

Major Project Design Brief

This document will make up the first section of your Logbook to be handed in with your complete project at the end of Term2, Week 6 (Thursday 6th June, 2024).

Use the outline provided below to describe the program you have chosen to develop.

9.2.1 Defining and understanding the problem

Defining the problem

- identifying the problem - Briefly describe the program you have decided to develop. What problem does it solve and why have you chosen this.

- The program that I have chosen to develop is a program that helps students manage their grades, upcoming assessments, and timetable. I am looking to make a web app.

- needs of the client

- functionality requirements - picture yourself as the client and describe what you want from the finished program. Functionality requirements encompass the various tasks, operations, and processes that the software should be able to perform to meet the user's needs. This could include user interface features, data processing capabilities, specific outputs, integrations with other systems, and user interaction mechanisms. Identify SMART goals from which you can measure success when it is complete (A well-worded goal will be Specific, Measurable, Attainable/Achievable, Realistic and Time-bound (SMART).)

- I want to have a system where users can input all their upcoming assessments and track what they need to study for, a system where users can track all of their marks and see where they need to improve, and a timetable system where users can enter in their classes and see on the dashboard what classes they have on that day.

- compatibility issues - this refers to the ability of the software to operate effectively with other systems, software, and hardware environments. Identify the operating system to be used (like Windows, macOS, Linux), software tools, browsers required etc.

- Since I am planning to implement the program as a web app, there will be little compatibility issues. The program will be able to run on all desktop operating systems that support modern web browsers

- performance issues - this refers to how well the software operates under certain conditions. This includes speed, responsiveness, scalability, and stability of the application.

- Since web apps are lightweight, I expect the program to be snappy and responsive on most platforms. It will have a high scalability due to the use of local storage instead of server side storage

- boundaries of the problem - What is the scope of the project you are attempting? Scope is the limit imposed by the programmer, for the reason of reducing the project size and being able to complete it in the required time.

- If I had the appropriate time, knowledge, and resources, I would like to have some more specific niche functionality such as Apple widgets for the day's classes, or areas where resources can be

accessed by the user for their classes.

Issues relevant to a proposed solution

- determining if an existing solution can be used
 - social and ethical considerations - what social and ethical issues should be considered if you are using/modifying an existing solution?
 - Compliance of data protection and privacy laws
 - Intellectual property rights and licencing
 - Security of user information and sensitive data
 - Bias of creating a fair experience for all users
 - consideration of existing software products - are there programs that already do the tasks your proposed project will perform? If so, why are you developing this product? What is the market niche?
 - Currently, there are no existing “ready-made” solutions. The only somewhat similar programs are Microsoft Excel and Google Sheets, both of which would need a high level of understanding to build something similar.
 - customisation of existing software solutions - If an existing product meets most but not all requirements, customization might be a viable option. Could you modify an existing software product to meet your specific requirements.
 - Microsoft Excel is highly customisable and can be changed to the user's needs provided the user has adequate knowledge of Excel and its functions.
Google Sheets is not as customisable as Excel but still highly customisable depending on the user's knowledge level.
 - cost effectiveness - This concerns the financial implications of using an existing solution versus developing a new one. Is the task financially feasible?
 - It would be highly cost effective as users could save time and money trying to learn how to use Excel and
 - licensing considerations - If adapting an existing product, you will need to understand and adhere to software licences. What type of licence will your developed software product have?
 - My software project will be available under a freeware licence, whereby it will be available to all users for free but the code is still protected under copyright. This means that I will have full protection against any competitors trying to copy my code.
- selecting an appropriate development approach if there is no appropriate existing solution - Identify the approach you will use for your software development and justify its use in this situation.
 - The best software development approach for this project would be the Agile Approach. This is due to its fast paced nature and adaptability to constantly changing development environments, meaning that it allows me to adapt my program to whatever the current needs and constraints of the project are, as well as fix any bugs that may occur as soon as possible.

Design specifications

- specifications of the proposed system - describe, in words, the inputs, processes and outputs that make up the system you are developing.
 - The inputs will comprise of text, integers, and dropdown menus
 - The processes will involve the formatting of data and the computation of numbers using algorithms
 - The outputs will provide tables, integers, and percentages for the user
- developer's perspective in consideration of:
 - data types & data structures - describe the data types and data structure you will need to store and process data. Justify your choice of the data structures used.
 - I will be using arrays, lists, and strings as the data structures in my program as these make it easy to create, store, and read data across multiple different web pages and programs, making them highly appropriate for use in this program
 - I will be using booleans, integers and floats as the data types in my program as there will be the computation of numbers and percentages to be read by the user, as well as search algorithms, so these are the most appropriate data types for this operation.
 - algorithms - create an algorithm (including modules/subprograms) to describe the key functionality of your program. Use correct pseudocode.

BEGIN Settings

 Load SubjectsArray
 CASEWHERE button pressed is
 Remove: Run RemoveItem(ItemID)
 Add Subject: Run AddSubject
 ENDCASEWHERE

END Settings

BEGIN RemoveItem

 Read ItemID
 Open SubjectsArray
 Found = False
 Count = 0
 REPEAT
 IF ItemID.SubjectsArray(Count) = ItemID THEN
 Found = True
 Delete SubjectsArray(Count)
 ELSE
 Increment Count
 ENDIF
 UNTIL Found = True

END Remove Item

BEGIN AddSubject

 Load SubjectsArray
 Input Subject
 Input Teacher
 Generate ItemID

```

Append Subject to Subject.SubjectsArray
Append Teacher to Teacher.SubjectsArray
Append ItemID to ItemID to ItemID.SubjectsArray
END AddSubject

```

- user's perspective
 - interface design - explain the type of interface you will develop, including hardware platform (eg GUI, CLI, mobile device, laptop etc)
- I will be developing a graphical user interface program for a laptop/desktop computer with internet access and a web browser.
 - social and ethical issues - what social and ethical issues do you need to consider in the development of this software product?
- Privacy and Data Protection
 - Ensuring user data is collected, stored, and processed securely in accordance with data privacy laws.
- Security
 - The program needs to be developed in a secure environment and all vulnerabilities need to be patched as soon as possible
- Inclusivity
 - Supporting different types of users including language, contrast, disability, ease of use, ergonomics
- Intellectual Property
 - Respecting existing programs IP and legal rights
- Impact On Employment
 - How the development of this program will impact people's jobs and line of work
- relevance to the user's environment and computer configuration - how can you ensure the developed product is suitable for the end user's environment?
- It is very easy to ensure that this program is suitable for the end user's environment. Since it is a web based application it is suitable for most computers that are able to run modern web browsers, which encompasses 96.3% of all devices.

System documentation

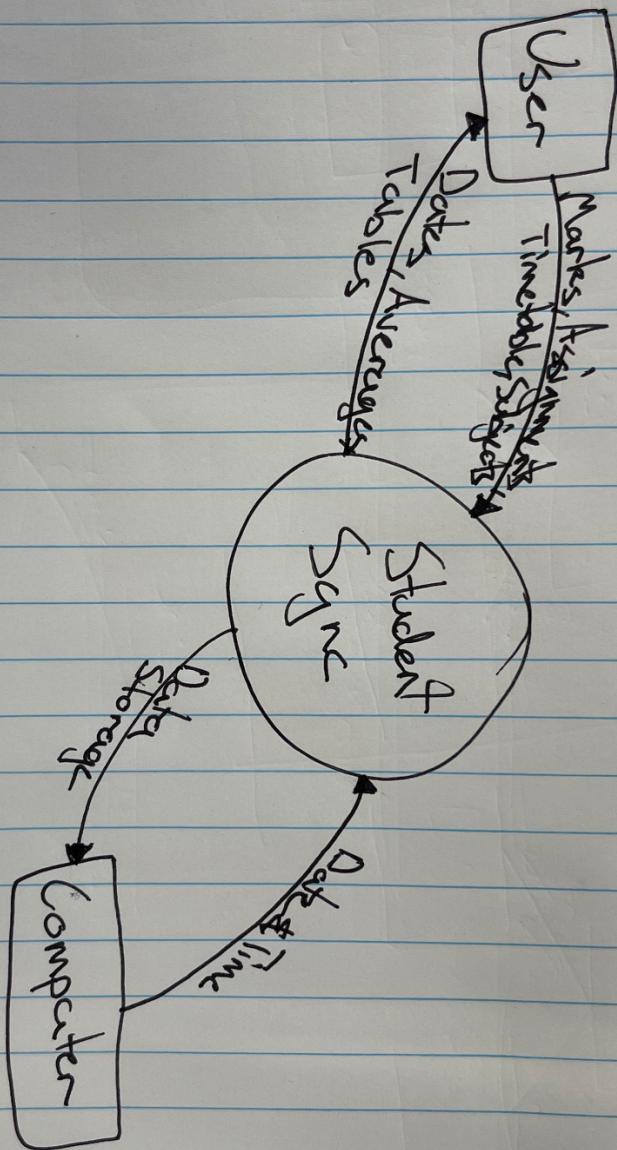
- representing a system using systems modelling tools, including:
 - IPO diagrams - draw an IPO for the system you are developing. Ensure this matches your algorithm. Subprograms should have a separate IPO diagram (or section of the diagram)

Input	Process	Output
Subjects Array	The webpage creates the subjects table based on the information stored in the Subjects Array.	A table with the information stored in the Subjects Array is created and displayed on the web page to the user
Remove button is pressed	The scripts in the web page take the item's id and search the Subjects Array for it, then delete the corresponding teacher and subject, as well as the ItemID	The corresponding subject and teacher is removed from the Subjects Array and the table shown to the user is updated.

	from the array.	
Add Subject button is pressed	The user is prompted to enter in the name of the subject and its teacher. An item id is then generated and all information is appended to the Subjects Array.	The Subjects Array has been updated and the table is refreshed to show the new data to the user.
Type in Subject	The user enters the name of the subject and it is stored and appended to the Subjects Array.	The Subjects Array is updated to reflect the new information and the table is refreshed to show the user the new data.
Type in Teacher	The user enters the name of their teacher and it is stored and appended to the subjects array.	The Subjects Array is updated to reflect the new information and the table is refreshed to show the user the new data.

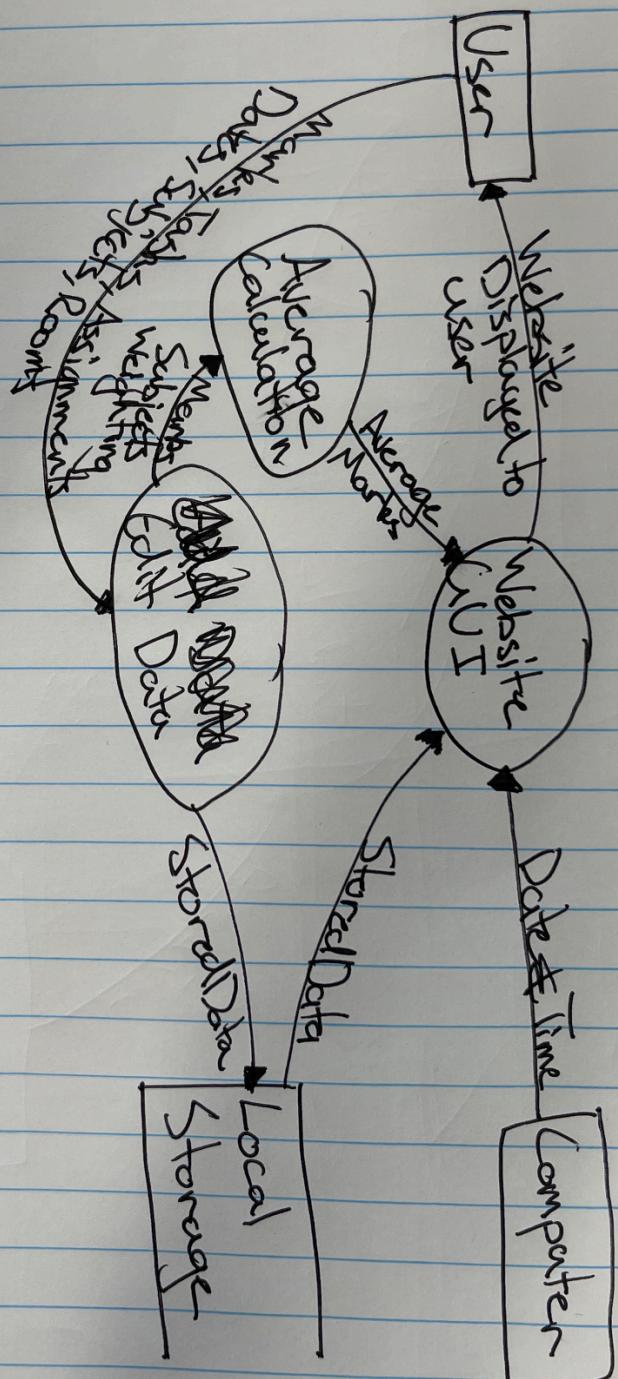
- context diagrams - [draw a context diagram for the system you are developing](#)

Context Diagrams



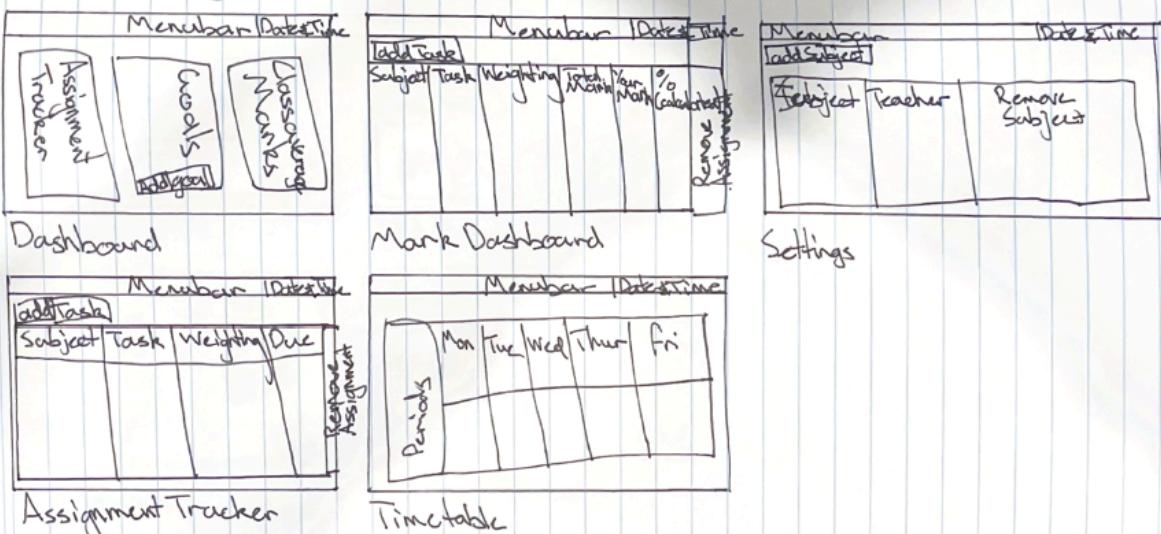
- data flow diagrams (DFDs) - draw a data flow diagram for the system you are developing

Data Flow Diagram



- Storyboards - create a storyboard for the program you are developing.

Main Pages Storyboard

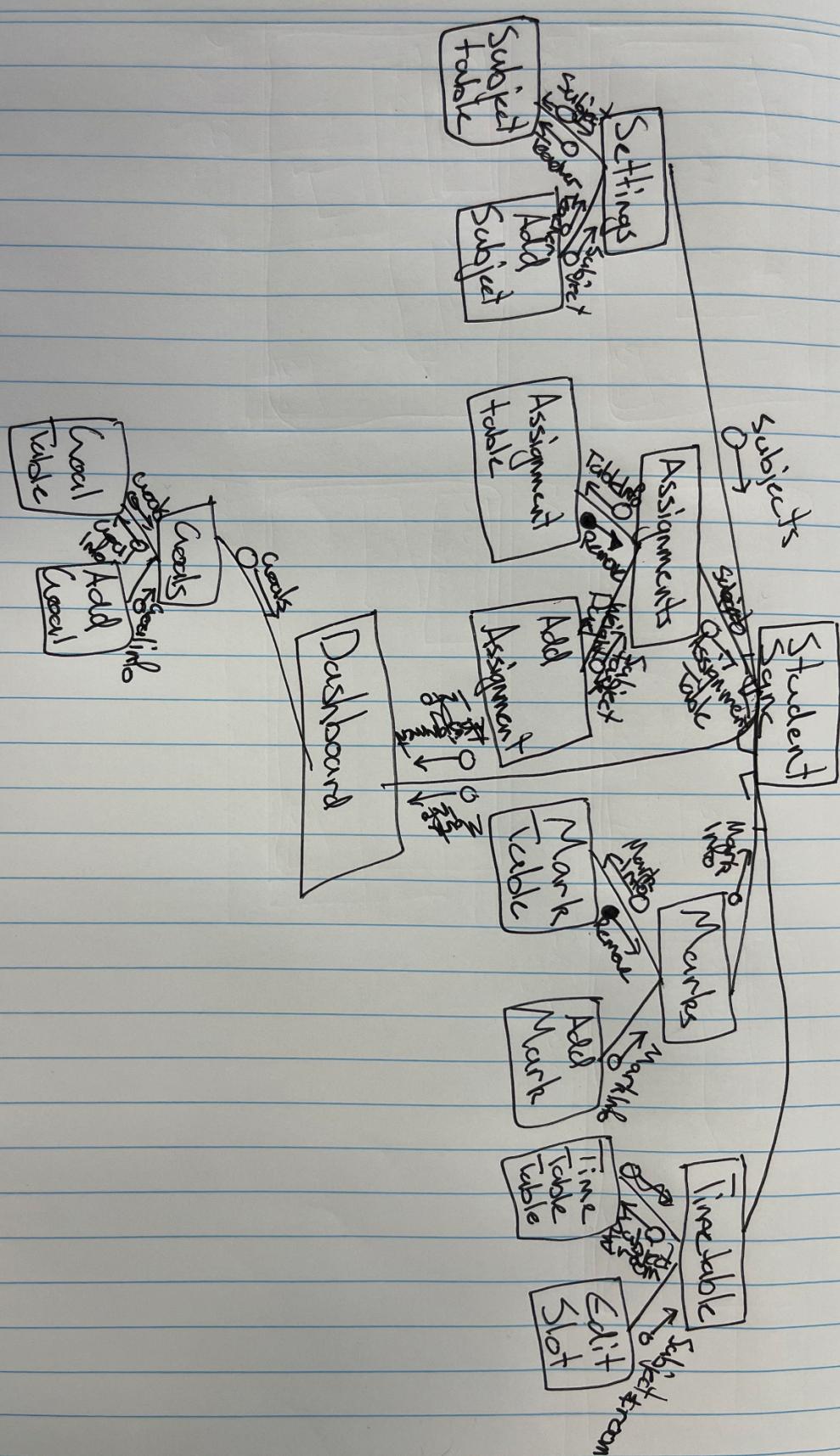


Popups Storyboard



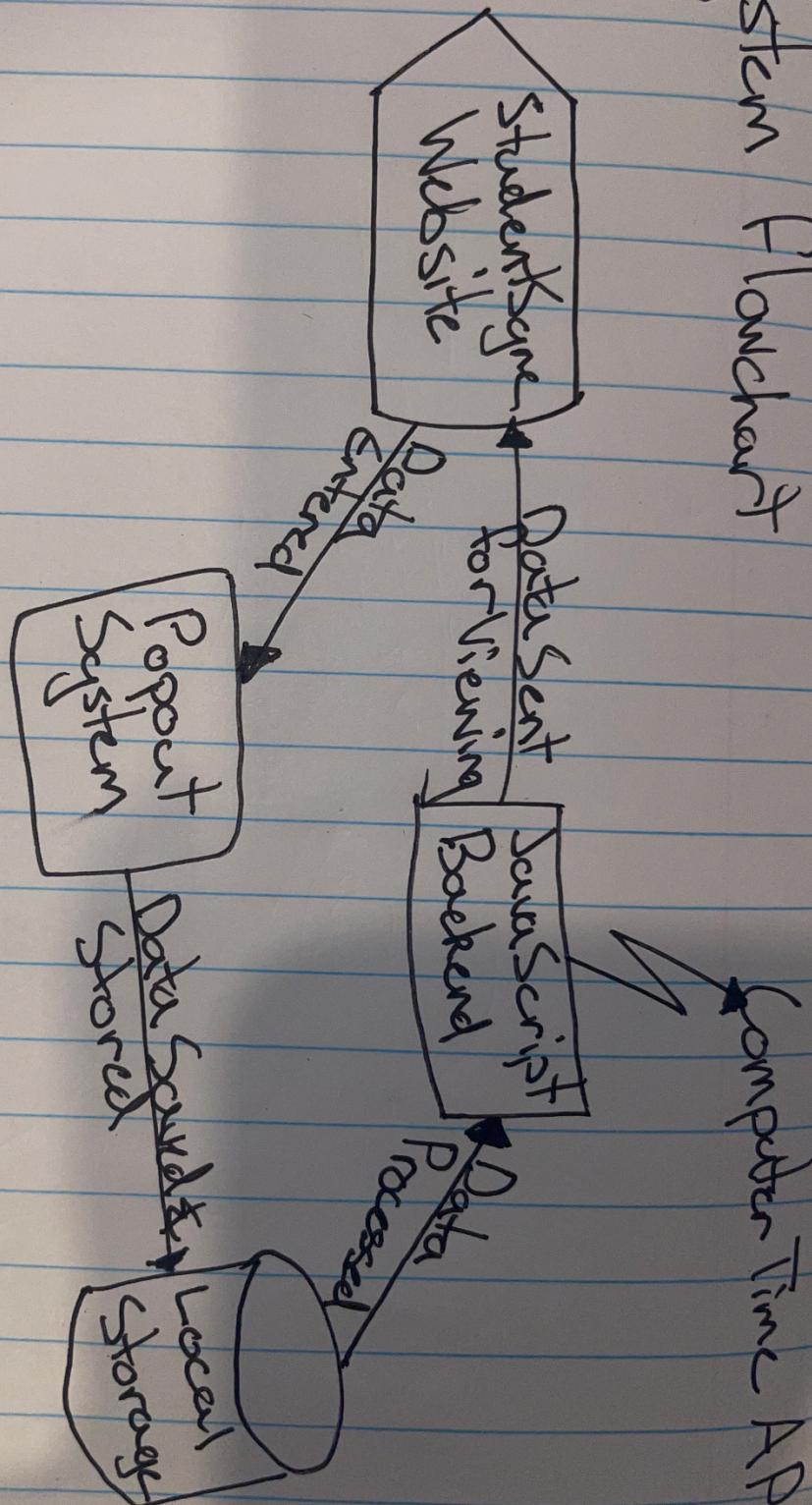
- **structure charts** - using your algorithm, create a structure chart for the program you are developing.

Structure chart



- system flowcharts - create a system flowchart for the program you are developing.

System Flowchart



- data dictionaries - from your algorithm, create a data dictionary to show the key items of data that you will use in your program. Include how data will be stored?

Data Item	Data Type	Size	Description	Example
Goal	String	70 bytes	A longer string of characters	I want to get 1st in my class.

			describing a goal. Stored in a list.	
Subject	String	20 bytes	A few word noun for the name of a class. Stored in a global array.	Business Studies
Teacher	String	20 bytes	A person's name. Stored in an array.	Mr. Rogan
Task Name	String	100 bytes	The name of an assessment task. Stored in a global array.	Task 3 - Project
Weighting	Float	32 bits	The weighting of a task compared to its others. Stored in a global array.	30%
Due Date	String	32 bytes	The date that an assignment is due. Stored in a global array.	12/08/2024
Your Marks	Integer	8 bits	The marks you receive from a test. Stored in a local array.	75
Total Marks	Integer	8 bits	The total marks in a task. Stored in a local array.	100
Percentage	Float	32 bits	The percentage mark received from a task/average calculated from the marks. Stored in a global array.	92.8%
Room Number	String	10 bytes	The room number of a subject in a specific timetable slot. Stored in a local array.	G.02

- test data and expected output - [create test data appropriate to test boundary conditions and logical pathways of your algorithm](#)

Test Data	Reason for Inclusion	Expected Result	Actual Result
Maths 2	Subject Field - Letters, Space, And Number	Data should be stored globally with no issues.	Data stored globally successfully.
64101	Subject Field - Fully Numerical	Data should be stored globally with no issues.	Data stored globally successfully.
English	Subject Field - Fully Letters	Data should be stored globally with no issues.	Data stored globally successfully.
Mr. Lancaster	Teacher Field - Letters, Space, Period	Data should be stored locally with no issues.	Data stored locally successfully.
Daniel	Teacher Field - Fully Letters	Data should be stored locally with no issues.	Data stored locally successfully.
Pope John Paul the 2nd	Teacher Field - Letters Spaces, Number	Data should be stored locally with no issues.	Data stored locally successfully.

Communication issues between client and developer

- the need to consult with the client - [explain the relationship between a software developer and client.](#)
 - Collaboration to achieve a functional and up to standard final version.
 - The relationship between the developer and the client needs to be open and constant so that

the client can get fixes and adjustments for anything that they want in their program while the developer can fix and update the software to the clients standards, as well as provide technical support if anything happens to the program.

- the need to incorporate the client's perspective - [how would you clarify what the client really wants?](#)
 - Constant collaboration and talking to the client, revising the program with each iteration
 - The best way to clarify what the client wants in their program is to have brainstorming sessions to find everything that they may want in their program. This includes talking about their existing solutions and other possible solutions to their problem, features they want in their existing programs that don't exist, and all design features such as colours, images, and style.
- the need for the developer to enable and consider feedback - [how would you get feedback from a client you are developing a software product for?](#)
 - The best way to receive feedback from a client is to host one on one sessions with the client at specific stages throughout the development of the program and show and explain the current state and progress of the program, so that they can give their feedback on the current state of the program.
- the need to involve and empower the client during the development process - [at what stages of the development process should a client \(end user\) be involved?](#)
 - The client should be actively involved throughout the whole development process, actively providing feedback at each stage to help achieve their vision of the program.
 - The client should be the final authority for decision making surrounding the final features and design of the program as a whole.

Quality assurance

- the need to explicitly define the criteria on which the quality of the product will be judged - [identify 3 or 4 key requirements you will be able to use to assess whether you have successfully completed the task you set out to do.](#)
 1. All features requested are included and working
 2. The scripts and mathematical functions within the program are producing the correct output
 3. The GUI looks modern and sleek, as well as utilises ergonomic and inclusive features
 4. Peer testing highlights no issues within the program
- putting in place management processes to ensure that quality criteria will be met - [identify some strategies you will use to ensure you complete the software project to the standard you have outlined above.](#)
 - Regular code reviews to check up on the progress of the program compared to progress tools and the Gantt Chart, as well as bug checking and backtracking of features
 - Complete a testing process and report to ensure that all features are working before the final version of the program is released
 - Get feedback from my peers on how my project is progressing throughout the production process to ensure that I am on track with my development goals
- an ongoing process throughout development to ensure the quality criteria will be met - [Create a Gantt chart to show your proposed development schedule of your software project. I have started this for you.](#)

