Faculty of Business and Information Technology

MBAI 5300G - Programming and Data Processing
Final Project Description
Fall 2025

Task	Due Date	Value
Group Selection	Nov. 8 (11:59 PM)	–
Final project Topic selection/proposal	Nov. 8 (11:59 PM)	–
Presentation	Monday Section: Nov. 17 & 24 and Dec. 1 Friday Section: Nov. 21 & 28	6%
Presentation Participation	Monday Section: Nov. 17 & 24 and Dec. 1 Friday Section: Nov. 21 & 28	4%
Final Report	Dec. 2 (11:59 PM)	10%
Code/Dataset	Dec. 2 (11:59 PM)	10%

The final project is worth 30% of your final grade for this course, and it consists of **coding** (10%), a 2500 to 3,000-word **written report** (10%), a **demo/presentation** (6%), and **participation** (4%), as described below. The final project is expected to be prepared in **groups of four**, although exceptions may be granted for students who can **significantly benefit** from working fewer members or in groups of five. Should you wish to express a preference for your group members, use the self-sign-up link available on Canvas (Click on the People tab, then Groups) to join a group by **Saturday, November 8, 11:59 PM**. **Students without a group will be randomly grouped by this deadline, and switching groups will not be allowed after this date**.

IMPORTANT NOTE: All group members are expected to actively participate in coding, debugging, and report-writing activities throughout the project. At the end of the project, each group must submit a summary outlining the contributions of every member.

Topic and Dataset Selection:

The final project includes two primary topics—**Elections Canada** and **Stock Trading Strategies**—along with seven general topics that require students to select a specific dataset related to their chosen area. Once groups have finalized their topic and dataset, they must email their selections to the instructor by **Saturday, November 8, at 11:59 PM**. Please note that once a topic has been approved, **no changes will be permitted**. Groups that do not submit a topic by the deadline will be **randomly assigned one**. Students are also encouraged to propose their own project ideas but must discuss them with the instructor **well before the selection deadline** to allow adequate time for review and any necessary revisions.

Topic 1: *The Role of Twitter in the Canadian Federal Election*: This project should examine the construction of migration- a distinctly contentious and multi-faceted issue with considerable implications for the constitution of citizenship and political community- on Twitter during the 2019 Canadian Federal election. Employing both quantitative and qualitative content analysis you should provide an assessment of the role of various actors- government agencies, political parties, journalists, civil society groups, lay citizens, bots, etc.- in shaping and steering online discussions of migration and its ostensible effects.

Data Sources: A JSON file with approximately 5000 tweets with 31 attributes will be provided.

Topic 2: *Can Technical Indicator-based Stock Trading Strategies Perform Better than Top-performing Mutual Funds?* This project aims to evaluate whether technical indicator–based stock trading strategies can achieve higher performance than top-performing mutual funds offered by major Canadian financial institutions (e.g., TD, CIBC, Royal Bank, etc.).
The analysis will focus on several groups of indicator-based trading strategies, including but not limited to:

- Trend-Following Strategies
- Mean-Reversion Strategies
- Momentum Strategies
- Volatility-Based Strategies
- Hybrid or Multi-Indicator Strategies

Each group member is required to examine a minimum of **three distinct trading strategies**, testing and comparing their performance against benchmark mutual funds in terms of return, risk, and consistency.

Data Sources:

i) Quarterly and Annual returns for some of the mutual funds available in Canada (e.g., https://www.td.com/ca/markets-research/mutual/mutual.jsp). As a benchmark, you may consider TD Bank's NASDAQ Index-based mutual fund, TDB908 (https://www.td.com/ca/en/asset-management/funds/solutions/mutual-funds/fundcard?fundId=3268&fundname=TD-Nasdaq%C2%AE-Index-Fund---e)

ii) Yahoo's yfinace API: you can obtain historical and real-time data for a variety of financial markets and products, as shown on Yahoo Finance (e.g., https://algotrading101.com/learn/yahoo-finance-api-guide/). For your project, you need to get at least **ten years of historical data** for each stock included in the mutual fund.

iii) Python's technical analysis library: is an easy-to-use library that leverages the Pandas package with more than 130 Indicators and Utility functions and more than 60 TA Lib Candlestick Patterns (https://github.com/twopirllc/pandas-ta).

Topic 3: *Web-Based Trading Strategy Backtesting and Live Simulation Platform*: This project involves developing a web-based platform that enables users to design, backtest, and evaluate trading strategies in real time. The system should incorporate historical data analysis, risk and performance reporting, and live market data integration to assess strategy robustness. For reference, you may model a user-friendly interface similar to nof1.ai

Topic 4: *Risk Analysis Using Historical Data*: Analyze historical risk data for a business sector (e.g., insurance claims) to identify patterns and calculate risk metrics.

Topic 5: *Time Series Analysis of Sales Data*: Perform time series analysis on historical sales data to identify trends, seasonality, and forecast future sales using statistical methods.

Topic 6: *Retail Analytics*: Perform a complete analysis of various aspects of a business, including customer behavior and demands, supply chain analysis, sales, marketing, and inventory management.

Topic 7: *Airline Performance and Customer Satisfaction Analysis*: Analyze airline operational performance and customer satisfaction to identify areas for improvement and enhance overall service quality.
Topic 8: *Airline Revenue Management and Environmental Impact*: Evaluate the effectiveness of revenue management strategies in the airline industry while assessing the environmental impact of airline operations.

Topic 9: *Customer Satisfaction Analysis*: Utilize customer feedback and survey data to assess satisfaction levels regarding various airline services (e.g., seating, in-flight service, boarding process) and identify areas for improvement.

Code (One Submission per Group 10%):

Your final project code and data should be submitted in a zipped folder, comprising the following essential files and datasets by **December 2 at 11:59 PM**.

i) **Source code:** Include bug-free and well-documented source code, allowing others to understand and replicate your project.

ii) **Readme File:**
The **README** file must include the following components:
- **Setup Instructions:** Provide clear, step-by-step directions on how to install and run the project, including any required dependencies or specific configurations.
- **Team Contributions:** Include a brief summary of each group member's contributions. All members are expected to actively participate in the coding, debugging, and report-writing activities throughout the project.

iii) **Dataset used:** Include all raw data utilized in your project. If the data is large, it is advisable to submit the datasets to an appropriate public data repository and provide the necessary links or instructions to access them.

Your code will be graded according to the following criteria:
- Program Correctness: 75%
- Code Efficiency: 10%
- Readability: 7.5%
- Documentation: 7.5%

Project Report (One Submission per Group 10%):

To prepare your report, please use the provided template "*Report Template.docx*" (adapted from Elsevier), which can be found on Canvas. Your final project report should be between 2500 and 3000 words and must follow the structure outlined below:

Title: The title of your report should be both captivating and precise, effectively communicating the core themes and importance of your research

Abstract: A concise and factual abstract is required. The abstract should briefly state the purpose of the research, the principal results, and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the text. Also, non-standard, or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

Keywords: Immediately after the abstract, list up to **6 keywords**. Avoid general terms, plurals, multiple concepts (e.g., "and," "of"), and abbreviations unless widely recognized in the field.

I. **Introduction**: Introduce the purpose and scope of the report, outlining the specific objectives and goals of the data analytics project.
II. **Literature Review:** Provide a review of relevant literature, research papers, reports, and sources related to your project. Additionally, include key theories and concepts pertinent to the topic, and identify any gaps in the existing literature that your project aims to address.
III. **Methodology**: Outline the research approach, starting with a description of the data sources used, including datasets and/or surveys. Provide detail of the data collection methods to ensure reliability, followed by the data processing techniques, such as cleaning and transformation, that prepared the data for analysis. Finally, describe the analytical methods employed, including statistical analysis and data visualization, to derive insights and effectively present findings.
IV. **Data Analysis:** Present the steps involved in data processing and summarize the key findings from your analysis. Use tables, charts, and graphs to visually illustrate the results, ensuring a clear representation of the data. Additionally, interpret the findings to provide insights that enhance understanding and highlight the significance of the results in relation to the research objectives.
V. **Discussion:** Analyze the findings in relation to the research questions and provide a comparison with previous studies. Discuss the implications of the findings for practice or policy, highlighting how the results can inform decision-making and contribute to the field.
VI. **Conclusion:** Summarize the main findings and outcomes of the data analytics project, emphasizing the value and implications for the business. Reflect on the project's successes, limitations, and areas for future research or improvement.

References: Include a list of all sources referenced or cited in the report. Please use the APA or MLA referencing style.

Appendices (if applicable): Include any supplementary material, such as additional data, charts, graphs, or code snippets, that are relevant to understanding your report.

Demo/Presentation (Every Group Member Must Participate 6%):

Your project presentation/demo is scheduled for **November 17, 24 and December 1** (Monday section) and **November 21 and 28** (Friday section). Each presentation/demo should last 20 minutes, followed by a 5-minute question-and-answer session, for a total of 25 minutes. Your presentation/demo will be graded based on the following criteria:

i) Relevance to the selected topic.
ii) Clarity, ensuring that the content is understandable to everyone in the class.
iii) Conciseness and precision, covering all relevant points within the allotted time.
iv) Effectiveness of the Q&A session.

Participation (4%):

After each presentation, fellow students will have the opportunity to ask questions and engage in the discussion with the presenting group. Student participation will be graded based on the following criteria:

i) Questions must be relevant to the presentation and thought-provoking.
ii) Comments should aim to clarify points that have already been discussed.
iii) You may answer questions raised by others if the presenting group is unable to respond effectively.

Deliverables: Please submit your final project report (in **PDF** or **DOCX** format) and your code/data package (in ZIP format) separately by December 2nd at 11:59 PM. Remember, only one submission is required per group.