Software Design Document

Victoria State Accident

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# System Vision

## Problem Background

## System Overview

## Potential Benefits

# Requirements

## User Requirements

In this section you detail how a user is supposed to interact with or use your program. What do they ***need*** to be able to do? This should all be from the end users perspective. Can be a combination of narrative text and listing of needs.

**Assignment note: You have not been given a client/user, so you can make one up. Who do you think would be using your software?**

## Software Requirements

In this section you detail what the requirements for the software are. What functionality will it provide? This is usually a formal listing, with requirements often using the word ‘Shall’. IE:

R1.1 The program shall accept multiple file names as arguments from the command line.

R1.2 Each file name can be a simple file name or include the full path of the file with one or more levels.

etc …

Can be primarily functional requirements, though you may include other types if you think of them.

## Use Cases & Use Case Diagrams

In this section you provide some use cases showing how people may use your software.

# Software Design and System Components

## Software Design

A block diagram/flowchart of how your software might work

A diagram of a company

Description automatically generated

## System Components

### Functions

Preliminary list of all functions in the software. For each function in the list the following information is provided:

* a brief description of what it does (1 or 2 sentences);
* a list of the input parameters, and their data types, and what they are used for;
* a list of any side effects caused by the function (ie change global or member variables, changes data passed by reference from calling function etc)
* a description of the function’s return value

### Data Structures / Data Sources

List of all data structures in the software (eg linked lists, trees, arrays etc) or eternal data sources. For each data structure in the list the following information is provided:

* Type of structure (tree, list etc),
* Description of where and how it is used
* List of data members, and what each one is for do
* List of functions that use it

### Detailed Design

Pseudocode for all non-standard / non-trivial algorithms that operate on data structures

function binary\_search(array, target):

left = 0

right = length(array) - 1

while left <= right:

mid = (left + right) // 2

if array[mid] == target:

return mid

elif array[mid] < target:

left = mid + 1

else:

right = mid - 1

return -1

# User Interface Design

This is your initial interface design. Describe the tools you used for this design stage and any key findings that informed your design. This introduction is descriptive and should explain what you have completed for the actual design work you will present in the sub-sections below.

## Structural Design

Structural design refers to the navigational and information structure of your product – the structure that supports the interface layout. How will you structure your product? How will you group your information? How will you navigate through your product? Why? This can take the form of a diagram showing structure and hierarchy, supported by a discussion and justification of your choices. Why have you made these design choices? Describe and outline the structure of your interface and of your information.

When coming up with the structural design we have learnt that this is a dataset in which people from a wide range of ages will be looking at. It can start from the young ages of 15 where it could be used for school assignments, up to the possible age of 80+. Baring this in mind we need to make sure that this design will be simple and easy to use for everyone. If we over complicate it the older population won’t understand how to use it but we want to make sure that this design speaks out to all users. Providing everyone with facts and accurate results to help educate everyone in safety.

In the image below shows a little example of a potential way in which we look to have the initial design.

A screenshot of a computer

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Is simple but easy to navigate. At the top you have a clear navigation bar which highlights which page is being viewed so that that whoever is using will know what they’re looking at. It also shows how we would want it to stand out with clear description for everyone to read and what the site will be used for.

For our design we are looking to have 6 pages. These pages will be the; home/landing page, Accidents within time period, Accidents per hour, accident per external subject, alcohol related accidents and speed related accidents. These pages will be all for educational purposes. We want to help educate the public with the data.

Each page will use different parts of the data provided by: <https://www.kaggle.com/datasets/gaurav896/victoria-state-accident-dataset?resource=download> when grouping up the data we’ll aim to select the specific information from the data provided so we don’t over complicate the data for everyone.

Here is how we looking to group the data per page:

* Home/landing page
  + Just an overview of what the page is about
* Accidents within time period
  + Accident\_Date
  + Day\_of\_the\_week
  + Region\_Name
  + Total\_Persons
  + INJ\_OR\_Fatal
  + Fatalities
  + Old\_Driver
  + Young\_Driver
  + RMA
  + Unlicensed
* Accidents per hour
  + Accident\_Date
  + Day\_of\_the\_week
  + Region\_Name
  + Total\_Persons
  + INJ\_OR\_Fatal
  + Fatalities
  + Old\_Driver
  + Young\_Driver
  + RMA
  + Unlicensed
* accident per external subject
  + Accident\_Date
  + Day\_of\_the\_week
  + Light\_Condition
  + Pedestrian
  + Pillion
  + Unknown
  + Region\_Name
  + Total\_Persons
  + INJ\_OR\_Fatal
  + Fatalities
  + Old\_Driver
  + Young\_Driver
  + RMA
  + Unlicensed
* alcohol related accidents
  + Accident\_Date
  + Day\_of\_the\_week
  + Light\_Condition
  + Alcohol\_Related
  + Region\_Name
  + Total\_Persons
  + INJ\_OR\_Fatal
  + Fatalities
  + Old\_Driver
  + Young\_Driver
  + RMA
  + Unlicensed
* speed related accidents
  + Accident\_Date
  + Day\_of\_the\_week
  + Light\_Condition
  + Speed\_Zone
  + Run\_Offroad
  + Region\_Name
  + Total\_Persons
  + INJ\_OR\_Fatal
  + Fatalities
  + Old\_Driver
  + Young\_Driver
  + RMA
  + Unlicensed

The data may seem similar as the but each page has roughly the same but then specific data in which the page is focusing on. This is due to the similarities in the pages. It is important that we keep the pages relating the same common data but then have its specific data from the data set in which we are focusing on. This will help make our site easier for the users to use and make sure they’re getting the right information.

## Visual Design

Detail your visual design: Layout, visual elements, icons, graphics, style, colour, fonts general screen designs. This can be sketches, wireframes, mockups etc, supported by a discussion, explanation, and justification of your choices.

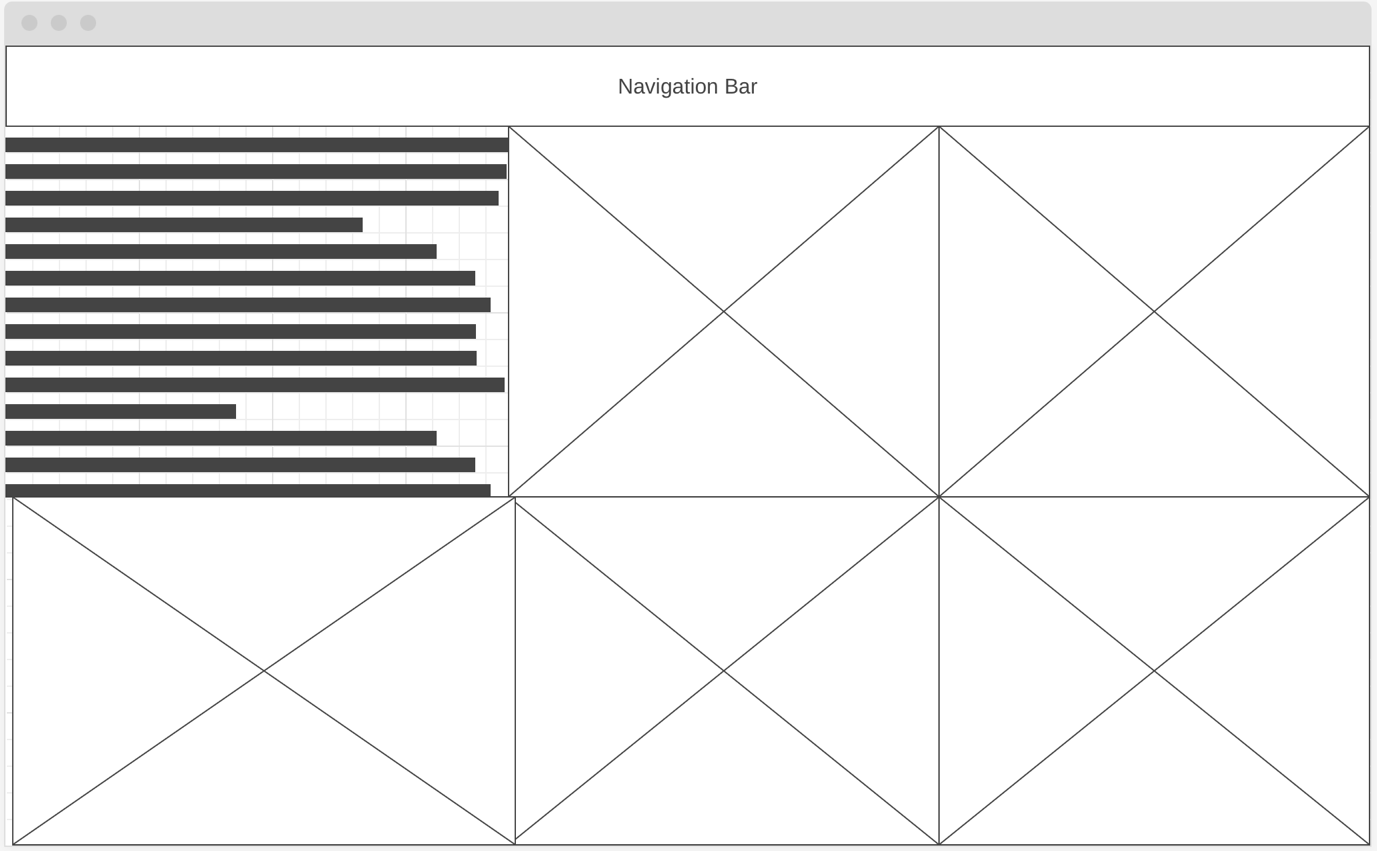
Landing page

A screenshot of a computer

Description automatically generated

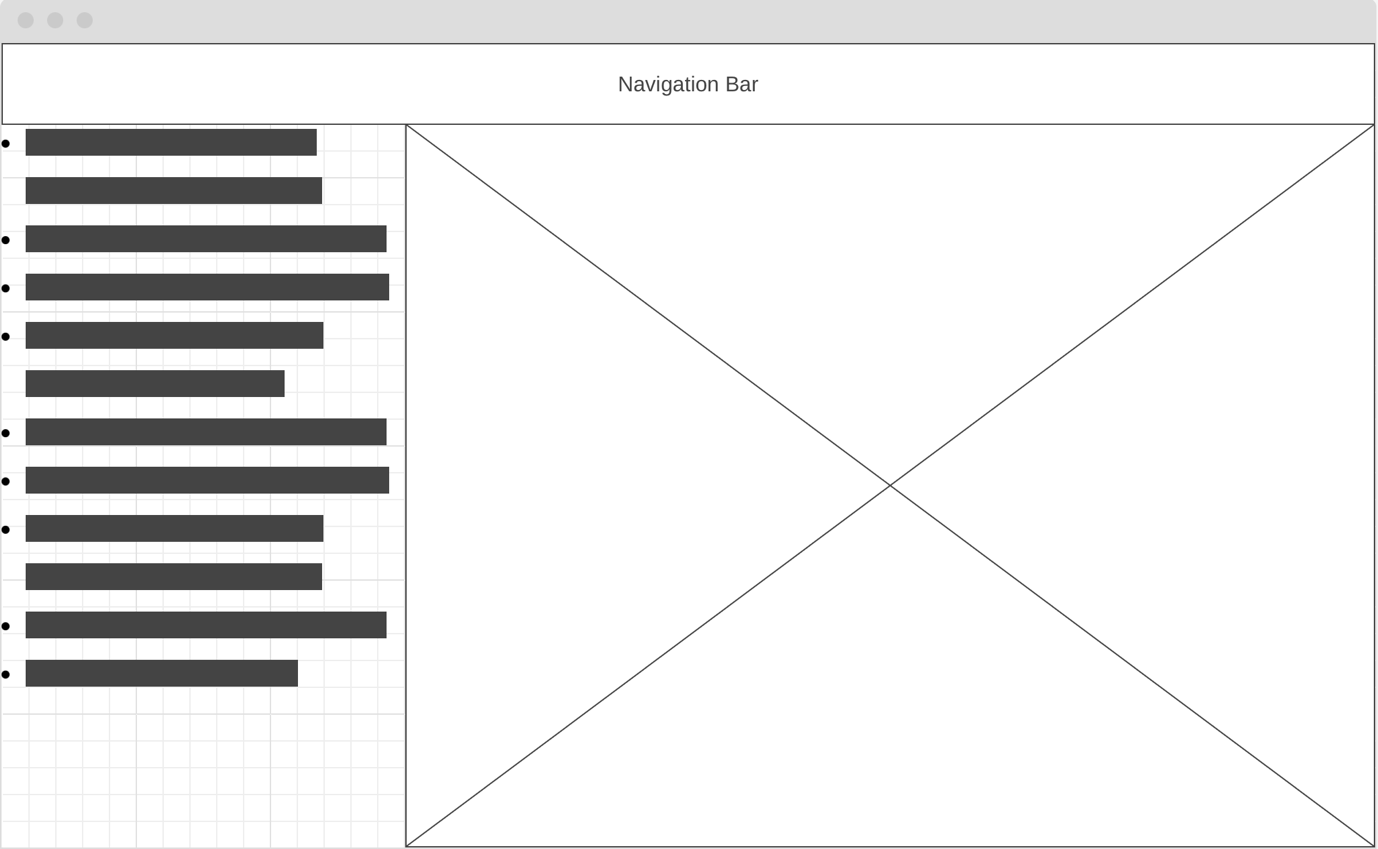
This page will be of simple design to help people of all ages navigate around with being able to achieve the data that they’re looking for. On this page it’ll state what the website will be used for and give a brief description and have an interactive navigation bar at the top where people can move from page to page.

Accidents within time period page



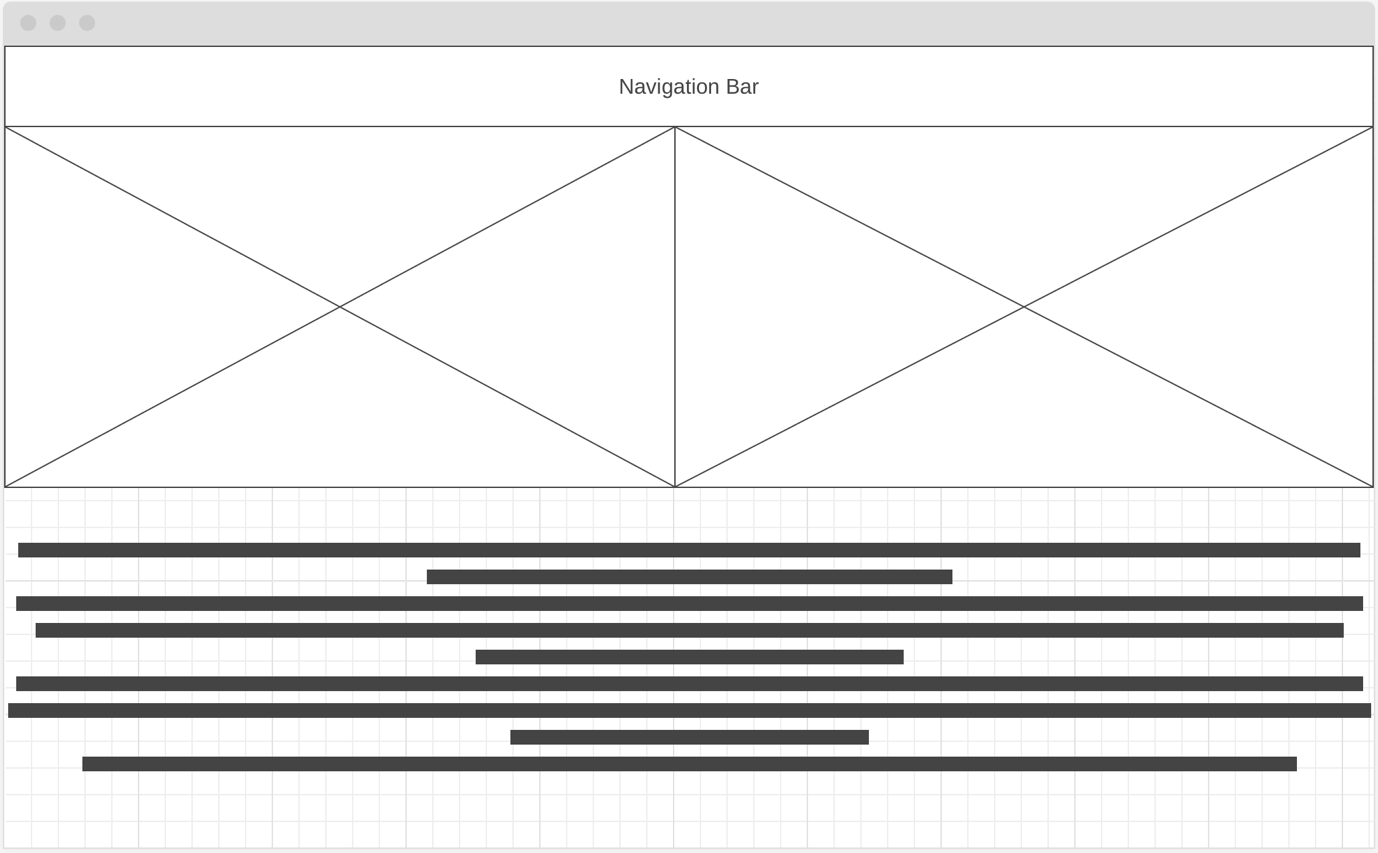
This page is made up of 5 graphs which will outline the number of accidents over each of the 5 individual years this data set is spread amongst. It will also have a section which has a brief explanations of what this page is and provide facts on the most common form of accidents and how we can help provide any information on how to prevent them

Chart showing number of accidents during each hour of the day



This page will be an interactive page where the user will be able to select an input certain hours of the day to see when most accidents commonly happen. We will also provide safety tips on how to limit the chances of you being involved in one of these accidents plus the what to do if you are in an accident and the step to help guide you through the situation.

accidents caused by subject



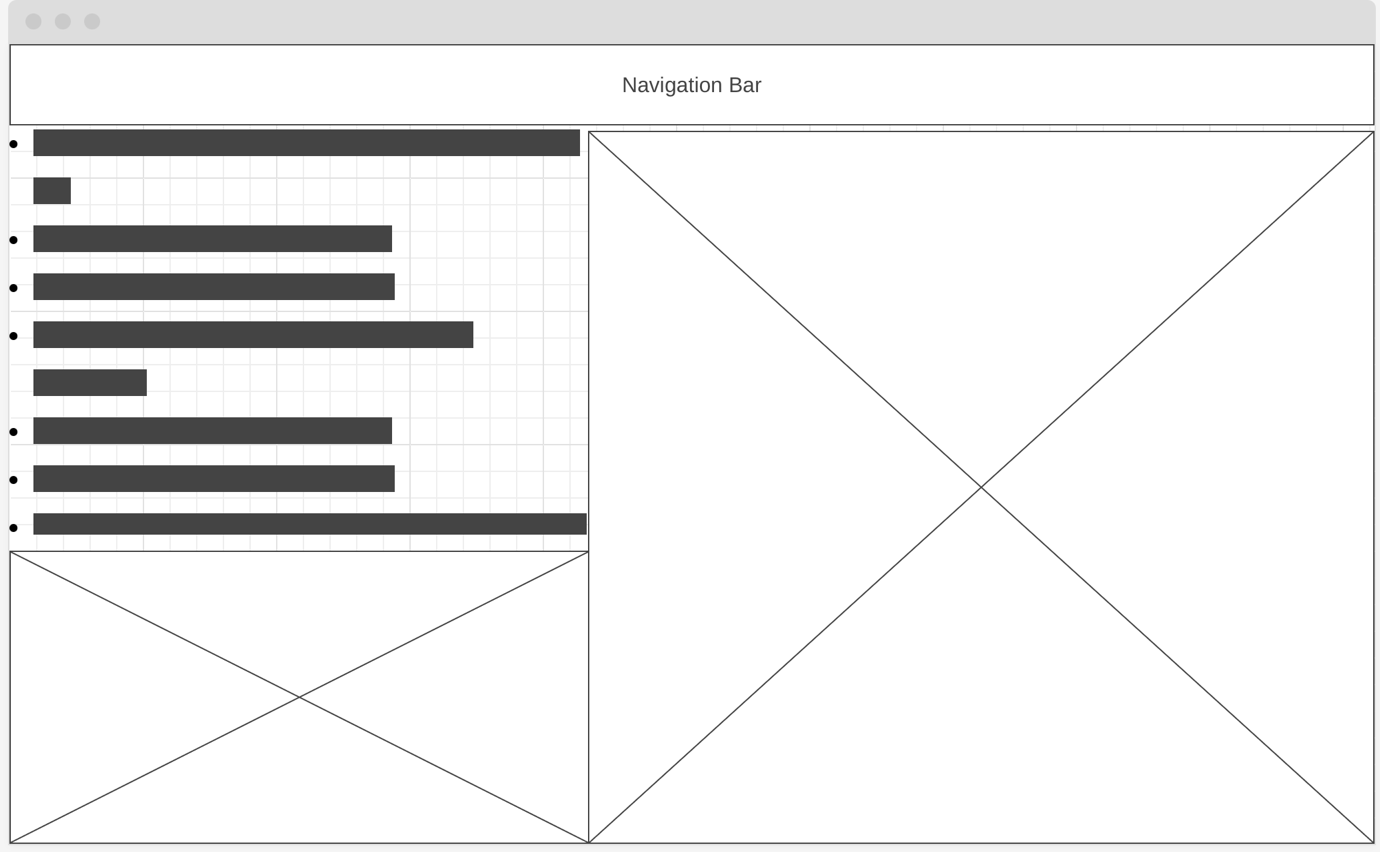
This page is all about the accident caused by external subjects other than the vehicles. External subjects can be many factors such as pedestrians, dirt, fog, animals etc. This page’s layout is designed into two graphs and information about how you can help limit the amount of accidents in caused by external factors. 1 graph will display the most common different types of external factors causing these accidents as well as the other graph showing you around what time of year these accidents would normally occur.

alcohol related accidents page



This page will have facts on surrounding the graph to help show the dangers of driving under the influence of alcohol. These facts are not a scare tactic but will be used for educational purposes on the negative effects of what alcohol can do to ones mind and how it can effect your capability to drive. the graph will also be interactive and allow the user to go through the years as well as be able to see the busiest times that these accidents usually occur.

speed relating to severity of incident



This page will display the 2 graphs. 1 displaying the different types of injuries occurred and the other displaying the speeds of which each injuries occurred at. On this page it will also display facts on why there are speed limits put in place to help with limiting the causes and severity of the injuries at the events.