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***COMP3850 Project Deliverable Certificate***

| **Name of Deliverable** | *Deliverable 1* |
| --- | --- |
| **Date Submitted** | *08 / 08 / 2024* |
| **Project Group Number** | *14* |
| **Rubric stream being followed for this deliverable (highlight one)**  ***Note: the feasibility study has the same rubric for all streams.*** | *SOFTWARE Rubric*  *GAMES Rubric*  *CYBERSECURITY Rubric*  *DATA SCIENCE Rubric* |

We, the undersigned members of the above Project Group, collectively and individually certify that the above Project Deliverable, as submitted, **is entirely our own work**, other than where explicitly indicated in the deliverable documentation.

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*NB: please write all details clearly (if handwritten).*

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**List of tasks completed for the deliverable and activities since last deliverable certificate with totals for each individual team member and whole team** *(copy individual total row for each member and copy pages if more pages needed)*

| **Performed by  *(Names)*** | **Duration *(hrs)*** | **Complexity  *(L, M, H)*** | **Name of task** | **Checked by  *(Initials)*** |
| --- | --- | --- | --- | --- |
| Noorullah Khan | 0.5 | Mid | Initial Project Thought | QN |
| Noorullah Khan | 2 | High | Detailed Project Proposal | QN |
| Noorullah Khan | 1 | High | Data Source Research | AC |
| Noorullah Khan | 3 | Mid | Deliverable 1 tasks | QN |
| Noorullah Khan | 0.5 | Low | Wrote and Formatted Weekly Reports Document | QN |
| Noorullah Khan | 0.5 | Mid | Managing deliverable, assigning tasks to be done and checking which have been done, clearing questions and inconsistencies | AC |
| Noorullah Khan | 0.5 | Mid | Deliverable 1 tasks 3.1 | QN |
| Noorullah Khan | 1 | High | Setting up Monday Project Management | AN |
| Noorullah Khan | 0.75 | High | Setting up Trello/Jira Project Management software | AC |
| Noorullah Khan | 1 | High | Planning database Layout and Columns with Adam | QN |
| Noorullah Khan | 0.75 | Mid | Working on Deliverable 1 Alternatives Firebase | QN |
| Noorullah Khan | 1.5 | Mid | Week 1 EY Meeting | QN |
| Noorullah Khan | 1 | Mid | Week 2 Post Lecture Meeting Team meeting | QN |
| Noorullah Khan | 1.5 | Mid | Week 2 EY Meeting | QN |
| Noorullah Khan | 1 | Mid | Week 2 online Meeting | QN |
| Noorullah Khan | 3.5 | Mid | Week 3 Post EY Team meeting | QN |
| Noorullah Khan | 0.5 | High | Building Gantt Chart on Jira | QN |
| Noorullah Khan | 0.5 | Mid | writing in Team Manual about new PM tool, Jira | QN |
| Noorullah Khan | 0.75 | High | Finding Data Sources with Adam (online) | AN |
| Noorullah Khan | 1 | Mid | Reading through Deliverable 1 and Team Manual and fixing typos, inconsistencies | AN |
| Ninuri Mahagoda | 1.5 | Mid | Creates shared google drive and shared docs for deliverables | TV |
| Ninuri Mahagoda | 2 | High | create 30+ User Stories for 7 Epics | TV |
| Ninuri Mahagoda | 3 | Mid | Deliverable 1 - Feasibility Report Task 2 | QN |
| Ninuri Mahagoda | 2.5 | High | Edited User Stories and added acceptance criteria for each | TV |
| NInuri Mahagoda | 1.5 | Low | Deliverable 1 - Team Manual | NK |
| NInuri Mahagoda | 0.25 | Mid | Branstorm MVP | QN |
| Ninuri Mahagoda | 1.5 | Mid | Week 1 EY Meeting | NK |
| Ninuri Mahagoda | 1 | Mid | Week 2 Post Lecture Meeting Team meeting | NK |
| Ninuri Mahagoda | 1.5 | Mid | Week 2 EY Meeting | NK |
| NInuri Mahagoda | 1 | Mid | Week 2 online Meeting | NK |
| NInuri Mahagoda | 3.5 | Mid | Week 3 Post EY Team meeting | NK |
| NInuri Mahagoda | 3 | Mid | Edited, and reviewed deliverable 1 before submission | TV |
| Tashiya Vilathgamuwa | 2 | High | Create 30+ User Stories for 7 epics | NM |
| Tashiya Vilathgamuwa | 1 | Mid | Research- what columns we would need to train for Life insurance claims | AN |
| Tashiya Vilathgamuwa | 2.5 | Mid | Feasibility Report tasks - 4.1 | QN |
| Tashiya Vilathgamuwa | 2.5 | High | Edited User Stories and added acceptance criteria for each | NM |
| Tashiya Vilathgamuwa | 1 | Mid | Team Manual | NM |
| Tashiya Vilathgamuwa | 2 | Mid | Feasibility Report - Edit 4.1 and added recommended solution | NK |
| Tashiya Vilathgamuwa | 0.25 | Mid | Brainstorm MVP | AN |
| Tashiya Vilathgamuwa | 1.5 | Mid | Week 1 EY Meeting | AN |
| Tashiya Vilathgamuwa | 1 | Mid | Week 2 Post Lecture Meeting Team meeting | AN |
| Tashiya Vilathgamuwa | 1.5 | Mid | Week 2 EY Meeting | AN |
| Tashiya Vilathgamuwa | 1 | Mid | Week 2 online Meeting | AN |
| Tashiya Vilathgamuwa | 3.5 | Mid | Week 3 Post EY Team meeting | AN |
| Tashiya Vilathgamuwa | 3 | Mid | Edited, and reviewed deliverable 1 before submission | NM |
| Quoc Hung (Alan) Nguyen | 1 | High | Feedback and modify Project Proposal | NK |
| Quoc Hung (Alan) Nguyen | 1 | Mid | Feasibility report part 5 | NK |
| Quoc Hung (Alan) Nguyen | 1.5 | Low | Team manual part 1 and 4 | NK |
| Quoc Hung (Alan) Nguyen | 1.5 | Low | Set up Discord server and invite group 13+14 and mentors  | on-going | NK |
| Quoc Hung (Alan) Nguyen | 2 | High | Learn and work with Microsoft Purview to determine if it is appropriate  | on-going | AN |
| Quoc Hung (Alan) Nguyen | 3 | High | Learn about Azure (preparation for coming weeks) | AZ-305  certification | on-going | AN |
| Quoc Hung (Alan) Nguyen | 1 | High | Learn about Transformer and Convolutional Neural Network  model and ways to work with it | on-going | AN |
| Quoc Hung (Alan) Nguyen | 1 | Mid | Re-write 4.2 | TV |
| Quoc Hung (Alan) Nguyen | 1.5 | High | Learn about GitHub workflow in a team setting to set it up | NK |
| Quoc Hung (Alan) Nguyen | 0.25 | Mid | Brainstown MVP | NM |
| Quoc Hung (Alan) Nguyen | 1.5 | Mid | Week 1 EY Meeting | NM |
| Quoc Hung (Alan) Nguyen | 1 | Mid | Week 2 Post Lecture Meeting Team meeting | NM |
| Quoc Hung (Alan) Nguyen | 1.5 | Mid | Week 2 EY Meeting | NM |
| Quoc Hung (Alan) Nguyen | 1 | Mid | Week 2 online Meeting | NM |
| Quoc Hung (Alan) Nguyen | 3.5 | Mid | Week 3 Post EY Team meeting | NM |
| Aasnayem Gazzali Chowdhury(Adam) | 0.5 | Mid | Review and Edit the research on the columns to train for Life insurance Claims | NK |
| Aasnayem Gazzali Chowdhury(Adam) | 1.5 | High | Data Source and Insurance Claims Research | NK |
| Aasnayem Gazzali Chowdhury(Adam) | 4 | Mid | Deliverable 1 tasks - 1.3, 1.4, 4.2 | QN |
| Aasnayem Gazzali Chowdhury(Adam) | 1 | High | Planning database Layout and Columns with Noor | NK |
| Aasnayem Gazzali Chowdhury(Adam) | 1.5 | Mid | Editing Deliverable 1 tasks and working on 4.2(Disadvantages) | TV |
| Aasnayem Gazzali Chowdhury(Adam) | 1 | Mid | Draft database table | NK |
| Aasnayem Gazzali Chowdhury(Adam) | 1.5 | Mid | Week 1 EY Meeting | TV |
| Aasnayem Gazzali Chowdhury(Adam) | 1 | Mid | Week 2 Post Lecture Meeting Team meeting | TV |
| Aasnayem Gazzali Chowdhury(Adam) | 1.5 | Mid | Week 2 EY Meeting | TV |
| Aasnayem Gazzali Chowdhury(Adam) | 1 | Mid | Week 2 online Meeting | TV |
| Aasnayem Gazzali Chowdhury(Adam) | 3.5 | High | Week 3 Post EY Team meeting | TV |
| Aasnayem Gazzali Chowdhury(Adam) | 1 | Mid | Finding Data Sources with Noor(online) | NK |
| Aasnayem Gazzali Chowdhury(Adam) | 2.5 | High | Learn about git and collarborative workflow in git | NK |
| Aasnayem Gazzali Chowdhury(Adam) | 1 | Mid | Review pandas package in python for future use | QN |
| **Ninuri Total** | 22.25 |  |  | Q |
| **Tahiya Total** | 22.75 |  |  |  |
| **Noorullah Total** | 22.75 |  |  |  |
| **Alan Total** | 22.25 |  |  |  |
| **Adam Total** | 22.5 |  |  |  |
| **TEAM TOTAL** | **112.5** |  |  |  |

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# FEASIBILITY REPORT

## Introduction

Insurance fraud is any act which is done to defraud the insurance process such as submitting fraudulent insurance claims, one main methods of insurance fraud. The goal is to get a benefit or advantage that the applicant is not entitled to. Insurance fraud costs Australians $2.2 Billion every year (Fraud Bureau of Australia, 2024). The client NRMA wants a solution using GenAI (Generative AI) which will aim to prevent/mitigate the success of fraudulent insurance claims.

### 1.1. Problem Identification

* **High Cost of Fraud:** Insurance fraud costs Australians AUD $2.2 billion each year (Fraud Bureau of Australia, 2024). Processing and approving fraudulent insurance claims are a significant contributor to this problem, where individuals submit untrue or exaggerated claims to get benefits they are not entitled to (Fraud Bureau of Australia, 2024).
* **Manual Detection Methods:** Relying on traditional and manual methods to detect fraud insurance claims is what NRMA and the rest of the industry relies on. These methods are time-consuming and resource intensive. They are also often insufficient to catch the ever evolving, often sophisticated tactics used by fraudsters and scammers (Insurance Council of Australia, 2023).
* **Lack of Real-Time Analysis:** An approval of fraudulent claims can take place because of the delay it takes the existing system to properly investigate such claims (Smith & Jones, 2022). The existing system doesn’t provide real-time feedback or analysis on the legitimacy of claims or the latest tactics and schemes being used by malicious parties.
* **Data Silos:** The ability to detect patterns indicative of fraud is hindered due to the lack of integration between the different data sources (fragmentation). This fragmentation makes it difficult to gain comprehensive insights into claims (Brown, 2023).
* **Inefficient Use of Resources:** Resources such as the considerable time NRMA staff spend reviewing and processing each claim because of the limitations of current fraud detection methods could be better utilised in other areas (NRMA Annual Report, 2023).
* **Evolving Fraud Tactics:** The tactictics used by fraudsters to exploit vulnerabilities in the process are always evolving. The current approach used by NRMA and other companies in the industry may not be agile and versatile enough to adapt to all the new fraud strategies quickly enough (Wilson, 2023).
* **Need for Automated Solutions:** There is currently a reactive fraud management mindset instead of a proactive approach (Taylor, 2023). This is because there is no advanced automated system which can continuously monitor and analyse claims data and applicants for fraudulent claims and malicious actors.
* **Competitive Pressure:** In an industry as competitive as insurance, the NRMA’s potential inability to effectively manage fraud impacts its brand image and market position. This can lead to competitors who employ more advanced fraud detection techniques to gain a competitive advantage (Insurance Times, 2023).
* **Client Demand for Innovation:** It is recognised by NRMA and others in the insurance industry the need for innovation solutions enhancing fraud detection. GenAI (Generative AI) integration presents an opportunity for NRMA and the industry to modernise and improve the effectiveness of their fraud detection processes (NRMA Innovation Report, 2023).

### 1.2. Opportunities

NRMA can gain many opportunities and advantages by implementing a comprehensive fraud detection database system. These benefits include operational efficiency, financial savings, customer satisfaction and market positioning.

* By using a comprehensive database system, a GenAI model for fraud detection can be created. This can greatly improve the precision and success of fraud detection by pinpointing patterns and anomalies that conventional methods could overlook.
* By streamlining the fraud detection process with automation, the need for manual work will be decreased. This will enable NRMA agents to dedicate their time to intricate and valuable duties.
* Effectively identifying and stopping false claims can lead to significant financial benefits for NRMA, which can then be used to fuel the growth of the company.
* Quicker and more precise processing of claims improves the customer's satisfaction and loyalty levels.
* Using GenAI offers important information and analysis on claims patterns and fraud trends, leading to improved decision-making.
* NRMA's use of cutting-edge AI tools for spotting fraud showcases the company as a pioneering force in the insurance sector.
* A system powered by GenAI can manage growing numbers of claims without needing more money for operations.
* Advanced techniques for detecting fraud help NRMA to stay ahead of regulations and show proactivity in fighting insurance fraud.
* Investing in GenAI technology helps NRMA stay ahead of changing fraud tactics and new risks, guaranteeing long-term success.

### 1.3. Mandates

#### Privacy Policy:

While choosing or creating the dataset, it has to be ensured that the Australian Privacy Principles are followed. Clause 3.1 in the Australian Privacy Principles states that there should not be any personal data such as names, phone numbers, and addresses in the dataset unless it is really necessary (OAIC, 2014). The only way to include personal details is if only the individual consents.

#### Risk Mitigation:

NRMA will handle insurance claims. Its crucial to have risk provisions, in place. The risk management policies play a role in maintaining the companys security. It is important to ensure that the system is precise and effectively identifies insurance claims. Additionally having an incident response plan in place establishes steps to follow when dealing with claims. Therefore accuracy in the model and a defined response plan are essential, for handling fraudulent insurance claims.

#### Microsoft Products:

NRMA is a Microsoft partner. Therefore, the use of Microsoft products is mandated. The use of non-Microsoft products is not recommended.

### 1.4. Assumptions

In order to implement the planned solution which is a GenAI model which can detect fraudulent insurance claims, some assumptions should be considered for better clarity. Some of these assumptions are listed below.

* **Availability and quality of data:** The comprehensive database system will make it possible to train a GenAI fraud detection model. In order to train the model the database/dataset must be diverse, detailed and of high quality. High quality data is accurate, reliable, and relevant. Therefore, high quality data is essential to train the model.
* **Access to Microsoft products:** As mentioned before, NRMA is a microsoft partner. So, it can be assumed that access to Microsoft products will be provided within reason.
* **Combining data:** As this is going to be a fairly large dataset, another assumption is that data from various sources can be combined to create one unified dataset. This will aid in analysing fraudulent claims as different types of data can be assessed.
* **Support from NRMA:** It is assumed that NRMA will provide adequate support in the technical department so that the process of developing the model is smooth.
* **Scope of the system:** It is assumed that the system is expected to analyse the data and detect claims. If any suspicious claims are detected the claims manager will then make a decision on whether to proceed with the claim or not.
* **Proper communication between the Data and AI teams:** Building a proper model needs direct communication and collaboration between both parties. Therefore, it is assumed that there will be genuine communication between the two teams.
* **Integration of the system:** It has to be ensured that NRMA’s IT infrastructure can accommodate the new system.
* **Data privacy measures:** It is also assumed that the different data privacy protocols such as access controls, two-factor authentication, etc are in place to ensure the security of the process.

## 2. Current Situation

### 2.1. NRMA

NRMA is one of Australia’s and New Zealand’s largest general insurer backed by IAG providing insurance for cars, homes, travel, business, motorcycles, boats, caravans, and security (NRMA, n.d.). Formerly standing for National Roads and Motorists’ Association the organisation has now grown beyond just roadside services (Insurance Business, n.d.). NRMA strives to provide a wide range of insurance solutions to protect your items and make your world safer (NRMA, n.d.). Currently in the Insurance Industry the estimated range of fraudulent claims are said to be between a range of 3%-10% (Baldock, 1997). With areas such as travel insurance claims having 20% of claims be fraudulent while in professional indemnity claims only 2% are said to involve fraud (Baldock, 1997). NRMA and other Insurance companies use a lot of time and resources to identify and handle fraud and even then fraud still happens as offenders change there tactics and methods of submitting fraudulent claims.

### 2.2. Work Processes

When a customer makes a claim to NRMA insurers will investigate the claim to ensure the claim is genuine and it follows the company's policy. This is done to make sure that no fraudulent claims are made to NRMA.

A research done by the Australian Securities and Investments Commision (ASIC) highlights various heavy-handed practices done by insurance companies when investigating suspected fraudulent claims (Collett, 2019). ASIC found that insurers were putting customers through unreasonable, lengthy and confusing processes when investigating claims (Collett, 2019). This includes unexplained information requests, social media histories, criminal record checks, telephone and text message records, birth certificates, financial statements and information on family and friends (Collett, 2019). Additionally, it was found that support for additional needs was inadequate in which customers with poor English proficiency were not provided translators (Collett, 2019). Further, backed by statements from the Director of Casework at the Financial Rights Legal Centre where these processes match experiences told by consumers on the Insurance Law Service Line where they were subjected to bully behaviour, threats, harassment, long interviews and were treated like criminals (Collett, 2019).

A comprehensive car insurance claim sent to NRMA by Mr Mrad for a stolen car was denied for the reason that “he had not proven a loss and had not dealt with the insurer in good faith” (Collett, 2019). When he was not provided the evidence used to deny the claim he sought help with the Financial Rights Legal Centre leading to the claim being finally resolved two years later (Collett, 2019). A spokesperson for IAG addressed the poor and lengthy claim investigation experienced by Mr Mrad and stated that they have improved their investigation process from identifying claims and reducing time-frames (Collett, 2019).

This highlights the problems identified in Section 1 of manual detection methods and inefficient use of resources. Manual detection methods can be seen to be used by insurers which results in lengthy waiting periods for claims and higher chances of errors when investigating claims. Additionally, inefficient use of resources when investigating claims wastes time for both the company and the customer with only very few investigated claims being a real fraud claim.

### 2.3. Products and Clients

NRMA Insurance provides various products to a wide selection of clients:

* **Individual Policyholders:** one of the main clients of NRMA as they offer products such as insurance for:
  + **Motor vehicle owners:** These are for vehicles such as cars, motorcycles, boats, and caravans to help them be insured in case of damage, thefts, and liabilities (NRMA, n.d).
  + **Homeowners:** To help individuals who want coverage for their home buildings and contents in the case of theft or damage (NRMA, n.d).
  + **Travellers:** To help individuals with issues such as 24-hour emergency assistance, existing medical conditions, and trip cancellation for international and domestic travel (NRMA, n.d).
  + **Landlords and Renters:** to protect their rental property (holiday rentals and residential strata) from damages, loss of rent, and issues with tenants (NRMA, n.d).
* **Businesses:** NRMA offers coverage for businesses ranging from small to medium enterprises to large corporations for property, business interruptions, employee-related risks, liability, and industry-specific risks (NRMA, n.d).
* **Specialty Insurance Clients:** NRMA also offers comprehensive insurance packages for individuals who are looking for high-value coverage on their motor vehicles, homes, and personal property (NRMA, n.d).
* **Extra coverage:** NRMA also provides clients insurance for their security items such as alarms, CCTV and monitor and alarm responses in the case of damages or thefts (NRMA, n.d).

## 3. Benefits

### 3.1. Tangible Benefits

#### Cost Savings:

NRMA can save large amounts of money by being able to accurately detect and prevent fraudulent insurance claims which would have otherwise been lost to fraud. These savings can improve profitability or be reinvested into the business to enhance services and reduce customer premiums.

#### 

#### Enhanced Operational Efficiency (Time Saving):

By implementing the comprehensive database system which makes the AI automated fraud detection process possible, it reduces the manual and personal effort required by NRMA agents. This also allows for NRMA agents to instead focus on more complex and high-value tasks. This will improve overall productivity of NRMA and reduce the time taken to process claims.

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#### New Products and Services:

NRMA can offer its comprehensive database system (which can be used to power GenAI Enhanced Fraud Detection Services) to other insurance companies. This will generate additional revenue along with positioning NRMA as an industry leader. It will allow for other companies to benefit from improved fraud detection without needing the RnD (research and Development) to make their own systems (Fraud Bureau of Australia, 2024).

NRMA also has the opportunity to develop a Customer-Focused Fraud Prevention Alerts service which will also be powered by the comprehensive database system. This can alert customers on tips to prevent fraud and notify them if something fraudulent appears in their email. This can be a form of Email Insurance product which NRMA can market. This would also enhance customer security and satisfaction and enhance NRMA’s reputation and brand image in proactive fraud prevention (Smith & Jones, 2022).

NRMA could also create a Data Analytics and Insights Platform which will be powered by insights from the comprehensive database system. This will offer detailed insights and analytics into fraud trends and patterns. This platform can be offered to businesses and policymakers as a subscription basis service. It will allow them to make better decisions using valuable insights and learn better fraud detection strategies to combat the ever evolving tactics of fraudsters. This will allow NRMA to have influence outside just the insurance industry and enter the cybersecurity and risk management industries (Brown, 2023).

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### 3.2. Intangible Benefits

#### Data Driven Decision Making:

The implementation of a comprehensive database for fraud detection system will provide NRMA with valuable insights and analytics into claims patterns, fraud trends and into the wider market. Using these insights, data-driven decision making can take place which will help NRMA to refine its policies, improve risk management and develop targeted strategies to combat the ever changing and evolving threat of insurance fraud.

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#### Competitive Advantage:

By implementing the use of a comprehensive fraud detection database which can be used by advanced AI technologies, NRMA will be positioned as a leader in innovation and in the insurance industry. This has potential to enhance NRMA’s reputation, giving it a step above competitors such as QBE and Allianz and attract new customers. This enhanced reputation can also reveal new business opportunities and partnerships.

## 4. Alternative Solutions

### 4.1. Data pipeline with Firebase’s Firestore

#### 4.1.1 Advantages

##### Strategic Considerations:

* **Accelerated time to market:**  With Firebase's range of tools and services our team can speed up the development and deployment process helping NRMA bring their fraud detection system to market faster. This swift rollout can give NRMA an advantage by enabling them to respond to fraud threats compared to their competitors. For instance our developers can make use of Firebase's configured data storage and real time database features to significantly shorten the development cycle delivering a functional prototype, in a more timely fashion.
* **Advanced Data management:** Firebase offers data management tools that simplify the handling of datasets. For example Firebase cloud functions can automate data processing tasks like cleaning and transforming data into insights. Our team can establish triggers for data processing, reducing efforts and ensuring that the fraud detection system functions with current information.

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##### Economic Considerations:

* **Cost Effective:**By utilising Firebases pay as you go pricing model NRMA only pays for the resources utilised. For example Firebase's cloud firestore automatically scales with data volume and user interactions with costs incurred based on usage, rather than a fixed rate. With this flexibility we have it would be really helpful because it lets our client handle our teams costs efficiently
* **Efficient resource utilisation:** Firebase's ability to scale dynamically ensures that resources are used effectively, adapting automatically to meet the demands of the fraud detection system. For instance when there is a lot of data activity like during peak times, for submitting claims Firebase can increase its resources to manage the workload. This prevents provisioning and underutilization ensuring that NRMA only pays for what's actually used. That's why Firebase is effective in managing resources as it helps control costs and optimise the value of the system.

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##### Technical Considerations:

* **User Friendly Interface:** Firebase has an interface that's easy for everyone to use without needing knowledge of SQL making it accessible for those with no coding background. For example Firestore and realtime databases in Firebase use an interface and simple query methods that let non technical users manage and work with data efficiently. This user friendliness ensures that NRMA staff members who aren't tech savvy can easily navigate through and utilise the fraud detection system.
* **Low Computational requirements:** Firebase is designed to work on devices, with processing power. For example Firebase's real time databases and cloud functions are built to run efficiently on devices, with power or limited resources. This means that NRMA users can utilise the system across platforms, including mobile devices without requiring substantial computational power.
* **Web Development optimisation:** Another advantage of Firebase is its focus on web development offering tools and features that simplify the process of creating and launching web applications.

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##### Operational Considerations:

* **Reliability and Performance:** Firestore is a regional and multi-region solution that scales automatically and by housing data across multiple data centres it can ensure string reliability and global scalability (Firebase, 2019).
* **Uptime:** Firestore has a typical uptime performance of 99.99% and it is good for apps in which availability is of the most importance (Firebase, 2019).

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##### Planning Considerations:

* **Useability:** Firestore is easy to get up and running and has features such as offline support and real time support so help users when a problem arises. Furthermore, there are a lot of resources and documentation on the software available from the community to make the learning process easier for newcomers (Firebase, 2019).

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#### 4.1.2 Disadvantages

##### Strategic Considerations:

* **Integration Limitations:** Firebase may not integrate as seemingly with Microsoft Power BI and other BI tools. The ability to generate business insights and visualisations for stakeholders could thus potentially be hindered by use of Firebase.
* **Venor Ecosystem Lock-In:** It could be difficult to switch or integrate to other platforms down the line if we rely on Firebase. This is because Firebase can lead to vendor lock-ins and compatibility issues. Alternatives offer more versatile ecosystems which are used widely in enterprise development environments.
* **Limited Multi-Region support:** Despite Firebase’s Firestore offering multi-regional support and it being possible for your data to be replicated across data centres in different geographical areas, it is still limited compared to other cloud database services. This is especially prevalent in terms of multi-regional configuration options and flexibility.

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##### Economic Considerations:

* **Cost Management:** Firebase operates on a pay-as-you-go model meaning costs increase based on increased data usage and scalability. This unpredictability can cause price surges. More comprehensive cost management tools are offered by alternatives including discounts for enterprise usages.
* **Resource Allocation:** Firebase is a non-SQL system which may require the team to undergo additional training and resources. This can increase the project costs.

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##### Technical Considerations:

* **Querying Capabilities:** Compared to SQL databases, Firebase’ querying capacities are limited. This makes it more difficult to use complex queries and advanced data manipulation strategies.
* **NoSQL Schema Design:** More careful planning and design is required to ensure consistency and avoid data duplication due to Firestore’s NoSQL structure. This is more difficult than relational databases where relationships are defined and use keys.
* **Data Consistency:** There may be a lag before all data reflects the latest writes because Firestore uses eventual consistency. Applications that require strong consistency guarantees such as machine learning models can find this problematic.
* **Tool Compatibility:** Firebase has limited libraries and developmental tools than SQL-based systems.
* **Development Tools:** Google Cloud Functions and Google Scripts are what is used by Firebase. This will require adjustments to existing development environments which are all configured to rely on SQL, Python and PtSparks.
* **Performance and Scalability:** Firebase can have issues when handling very large datasets and complex transactions.

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##### Operational Considerations:

* **Operational Differences:** A different skillset is required when developing, managing and maintaining a NoSQL database like Firestore. Unnecessary operational complexity can arise when ensuring data integrity in a NoSQL database.
* **Security and Compliance:** Despite Firebase’s Firestore having robust security features, it may not meet all the specific regulations which larger enterprises need especially when handling sensitive data. This could be because its encryption and backup have been optimised to work on all devices and machines including low powered.

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##### Planning Considerations:

* **Data Migration Challenges:** It can be time-consuming and complex to migrate data from a traditional relational database to Firestore. This is mainly because data will need to be restructured from a relational schema to a NoSQL format.
* **Learning Curve:** For teams used to working with SQL, there is a significant learning curve to start working with Firestore. This can slow-down the development process.
* **Long Term Scalability:** Despite Firestore being scalable, it is not as efficient as other databases for working with extremely large datasets and complex transactional workloads as enterprise-scale database systems. Long term strategic goal suitability could be limited by this.

### 4.2. Data pipeline with Azure Services

#### 4.1.1 Advantages

##### Strategic Considerations:

* **Scalability:** Azure services provide elastic scaling, allowing data pipelines to handle increasing data volumes and dynamic processing demands. It can scale up and down quickly according to demand at no extra cost. For example, we can provision a dedicated SQL database in Azure Synapse Analytics for scalable data warehousing with ease.
* **Integration:** Azure Data Factory supports integration with a wide range of data sources and applications. This is particularly useful for our project as we will need to ingest data from many sources.
* **Global Reach:** We can take advantage of Azure's global network of data centres to ensure optimal performance by deploying solutions in regions close to your data sources and end-users.

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##### Economic Considerations:

* **Cost efficiency and optimisation:** Azure follows a a pay-as-you-go model allowing clients to manage their costs effectively by paying for only the resources they use. Tools such as Azure Cost Management allow clients to monitor and control spending, Azure Cost Alerts are used to notify the client on their potential overspending and Azure Cost Analysis allow the client to analyse their spending patterns to optimise their resource usage.Our client can also set out budgets which help in maintaining financial discipline by setting spending limits and tracking expenses.
* **Reduced Capital Expenditure:** Utilising Azure’s cloud infrastructure minimises the need for significant upfront investments in hardware and especially maintenance. For example, we can provision Azure Virtual Machines to adapt to our on-demand computing needs without upfront hardware cost. We can ensure cost efficiency by decommissioning virtual machines when they are no longer needed to avoid unnecessary expenses.

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##### Technical Considerations:

* **Advanced analytics capabilities:** Azure supports advanced analytics capabilities with its tool Azure Stream Analytics. This allows clients to process and analyse real-time data streams to acquire immediate insights and results in the ability to take prompt actions based on the data.
* **Automation and orchestration:** Again, Azure Data Factory offers easy to use automation and orchestration of data workflow, enhancing efficiency and avoiding manual tasks which overall reduce error. Moreover, Azure Data Factory help us visualise data flow which makes it easy to understand the origin of our data.
* **Security and compliance:** Azure ensures high levels of security with features like data encryption with Azure Key Vault and identity management with Azure Entra ID.

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##### Operational Considerations:

* **Reliability and availability:** Azure guarantees high availability and robust disaster recovery if the infrastructure is architected correctly, ensuring continuous operation of data pipelines. Azure’s Service Level Agreement for many services guarantees a 99.99% uptime, which means they can only be down for approximately 52 minutes per year. That is incredibly low considering the scale of Azure’s global data centres and the management of numerous services.
* **Monitoring and diagnostic:** Azure Monitor and Azure Log Analytics provide a comprehensive monitoring and diagnostics tools to track pipeline health and performance.
* **Support:** Azure provides well-written documentation on their services as well as mainingting an active community forums to answer any questions we might have while developing and maintaining the solution. They also offer various levels of support through Azure Support Plans.

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##### Planning Considerations:

* **Free training and development:** Besides from our training documentation, Azure provides many free training and upskilling. Thus, our client can use Microsoft Learn to train their employees and get certification

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#### 4.1.2 Disadvantages

##### Strategic Considerations:

* **Flexibility:** Sticking with one particular service provider which are Azure services in our case can limit NRMA’s strategic plans. The company will not be able to adapt to newer technologies if they choose one particular platform. Companies fall behind if they are not able to improvise which will hamper the progress of the company. Changing services will be tough if we stick with azure. Integrating new services will also be harder if NRMA sticks with one service provider.

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##### Economic Considerations:

* **High costs:** Training employees on a new service platform can be costly. More resources will be required compared to normal while training a whole set of employees. Even though it is cheaper initially to implement, ongoing costs may increase if the amount of storage needed increases.
* **Licensing costs:** Some services on Azure are not free. Therefore, there are extra licensing and subscriptions costs which need to be considered while choosing Azure as a service platform.

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##### Technical Considerations:

* **Learning complexity:** Azure is generally difficult to master due to the many services that they offer. Learning all of them properly will need a lot of time and effort. Therefore, maintaining the data pipeline can prove to be difficult.
* **Reliability:** Even though there is a service level agreement(SLA) around 99% which means that the azure services will be down for a certain period of time, azure can be prone to system outages or hackers taking over. This results in uncertainties while using azure.

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##### Operational Considerations:

* **Maintenance issues:** As Azure provides many services, it is expected that they will release updates to those services. Regularly updating and keeping up with the updates can be quite challenging. Moreover, if there is a maintenance issue, the support team will have to be prepared for a quick fix which can be tough. Issues with azure services can delay processing times which is an operational hazard for NRMA
* **Skill requirement:** Running Azure services requires people with a lot of knowledge about it. Therefore, it needs consideration while hiring employees. Operating azure services may also require training the staff which has to be considered as well.

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##### Planning Considerations:

* **Selection of correct services:** As azure has a variety of services, it will be difficult to choose the correct services needed. Therefore, planning which services to choose becomes harder and requires a lot of skill and knowledge on azure.
* **Change in business requirements:** A sudden change in business requirements may need a change in the data pipeline. Changing the data pipeline can prove to be challenging. Therefore, planning for a change in business requirements requires a whole new plan and a lot of time and effort.

### 4.3. No Action - Is the project needed?

#### 4.2.1.Advantages

##### Economic Considerations:

* **No economic costs**: By taking no action and continuing the current processes, there will be no extra investment, therefore, money can be saved.
* **No risk from a failing product**: There is always a possibility that the proposed product might fail or might face problems. There will be extra costs in combating those problems which may lead to losses financially. By not taking any action and sticking to the current systems, NRMA can avoid potential financial losses associated with a failed product.

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##### Strategic Considerations:

* **Company Stability:** Not implementing a new system will maintain the NRMA’s stability and consistency. This can assure the customers as they will see that there are no dramatic changes involving the company’s processes.
* **Resource Allocation:** NRMA can allocate their resources elsewhere if they decide to take no action. This will allow the company to possess enough resources in case of an emergency. They can also allocate their resources to other prospective projects which interests them more.

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##### Technical Considerations:

* **Data security:** Implementing a new system will result in transferring data. Some data can be lost or be corrupted. Therefore, by taking no action, NRMA can reduce the risk of losing data.
* **Reduced risk of a system failure:** While implementing a new system, it is not uncommon to face some technical issues. Those technical issues can be drastic and result in a system failure. Therefore, by avoiding a new system, NRMA can reduce the risk of a system failure.

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##### Operational Considerations:

* **Consistent Workflow:** Not deciding on a new system will ensure that the workflow of their operations is uninterrupted. This will result in continuing the daily operations which will maintain the efficiency and productivity of NRMA.

##### Planning Considerations:

* **Avoidance of Project Planning:** NRMA can save a lot of time and money by not deciding on the new system. Planning a project requires a lot of brainstorming and investment. By taking no action, NRMA can avoid the time consuming project planning tasks such as resource allocation, change management, etc. This will allow NRMA to spend their time and investment on other essential tasks.
* **Avoidance of Re-Evaluation:** Continuing on from the previous point, in a project, there needs to be a re-evaluation process as not everything goes as planned. No action will result in no adjustments to the business plans which will also save time and effort.

#### 

#### 4.2.2.Disadvantages

##### Economic Considerations:

* **Missing out on profits:** Sticking with the ongoing systems may lead to missed opportunities in maximising profits. Adopting a newer, more efficient system may lead to managing claims correctly and thus will reduce losses. Therefore, NRMA may miss out on profits if they do not change the current system
* **Losing out to competitors:** If no action is taken, the other competitors in the insurance claim department may adopt newer technology which may be more capable in handling claims. If the newer systems for the competitors are efficient, this will result in NRMA losing its market share to them as customers will prefer the more reliable company.
* **Increasing costs due to fraudulent claims:** By taking no action, a potentially better system will not be implemented. Moreover, the current systems in place to detect fraudulent claims may not be good enough. Therefore, the number of wrongful claims will increase which will increase costs and this may even result in losses for NRMA.

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##### Strategic Considerations:

* **Missed Opportunities:** Not implementing a fresh, new system may lead to NRMA missing out on certain opportunities such as a more swift process to track fraudulent claims. This will result in NRMA being stagnant and thus market growth will be less.
* **Lack of Innovation:** No action will result in turning down chances to innovate with new systems. This will harm the brand image of NRMA as the willingness to innovate is a good indicator of a top company.

##### Technical Considerations:

* **Outdated systems:** Not considering a new system will result in sticking with the current systems which may be outdated. Outdated technology will not fully utilise its capabilities. Not having a modern system will lead to problems while handling insurance claims and detecting fraudulent claims. This will not be beneficial for NRMA.
* **Scalability issues:** NRMA deals with a large amount of data everyday. The current systems may not be able to handle the large amounts of data efficiently. As the demand is ever increasing, no action will cause the company to be inept in handling the demand.
* **Maintenance and security:** An older system will require more maintenance. Therefore, this is another disadvantage as there will be increased costs and systems will be down for maintenance as well which will stagnate the business. An older system will not have the latest cyber security measures. Therefore, they are more prone to a cyber attack which is risky for a big cooperation like NRMA.

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##### Operational Considerations:

* **Increased Workload:** Turning down a new system will lead to the amount of work to be done by the employees to increase. A new system could have made the whole process of checking fraudulent claims more streamlined which would have reduced the workload of the employees which in turn would increase the working satisfaction. However, no action will result in the eventual burnout of the employees which will decrease the efficiency of the company.
* **Inefficiency of the current system:** Not implementing a newer, automated system to detect fraudulent claims will result in using the current system which can be inefficient. Inefficiency will lead to longer waiting times for customers, increased working hours, and improper service. Using the current system will eventually result in system crashes which will affect the operational processes of NRMA.

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##### Planning Considerations:

* **Requirement for more resources:** An older system will obviously need more resources for troubleshooting, fixing, etc as it is more vulnerable to crashing. Therefore, more resources will be needed while planning. The resources could have been allocated somewhere more profitable if the system was technologically advanced. This disrupts the process of planning the budget for NRMA.
* **Restricted flexibility:** Planning for the future becomes tough while utilising an older system. As it is prone to problems, proper plans cannot be set in place due to the uncertainty of the system. If there are plans made to be technologically advanced, the older system may not allow for such a plan as it may not be able to handle a faster process.

## 5. Recommended Solution

### 5.0 Side notes

Our sponsor EY has decided to assign group 14 to be the “Data team”, whilst group 13 will be working as the “AI team”. This essentially means that we will be working together to bring forth a solution to the mock problem provided by EY. With that said, we aren’t directly building the Generative AI model which will be the soul of the solution. Instead, our team will focus on the “data part” of the solution which includes sourcing, extracting, transforming and loading the data to the model. We also aim to assign a few team members to start on the web development process as soon as possible. However at the moment, the decision on the Generative AI model will belong to group 13. Therefore, the recommended solution below is our attempt to propose a solution to EY’s problem as if we are delivering an end-to-end solution.

### 

### 5.1 Problem and Purpose:

Insurance fraud is a concern for companies like NRMA costing Australians $2.2 billion annually. The current methods of detecting fraud are time consuming and resource heavy often failing to catch activities. NRMA is looking to leverage Generative AI (GenAI) to combat fraudulent insurance claims effectively. The aim of this initiative is to implement an automated system for fraud detection that can analyse claims data in time, spot patterns and enhance the efficiency and accuracy of the claims processing.

### 

### 5.2 Brief Comparison of alternatives

The three alternative solutions above can be summarised as follows:

1. **Firebases Firestore**
   1. Advantages:
      1. Speeds up time to market with already built in tools
      2. User friendly interface suitable for non technical users
      3. Cost effective pay as you go pricing structure
   2. Disadvantages:
      1. Unlike Azure and AWS, Firebase will not integrate as seemingly with Microsoft Power BI and other BI tools.
      2. Risk of being tied to a specific vendor
      3. Less robust querying capabilities for complex data analysis
2. **Azure Services Data Pipeline:**
   1. Advantages:
      1. Integration within the microsoft ecosystem
      2. Analytics and AI features for detecting fraud
      3. High scalability with strong security measures
   2. Disadvantages:
      1. Steep learning curve associated with Azure platform
      2. Potential rise in ongoing costs based on usage trends
      3. Some services require additional licensing
3. **No action:**
   1. Advantages:
      1. No additional immediate costs
      2. Maintains Current operations and stability
      3. No risk associated when implementing a new system
   2. Disadvantages:
      1. Might miss out on efficiency improvements and cost reductions
      2. Still exposed to changing fraud methods
      3. Potential of lagging behind technologically advanced competitors

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### 5.3 Recommendation

Based on the provided report, our team suggests going ahead with setting up the data pipeline using Azure Services as the choice for NRMAs fraud detection system. This recommendation is backed by an evaluation of three options: Firebases Firestore, Azure Services and Not continuing with the project.

Firebases Firestore has some features such as time to market advanced data management capabilities and a cost effective pay as you go model. Its user-friendly interface is especially beneficial for teams with coding skills. However, Firebase falls short in meeting NRMAs requirements due to its limitations. Specifically, its integration with Microsoft tools like Power BI is restricted, which is crucial considering when our team presents our data, powerBI will be an extremely important tool. Moreover, Firebase lacks region support and querying capabilities that could impede the creation of an advanced fraud detection system.

Choosing not to take any action might seem cost effective initially. However, Poses risks for NRMA in the long run. Maintaining the state would mean missing out on opportunities for efficiency improvements and cost savings, from enhanced fraud detection measures. It could also result in NRMA lagging behind competitors in terms of technology adoption potentially leading to a loss of market share. Moreover, sticking to outdated systems could expose NRMA to increasing risks from evolving claim strategies.

On the other hand, integrating a data pipeline using Azure Services presents benefits that closely align with NRMAs requirements and strategic positioning. Being a partner of Microsoft (Stated in the mandates section) NRMA stands to gain from integration with the Microsoft ecosystem, including leveraging Power BI for analytics. Moreover, Azure's scalable infrastructure can effortlessly handle expanding data volumes and processing needs ensuring the system remains efficient as NRMAs demands evolve. The platform's advanced analytics and AI functionalities are especially suitable for creating a fraud detection system powered by GenAI, which is crucial to NRMAs objectives.

Azure also offers security measures and compliance certifications essential for safeguarding sensitive insurance claim information. Although there are expenses associated with Azure usage the platform provides tools for managing and optimising costs. With its pay as you go model NRMA can adjust resources as required, offering flexibility.

Additionally, Azure's continuous innovation in introducing services and features guarantees that NRMA can adapt to emerging technologies and fraud strategies over time effectively safeguarding their investment for the future. The platform's impressive 99.99% uptime SLA ensures availability for fraud detection operations. Microsoft's detailed guides, training materials and support resources will prove to be extremely helpful, in both implementing and managing the system over time.

In summary, even though Firebase has its benefits and the idea of not proceeding with this project to save money might be tempting ,Azure Services emerges as the appropriate choice for addressing NRMAs fraud detection requirements. It fits seamlessly with NRMAs partnership with Microsoft, offers features for detecting fraud and presents a scalable secure foundation, for future expansion. This solution positions NRMA well to combat insurance fraud effectively enhancing efficiency and stay competitive in the insurance sector.

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# 

# TEAM MANUAL

## 1. Team Organisation and Structure

| Name | Role |
| --- | --- |
| Noorullah Khan | Project Manager / Solution Engineer / Data Scientist |
| Tashiya Vilathgamuwa | Business Analyst / Document Control Coordinator / Researcher |
| Ninuri Mahagoda | Business Analyst / Document Control Coordinator / Researcher |
| Aasnayem Gazzali Chowdhury | Data Modeller / Data Engineer |
| Quoc Hung (Alan) Nguyen | Cloud Architect / Data Engineer |

Our team employs a flat hierarchy due to only having 5 members. This flat structure will simplify our communication pattern and allow for easier management.



**Noorullah Khan:**

1. Being the only team member to have worked professionally as a Developer, he has been assigned the role of **Project Manager**. He will be responsible for assigning tasks and setting deadlines with other members. He is also responsible to design (with assistance from teammates) the overall idea of the solution.
2. Additionally, he will serve as our **Solutions Engineer**, leveraging his extensive development skills to work the **Data Scientist** role throughout the project. He will actively engage in programming and development, determining what and how to build and implement solutions. This will also ensure the database system is developed to integrate well with the GenAI fraud detection system (developed by another team). His technical expertise will be crucial in designing and executing solutions that meet business requirements, ensuring robustness, scalability, and alignment with project goals.

**Tashiya Vilathgamuwa and Ninuri Mahagoda:**

1. Tashiya and Ninuri will be working as **Business Analysts** in our project. This role aims to bridge the gap between the technical and business people. Primarily, they will be looking at the solution from the user perspective and help the technical people in our team realise that vision.
2. They will also be working jointly as **Document Control Coordinators**. This role emphasises that they will be in charge of ensuring that our Deliverables are written in accordance with the definition given by the University. Also, they will be checking to ensure that we are not plagiarising or using AI-generated content.
3. Lastly, Tashiya and Ninuri will work as **Researchers**. This role will be responsible for assisting the team in finding relevant information that might be of use in the project. This research will help the team in understanding the problem in different ways.

**Aasnayem Gazzali Chowdhury:**

1. Aasnayem has been tasked with being a **Data Modeller**. EY has assigned our team to be the Data team which is responsible for sourcing, extracting, transforming and loading the data to the model which will be developed by another team (group 13). Therefore, Aasnayem will be responsible for modelling the data which will optimise the database for both storing and querying.
2. He is also our **Data Engineer** which will be responsible for writing scripts that will aid in the process of extracting and cleansing data.

**Quoc Hung (Alan) Nguyen:**

1. Quoc being the only member with Cloud experience in both teams has been assigned to the role **Cloud Architect** also known as the Solutions Architect (Microsoft Azure Solutions Architect). This role will be responsible for designing the architecture of the solution on Azure. This role will mainly be researching the cloud services that Azure has to offer and ensure that the design conform with the Well-Architected Framework set out by Azure and ensure that the code implemented by members from group 13 and 14 works on the cloud.
2. Quoc is also the team **Data Engineer** which will be responsible for writing scripts that will aid in the process of extracting and cleansing data. As a Data Engineer, I will also take part in managing Github as our system for version control.

## 2. Team Values and ACS Code of Professional Conduct

### 2.1. ACS Code of Professional Conduct

As we demonstrate our technical knowledge and skills of information and communications technologies (ICT) in our project with EY it is crucial we display ourselves as professionals by promoting good and working within ethical constraints (ACS, 2023). The ACS Code of Professional Ethics is used as a way of guiding our team’s behaviour when working within the ICT sphere enabling us to make judgements in complex situations inline with ethical values and principles as we face a rapidly changing environment. The code is based on the core values of honesty, trustworthiness, respect for others and respect for the profession (ACS, 2023). These values highlight the expected professional conduct of the team member and what our client expects from our team as we work on this project (ACS, 2023).

### 2.2. Honesty

As we interact with our team members and clients, honesty is a key factor in fostering healthy interactions between people and our final AI system (ACS, 2023). There as a team we plan to be truthful on our interactions with our members and our clients by using our discord as a place to communicate to each other about activities, progress, challenges and meeting notes so that everyone involved knows what is going on. We will also avoid misrepresentation of our actions and situation by having other members check our work progress and make sure multiple members are present when talking with the client so we are able to accurately present our situation. Furthermore, we will strive to create an environment in which our team members feel comfortable reporting unethical conduct.

### 2.3. Trustworthiness

As we work together on the project it is important to have trust in each other to complete tasks and be on top of the project to maintain public welfare and human dignity (ACS, 2023). As a team we have communicated our capabilities clearly and where we fall in the scope of the project as showcased in the organisation and structure of our team allow us to clearly assign tasks to each member. However, we strive to “develop life-long learning practices” as we engage in continuous development and training by learning new technologies such as Azure, Power BI and Gen AI enhancing our ability to deliver the project (ACS, 2023). One of the key requirements of our project is to respect the “privacy, confidentiality and integrity of personal information” such as Names, Addresses and Phone numbers when acquiring data to train our AI model. Thus, before we use the data we have implemented measures to clean the data to ensure that no personal information is present in our database (ACS, 2023).

### 2.4. Respect

Respect is a principle that is split into two parts respect for others and respect for the profession which are both essential for the interactions between professionals and as a characteristic in our responsibilities as a professional (ACS, 2023). Our team consists of members from various knowledge, experiences, and skills to bring to the project thus it is important to respect the views and opinions of others. To do this we always have meetings to discuss parts of the project and ensure that everyone is able to speak about the topic and what they do and do not understand. Additionally, as a profession it is important to encourage and support the “advancing of ICT knowledge and competence” of our members as we push each other to learn about the software and technology needed to complete our project (ACS, 2023). Ultimately, our project is based on the notion of “advancing ICT capabilities and systems” for EY as we incorporate Gen AI to improve an existing system for the client (ACS, 2023).

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## 3. Project Management and Tools

## 3.1. Approach Overview

The project management approach chosen is a flat team structure. This means there will not be a rigid hierarchy or firm chain of command. This means that although everybody will take tasks from the project manager, everybody is free to express their ideas, thoughts and opinions. Discord is being used as a communication platform between the team and everybody is allowed to message in any of the channels. This promotes the freedom of communication of ideas and innovative solutions.

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### Jira’s Work Management Tool:

The project management tool being used is Jira’s Work Management. The benefits of this tool are outlined below.

#### 

#### Managing Tasks

* **Tabular Layout:** Tasks are arranged in a table layout, providing a clear view of responsibilities and the status of each task. This function assists in delegating tasks, establishing deadlines, and monitoring advancement.
* **Task Dependencies:** Setting task dependencies guarantees that tasks are finished in the right order, which helps avoid bottlenecks and delays.

#### Gantt Charts

* **Gantt Charts:** Gantt Charts allow for the visual depiction of the project timeline. Task start and end dates are illustrated along with their connections to other tasks. This is essential as it assists in determining the flow and allocation of tasks along with guaranteeing that the project remains on schedule.
* **Milestones and Deadlines:** The team is able to concentrate on essential deliverables because key project milestones and deadlines are visualised. This ensures timely completion.

#### Time Tracking

* **Resource Allocation:** Resources can be efficiently allocated by using Jira’s time tracking feature. This is because it allows users to monitor the time spent on various tasks. This can also ensure fair and equal balancing of the workload and effective utilisation of resources.
* **Productivity Analysis:** Workflow can be optimised as time tracking data can be analysed to help see areas of improvement in regards to efficiency.

#### Cooperation and Updates

* **Real-Time Collaboration:** Taking upon actions such as sharing files, adding comments, and updating task statuses allow team members to collaborate on tasks in real-time.
* **Notifications and Reminders:** To reduce the risk of missed deadline the team uses automated notifications and reminders to keep the members informed on upcoming tashs and deadline.

#### Analysis and Reporting

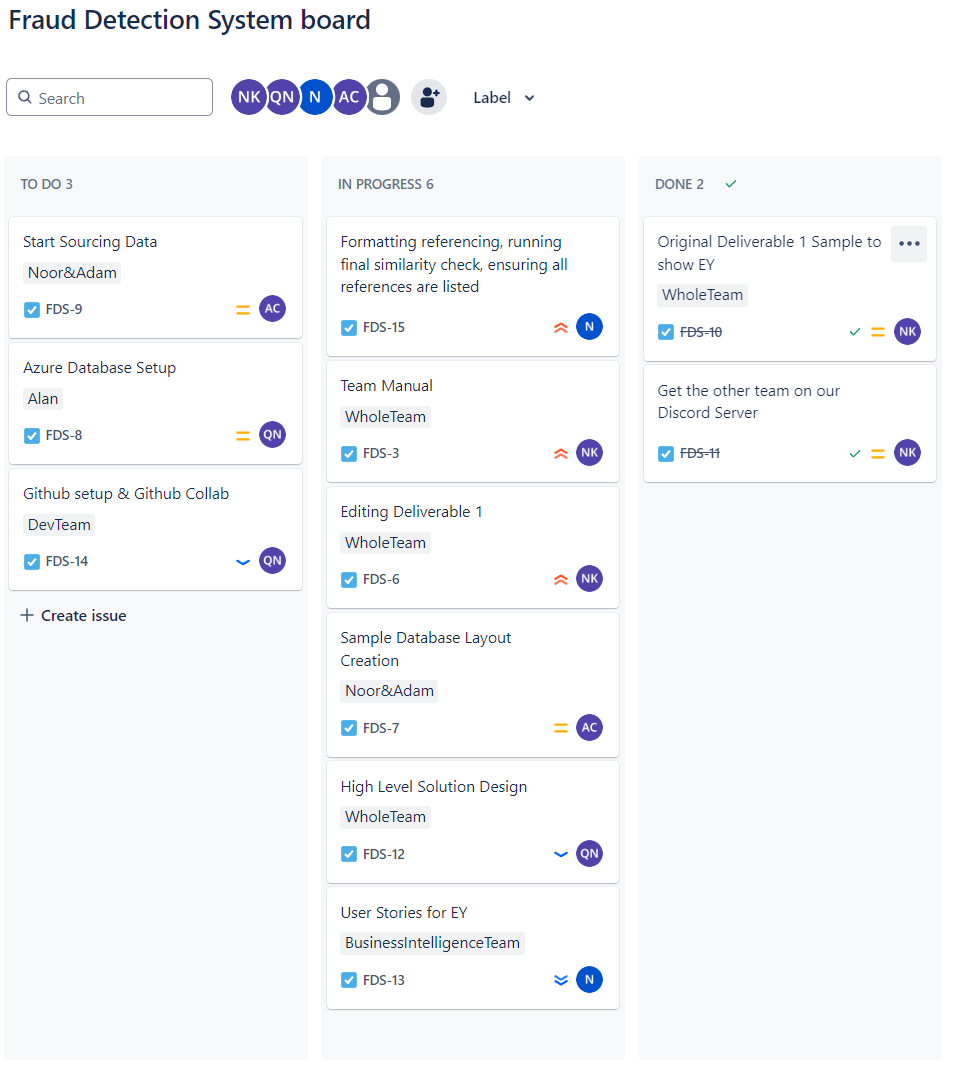
* **Progress Reports:** Regular updates are created to give information on how tasks are being completed, the status of the project, and any possible dangers.
* **Data Visualization:** Customizable dashboards and visual reports simplify trend identification and decision-making.

#### Pricing

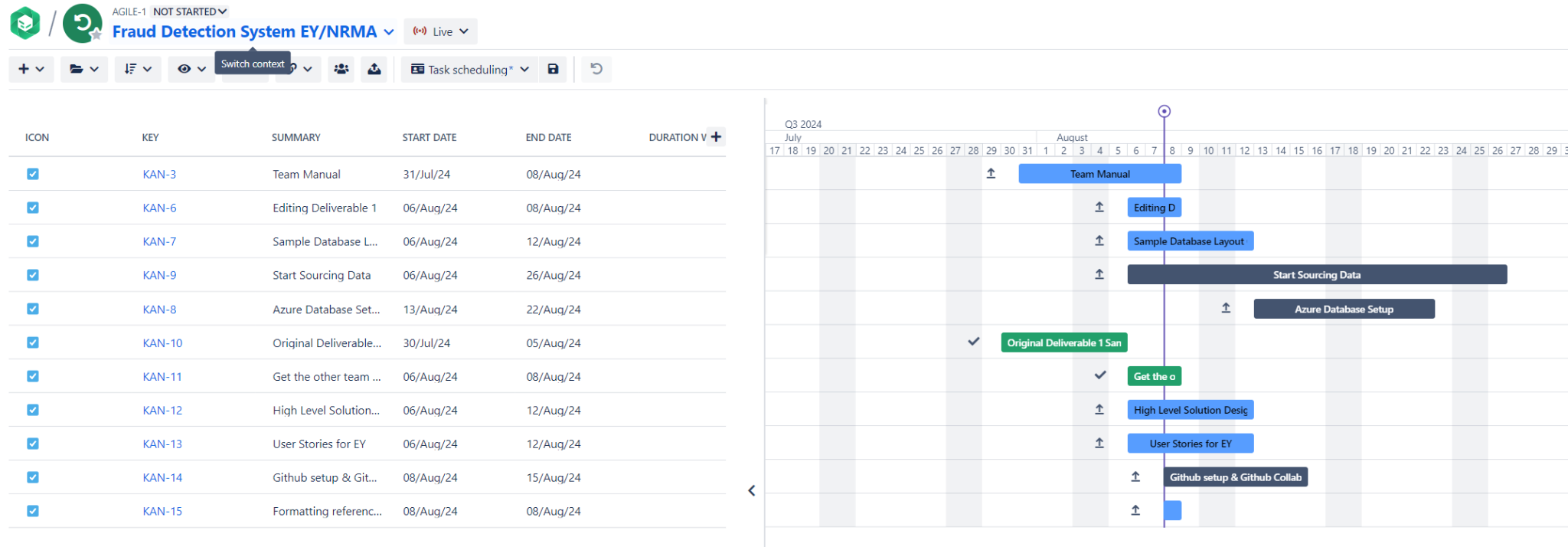
* **Free Plan:** Jira’s Work Management tool offers a free plan that includes all the essential features of task and project management such as Gantt charts and collaboration tools. The free trial supports up to 10 team members.This makes it an excellent option for team-based projects.
* **Paid Plan:** If more users are needed to work on the project, there are various paid plans available.

Examples of the project in the Jira Project Management tool are displayed below.

Tasks Overview:

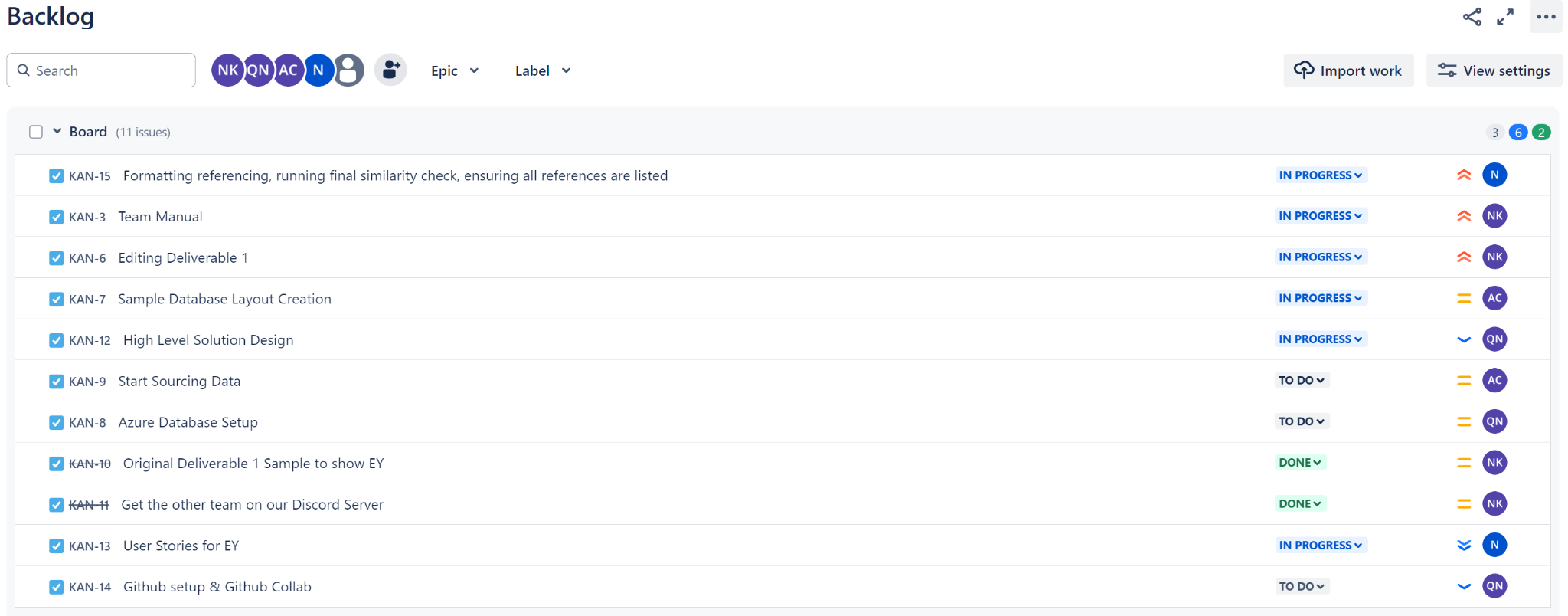


#### Gantt Chart Overview



#### 

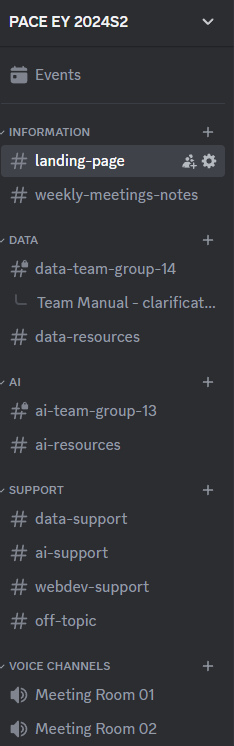
#### Backlog Overview



## 4. Communication Plan And Meet Schedule

## 4.1 Communication

A Discord server has been established to be the central place for communication for both group 13, 14 and our sponsor EY. It has been set up as follow:



There are 5 categories including:

1. **INFORMATION**: channels inside this category is mainly used to make announcements and relay information from weekly meeting with sponsor to both teams
2. **DATA**: channels inside this category will be data related:
   1. data-team-group-14: is a private chat channel used and viewed only by members of group 14. We are assigned to work on the Data team. This chat will be our main mode of communication.
      1. Team Manual - clarification…: is an example of a thread, which is a side discussion we want to have with a few selected members. The usage of a thread will help not clutter the main chat channel
   2. data-resources: is a public chat channel where anyone can post any data related resources, including data sources and blogs about cleaning data.
3. **AI**: channels inside this category will be AI related:
   1. ai-team-group-13: is a private chat channel used and viewed only by members of group 13 and the server’s moderator (Quoc Hung from group 14). Group 13 has been assigned to work on the AI team. This chat will be their main mode of communication.
   2. ai-resources: is a public chat channel where anyone can post any AI related resources, including where to find open-sources models and how to fine-tune a model.
4. **SUPPORT**: channels inside this category will mainly be used to ask mentors for support in specific problems:
   1. data-support: is a public chat channel to post data related questions
   2. ai-support: is a public chat channel to post AI related questions
   3. webdev-support: is a public chat channel to post web development related questions
   4. off-topic: is a public chat channel to post any miscellaneous questions
5. **VOICE CHANNELS**: channels inside this category will mainly be used as virtual online meeting rooms where we can organise our weekly meeting.

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### 4.2 Meet Schedule

* Face-to-face meeting with sponsor: 8am to 9am weekly on Tuesday at EY office 200 George street, Sydney 2000
* Face-to-face team meeting: 9:30 to 1pm weekly on Tuesday after the meeting with the sponsor.
* End of week online meeting: 11am to 12:30am weekly on Saturday using Discord

Every week, we will have a meeting with our sponsor at their office to showcase what we have done throughout the week and decide on the direction for the next step. This meeting will be our formal way of demonstrating our work to the sponsor besides our informal chat on Discord with them. Following this meeting will be a 90-minute meeting for our team. The purpose of this meeting is to build team rapport and also discuss our plans and work for the week. Lastly, at the end of every week, we will have an online meeting on Saturday to check on the work we have done as well as planning for our next meeting with the sponsor. The purpose of these meetings can be overlapping depending on the tasks that we have at hand. However, we aim to meet with each other 3 times a week to keep everyone accountable and build trust in each other.

## 5. Change Management And Conflict Resolution

### 5.1 Change management

Managing change effectively is essential, for ensuring transitions and reducing disruptions during the implementation of procedures, technologies or organisational changes. Here we detail the steps and strategies for overseeing change, within our team.

#### Approach to handling change

Our team acknowledges that changes in project scope, methods or team dynamics are bound to happen. We strive to adapt effectively to ensure project success while keeping the team united and productive.

#### Change Management Process:

#### Identifying the need for change within our team

* 1. Regularly review our processes and results
  2. Encourage team members to propose enhancements
  3. Stay updated on industry trends and best practices

#### Assessing the impact on our workflow and team members

* 1. Conduct an analysis of how the change will impact our operations
  2. Consider both short term disruptions and long term advantages
  3. Identify risks and obstacles

#### Developing a plan for implementing the change

* 1. Develop a detailed timeline for the change
  2. Assign responsibilities to team members
  3. Set clear milestones and criteria for success

#### Communicating the change to all team members

* 1. Hold a team meeting to introduce the change
  2. Provide context and reasoning behind the change
  3. Address concerns and questions openly

#### Implementing the change

* 1. Adhere to the timeline
  2. Offer resources and assistance
  3. Stay adaptable and prepared to make adjustments as needed

#### Monitoring and evaluating its effectiveness

* 1. Regularly monitor progress
  2. Collect feedback, from team members
  3. Measure against predetermined success criteria

#### Making adjustments based on feedback and outcomes

#### Make necessary changes based on feedback and outcomes

#### Celebrate achievements and learn from difficulties

#### 

#### Communication

Effective communication is vital for our teams prosperity:

* Team meetings to discuss upcoming changes every Tuesday and Saturday
* Utilising our project management tool (Trello) to document and monitor changes
* Promoting open discussions and feedback from all team members
* Ensuring that all members comprehend the reasons behind changes and their implications

#### 

#### Training and support

We are dedicated to supporting each other through transitions

* Organising peer to peer knowledge sharing sessions
* Allocating time for self study and skill enhancement when new technologies or methodologies are introduced
* Implementing a buddy system for any potential new team members or those assuming new responsibilities

### 5.2. Conflict resolution

#### Approach to addressing conflict

We understand that differing viewpoints can result in conflicts. Our aim is to handle conflicts, in an professional manner seeing them as chances for development and progress.

#### 

#### Conflict resolution procedure

1. Recognise the conflict among team members
2. Organise a meeting involving the team members
3. Give each member an opportunity to share their viewpoint
4. Pinpoint the cause of the disagreement
5. Brainstorm potential solutions collectively as a team
6. Reach an agreement on a resolution
7. Put the solution into action and do a follow up

#### 

#### Guidelines for Constructive Conflict Resolution

* Direct attention to the problem, not personal characteristics
* Use "I" statements to communicate emotions and concerns
* Engage in active listening
* Strive to grasp all viewpoints before suggesting solutions
* Be willing to negotiate
* Maintain professionalism and respect consistently

#### 

#### Escalation process

If conflicts cannot be resolved among team members:

1. Approach the team leader or project manager to address the matter.
2. If a resolution is not reached, escalate the concern to MQ’s leaders.

#### 

#### Preventative steps:

To minimise conflicts within our team:

* Clearly define roles and responsibilities
* Establish and communicate team norms and expectations
* Encourage regular team-building activities
* Provide opportunities for open feedback
* Address potential issues early before they escalate

Through following the above guidelines, our team will be able to ensure our team environment is positive and promotes collaboration which in turn will help to manage any potential internal changes and resolve conflicts to make sure our success through out this project.

## 6. REFERENCES:

ACS. (2023). *ACS Code of Professional Ethics*. ACS; Australian Computer Society. https://www.acs.org.au/content/dam/acs/CodeOfProfessionalEthics\_Mar\_2023.pdf