable ESG data providers (e.g., MSCI, Sustainalytics, Refinitiv) and supplement with proprietary research, engagement with companies, and industry expert input.

**2. ESG Integration & Fundamental Analysis:**

* **Materiality Assessment:** Identify the most financially material ESG issues for each sector. Focus on factors that can significantly impact a company's long-term financial performance.
* **ESG Factor Integration:** Incorporate ESG factors into fundamental valuation models. This includes adjusting financial forecasts based on ESG risks and opportunities, assessing the quality of management's ESG oversight, and evaluating the long-term sustainability of business models.
* **Engagement:** Actively engage with companies to improve their ESG performance and promote sustainable business practices. Prioritize companies with lagging ESG performance but potential for improvement. Collaborate with other investors on engagement initiatives.

**3. Portfolio Construction & Optimization:**

* **Diversification:** Construct a diversified portfolio across sectors and geographies to manage risk.
* **Active Management:** Actively manage the portfolio to capitalize on ESG-driven investment opportunities and manage ESG risks.
* **Benchmark Alignment:** While the objective is to outperform the benchmark, the portfolio should maintain a reasonable level of benchmark awareness. Deviations from the benchmark will be justified by strong ESG and financial rationale.

**4. Performance & Reporting:**

* **Financial Metrics:** Track and report risk-adjusted returns, downside protection (e.g., maximum drawdown, downside deviation), and tracking error relative to the benchmark.
* **Impact Metrics:** Measure and report the positive environmental and social impact of the portfolio. Examples include:
  + **Carbon avoided:** Calculate the carbon emissions avoided by investing in companies with lower carbon footprints.
  + **Green revenue generated:** Track the revenue generated by portfolio companies from environmentally friendly products and services.
  + **Improved social outcomes:** Measure progress on relevant social metrics, such as diversity and inclusion, employee well-being, and community engagement.
* **Reporting Framework:** Provide quarterly reports to investors, aligned with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations. Reports will include detailed information on portfolio holdings, ESG performance, and impact metrics.
* **Attribution Analysis:** Conduct annual attribution analysis to identify the contribution of ESG factors to portfolio performance. This will help demonstrate the link between ESG integration and financial returns.

**5. Strategy Evolution Process:**

* **Annual Methodology Review:** Conduct an annual review of the ESG integration framework and investment strategy to ensure its effectiveness and relevance. This will include reviewing the materiality assessment, ESG data sources, and engagement strategy.
* **Stakeholder Feedback:** Solicit feedback from investors and other stakeholders to continuously improve the strategy.
* **Emerging ESG Trends:** Monitor emerging ESG trends and incorporate them into the strategy as appropriate.

**6. Implementation & Resources:**

* **Dedicated ESG Team:** Establish a dedicated ESG team with expertise in ESG research, integration, and engagement.
* **Data & Technology:** Invest in robust ESG data and analytics platforms to support the investment process.
* **Collaboration:** Collaborate with other asset managers, research institutions, and NGOs to enhance ESG knowledge and best practices.

**7. Risk Management:**

* **ESG Risk Assessment:** Integrate ESG risk assessment into the investment process. Identify and manage potential ESG-related risks that could impact portfolio performance.
* **Portfolio Risk Management:** Implement robust portfolio risk management practices to manage overall portfolio risk.

**8. Target Outperformance:** This strategy aims to outperform the benchmark by 1.5% annually over a full market cycle (typically 5-7 years). While there is no guarantee of achieving this target, we believe that integrating ESG factors into fundamental analysis will enhance long-term value creation and improve risk-adjusted returns.

This framework provides a comprehensive approach to ESG investing, balancing financial performance with environmental and social considerations. By focusing on material ESG issues, actively engaging with companies, and continuously improving our methodology, we believe this strategy can deliver long-term value for our clients.

## Response Analysis and Evaluation

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