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|---|---|
| Date | 06 May 2023 |
| Team ID | SI/PBL-NT-GP-12271-1683873918 |
| Project Name | The Path to Prosperity: A Comprehensive Analysis of Financial Independence based on Data taken from Reddit |

# PROJECT FINAL SUBMISSION

## 1.INTRODUCTION

Financial independence is the status of having enough income or wealth sufficient to pay one's living expenses for the rest of one's life without having to be employed or dependent on others. Income earned without having to work a job is commonly referred to as passive income. Others define financial independence differently according to their own goals Reddit is an American social news aggregation, content rating, and discussion website. Registered users (commonly referred to as "Redditors") submit content to the site such as links, text posts, images, and videos, which are then voted up or down by other members Financial Independence, Retire Early (FIRE) is a movement of people devoted to a program of extreme savings and investment that aims to allow them to retire far earlier than traditional budgets and retirement plans would permit.

## 1.1 Project overview

Financial independen**ce** is the status of having enough income or wealth sufficient to pay one's living expenses for the rest of one's life without having to be employed or dependent on others. Income earned without having to work a job is commonly referred to as passive income. Others define financial independence differently according to their own goals. There are many strategies to achieve financial independence, each with their own benefits and drawbacks. Someone who wishes to achieve financial independence can find it helpful to have a financial plan and budget, so that they have a clear view of their current incomes and expenses, and can identify and choose appropriate strategies to move towards their financial goals. A financial plan addresses every aspect of a person's finances.

## 1.2 Purpose

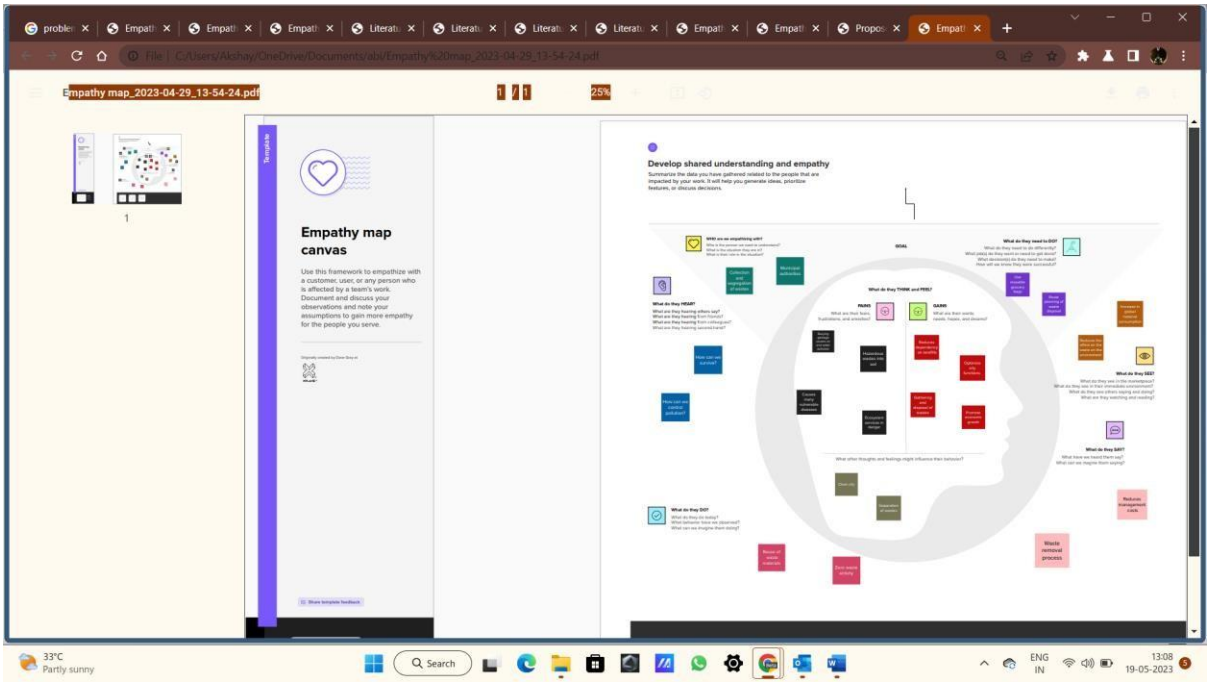
Financial independence is important for women, as it provides them with a sense of security and autonomy. Women often lack access to the same opportunities as men when it comes to financial independence. This can be attributed to the gender wage gap, which remains a persistent problem in many countries. Women are often paid less than men for the same job, and have fewer opportunities for career advancement. This means that they are less likely to be able to save money and invest in the future, leaving them more vulnerable to financial insecurity. In addition, women often have to juggle multiple roles and responsibilities, such as caring for children, running a household, and working full-time.

# 2.IDEATION AND PROPOSED SOLUTION

## 2.1 Problem Statement Definition

A problem statement is a statement of a current issue or problem that requires timely action to improve the situation. This statement concisely explains the barrier the current problem places between a functional process and/or product and the current (problematic) state of affairs.

## 2.2Empathy map




## 2.3 Ideation and Brainstorming

### 2.3.1 Literature review

| | TITLE& AUTHOR | METHODS USED | ADVANTAGE |
|---|---|---|---|
| 1. | S.No | • Real-world examples of data analysis in practice<br>• Case study exercises that could lead to potential portfolio pieces<br>• Review questions to help you check your comprehension<br>• R and Python data mining tutorials for complete beginners | We are surrounded by data, and the amount of new data available to us is growing every day. So is the demand for skilled data professionals. When you're just taking your first steps toward a career as a data analyst, it's key to immerse yourself in the language, ideas, and trends of data. Books are one way to do that.<br><br>We've curated a list of data analysis books appropriate for beginners on a range of topics, from general overviews to topical selections on statistical programming languages, big data, and artificial intelligence. |
| 2. | *Numsense! Data Science for the Layman: No Math Added* by Annalyn | While this book is geared toward beginners, it also offers value to | Reading this book provides a gentle immersion into the world of data |

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| | Ng and Kenneth Soo | practicing data scientists. Use it as a refresher on communicating what you're working on to business partners. | science—perfect for someone coming from a non-technical background. The authors walk you through algorithms using clear language and visual explanations, so you don't get bogged down in complex math. |
| **3.** | *Python for Everybody: Exploring Data in Python 3* by Dr. Charles Russell Severance | It's a useful resource on its own and even more valuable when used alongside Dr. Severance's popular course, Python for Everybody (available on Coursera). | This book will have you write your first program in minutes. Dr. Charles Severance of the University of Michigan walks readers through the process of learning to "speak" to a database through Python. |
| **4.** | *SQL QuickStart Guide: The Simplified Beginner's Guide to Managing, Analyzing, and Manipulating Data With SQL* by Walter Shields | Access to a sample database and SQL browser app, so you can immediately put what you're learning into action. You'll also get lifetime access to a host of digital tools—workbooks and reference guides among them—to complement your learning. | This is so much more than a book. When you buy this book on Structured Query Language (SQL), you get access to a sample database and SQL browser app, so you can immediately put what you're learning into action. You'll also |

| | | | |
|---|---|---|---|
| | | | get lifetime access to a host of digital tools—workbooks and reference guides among them—to complement your learning. |
| **5.** | *Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking* by Foster Provost and Tom Fawcett | This book digs deep into the importance of data for business decision making. If you're interested in pursuing a career as a business analyst, consider this an introduction to how data science and business work together and what goes into data-driven decision making. | This book by two experts in the field goes beyond the buzzword to illuminate just how big data is already changing our world, for better and sometimes worse. |
| **6.** | *Artificial Intelligence: A Guide for Thinking Humans* by Melanie Mitche | While data analysts don't necessarily need a deep understanding of AI, it can be helpful to understand these technologies and their impact on the world of data analytics. Mitchell approaches these topics in a way that's clear and engaging. | This book digs deep into the importance of data for business decision making. If you're interested in pursuing a career as a business analyst, consider this an introduction to how data science and business work together and what goes into data-driven decision making. |
| **7.** | *Storytelling with Data: A Data* | • Recognize context | By reading this book, you can start |

| | | | |
|---|---|---|---|
| | *Visualization Guide for Business Professionals* by Cole Nussbaumer Knaflic *Storytelling with Data: A Data Visualization Guide for Business Professionals* by Cole Nussbaumer Knaflic | • Choose the right visualization for the right situation<br>• Eliminate clutter and highlight the most important parts of the data<br>• Think like a visual designer<br>• Build presentations using multiple visuals to tell a compelling story | to separate the hype surrounding the idea of artificial intelligence (AI) from reality. Author Melanie Mitchell, a computer scientist, explores the history of AI and the people behind it to help readers better understand complex concepts like neural networks, natural language processing, and computer vision models. |
| **8.** | 9. *The Hundred-Page Machine Learning Book* by Andriy Burkov | This compact read covers an immense amount of information. Topics include supervised and unsupervised learning, neural networks, cluster analysis, and hyperparameter tuning. | In data analysis, our data is often only as good as the stories we tell with it. This book walks you through the fundamentals of communicating with data through storytelling and visualization. |
| **9.** | *Business unIntelligence: Insight and Innovation beyond Analytics and Big* | • The birth of the biz-tech ecosystem<br>• Practical tips for using big data<br>• Data-based, intuitive, and collaborative | This title delivers on its promise: an overview of machine learning in a little bit more than 100 pages (140 to be exact). It's short enough to |

| | | | |
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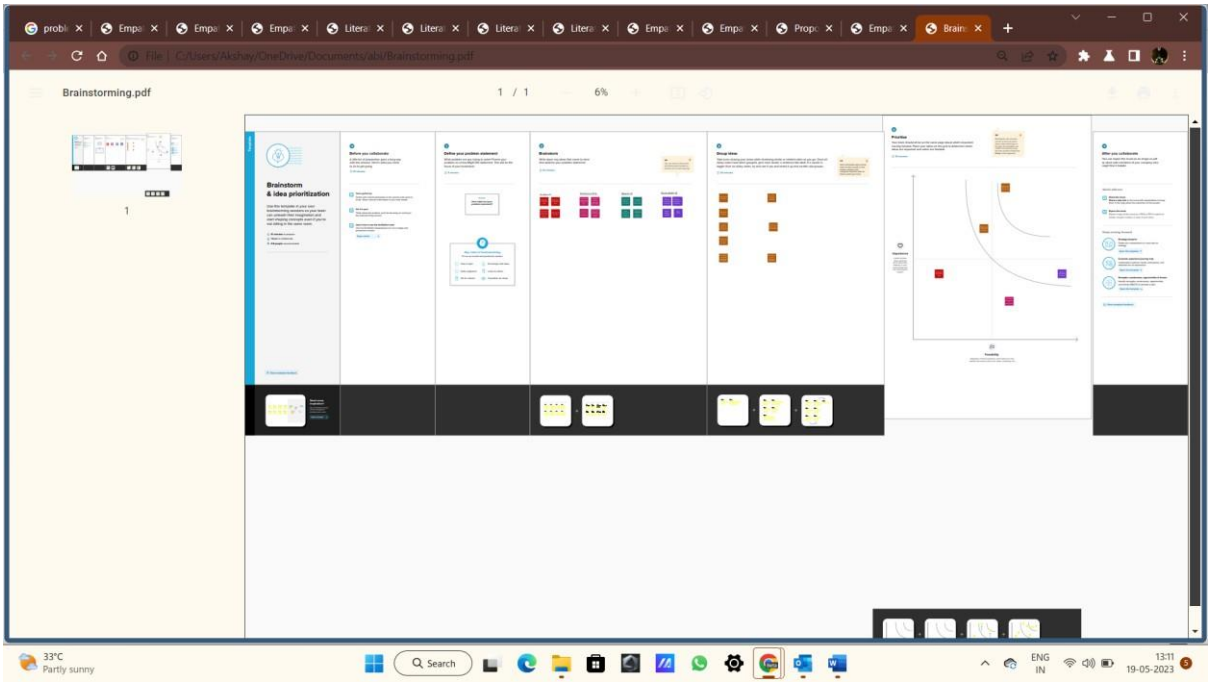
| | *Data* by Dr. Barry Devlin | decision making (and why companies need all three) | read in a single sitting. Andriy Burkov offers a solid introduction to the field, even if you have no statistical or programming experience. |

## 2.3.2. Brainstorming




## 2.4 Proposed solution

| S.no | Parameter | Description |
|---|---|---|
| **1.** | Problem Statement (Problem to be solved) | Lack of Capital/Cash Flow |
| 2. | Idea/ Solution description | Solution: Obtaining Funding Many entrepreneurs think of loans and other funding methods when considering their access to capital and cashflow |

| | | |
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| | | needs. But loans can be hard to get in every business climate. Loans guaranteed by the Small Business Administration (SBA) can be a bit easier to get, but the percentage of loans approved is still relatively low and is influenced by where you live, the industry you're looking to enter, and whether you have previous business experience. Solution: Managing Your Capital and Cash Flow Healthcare, food, and delivery of essential products, for example, will likely be strong. If you're in these sectors, strategize methods to capture and increase business. If you're planning a business venture, focus on recession -proof sectors. Finally, manage your cashflow judiciously for business success. This can be a challenge for business owners, but you don't know what the future business condition will be so it's best to have a cushion of cash reserves. Review and revise your product line to concentrate only on what's most successful. Assess whether you can |

| | | |
|---|---|---|
| | | reduce staff, real estate overhead, and other. |
| 3. | Novelty/ Uniqueness | Unique Finance Solutions is one of India's leading non-banking financial advisory company founded by the Ex-bankers associated with various leading banks, private financers and non-banking financial institution stop provide fast and hassle free loan with lowest in interest |
| 4. | Social Impact/ customer satisfication | customer satisfaction to shareholder value by establishing the link between satisfaction and two characteristics of future cash flows that determine the value of the firm to share holders: growth and stability. Using longitudinal American Customer Satisfaction Index and COM-PUSTAT data and hierarchical Bayesian estimation ,the customer . |
| 5. | Business Model (Revenue Model) | Cash flow modelling creates visibility into a company's assets, income, expenditure, debts and investment of its future business performance, and its most important business goal; solvency. |
| 6. | Scalability of the solution | Scalability is the measure of a system's ability to increase or decrease in performance and cost in response to changes in application and systemprocessingdemands.9Tips to Solve Cash Flow Problems • |

| | | |
|---|---|---|
| | | Use a Monthly Business Budget. ... • Access a Line of Credit. .... • Invoice Promptly to Reduce Days Sales Outstanding. ... • Stretch Out Payables. ... • Reduce Expenses. |

# 3.REQUIREMENT ANALYSIS

## 3.1 Functional Requirements

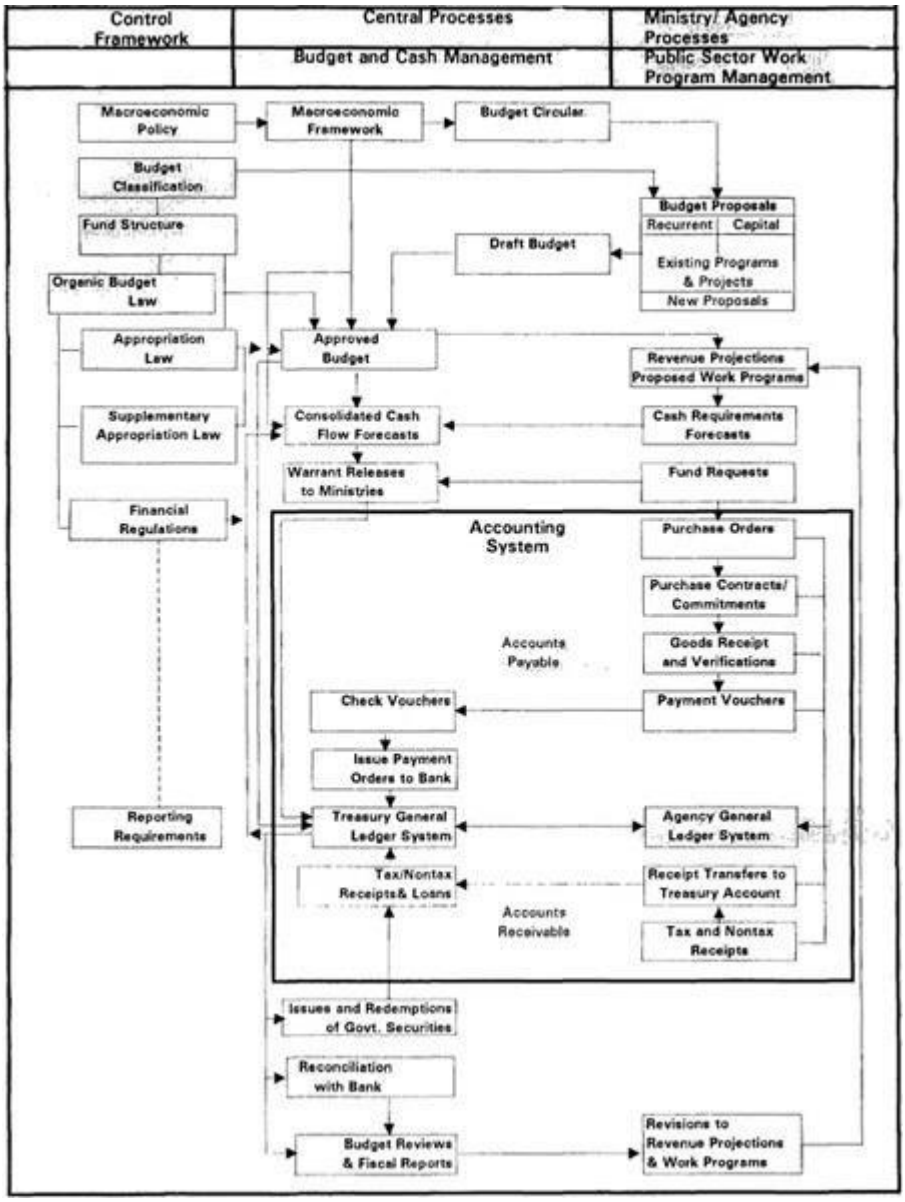
The approach taken in this paper is, first, to carry out a functional analysis of the business processes involved in government fiscal management. Second, this functional analysis is used as the basis for defining the information architecture, which is derived. Functional Requirement (Epic) Sub Requirement (Story / Sub-Task) FR-1 Register user login The registered user name and password will be provided after the registered user registration is confirmed. Password should be hidden from others while typing it in the field. FR-2 Register new user System must be able to verify and validate information. Online Crime reporting system must encrypt the password of the customer to provide security. FR-3 Complain History The registered user can add the desired complain into his cart by clicking add to cart option on the product. the strength of information linkages among the functional processes and describes the information requirements for these processes. All data generated are, as a result, grouped into distinct information areas. The information architecture is the base upon which the systems architecture can then be defined. The type of data in each information area, together with the nature of the functional processes and the information flows between information areas, determine the nature of the applications software and selection of hardware required to support government fiscal management. [2/]

1. Functional analysis

The functional requirements of information systems for government budgeting and accounting will depend upon:

- The overall regulatory framework for fiscal management;
- The functional processes associated with fiscal management; the information requirements for these processes; the information flows between functional processes; the nature, volumes, and frequency of these flows; and the geographical distribution of information source
- The functional processes associated with government fiscal management and the information requirements for these processes have been described in publications of the Bank, the IMF, and other organizations (see references). The functional processes carried out by the central government [4/] in the areas of budgeting and accounting—and linkages to

the control framework—are illustrated in Chart 1, and the main elements are briefly described below.




## 3.2 Non-Functional Requirements

**Non-functional requirements or NFRs** are a set of specifications that describe the system's operation capabilities and constraints and attempt to improve its functionality. These are basically the requirements that outline how well it will operate including things like speed, security, reliability, data integrity, etc.

Functional and non-functional requirements

Both functional and non-functional requirements describe specific characteristics that a product must have to meet the needs of the stakeholders and the business itself. But, as you can tell from the name, they focus on different things.

- Functional requirements define what a software product must do: its features and functions.

## Performance and scalability

Performance and scalability are the two core non-functional requirements no system can do without. Since they go hand in hand, we've put them in one section.

**Scalability** assesses the highest workloads under which the system will still meet the performance requirements. There are two ways to enable your system scale as the workloads get higher: horizontal and vertical scaling.

- *Horizontal scaling* is provided by adding more machines to the pool of servers.
- *Vertical scaling* is achieved by adding more CPU and RAM to the existing machines.
- **Portability** determines how a system or its element can be launched within one environment or another. It usually includes hardware, software, or other usage platform specifications. Put simply, it establishes how well actions performed via one platform are run on another. Also, it prescribes how well system elements may be accessed and may interact from two different environments.

- ***Example of portability requirements:***

- *A program running on Windows 10 must be able to run on Windows 11 without any change in its  performance.*

- Compatibility
- **Compatibility**, as an additional aspect of portability, defines how a system can coexist with another system in the same environment. For instance, software installed on an operating system must be compatible with its firewall or antivirus protection.

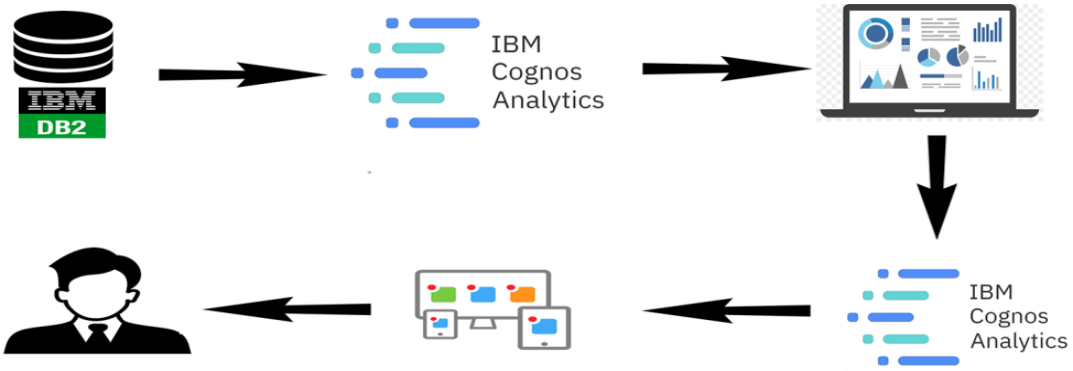
# 4. PROJECT DESIGNS

## 4.1 Data flow Diagram

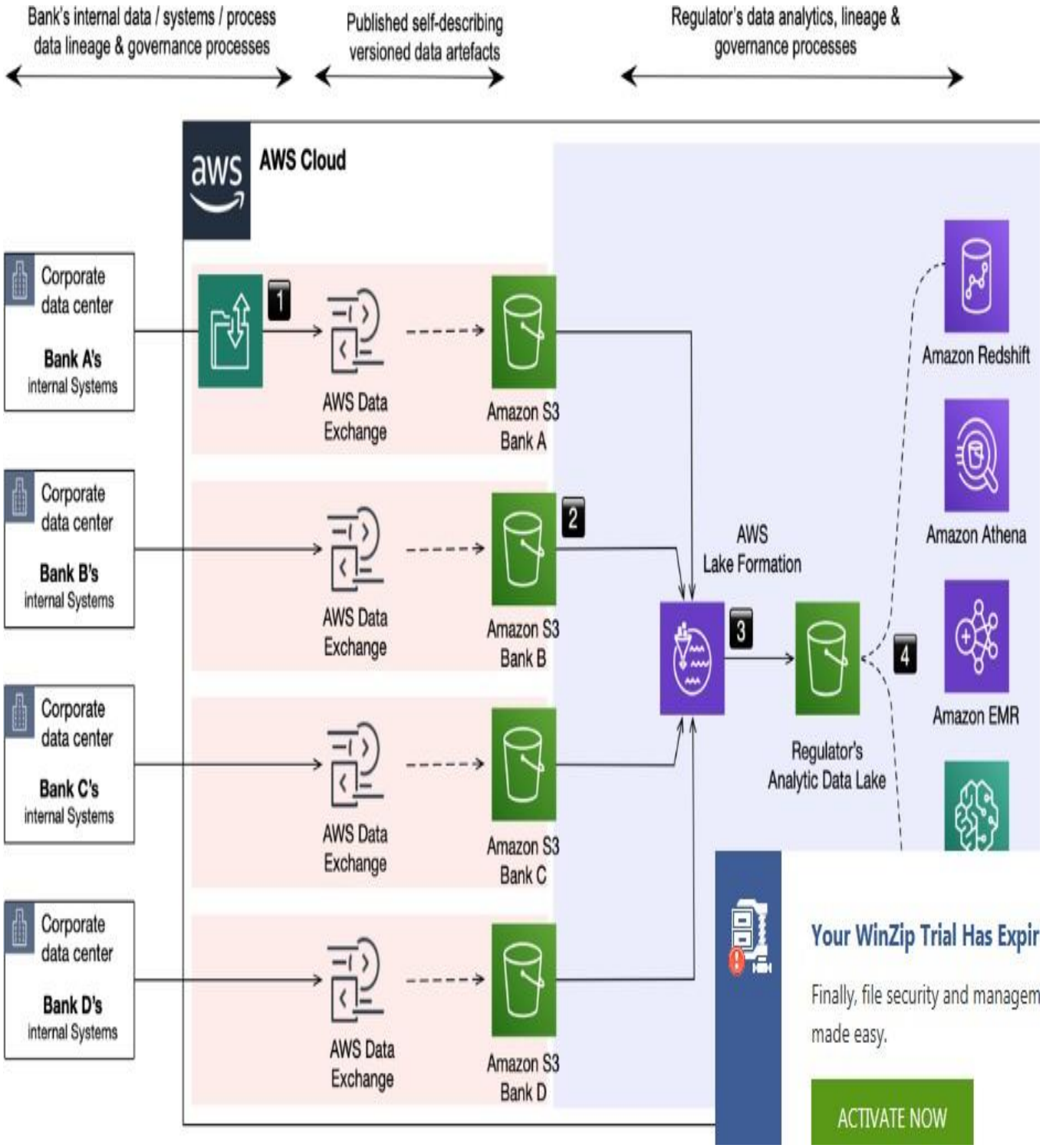
### Data Flow Diagram & User Stories

**Topic: The Path to Prosperity : A Comprehensive Analysis of Financial Independence on based on Data taken from Reddit**

**Data Flow Diagram:**




## 4.2 Solution and Technical Architecture




## 4.3 User Stories

**User Stories**

Use the below template to list all the user stories for the product.

| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance |
|---|---|---|---|---|
| Customer (Mobile user) | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password. | I can access dashboard |
| | | USN-2 | As a user, I will receive confirmation email once I have registered for the application | I can receive email & click |
| | | USN-3 | As a user, I can register for the application through Facebook | I can register dashboard wi Login |
| | | USN-4 | As a user, I can register for the application through Gmail | |
| | Dashboard | | | |
| Customer (Web user) | | | | |
| Customer Care Executive | | | | |

| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Team Member |
|---|---|---|---|---|---|---|
| Customer (Mobile user) | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password. | I can access my account / dashboard | High | Femishia J M |
| | | USN-2 | As a user, I will receive confirmation email once I have registered for the application | I can receive confirmation email & click confirm | High | Atheesha T |
| | | USN-3 | As a user, I can register for the application through Gmail | | Medium | Abi Dharshini K |
| | Login | USN-4 | As a user, I can log into the application by entering email & password | | High | Hepsibha S |
| | Dashboard | | | | | |
| Customer (Web user) | | | | | | |
| Customer Care Executive | | | | | | |
| Administrator | | | | | | |
| | | | | | | |

## 5. Coding and Solutions

```
import plotly.graph_objects as go# User input ticker of interest
ticker = "NFLX"fig =
```

```
go.Figure(data=[go.Candlestick(x=each_df[ticker].index,
                open=each_df[ticker]['Open'],
                high=each_df[ticker]['High'],
                low=each_df[ticker]['Low'],

close=each_df[ticker]['Close'])]).fig.update_layout(
    title='Candlestick Chart for ' + ticker,
    yaxis_title='Price',
    xaxis_title='Date',
    hovermode='x'
)
fig.show()
```

Here is what an example of what the candlestick plot looks like.


Figure 7: Netflix candlestick chart

Again, candlestick charts are packed dense with information, so there are many traders who build trading strategies around them. I discuss them a little more in my other post here.

## Risk and Returns Analysis

To make well-informed trades, it is important to understand the risk and returns of each stock. First, let's create a new dataframe to store

the daily percent changes in closing prices. I call this the 'returns' dataframe.

```
# Create a new df called returns that calculates the return
after each day.
returns = pd.DataFrame()# We can use pandas pct_change() method
on the 'Adj Close' column to create a column representing this
return value.
for ticker in tickers:
    returns[ticker]=closing_prices_df[ticker].pct_change()*100
```

```
returns.tail().style.format("{:.4f}")
```

| Ticker | SPY | AAL | ZM | NFLX | FB |
|---|---|---|---|---|---|
| Date | | | | | |
| 2020-08-07 00:00:00 | 0.0718 | -0.0767 | -3.5489 | -2.8188 | 1.1912 |
| 2020-08-10 00:00:00 | 0.2989 | 7.4444 | -3.3742 | -2.2942 | -2.0265 |
| 2020-08-11 00:00:00 | -0.8255 | -1.9286 | -7.5840 | -3.4031 | -2.6122 |
| 2020-08-12 00:00:00 | 1.3942 | -1.3838 | 2.4585 | 1.8290 | 1.4680 |
| 2020-08-13 00:00:00 | -0.1808 | -1.7725 | 4.4483 | 1.2325 | 0.5425 |

Figure 8: Tail of the returns dataframe to look at daily returns

Using the dataframe in Figure 8, we can now see how much gain/loss a stock experienced day by day. However, it's difficult to see the big picture when looking at all these numbers.

Let's summarize the data and look at the average daily returns. We can do this simply by using the .mean() function.

```
returns.mean()
```

```
Ticker
SPY     0.052639
AAL    -0.115652
ZM      0.506636
NFLX    0.168664
FB      0.084461
dtype: float64
```

Figure 9. Average daily returns for each company

In Figure 9, we are looking at the average returns over ~2.5 years. In other words, if you invested in Facebook (FB) 2.5 years ago, you can expect the value of your investments to have grown 0.08% **each day**.

I encourage you to play with the returns data as it is quite informational. Some examples of things to look at include best and worst single day returns, which I show in this blog.

Next, let's take a look at risks. One of the fundamental methods of understanding risk of each stock is through standard deviations on the rate of returns. Let's calculate the standard deviations of the returns using the code below in Figure 10.

```
# By looking at the standard deviation of all the returns, we can see which stocks are more volatile
returns.std()#.round(4)
```

```
Ticker
SPY     1.475897
AAL     4.317153
ZM      4.294298
NFLX    2.673114
FB      2.381381
dtype: float64
```

Figure 10. Standard deviations of returns df

We can break down the standard deviation information using a distribution plot.

```
# User input ticker of interest
ticker = "AAL"a = returns[ticker].loc['2020-01-03':'2020-07-
01'].dropna()
b = returns[ticker].loc['2019-01-03':'2019-07-
01'].dropna()plt.figure(figsize = (10,7))
a.plot(kind='hist', label='2020', bins=50, alpha=0.5)
b.plot(kind='hist', label='2019', bins=12, alpha=0.5)
plt.title('Distribution of ' + ticker + ' returns')
plt.xlabel('Daily Returns (%)')
plt.legend()
plt.show()
```

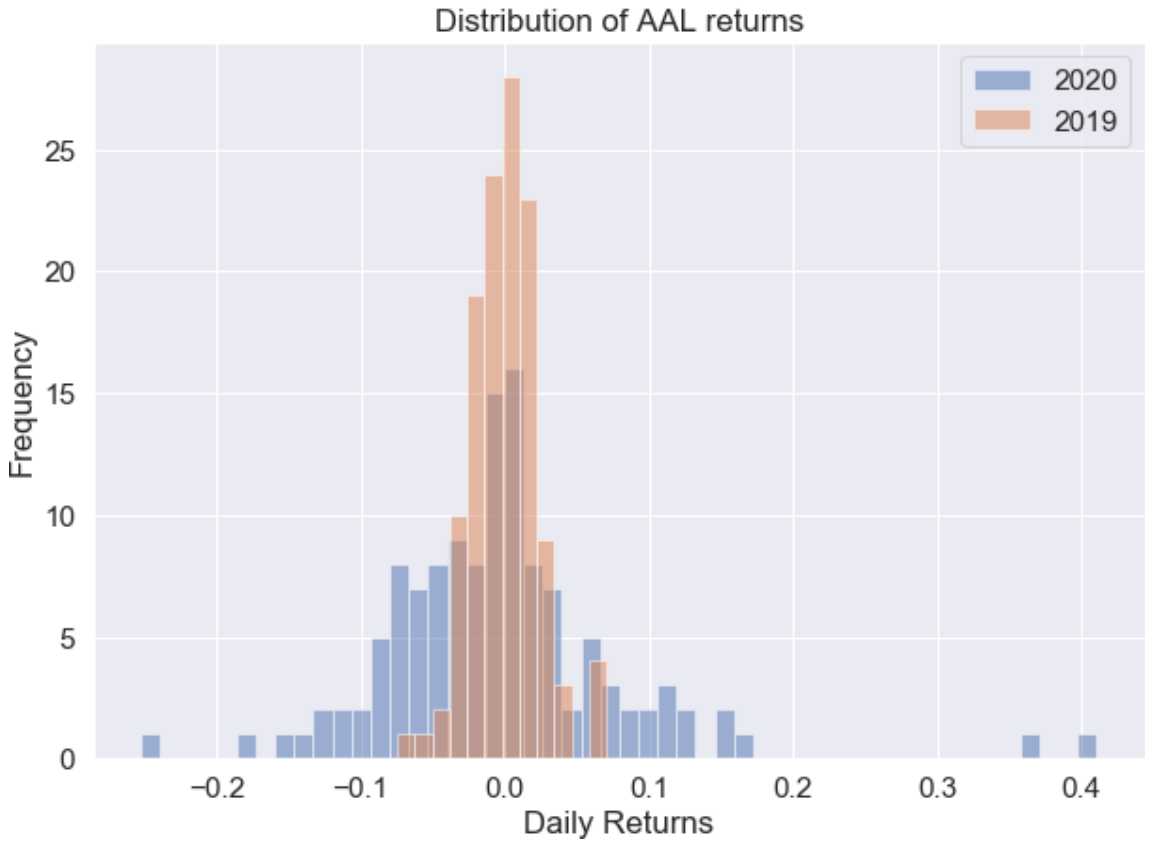



Figure 11. American Airline's (AAL) distributions of the daily returns compared 2019–2020

Now that we've looked at both risk and returns, let's pull them together into one graph.

```
fig = px.scatter(returns, x=returns.mean(), y=returns.std(),
text=returns.columns, size_max=60, labels={
                     "x": "Daily Expected Returns (%)",
                     "y": "Risk",
                 },
                 title="Stock Risk Vs Returns")
fig.update_xaxes(zeroline=True, zerolinewidth=2,
zerolinecolor='Black')#, range=[-0.005, 0.01])
fig.update_yaxes(zeroline=True, zerolinewidth=2,
zerolinecolor='Black')#, range=[-0.01, 0.1])
fig.update_traces(textposition='top center')fig.show()
```


Figure 12. Risk Versus returns for our companies of interest

## Simple Moving Average Trends

There are many ways to plot moving averages, but for simplicity, here I use the cufflinks package to do it for me.

```
# The cufflinks package has useful technical analysis functionality, and we can use .ta_plot(study='sma') to create a Simple Moving Averages plot# User input ticker of interest
ticker = "NFLX"each_df[ticker]['Adj Close'].ta_plot(study='sma',periods=[10])
```


Figure 13: A 10-day simple moving average overlaid on NFLX's closing prices

The moving average smooths out the day-to-day volatility and better displays the underlying trends in a stock price. The higher the time window for the moving average, the clearer the direction of the trend. However, it is also less sensitive to sudden shifts in market dynamics.

You can do a lot with multiple moving averages and comparing them over time. In my other blog, I talk about two trading strategies called the death cross and golden cross.

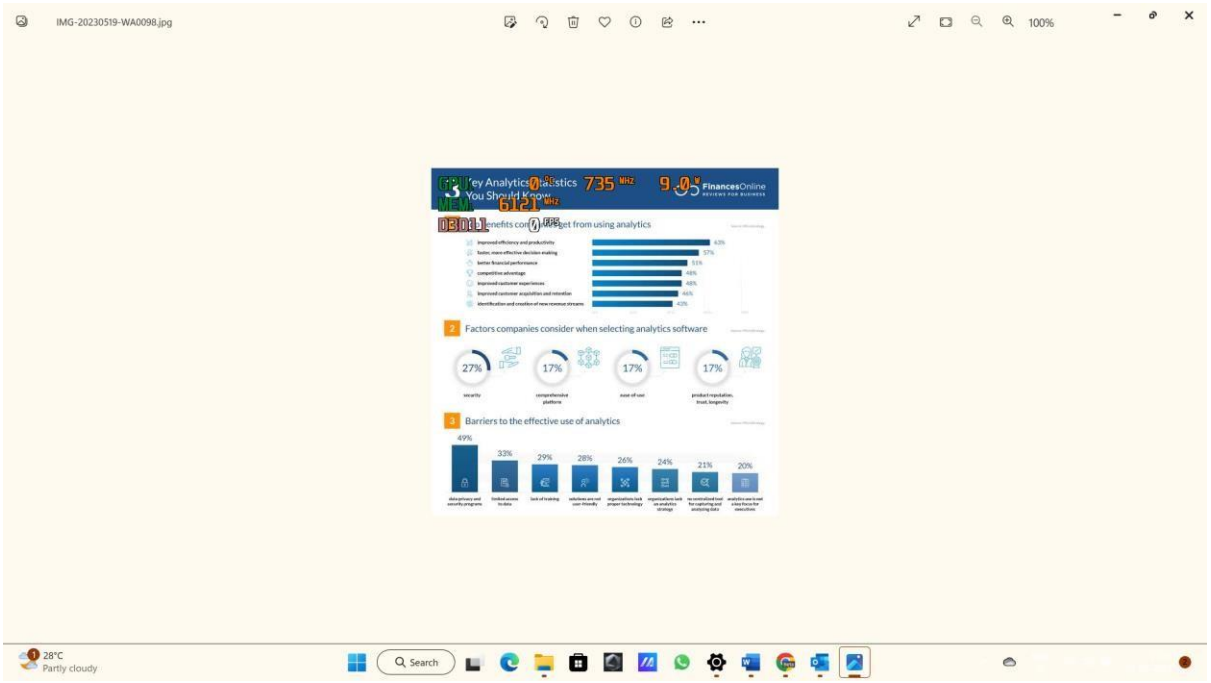
## Bollinger Band Plots

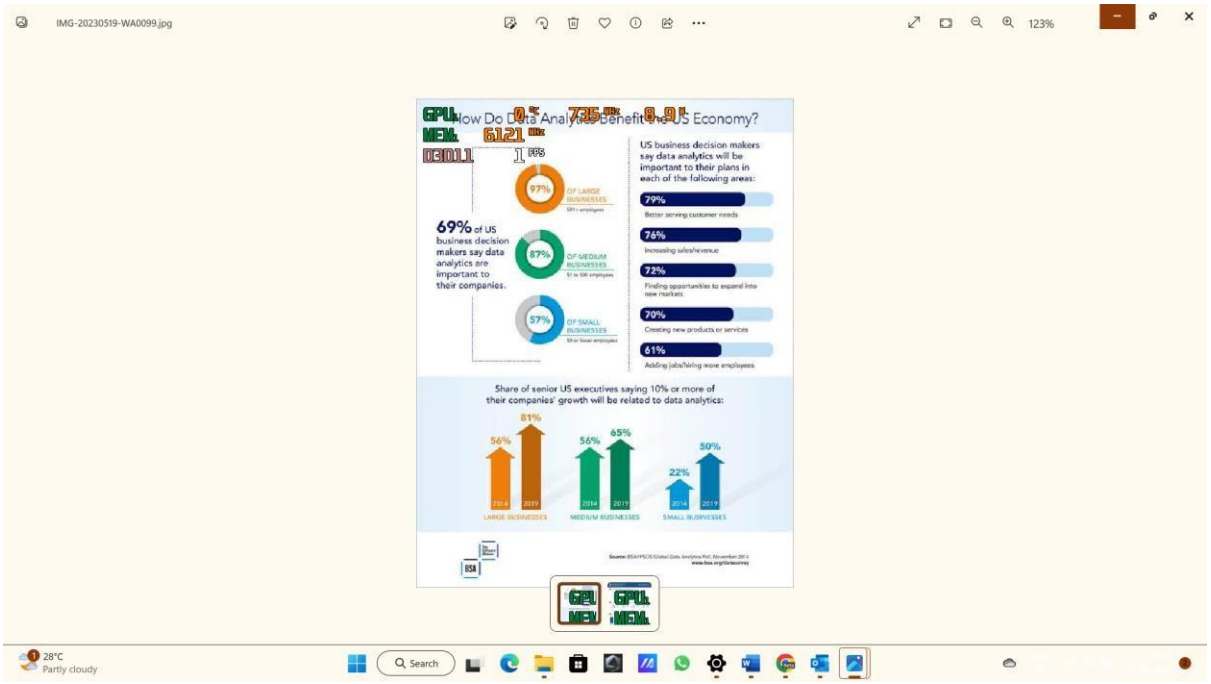
One of the simplest methods I found to plot Bollinger bands using Python is with the cufflinks package.

```
# User input ticker of interest
ticker = "SPY"

each_df[ticker]['Close'].ta_plot(study='boll',
periods=20,boll_std=2)
```


**6. Results**




## 7. Advantages

Freedom of choice, better security, control over time, fulfillment of goals, generational wealth, the ability to align actions with values, and the ability to take risks are some of an individual's benefits when achieving financial freedom.

- You build and protect your credit. When you become financially independent, you are in charge of your credit. ...
- You can save money. ...

- You can make your own decisions. ...
- You can achieve your financial goals. ...
- You can live a stress-free life. ...
- You can retire early.

**Disadvantages**

Not optimizing for maximum financial returns.
When you are financially independent, you don't need more money because you already have money. If the counter party isn't financially independent as well, you start feeling a little slimy for trying to optimize your returns.

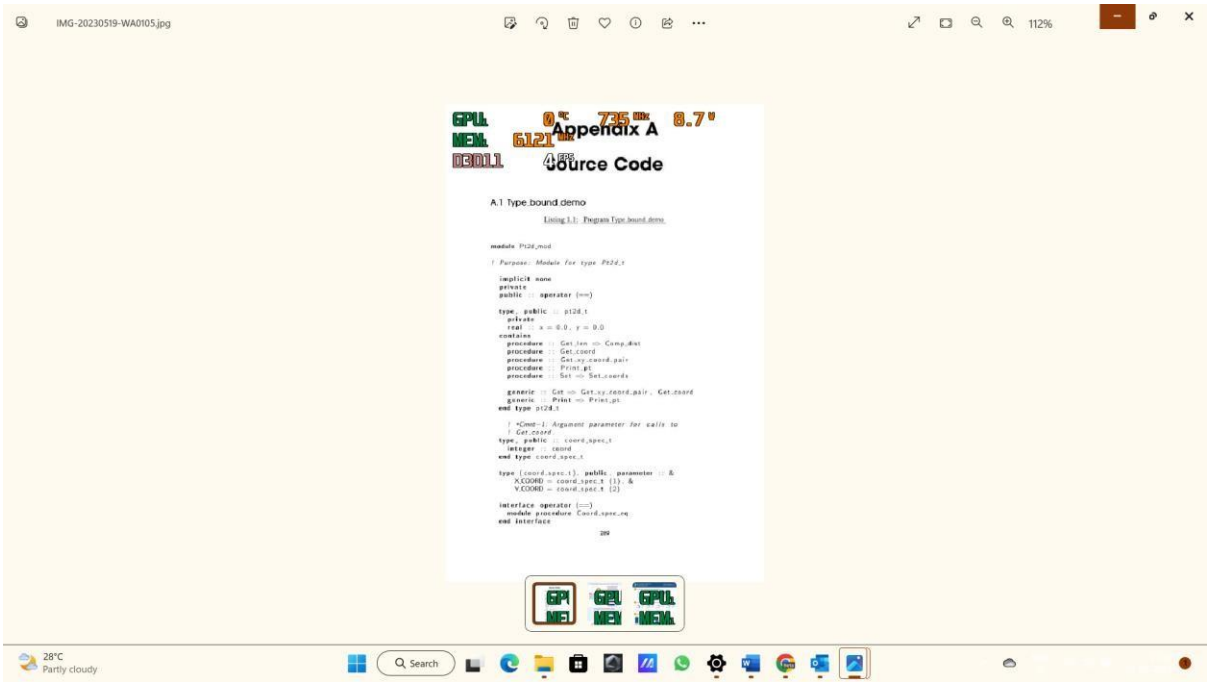
## 8. CONCLUSION

**Financial independence"** in simplest terms means financial security. The broader interpretation of financial independence, however, differs from person to person depending on their personalities and circumstances. For many people, financial independence is job security and career progression. For some people, financial independence can be a secondary source of income, like a spouse who is working or a family business. For retired people, financial security is whether the money they have saved can last for the remaining 20 to 30 years of their lives. Again, there are those, for whom financial security is assured through inheritance. All the interpretations are right or wrong, depending on personal circumstances

## 9. FUTURE SCOPE

The key to achieving **financial independence** is investing in **assets** which generate cash-flows for you. The cash-flows from your assets can be in the form of capital appreciation or income (e.g. interest, dividends etc). Assets which can generate cash-flows are mutual funds, fixed deposits, stocks, bonds, rented out real estate (residential or commercial) etc. Assets which do not generate cash-flows like house where you / your family is living in, cars, jewellery, household appliances etc, are not relevant from financial independence perspective. The cash-flow from your assets should be sufficient to meet your regular monthly expenses and also some unexpected expenses like medical emergencies. You should also have some extra cash-flows for re-investments or growth.
Remember your expenses will keep going up due to inflation. So the cash-flows from your assets should also grow over time.

## 10. APPENDIX




## 10.1 Github link

**https://github.com/naanmudhalvan-SI/PBL-NT-GP-12271-1683873918**

**10.2** https://youtu.be/ot31TtPDRRI