2810ICT Assignment A    
**Project Plan**

**Victoria State Accident Data Analysis**

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# Introduction

## Background

Road safety is a very prominent concern for every nation, and the State of Victoria in Australia is no exception. With the rapid urbanisation and increase in motor vehicle usage, the number of road accidents has seen a significant rise. Understanding the patterns, causes, and consequences of these accidents is crucial for policymakers, urban planners, and law enforcement agencies. Analysing road crash statistics can provide insights into the factors leading to accidents, which can then be addressed through targeted interventions, public awareness campaigns, and infrastructure improvements.   
   
The dataset in focus provides a comprehensive view of fatal and injury crashes on Victorian roads over the last five years, from 2015 to 2020. Such datasets are invaluable not only for governmental agencies but also for insurance companies, researchers, and data scientists. As the information that is provided within are based on time, location, conditions, crash type, road user type, object hit etc. Road Safety data was provided by VicRoads for educational and research purposes.

## Scope

The scope of the projects contains:  

**Data Analysis:** A thorough examination of the dataset to identify patterns, trends, and anomalies in the road crash statistics. This includes understanding the temporal distribution of accidents, the geographical hotspots, the conditions leading to accidents, and the types of road users most affected.

**Visualization Tool:** Development of a user-friendly graphical interface that allows users to interactively explore the dataset. The tool will provide various visualization options, such as heat maps, time series graphs, and pie charts, to represent different facets of the data.

**Predictive Analysis:** Leveraging the dataset to predict potential future trends in road accidents. This could involve using machine learning algorithms to forecast the number of accidents in the coming years based on historical data.

**Recommendations**: Based on the insights derived from the data, the project will offer actionable recommendations to reduce the number of road accidents in Victoria.

## Document contents

This document is structured as follows:   
  
**1. Project Overview:** A brief description of the project's objectives, stakeholders, and expected outcomes. 

**2. Work-Breakdown Structure:** A hierarchical decomposition of the project into smaller, manageable tasks and sub-tasks. 

**3. Activity Definition and Estimation:** Detailed definitions of each activity involved in the project, along with time and resource estimations. 

**Gantt Chart:** A visual representation of the project schedule, highlighting the start and end dates of each activity and their interdependencies. 

**Software Design Document:** A comprehensive guide detailing the software requirements, use cases, system components, and user interface design for the data analysis and visualization tool. 

**Conclusion and Next Steps:** A summary of the project plan and the subsequent steps to be taken.

By the end of this document, readers will have a clear understanding of the project's objectives, the approach to achieve those objectives, and the expected deliverables.

# Work Breakdown Structure

A diagram of a project plan

Description automatically generated

# Activity Definition & Estimation

## 3.1 Initial planning

### 3.1.1 Early Planning

In order to maintain track of the group's tasks while we work on this project, we have established a task list for our early planning for completing the assignment. This job list includes details such as the goals we must achieve to finish the task at hand and the deadline by which they must be finished by. This job list helps the team members to distribute their workload so that the deadline is met. The task list would also be used to keep track of status updates about the work so that to observe the project’s progression. We must determine which skill sets each of us already possesses and which we will need to acquire in order to finish this project as a group and do our best.

We must work together to determine which group members can contribute the most value to the project if they are given the right tasks because skill sets refer to a person's range of skills or abilities. A member would be assigned to a task where his or her talents would be useful to the group and the project itself if they are more proficient in Python but less effective at creating the plan charts for the project. After choosing the data that we will create for our project a job list. Each members skill sets will be determined and they will be assigned appropriate tasks in the job list.

We have collectively chosen to investigate the Victorian State Accident Dataset. For this project, we are required to show certain groupings from the dataset, including the details of all accidents that occurred during user desired periods, all accidents caused by accident types that contain a keyword (user entered), such as "collision" or "pedestrian”, allowing the user to analyse the role of alcohol in accidents and an "insight" of our choosing.

Finally, we need to set up a GitHub repository so that we can regularly update our work progress and can also check the files and inform group members of iteration changes on specified documents.  Additionally, this would allow for more fluid cooperation without compromising the integrity of the project by allowing other group members to share their work with their co-workers.

The initial planning stage of the project will take three days.

### 3.1.2 Work Division

Our group must first list the tasks we needed to finish before the deadline for Part A of the evaluation. We will update the Gantt chart as we move forwards with the project, and we will regularly update our project plan and software design documents. We must make sure to set time estimates to govern the pace of how our work is created if we are to guarantee that our group completes the project before the deadline.

Time estimates are crucial for the project and most important part of the project since they guard against delays that could cause more serious issues later on and adverse effects from not having regular intervals of updates, endangering the project's very capacity to be finished. Moreover, sometimes without a proper time estimation even with a best team and hundreds of good ideas we will not be able to succeed. In terms of dividing up the project's labour among the group members, we have collectively decided to work on the same duties and build upon one another's contributions to ensure we meet the specified objectives.

Work division should take one day to complete.

Following the planning stage for the structure, we began creating the data analysis programme for the dataset of Victoria State Accidents. We three in the group were given different parts of the tasks to complete, but we all had the same main goal to work towards. Therefore, although working on different aspects of the data analysis project, we made an effort to help each employee in their designated area.

Using an import of pandas into the Python programming language, we built the initialization of the arrays, importing the methods for columns and rows with functions to the width. Then, in order to build the data frame for our software application, we implemented a pd.read\_csv.

We then added code to allow our array to connect to the related database we wish to study, imported sqlite3, and created a temporary memory to store the database tables. Once these two goals had been achieved, we applied matplotlib to digitally plot our dataset into the array we had just created, print the output, and finally finish.

It was time to start creating a graphical user interface for the data once we had an array that could display it. We began by obtaining the data's indexes from the csv file.

In order to change the variables that come from the user's input instead of the hard-coded dates that are already implemented, we first managed to get the software to display the indices between two dates. This allowed us to successfully load the file into our Array of data.

Three unique processes made up the process of creating the Graphical User Interface. The initial step was to perform research on the proper tools and functions to utilise in order to optimise the GUI's interactable application. The planning and implementation of the code took place in the second step, which involved creating a plan within the development environment to explicitly define each segment of code and what it performs. This is an excellent approach to take because it makes the code understandable for anyone looking at it. The majority of coding and testing is then done in an iterative structure, which involves writing new code and testing it as it is being produced.

Any project involving the development of code must include the imperative process of testing the code; in this project, the testing process was designed to maximise efficiency. The first step was to ascertain the software requirements in order to better grasp what each piece of code should accomplish and produce. The planning of the test code came next; it is crucial to spell out the steps the testing code will take so that it is clear which components will be tested where. The testing code component must then be written, run, and its output results must be recorded. Finally, any necessary corrections will be made.

### 3.1.3 Initial Research

We have created a Work Breakdown Structure for the data analytics that were given to us for the project in order to assign specific tasks to each group member. This is helpful because it makes it much simpler to allocate tasks to people and allows the team to plan around other work that needs to be done outside of the project if the project is divided into smaller, more manageable tasks and packages. The project becomes much more easier for everyone to complete parts allocated to certain group members. Additionally, the Work Breakdown Structure fosters better group communication. It is easier to estimate, schedule, monitor, execute, and control the project's work when there is a clear understanding of the activities that will be performed for each task.

We will create a Gantt chart to help manage the tasks and objectives as we schedule and prepare for the research portion of the project. The creation of a Gantt chart will help our team organise the tasks we must complete, estimate the project's duration, and determine the resources needed to complete it. It is also helpful for controlling dependencies between tasks. The final requirement for the research phase of the project is the ability to administer a GitHub repository at a basic level.

As previously indicated, updates to the application on GitHub will assist us work and communicate with our team members by enabling us to regularly inform them on our progress whether on any social media or by updating the document file. Using the GitHub repository, we must make sure that we are not only post regular updates to each modification and addition to the work we apply, but that the work itself won't cause issues during the project's coding process due to overlapping updates and other issues.

The allocated time research is four days.

## 3.2 Initial Plan Document

### 3.2.1 Introduction

To begin our project, we initiated the process by generating a record to capture all project aims and objectives. Furthermore, this action aimed to structure the project's tasks from inception to conclusion, thwarting insignificant duties from overshadowing pivotal ones. Project planning emerges as a robust mechanism to facilitate team interaction over the project's duration.

The initial paragraph of the project blueprint is comprised of three fundamental elements. The opening segment delivers the project's context, providing readers with insights into the reasoning behind the task, how it should be done and what things will be done to complete the task. It delineates the factors that sparked the demand for undertaking the task. This holds significance not merely for external stakeholders, but also for the project group to fathom the purpose of their task.

The second element of the introduction spotlights the document's extent. This fragment precisely outlines the document's components. It expounds on the document's additions, particulars about their nature, and the approach to executing them. This section holds paramount importance, as it offers readers a glimpse of the document's materials, conveying an appreciation of the function of each element.

A span of two days has been allocated for the creation of the introduction section within the project plan document.

### 3.2.2 Activity Definition

The final aspect to outline in our project planning involves defining activities. An activity definition encompasses the division of the project into a set of distinct tasks, each of which must be completed prior to considering the objectives fulfilled. To accomplish this, we must categorize all project-associated activities. This entails identifying major project activities and subsequently dividing them into individual tasks and sub-tasks.

Upon cataloguing all the tasks indispensable for project completion, we evaluate the interdependency between each task. After delineating each step that warrants fulfillment, it becomes essential to ascertain the interrelation of tasks for proficient execution. Understanding all project dependencies is pivotal for accurate scheduling, completion, and prevention of unforeseen delays. Once this is arranged, the logical and effective sequencing of tasks and activities follows suit now that their mutual connections are clear. After formulating the project plan and obtaining a comprehensive grasp of the principal activities needed for project culmination, the team can draft an activity roster.

This activity roster should encompass pertinent project details, including its name, commencement date, an exhaustive listing of tasks, and the individuals designated to carry them out. The task inventory serves as a visual cue, assisting the team in gauging both the hierarchical importance and the anticipated duration of each task.

With our activity definitions refined, we initiate the creation of a Work Breakdown Structure. This project management tool aids in systematically completing substantial projects, breaking down multifaceted endeavours into gradual steps.

By deconstructing the project into more manageable constituents, the Work Breakdown Structure amalgamates scope and deliverables into a unified instrument. This delineation proves advantageous as it attributes effort assessments to specific segments of the Work Breakdown Structure and accelerates timetable formulation. It equally identifies potential scope discrepancies within the project, such as instances where a branch lacks clarity and moreover helps us to improve at every step. Enforcing this approach for our project will narrow down glaring issues anticipated during project execution.

A span of four working days has been allocated for this task.

### 3.2.3 Gantt Chart

A Gantt chart is a helpful project management tool that illustrates a project's schedule visually. Created by Henry L. Gantt, it's used to plan and track tasks over time. The chart displays activities as horizontal bars on a timeline, showing when they start and end.

Gantt charts offer clear visualizations of project timelines and dependencies. They assist in task organization, resource allocation, and communication. These charts track progress and identify risks, aiding effective time management. However, they might not suit every project or situation, particularly in rapidly changing environments where flexible tools like agile methodologies are preferred.

## 3.3 Software Design Document

### 3.3.1 System Vision Document

The initial step in creating a software design document involves the formulation of a system vision document. This serves as an enlightening text that outlines pivotal subjects. The primary segment within the system vision document pertains to the problem background. Within this section, the intention is to elucidate the context and the facets entwined with the problem.

This elucidation aids in comprehending the problem for both stakeholders and members of the project team. Following this, we encounter the system overview, a segment aimed at providing a comprehensive depiction of the software's components.

Herein, there is an in-depth exploration of visual design, tasks that the software is poised to accomplish, and other pivotal elements integral to the system. Lastly, the section pertaining to potential benefits is highlighted. This part conveys the advantages that system implementation might yield. Often presented through a combination of enumerated points and corroborating text, this section acts as a significant guideline for the project team.

A span of three days has been allotted for the creation of the system vision section.

### 3.3.2 System requirements

The system requirements section comprises three crucial components: user requirements, software requirements, and use cases. The user requirements segment outlines the software's user-centric needs. This component is pivotal, establishing the benchmark for the development team's final product. Detailing the software's necessities and functionalities, the software requirements section primarily covers functional requirements. Analogous to user requirements, this section is an essential guide for the development team, delineating the operational criteria of the product. Concluding this section are the use cases and use case diagram, which furnish elaborate accounts of user interactions with the software. Use cases are pivotal narrative tools demonstrating user engagement with the final product.

These narratives guide the development team and ensure alignment with user needs. We allocate three days for the completion of the system requirements segment within the software design document.

### 3.3.3 Components and software’s

The components and software segment of the document delves into intricate details concerning various aspects such as software design, functions, data structures/data sources, and detailed design.

These components hold immense significance, as they reflect the development team's strategies for structuring and designing the software. Furthermore, this section facilitates effective communication with non-technical project participants, as it offers a clear portrayal of the software's nature.

Allocating three days for planning the components and software segment has been deemed appropriate.

### 3.3.4 User Interface

Concluding the Software Design Document, the User Interface design section consists of two pivotal components: Visual design and Structural design. Both components encompass descriptions of elements within their respective design domains.

The Structural design places emphasis on the software's navigational and information arrangement. This element involves conveying the technical aspects of the software's structure in a more precise manner.

On the other hand, the Visual design covers the layout, visual constituents, icons, graphics, colour schemes, fonts, and more. This segment holds significance, detailing the primary design attributes of the user interface and explaining the rationale behind their selection.

For the task of designing the user interface, a time span of four days has been allocated.

# Gantt Chart

