Behavioural Finance Task Report

# About the Dataset

There are two datasets given:

1. Asset Dataset:
   * The dataset contains information about people’s assets
     + Asset Allocation: Crypto, Equities, Bonds, Real Estate, Commodities, Cash
     + Asset currency: AUD, JPY, USD, EUR, GBP
     + Asset value: The value of the asset in their respective currencies
     + Created: The day the asset was created
2. Subjects were measured on various parameters which seem to be normalised on a scale of 0 to 1:
   * Confidence: How certain an investor feels about their financial decisions
   * Risk tolerance: The degree to which investor is comfortable with uncertainty
   * Composure: The ability to stay calm during market fluctuations
   * Impulsivity: Tendency to make quick emotion driven decisions without thorough analysis
   * Impact desire: Degree to which an investor values making a social or environmental impact through investments.

# Descriptive Statistics

The most used asset currency is the AUD, and the least used currency is GBP. The most invested assets are Crypto, with the least number of investments in cash. Individual asset values ranged from 111.54 USD to 1530.9 USD.

# Boxplot analysis

The boxplot analysis provides several key insights. Most asset classes exhibit a median value in the range of approximately 200 to 300 USD, with very slight variations among them.

Whiskers of a boxplot represent the range within 1.5 times the interquartile range (IQR). Any points outside this range are potential outliers. Thus, following that logic, there are quite a few outliers in Crypto, Bonds and Real Estate. Further, crypto had the highest mean value and real estate had the lowest mean value.

Additionally, crypto displays a comparatively wider interquartile range which makes it more prone to extreme values and more scattered data points. This suggests that it has higher variability or volatility compared to other asset classes.

Furthermore, while equities, bonds, and commodities share similar central tendencies, their spreads differ, indicating varying degrees of dispersion within each asset class.

# Time Series Analysis

Assuming that the "created" column represents the time when a user added their assets, we observe that between February 21st (when the first asset was recorded) and May 20th (when the last asset was recorded), the total amount of money invested shows a steady decline over time. There is no discernible pattern or trends in the money invested in different types of assets

# Correlation Matrix

Correlation matrix shows that confidence, risk tolerance and composure are significantly interrelated. Additionally, asset value is at most correlated with confidence. Impulsivity, Impact desire and asset value are largely uncorrelated with other variables in this set.

# Personality Segmentation

Unsupervised Machine Clustering was carried out using personality traits (confidence, risk tolerance, composure, impulsivity, impact desire) and asset value. After preprocessing and scaling the data to standardize the variables, a K means clustering algorithm was applied to group the investors into three distinct clusters based on these criteria. The resulting clusters were visualised through a pairwise scatterplot matrix coloured according to their assigned personality cluster. This visualisation provides clear insights into the differentiation of investor personalities across the selected traits enabling better understanding of underlying behavioural segments within the dataset.

## Cluster 0: The Confident Strategists

This group is characterized by high confidence and composure, along with a high tolerance for risk. They tend to be less impulsive and generally possess higher asset values. These traits suggest they are likely experienced and emotionally stable investors who approach investment decisions with strategic foresight.

## Cluster 1: The Balanced Middle

Investors in this cluster exhibit moderate levels of confidence and impulsivity. They do not show strong peaks in asset value or other personality traits, indicating a more balanced or mixed profile. This group may represent transitional investors or those with diversified investment behaviours, as their values are more evenly distributed across the measured attributes.

## Cluster 2: The Reactive Novices

Members of this cluster show higher levels of impulsivity and lower levels of composure. They also have lower confidence and risk tolerance, and typically hold lower asset values. These characteristics suggest they may be newer to investing or more emotionally driven in their decision-making processes.

## Key Observations from Pair Plot

The pair plot reveals several notable relationships among the attributes which further validate the results from the correlation matrix. Confidence is positively correlated with risk tolerance, indicating that more confident investors are also more comfortable taking risks. Composure is inversely related to impulsivity, suggesting that more composed individuals tend to act with greater deliberation. Higher impulsivity is associated with lower asset values, hinting at the potential downsides of reactive investing. Finally, impact desire appears to have weak or no significant correlation with other variables, implying that it may be an independent trait in this context.