Computer Science Capstone Topic Approval Form

The purpose of this document is to help you clearly explain your capstone topic, project scope, and timeline. Identify each of these areas so that you will have a complete and realistic overview of your project. Your instructor cannot sign off on your project topic without this information.

Note: You must fill out and submit this form. Space beneath each number will expand as needed.

Note: Any costs associated with developing the application will be the responsibility of the student.

INFORM INSTRUCTOR:

- **Potential use of proprietary company information: (Y/N)**
  - N

ANALYSIS:

- **Project topic and description:**
  - Holistic Crypto Trading Bot Simulator. This project is a stand-alone application that connects to a live cryptocurrency exchange data feed to simulate an automated trading strategy in real-time. It will manage a virtual portfolio, execute simulated "paper trades" based on a technical analysis algorithm, and log all activity and performance metrics. **This system will not use real money.**
- **Project purpose and goals:**
  - **Purpose**: To design and build a complete end-to-end system for algorithmic trading simulation, demonstrating skills in real-time data processing, API integration, and system design.
  - **Goals**:
    1. Connect to a public cryptocurrency exchange API to receive live price data.
    2. Implement a trading strategy based on a common technical indicator (e.g., MACD or RSI).
    3. Develop an execution engine to simulate trades and manage a virtual portfolio.
    4. Create a logging system to record all trades and performance data to a local database.
- **Descriptive method:**
  - The application will run as a continuous process, ingesting live price ticks. For

each new tick, it will update its technical indicators. If the strategy's conditions are met (e.g., a moving average crossover), it will trigger a simulated trade. The system will then describe the outcome by logging the trade, updating the virtual portfolio's value, and calculating performance metrics like profit and loss.

- **Predictive or prescriptive method:**
    - The system uses a prescriptive method, as the trading algorithm prescribes specific actions ("buy" or "sell") based on the analysis of incoming data.

DESIGN and DEVELOPMENT:

- **Computer science application type (select one):**
    - Stand-alone
- **Programming/development language(s) you will use:**
    - Python (ideal for data analysis, APIs, and libraries like CCXT).
    - Maybe Rust if needed.
- **Operating system(s) or platform(s) you will use:**
    - Cross-platform (Windows, macOS, Linux).
- **Database Management System you will use:**
    - SQLite (for simple, local logging of trades and portfolio state).
    - Or some other SQL + No-SQL database
- **Estimated number of hours for the following:**
    - **Planning and design:** 40
    - **Development:** 160
    - **Documentation:** 40
    - **Total:** 240
- **Projected completion date:**
    - December 19, 2025

IMPLEMENTATION and EVALUATION:

- **Describe how you will approach the execution of your project.**
    - **Phase 1 (Connection):** Establish a stable connection to an exchange's WebSocket or REST API to stream live data.
    - **Phase 2 (Strategy Logic):** Implement the core trading algorithm and technical indicators.
    - **Phase 3 (Simulation Engine):** Build the virtual portfolio manager and the trade execution simulator, including logic for fees.
    - **Phase 4 (Logging & Persistence):** Integrate the SQLite database to log all actions and persist the portfolio state.
    - **Phase 5 (Interface & Testing):** Develop a simple command-line interface to display live performance and conduct thorough testing.
- **This project does not involve human subjects research and is exempt from WGU IRB review.**

By signing and submitting this form, you acknowledge that any costs associated with the development and execution of the application will be your (the student's) responsibility.

STUDENT'S SIGNATURE

David Ordaz - Rodriguez

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INSTRUCTOR'S SIGNATURE:

INSTRUCTOR APPROVAL DATE: 10/01/2025