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University Examinations 2024/2025

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE BACHELOR OF BUSINESS INFORMATION TECHNOLOGY AND BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

CIT 3408: ALGORITHMIC TRADING SYSTEMS DESIGN

DATE: JANUARY 2025 **TIME: 2 HOURS**

INSTRUCTIONS: *Answer question **one** and any other **two** questions*

QUESTION ONE (30 MARKS)

a. Develop a Python program that uses anomaly detection to spot unusual or suspicious trading activities. (5 Marks)

b. Compare different stop-loss strategies and analyze how they impact the performance of an investment portfolio. (5 Marks)

c. How can the Stochastic Oscillator be utilized to effectively time market entry and exit points? (6 Marks)

d. Discuss the potential risks and rewards associated with using merger arbitrage strategies in trading. (4 Marks)

e. In what ways can traders leverage corporate news through event-driven strategies to capitalize on market movements? (4 Marks)

f. Implement a decision tree model that classifies signals to buy, sell, or hold stocks based on various market indicators. (6 Marks)

QUESTION TWO (20 MARKS)

a. Evaluate the risks and potential rewards involved in trading strategies that focus on merger arbitrage. (6 Marks)
b. What challenges arise in managing market risk when employing event-driven trading strategies? (7 Marks)
c. Create a Python-based backtesting framework to assess how a trading strategy would have performed based on historical data. (7 Marks)

QUESTION THREE (20 MARKS)

a. Develop a Python program to perform sentiment analysis on Twitter data and use the insights to predict stock market movements. (7 Marks)
b. How can hybrid securities be incorporated into investment portfolios to balance risk and return effectively? (7 Marks)
c. Write Python code for a simple trading strategy that uses MACD crossovers to make trading decisions. (6 Marks)

QUESTION FOUR (20 MARKS)

a. How can traders utilize economic data—such as inflation rates or employment reports—to execute event-driven trades? (6 Marks)
b. Use Python to build a Long Short-Term Memory (LSTM) neural network model that predicts future stock prices. (8 Marks)
c. Write a Python program that implements a mean-reversion trading strategy using stock price data. (6 Marks)

QUESTION FIVE (20 MARKS)

a. Implement a Python program to execute a mean-reversion strategy using historical stock data. (8 Marks)
b. Develop a Python-based Random Forest model to predict stock price movements based on historical data. (6 Marks)
c. Analyze how Bollinger Bands can be used to identify overbought or oversold conditions in the market. (6 Marks)