

**Project****Total: 100 points****Instructions:**

1. This project report and presentation each account for 15% of your final grade.
2. Each group should turn in one single project. Please list you and your group members' names on the cover page.
3. Each group is expected to submit a **professional project report. Only this professional report will be evaluated and graded.**
4. Part 1 of this project will be assessed on the **accuracy of your calculations and quality of the report.** Part 2 of this project will be assessed based on **how rigorously/thoughtful students answer the questions raised** in both the project report and project presentation.
5. Your project submission should **display your analysis to each question in detail**, oversimplified answers will result in reduction in project grades.
6. **DO NOT copy and paste from your Excel spreadsheet**, present your analysis along with supporting short tables instead. Only submitting excel sheets/financial statements will result in reduction in project grades.
7. **Do not show the raw data (e.g., asset returns) in the report.** Answer the questions briefly and to the point using graphs, tables, etc. Plots and graphs are encouraged. Make sure it is clear from the report what you are doing and what questions you are trying to answer.
8. When reporting the results, **remove useless decimal places.** For example, instead of 0.007681270586 show 0.0077, or, if it is appropriate to present it as a percentage, 0.77%.

**Part I: Cryptocurrency Ecosystem and Interlinkages**

Blockchain technology has been transforming the financial market in various aspects. Specifically, cryptocurrencies have emerged as a new asset class that attracts huge amount of interest and capital investments around the world. The cryptocurrency industry is growing at a staggering pace. There are currently over 21,000 different coins/tokens in existence, across a variety of subsectors. Their total market capitalization is over \$800 billion.

In part 1 of this project, your group surveys a subset of cryptocurrency market and the blockchain ecosystem. Your group also performs simple empirical analysis on the interlinkages among various cryptocurrency assets and blockchain systems.

1. Choose five cryptocurrencies of your group's interest. When choosing the five cryptocurrencies, make sure that they all have daily price data from January 1, 2022 to December 31, 2022 on Yahoo Finance. You will need these data to perform analysis. Analyze and discuss in detail the following:
  - a) Visually inspect your data and make sure that there is no missing data during the sample period.
  - b) Detailed overview of each of the cryptocurrencies chosen.
  - c) What is the protocol adopted for each of the cryptocurrency.
  - d) Why your group choose these five cryptocurrencies? What interest you in your choices.
2. Using the cryptocurrency data on Yahoo Finance during time period from January 1, 2022 to December 31, 2022. Plot the daily prices for the five cryptocurrencies.  
Hint: You can either plot them in single plot or plot them in five separate plots depending on their comparative price levels.
3. Comment on the price trends from your plots. What can you conclude from the price variations?

4. Compute daily returns from the five cryptocurrencies' prices, then calculate standard deviations during the sample period. Which cryptocurrency has the highest variation? And which one has the lowest variation? Explain why their variation differs?
5. Generate a correlation matrix using the five cryptocurrencies' daily returns. What can you conclude from the correlation matrix?
6. Note that there is the news of failure of FTX in mid-November 2022 that impacts the cryptocurrency market tremendously. Specifically, on November 11, FTX files for bankruptcy and Bankman-Fried steps down. Do you observe the FTX impact in mid-November 2022 in your dataset? How much does the five cryptocurrencies' prices decrease/increase on November 11, 2022? And much does the five cryptocurrencies' prices decrease/increase in November 2022?
7. Add S&P 500 index (^GSPC) from Yahoo Finance in the above analysis during time period from January 1, 2022 to December 31, 2022. Repeat the analysis in Questions 2 through 6 for the market index (S&P 500 index (^GSPC)). Your analysis should **include but not limited** to the following:
  - a) Compute the daily prices, daily returns, standard deviations for the market index (S&P 500 index (^GSPC)).
  - b) Recompute the correlation matrix by including the market index (S&P 500 index (^GSPC)).
  - c) How do the five cryptocurrencies' daily prices, daily returns, standard deviations compare with those of the market index (S&P 500 index (^GSPC)).
  - d) How do the five cryptocurrencies react to the FTX failure compared to the market index (S&P 500 index (^GSPC)).
  - e) What can you conclude by including the market index (S&P 500 index (^GSPC)) into your analysis.
8. What do you learn from the analysis from Part I of this project?

**Part II: A Business Idea to be Implemented on the Blockchain**

9. Each group must propose a business idea. The business idea should be technically feasible for implementation via smart contracts on the Ethereum blockchain. Your business idea proposal must answer the following questions:
- a) Who are the target consumers for your business proposal?
  - b) What is the closest existing competitor to your idea?
  - c) Given the competitors, why would your target consumers prefer your business?
  - d) Why deploy your idea on blockchain rather than in a centralized context?
  - e) Explain how your business idea can be implemented on the Ethereum blockchain. Address all technical hurdles (e.g., Does the contract need to access information not stored on the blockchain? If so, how would it gain that access?).
  - f) Is your business economically-viable for implementation on Ethereum?
  - g) Is your business economically-viable for implementation on any other blockchain?

Groups are encouraged to base their proposals on existing ideas by proposing improvements on promising existing ideas. Students are particularly encouraged to consider ideas in the realm of Decentralized Finance (DeFi) or Insurance. For a list of prominent ideas in the area of DeFi, students are encouraged to consult [www.defipulse.com](http://www.defipulse.com), which also provides additional links with details regarding each business.