# Acknowledgements

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# 1.0 Introduction

As a student pursuing a Bachelor's degree in Computer Science with a major in Software Development at Swinburne University of Technology, I have completed an internship program at AmBank Group at their AmBank Structured Internship Programme. This internship served as my second professional placement, further building on the experience I gained during my Diploma in Information Technology. My background in computer science and passion for programming have led me to actively seek out educational and practical opportunities to develop my software development skills.

My Diploma in Information Technology provided fundamental knowledge spanning critical technical areas and programming concepts. This included grasping programming logic, object-oriented coding, data structures, and design patterns. A key project illustrating these skills was leading development of a highly graded Android hotel booking application. Additionally, for my final year project, I led a team in creating an advanced web-based HR leave management system. This further exhibited abilities in web development, database logic, and system design. Through these formative educational experiences, I gained well-rounded exposure to diverse facets of information technology and software engineering. Working on robust systems like the HR platform demonstrated analytical thinking and technical acumen that translate well to real-world software development. These opportunities enabled me to establish core programming abilities and kickstarted my journey toward becoming an adept software and data engineer.

Now in my Bachelor of Computer Science, I further learnt more in the advanced levels by involving in many other projects. Being in a degree programme that places a lot of emphasis towards practical and hands-on skills, this is where I was involved in the most assignments and projects in order to maintain a high CGPA. I have involved in various High Distinction level projects that further demonstrates my technical abilities, discipline and time management. I have also previously worked with my external supervisor, Dr. Chew Yew Choong, Chief Data Officer of AmBank Group, during my Software Engineering Project units. This is where I have successfully delivered a Machine Learning model for Bankruptcy Prediction as well as a web application that harnesses this technology. Due to this showcase of my work, I was able to secure a very good internship opportunity at AmBank so that I can further apply my skills in a professional environment.

# 2.0 Organizational Background

This section of the report discusses the brief history and general information of the company where I pursued my internship, which is AmBank Group. The background of the company as well as the department that I was assigned to will be discussed accordingly.

## 2.1 Organization History

AmBank group is one of the leading financial services groups in Malaysia with almost 50 years of experience and is headquartered in Kuala Lumpur. They are formed in 1975 when AmFinance Berhad merged with Malaysian United Finance Berhad (MUI). Today, AmBank Group provides a wide range of both conventional and Islamic banking and financial solutions through its key operating subsidiaries – AmBank (M) Berhad, AmInvestment Bank Berhad, AmIslamic Bank Berhad, AmGeneral Insurance Berhad, and AmMetLife Takaful Berhad. Some of the main products and services offered by AmBank Group include savings and current accounts, deposits, credit cards, personal financing, , corporate banking, investment banking, unit trusts and others.

As a group, AmBank has over 8,000 employees led by Group Chief Executive Officer Dato’ Sulaiman Mohd Tahir. It has a strong focus on community development and sports sponsorship to promote healthy living and education in Malaysia. Through its digital and transformation initiatives, the group aims to provide simpler, faster and seamless customer experiences across all touch points. AmBank Group is listed on the Main Market of Bursa Malaysia with most of its shares owned by Australia and New Zealand Banking Group (ANZ) – one of the top 4 banks in Australia. As an ANZ subsidiary, AmBank Group leverages on the regional expertise and insights of its parent for product innovations that cater to evolving consumer needs in Malaysia.

## 2.2 Group Data & Analytics Department

The department that I was assigned in for my AmBank’s Structured Internship Programme placement is the Group Data & Analytics Department. This department plays a pivotal role in leveraging data to form strategic decision-making, improve business impact and enhance overall operational efficiency in the bank. The department is responsible for collecting, analyzing, and interpreting vast amounts of financial and customer data to derive actionable insights to form said decision-making.

Examples of the departments’ project involve advanced analytic models to assess credit risk, detect fraudulent activities, and optimize marketing strategies. They are also involved in assessing the data architecture within AmBank’s services, where one of their projects involve the goal of achieving consistency between identifying the types or classification of the same customer across their multiple digital services. Additionally, the Group Data & Analytics team also collaborates with other departments to enhance customer experiences by personalizing services and tailoring the digital product offerings. Overall, their efforts contribute to the bank's ability to make informed decisions, manage risks effectively, and deliver value to customers. As an intern, I am assigned to this department to learn and assist the teams that are formed here. The department consists of 4 teams or subdepartments that are responsible for the standard roles in the field of Data.

**Data Engineer Team**

Data Engineers are responsible for designing, constructing and maintaining the bank’s data architecture. They ensure efficient data flow, integration, and storage, supporting the foundation for analytics. Data Engineers work on ETL (Extract, Transform and Load) processes and implement data pipelines, ensuring the availability and reliability of high-quality data for analysis.

**Data Science & Machine Learning Team**

The Data Science & Machine Learning team focuses on developing predictive models, utilizing advanced analytics and Machine Learning algorithms. For example, the projects that they are involved leverages data to provide insights on customer behaviour, credit risk processes, enabling the bank to offer personalized services, manage risks effectively, and optimize various operations.

**Data Analyst & Business Intelligence Team**

The Data Analyst & Business Intelligence department analyzes the data prepared by the Data Engineers to extract meaningful business insights, creating reports and dashboards using Microsoft Power BI for decision-makers. They translate complex data into actionable information for departments such as marketing, finance, and operations. Data Analysts & Business Intelligence play a critical role in monitoring key performance indicators to identify trends and supporting data-driven decision-making across the bank.

**Data Governance & Enablement Team**

The Data Governance & Enablement team ensures the quality, security and especially the compliance of data assets. This team establishes and enforces data governance policies, metadata management, and data quality standards. They collaborate with other teams to ensure adherence to regulatory requirements, mitigate risks associated with data, and enable the organization to derive maximum value from its data assets while maintaining data integrity and confidentiality.

# 3.0 Work Experience

This section of the report discusses the description of the position, experiences and job responsibilities as an intern at AmBank Group as Group Data & Analytics Department.

## 3.1 Position Description

During my internship, I am assigned to the Group Data & Analytics Department under my supervisor, Dr. Chew Yew Choong, as well as along with the 4 subdepartments. However, due to bank security polices, I am not allowed to work with sensitive and private customer data, which is the majority of what the entire department is working with. This internship is focused solely on preparing and teaching me the related processes of the department of the banking industry through observation, as well as a project that was being assigned by the supervisor. This is to prepare myself to eventually become a permanent staff down the road once the internship is finished.

The project that was assigned by my supervisor is titled Dividend Investment Strategy System. This project is established and developed for AmBank’s Structured Internship Programme to demonstrate the capacity of Data and Software Engineering within the Stock Market.

## 3.2 Project Overview

This project is established and developed for AmBank’s Structured Internship Programme to demonstrate the capacity of Data and Software Engineering within the Stock Market. Investing in stocks is considered as a dynamic environment that offers opportunities for financial growth and security. However, there are a lot of inherent uncertainties that makes informed decision a crucial aspect of successful investing. The Dividend Stock Investment Strategy System is an attempt to mitigate the uncertainty by providing a platform for calculating and analyzing financial ratios, with a focus on dividends.

A screenshot of a computer

Description automatically generated

Figure 3.2.1 – System Architecture

The figure above illustrates how the system architecture looks like, as well as the processes involved to assemble the complete product. Firstly, a data source is needed to gather the basic information of the stock market, such as the stock code, their historical prices, quarterly financial reports, and dividend history. This information is available publicly in various stock websites. Upon further research, the websites that will be focused on are Bursa Marketplace, Yahoo Finance and KLSE Screener, since gathering from these three will result in all the data required for this project.

The three targeted website will be used to carry out web scraping process with the use of Python scripts that will collect all the data into a DataFrame. Each website requires different techniques required to web scrape properly, with Yahoo Finance requiring an API, KLSE Screener and Bursa Marketplace requiring complex HTML parsing and pathing to target the specific element and retrieving the value.

Once the large amount of data has been scraped and preprocessed into a DataFrame, further calculation is required to come up with more values. These new values are useful financial ratios in assessing the company’s performance in the stock market such as Earnings per Share, Price to Earnings and so on. Afterwards, each stock code is automatically assessed and graded accordingly based on their financial ratios which will be the system’s recommendation for potential investment. All of the collected and calculated data will be loaded in a SQL Database which can then be used to display on a website developed with a Flask Framework.

## 3.3 Skills & Tools Used

This section involve discussing programming languages, frameworks, libraries, tools and technologies utilized during system development.

**Languages Used:**

1. HTML, CSS, Javascript. The fundamental building blocks of the web development. These three languages work together to create engaging and responsive web interfaces. In the project, they are used to build the frontend of the web application, defining the structure, presentation, and behaviour of the user interface.
2. Python. Used for any data science and engineering processes due to its rich ecosystem of libraries and simplicity.

**Libraries Used:**

1. Flask: A micro web framework written in Python. It is designed to be simple, lightweight and easy to understand. It provides the necessary tools and utilities to build web applications that follows the Web Serve Gateway Interface, supporting various extensions for added functionality. Its simplicity and flexibility makes it an ideal choice in developing our Dividend Stock Investment Strategy System website.
2. SQLAlchemy: Python SQL toolkit and Object-Relational Mapping (ORM) library. It provides a set of high-level APIs for interacting with databases such as SQL, allowing to work with relational databases that houses the collected and calculated data. It offers consistent API for querying, inserting, updating and deleting data.
3. Pandas. Popular open-source data manipulation and analysis library for python. Used for its wide range of functions and methods to clean, transform, filter, and aggregate data that works very well with other libraries.
4. Bootstrap. A front-end framework that allows making simplistic, stylish, and professional looking website much easier.
5. Chart.js. An integral part of the web application that displays interactive charts dynamically based on loaded data in the database.
6. Beautiful Soup.py. Beautiful Soup is a Python library that excels in web scraping tasks. Leveraging its capabilities, our Dividend Investment Strategy System efficiently extracts and parses data from HTML and XML files. Its intuitive navigation and search functions empower us to scrape relevant financial data from sources such as Bursa Marketplace.
7. Tabula.py. Specifically designed for extracting tables from PDFs. In our system, Tabula.py plays a pivotal role in gathering structured stock lists from PDF reports. Tabula.py enhances the automation of data collection, enabling us to integrate valuable insights into our investment decision-making process.
8. Yfinance.py: Yfinance.py is an essential library for fetching financial data from Yahoo Finance. By leveraging this library, our Dividend Stock Investment Strategy System dynamically retrieves real-time stock information, facilitating the timely analysis and adjustment of investment strategies. Yfinance.py enhances the accuracy of our system by providing up-to-the-minute data on stock prices, dividend yields, and other critical financial metrics.

**Tools Used:**

1. Jupyter Notebook. Jupyter Notebook is an open-source web application that allows to create and share documents containing live code, equations, visualizations and narrative text. It provides and interactive environment for data collection and analysis during the ETL process of the system. It supports the Python programming language which makes it an ideal choice for the tasks outlined.
2. Visual Studio Code. A lightweight and versatile source code editor that offers a wide range of features, such as syntax highlighting, code completion and debugging. The Integrated Development Environment houses many features suited for various development frameworks. It is an ideal choice in creating the Flask web application.

# 4.0 Evaluation of Industry Placement

My three-month internship placement at AmBank Group within the Group Data & Analytics department has been an invaluable learning experience that has reaffirmed my commitment in software development. Through meaningful real-world projects, I gained extensive technical skills in data analytics, web scraping, database management, and full-stack web development that align closely with my academic coursework in areas like Introduction to Data Science, as well as Software Engineering Project units.

The Dividend Investment Strategy System project challenged me to leverage data science methodologies to collect, process, analyze and visualize complex financial data. Honing critical skills in Python programming, web scraping techniques, Pandas for data analysis and Chart.js for dynamic data visualizations, I transformed raw data into actionable insights for investment strategies. This underscored the immense value of data analytics in financial and banking services, a rapidly growing domain that leverages interdisciplinary computer science skills.

Additionally, developing an interactive web application demonstrated the real-world applicability of software engineering concepts learned through units like Managing Software Projects. Planning technical specifications aligned with client needs, implementing agile development process, conducting rigorous testing, and comprehensive documentation were integral in delivering a high-quality product to provide value to subscribed users.

Finally working collaboratively with my supervisor and colleagues through meetings, quick review, presentations and documentations refined vital communication and teamwork abilities. Effectively conveying complex technical details or product functionalities to non-technical stakeholders is an indispensable skill in the industry.

Working in this placement has given me an additional insight particularly working at a technical department within an “end-user” organization. Unlike experiences in a typical technology provider role, where projects are often client-driven with external deadlines, working within AmBank as an "end-user" provided a distinct perspective. The projects undertaken were geared toward internal use, serving the bank's specific needs and aligning with its strategic goals. This contrast emphasized the unique dynamic of working with technology within the context of the organization itself, where the deadlines are set by the bank, reflecting the intrinsic needs and priorities of the institution.

Collaborating on projects within an "end-user" organization shed light on the intricate relationship between in-house technical teams and external technology providers. The majority of technical departments within AmBank relied on systems and products from external vendors. This dynamic involves meticulous testing, user acceptance tests, and continuous adjustments to ensure that the products seamlessly align with the bank's business requirements. This experience provided valuable insights into the nuanced interplay between technology providers and end-user organizations, underscoring the importance of internal technological solutions tailored to the specific demands of the organization. It broadened my understanding of the holistic technology ecosystem within a financial institution and the collaborative efforts required to integrate external solutions effectively.

In conclusion, the internship has equipped me with specialized technical expertise through challenging real-world projects, while allowing me to apply interdisciplinary knowledge and skills cultivated in my BCSSUT studies. It has also provided me the additional insight for my future career prospects, making a distinction between working in a technical team for an end-user organization or a technology provider. The experience has undoubtedly reaffirmed my passion for a career involving data analytics and software engineering in the dynamic financial services domain. My expanded skillset and demonstrable development portfolio will be an invaluable asset when seeking graduate roles. I wholehearted recommend future students to undertake an internship to bridge theory and practical experience.