Software Design & Development
Assessment Task 1

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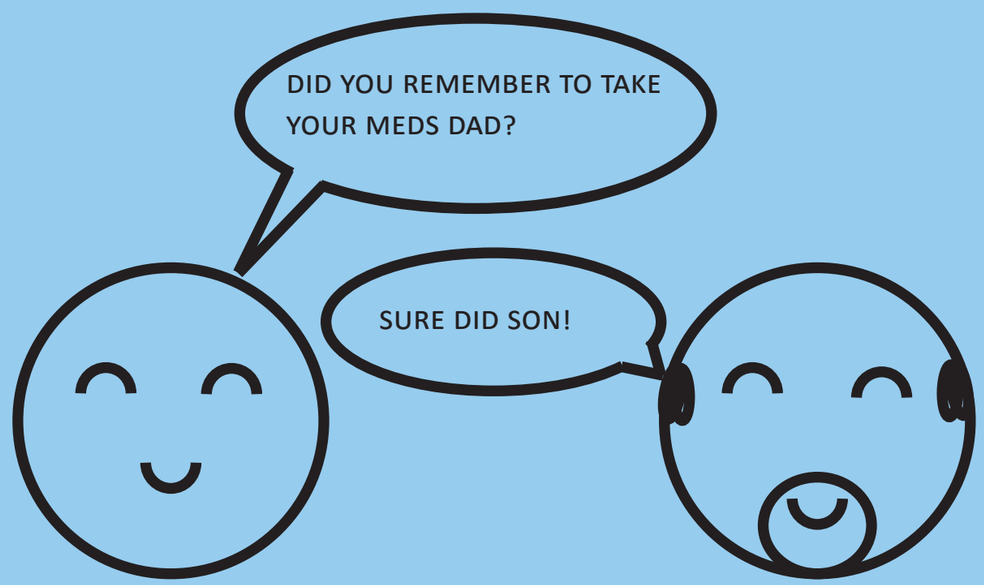
INTRODUCTION

This project is a software. It is designed to help people who suffer from dementia. The project aims to be very simple to use, as we believe that this will increase the usability for people who suffer from dementia.

The general features of our program:

- Digital clock
- Reminder slots
- Sends notifications when tasks are due



RATIONALE

Our group decided to focus on dementia as our disability for this project. Dementia is a neural disease mainly associated with age, that causes mental and memory problems. As the world's population ages with declining birth rates, dementia could become more prevalent. Despite this, there is always a need for a tool to assist with this problem and to improve people's quality of life, as there are always people who suffer from dementia.

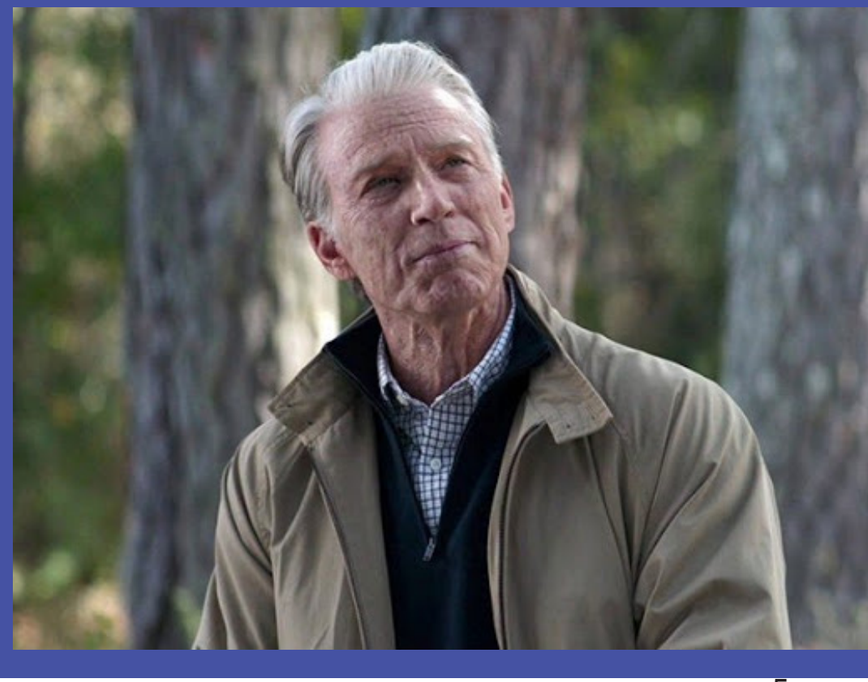
Our solution will help those suffering from dementia by allowing them to write down, and be reminded of, simple daily tasks. This saves them the frustration of forgetting simple activities, or losing written to-do lists or checklists. Furthermore, this prolongs their ability to live a semi-normal life. Our solution also allows concerned family members to send reminder lists to the users if they are unable or unwilling to create them themselves.

People with dementia have a very difficult time living normal lives, and this program helps them to gain control of their lives a little better, by making it so that they can pre-plan and schedule things before they forget.

HOW DOES THE SOLUTION ENHANCE THE ACCESSIBILITY FOR THE CLIENT?

The solution aims to enhance accessibility for people with dementia. Dementia decreases people's social and thinking ability, and therefore interferes with their social and working life.

Our solution is a reminder system that helps these people with these struggles in everyday life. It involves reminder message boxes that they can customise by selecting the wanted time for each reminder. Each reminder is also customisable, so the client can create and edit the details of the reminders. When the reminder is due, a message box pops up on the screen with the reminder number, of which the client can check the details. This helps the client to easily organise their life, as they may struggle to remember certain things without reminders.



DEFINING AND UNDERSTANDING THE PROBLEM

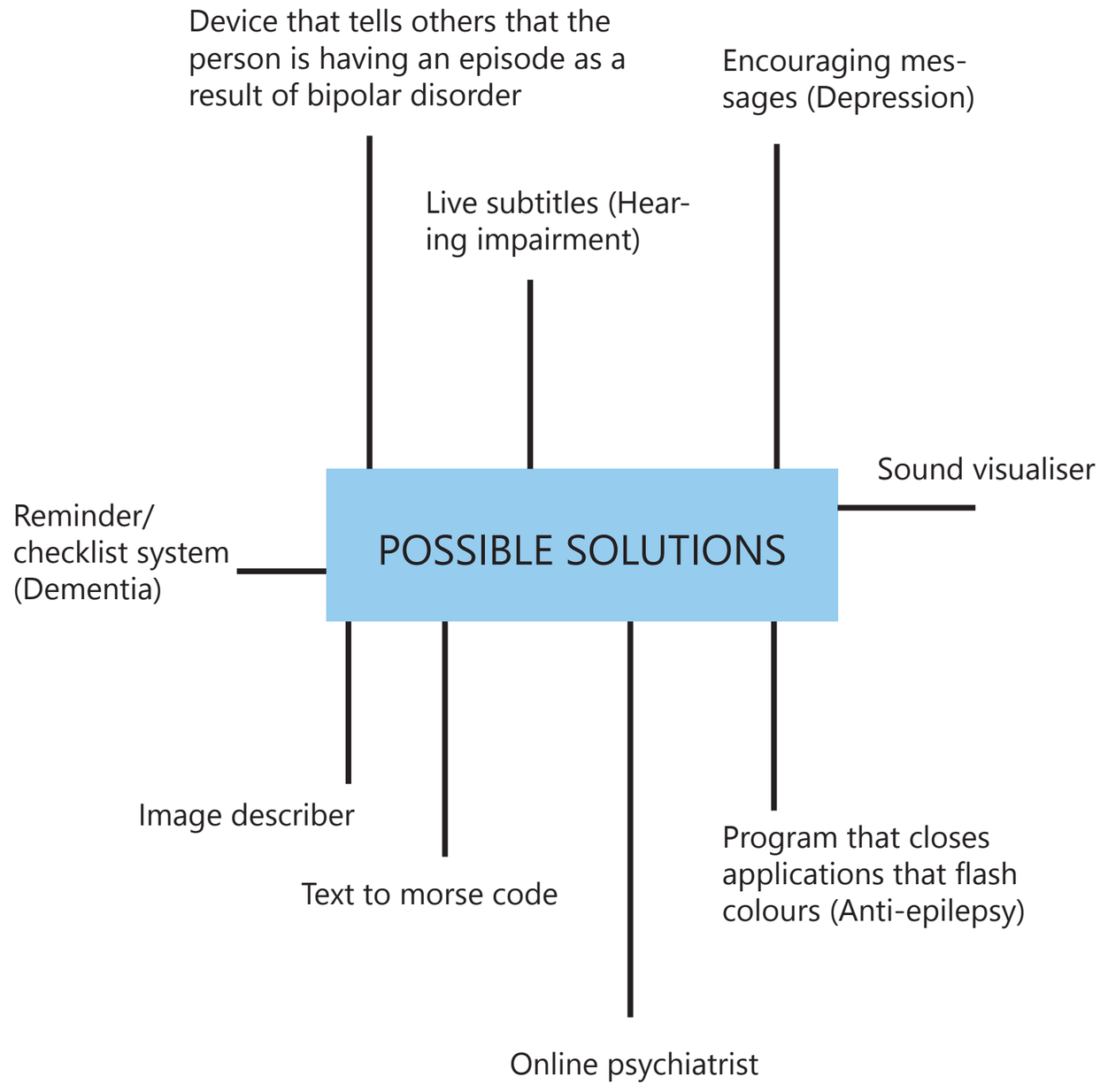
Initially, the client proposed the following problem –

Provide a solution to overcome difficulties faced by someone with a disability or accessibility issue. To do this you must develop a prototype computer controlled input device and accompanying software that either

- demonstrates the practicality of the input device, or
- augments the input device with software based analysis or response.

Your solution will show a clear path from the underlying social and ethical issue facing the user to the technical aspects of the solution and how it enhances accessibility

INITIAL IDEAS



RESEARCH

After brainstorming for the disability or accessibility issue that our solution could aim to resolve, we chose the idea of making a reminders program for those who suffer from dementia. Therefore, research was conducted on the disability of dementia.

What is it?
Dementia is the name for a group of symptoms that negatively impact people's social and thinking ability. It can interfere with a person's social and working life.

Who is affected?
Generally, dementia affects elderly people, although it is not a normal part of ageing. Dementia is more common to affect people over the age of 65.

Types of disorders resulting in dementia

- Alzheimer's disease - a progressive disorder that destroys memory and other important mental functions
- Vascular dementia - brain damage caused by stroke
- Dementia with Lewy Bodies - dementia caused by degeneration and death of nerve cells in the brain
- Frontal Temporal Lobar Degeneration (FTLD) - degeneration of behavioural and language abilities. Associated with degeneration of the frontal and temporal lobes of the brain.
- Huntington's disease - hereditary disorder where nerve cells in the brain deteriorate
- Korsakoff's syndrome - brain disorder caused by a severe lack of vitamin B-1. Most commonly caused by alcohol misuse
- Creutzfeldt-Jacob disease - Brain disease that can be inherited or contracted from infected tissue. Results in dementia and death.

People with dementia suffer from:

- General loss of memory and cognitive thinking
- Disorientation and general confusion
- Inability to recognize people, places and/or time
- Inability to take care of self

PLANNING - CASE TOOLS

Before we began to code, we planned out some important functions that we wished to include in the program. Shown on this page is an IPO that we planned to use for the development of our first prototype.

The next 2 pages contains the first Context Diagram, and DFD.

Name	Inputs	Processes	Outputs
new reminder	name, description, due date	create a new reminder with that information	a new reminder
modify reminder	which reminder, new details	replace the details of the existing reminder with the new details	a changed reminder
clear reminder	which reminder	removes the existing reminder	a reminder now gone
swap reminder	which reminder, which reminder 2	exchanges the positions of the two reminders	two reminders are swapped
set reminder important	which reminder	sets the reminder as important	the specified reminder is now important
set reminder unimportant	which reminder	sets the reminder as unimportant	the specified reminder is now unimportant
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open a menu panel	which tab	opens a new page	a new page is opened
close tab	n/a	closes a page	current page is closed
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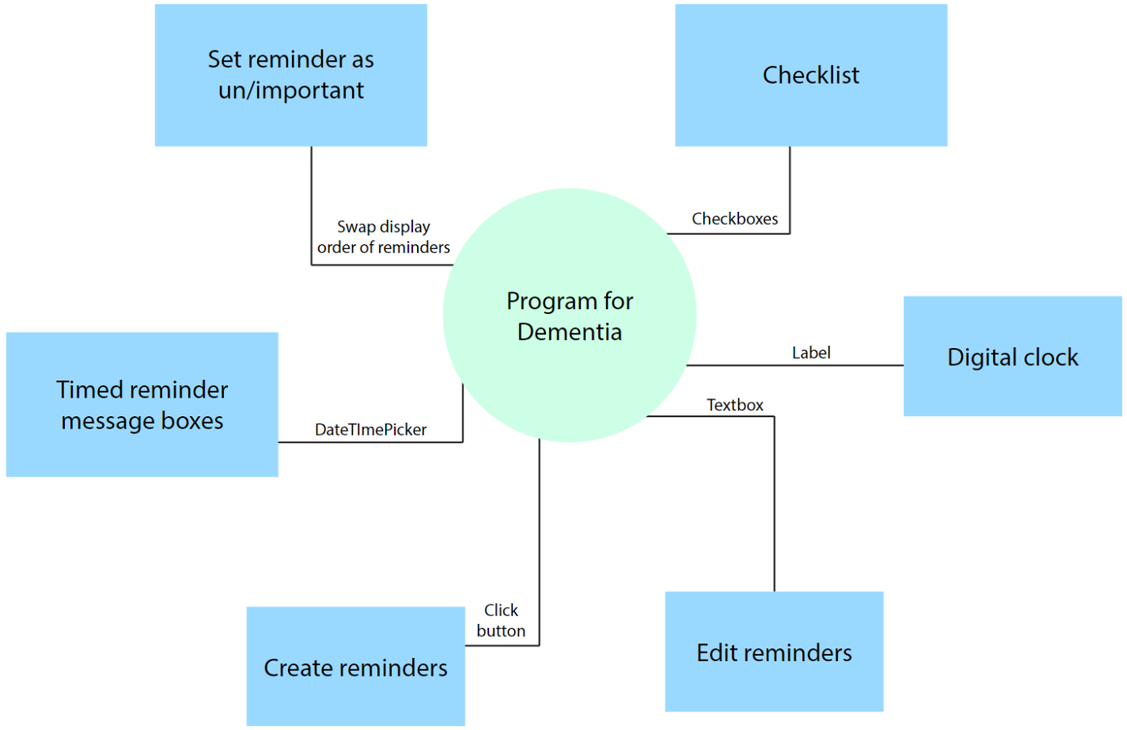
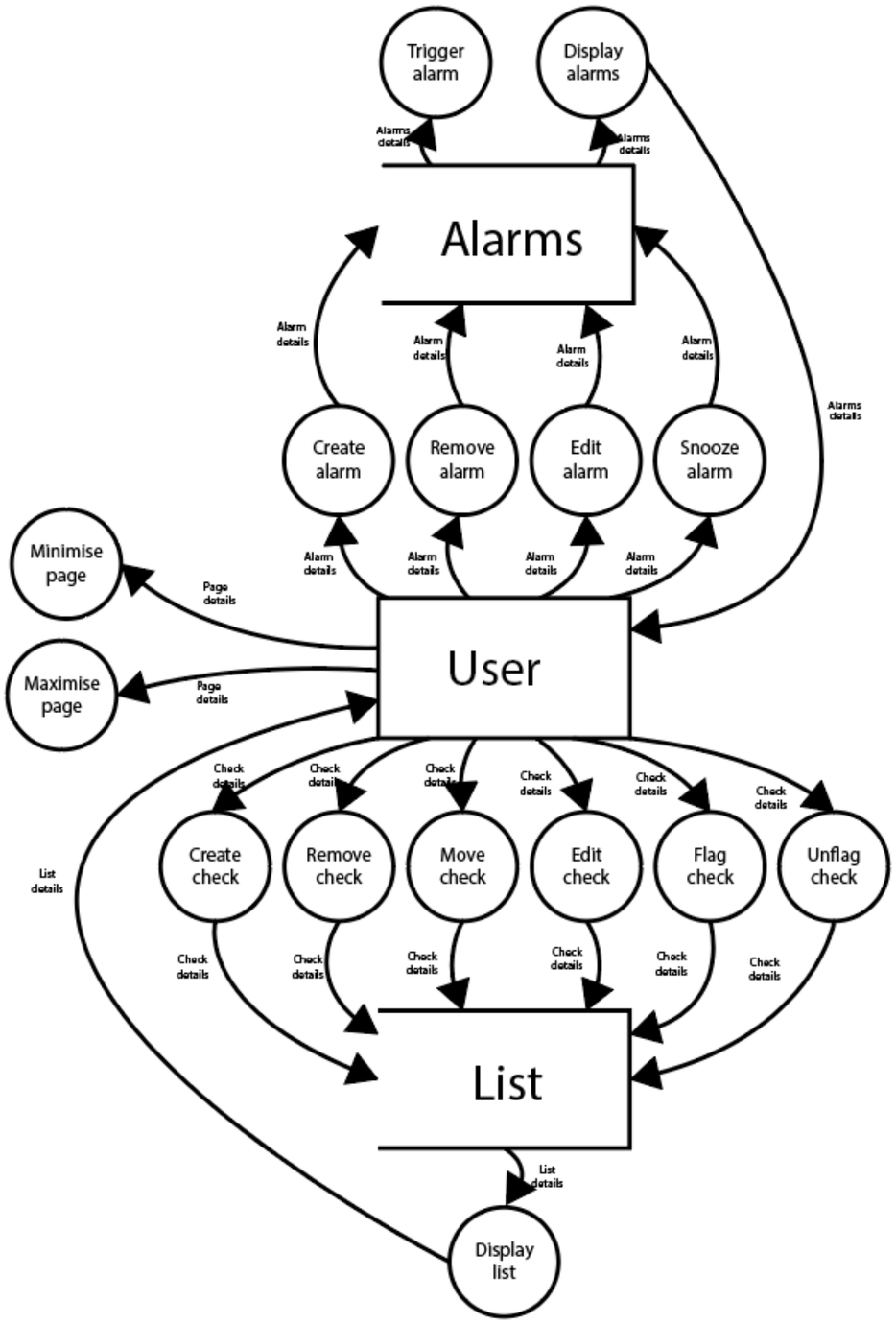
date/time set alarm	date, message	creates a new alarm on the specified day with the specified message	a new alarm is created
modify alarm	which alarm, new date, new message	replaces the date and message of the specified alarm with the new date and message	an alarm is changed
delete alarm	which alarm	removes the specified alarm	an alarm is removed
Import	Data file	Reads data file and writes data into reminders	Saved reminders set
Export	reminders	Reads reminders and writes data into data file	Reminders saved into file

PLANNING - CASE TOOLS (CONTINUED)

Context Diagram



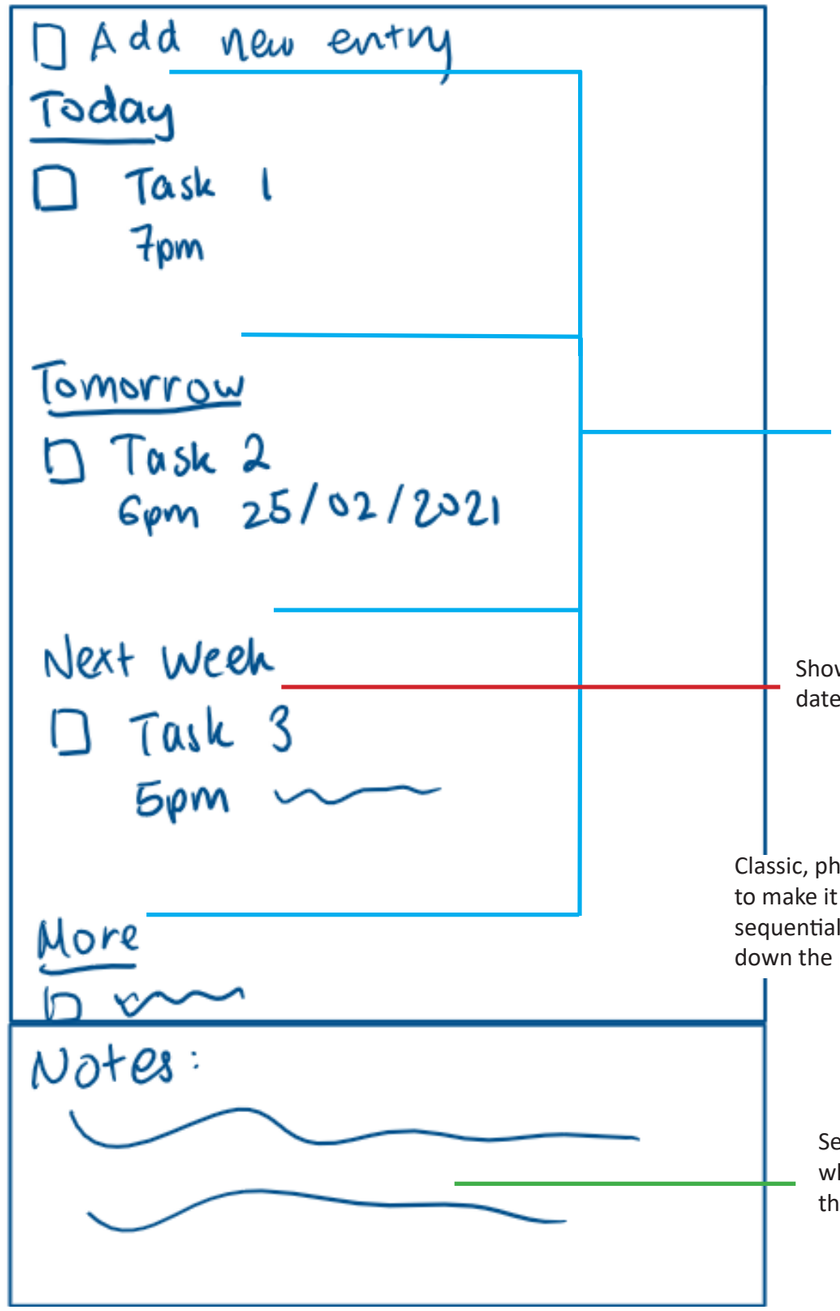
DFD (Data Flow Diagram)



INITIAL GUI IDEAS

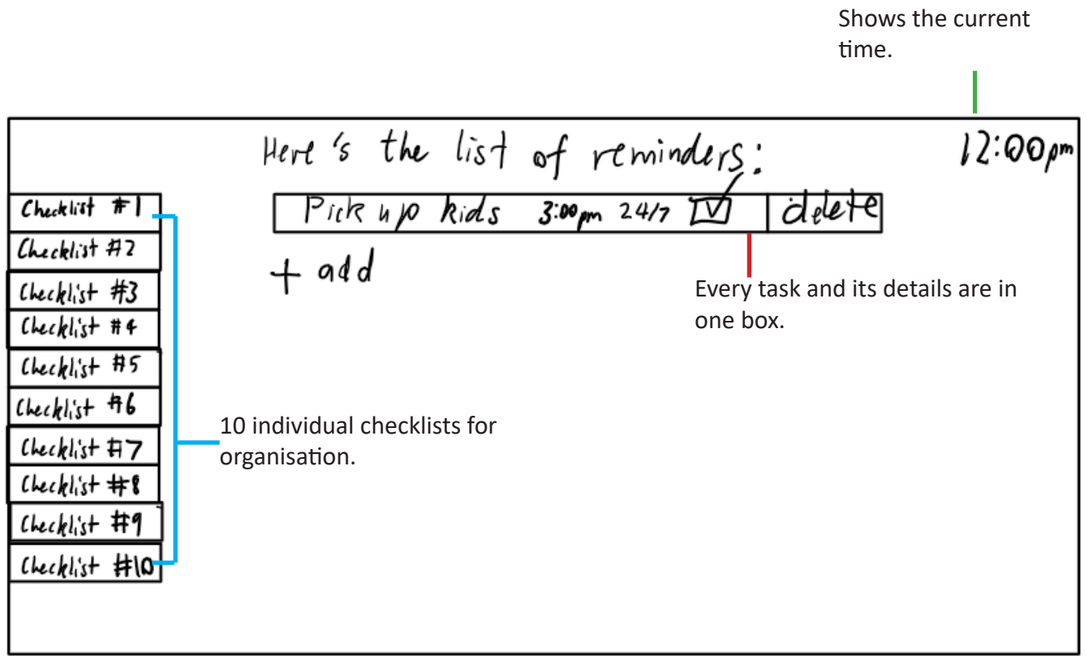
Before we made the Wireframe, we sketched out some possible GUI designs for our program. The following pages display some initial GUI ideas.

GUI Idea #1

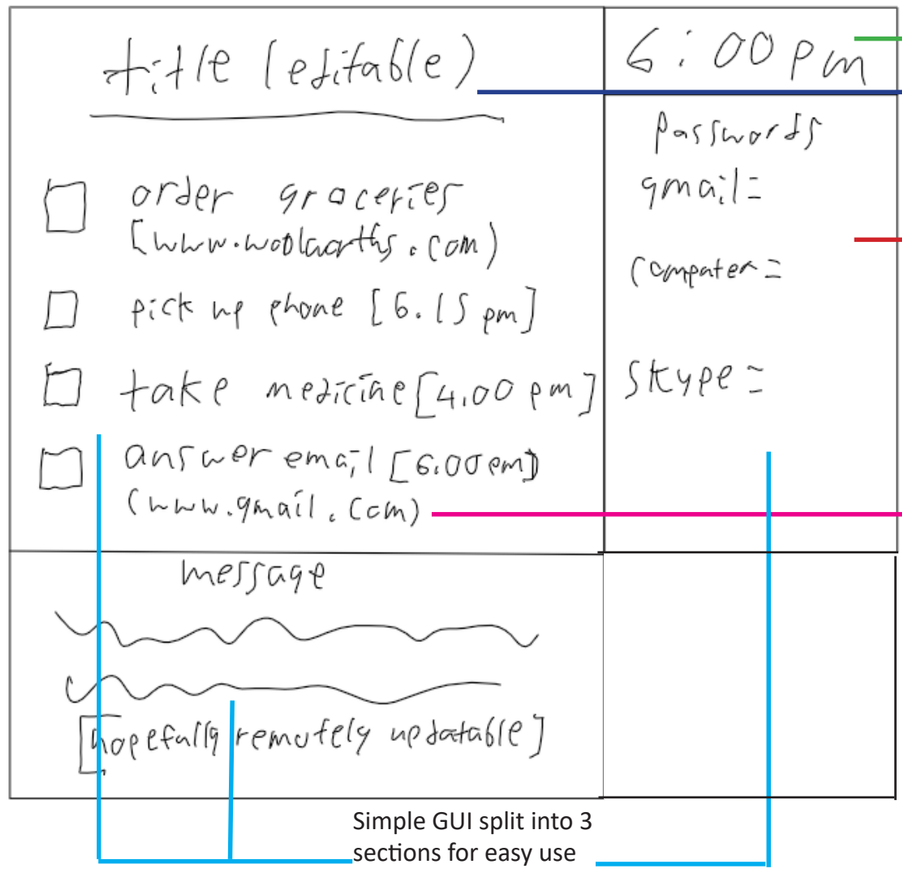


INITIAL GUI IDEAS (CONTINUED)

GUI Idea #2

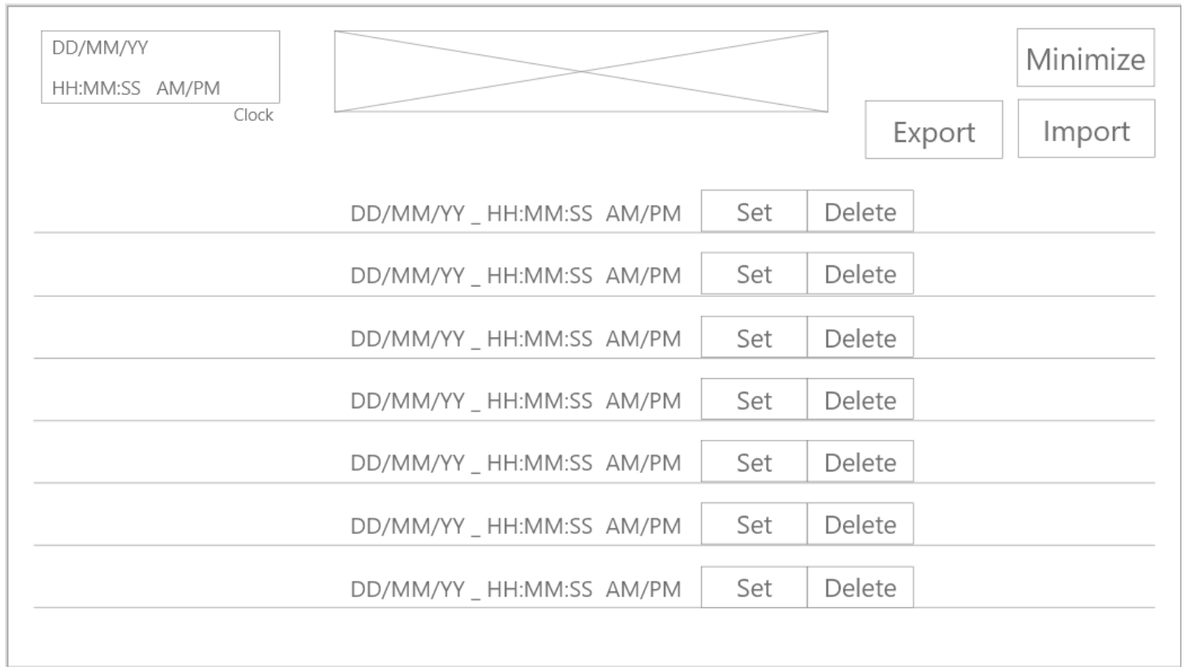


GUI Idea #3



WIREFRAME

Initial wireframe:



Evaluation:

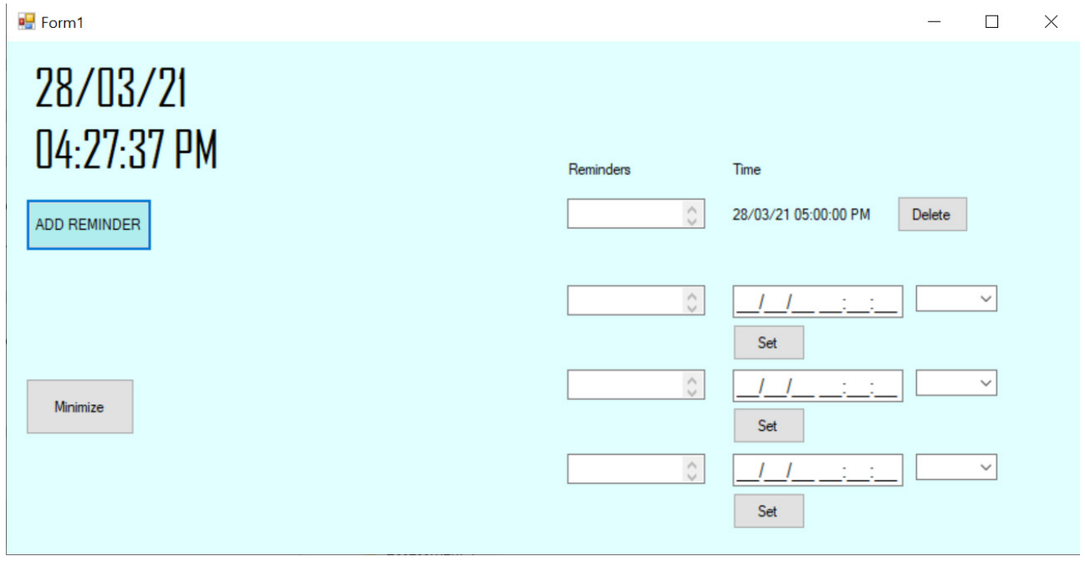
We believe that this solution will be very helpful to someone who suffers from a mental illness such as dementia. Our program aims to help people suffering from dementia by giving them a place to note down things that they wish to remember, so that they can be reminded at any time that they choose.

Our UI is also very user friendly, which is especially important for someone who suffers from mental illnesses such as dementia. Some user friendly UI elements that we have included are:

- A standard checklist format from top to bottom
- Large buttons which are easy to see and click
- A large, digital clock
- Contrasting dark colours with white background for easy visibility of the UI elements

PROTOTYPES

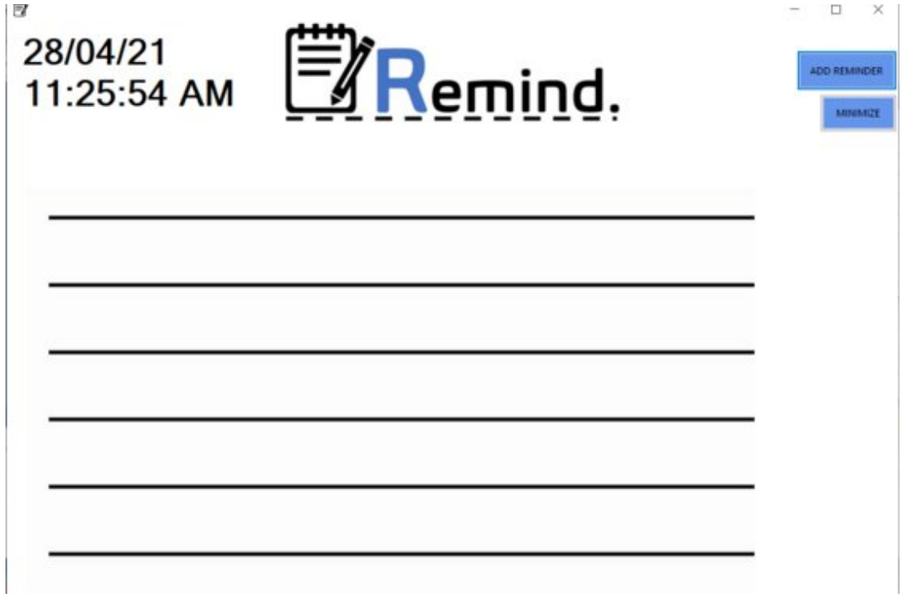
Initial prototype:



This was our first attempt at building a program to meet the clients needs. We decided to use Windows Forms to create our program, as we decided that older people may be confused by Console, and would find it easier to use a more traditional program.

To show the reminders we used textboxes, with the user inputting their reminders into the boxes, then pressing the 'Set' button. Once the 'Set' button is clicked, the set time appears through a label, and the 'Delete' button appears so the user can remove the set reminder and enter in a new one. The user could also press the 'ADD REMINDER' button to create more reminders, up to a maximum of 9. The 'MINIMISE' button allows the user to hide the program and have it continue running in the background.

Second iteration:

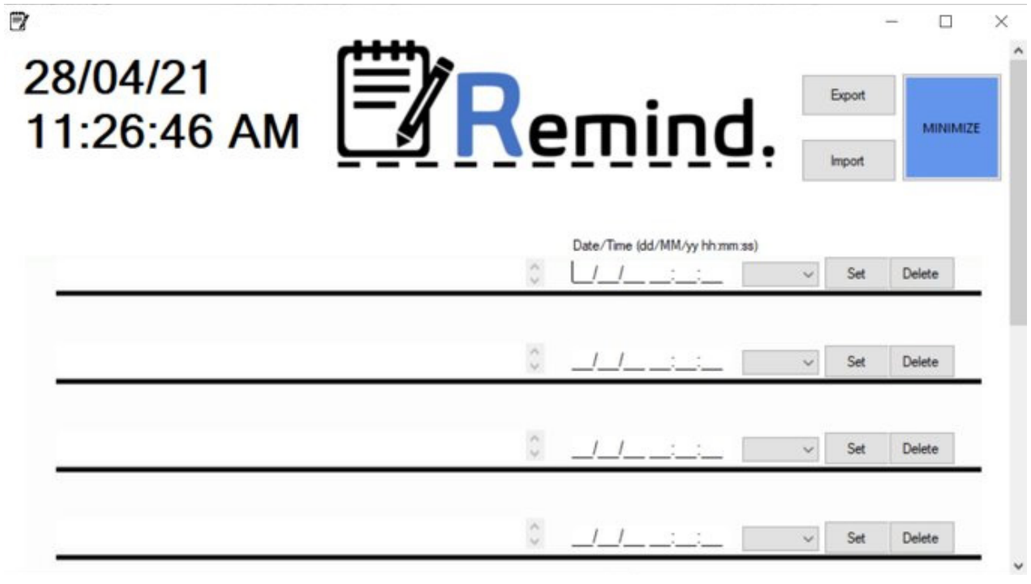


The first prototype was evaluated. Although it was only used to present the client with the functions, rather than a design for the GUI, the client still suggested a change in the aesthetics.

For prototype 2, we planned to modernise the programs aesthetic. Therefore, we added a logo and integrated the textboxes into the lines of a notebook. This was to further convey the message/reminder pad idea of our program. Most of the core functionality of the program remained unchanged, with only a few buttons being moved.

PROTOTYPES (CONTINUED)

Third iteration:

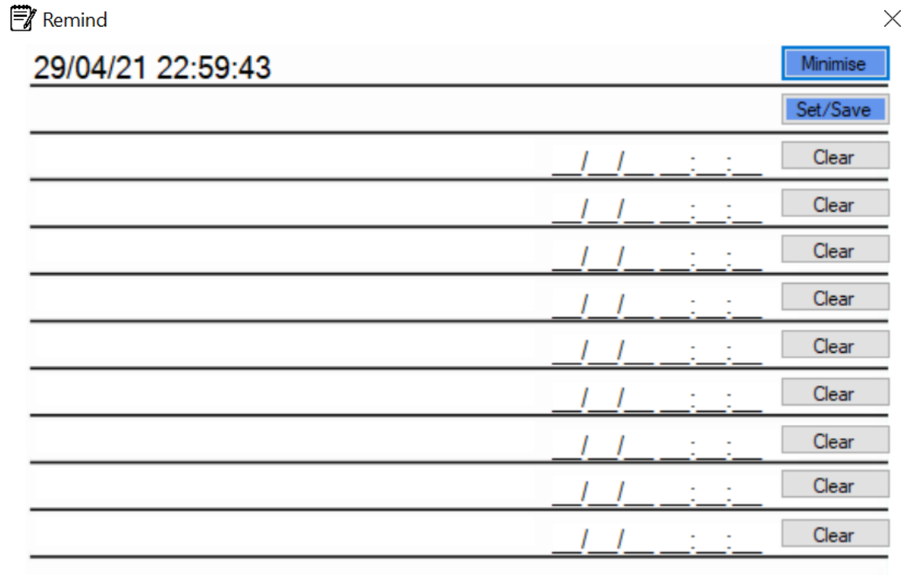


After prototype 2 was evaluated, the client wished to have a way to save inputs before closing the program.

In prototype 3, we planned to keep the GUI design and merely change some functions.

Therefore, prototype 3 was mostly the same visually, but had some important changes made. The 'ADD REMINDER' button was removed, as we opted to just make all the reminders visible from the start. We also added an import and export functionality, with the user being able to input reminders from external sources. This was to allow family members of the user to send them reminder lists, but can also be used to save and load lists.

Fourth iteration:



Prototype 3 was evaluated and it was agreed that it was spatially inefficient.

For prototype 4, we planned to simplify every component of the program.

Consequently, we drastically changed the look and size of the program, with the aesthetic being simplified to only the note pad, and the 'Export' button being replaced with a 'Save/Export' button. The 'Import' button was also removed, with the program instead importing on start-up. This was done to simplify the save/load process in order to better suit our (mostly) elderly-intended users. We also made our code more efficient, cutting our line count from 750 to 250 by using arrays and loops. Furthermore, we fixed the size of the program to approximately 1/4 of the size of a standard laptop screen, with the border style as FixedSingle so the user cannot resize the program.

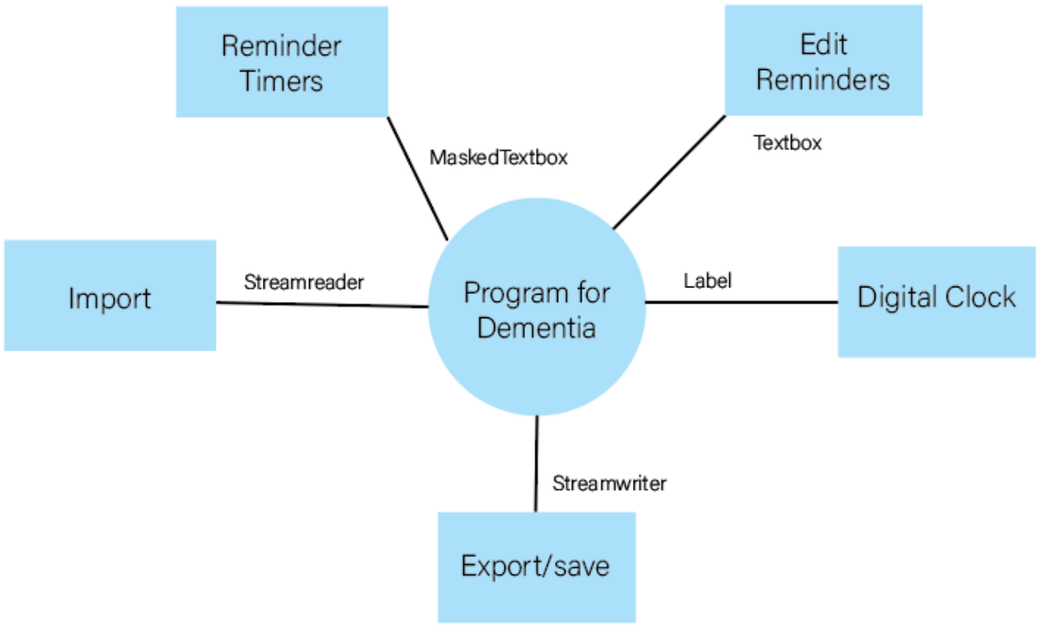
UPDATED CASE TOOLS

After creating several prototypes, we decided to update a few of our CASE tools. The following spread displays the updated IPO, Context Diagram and DFD for prototype 4.

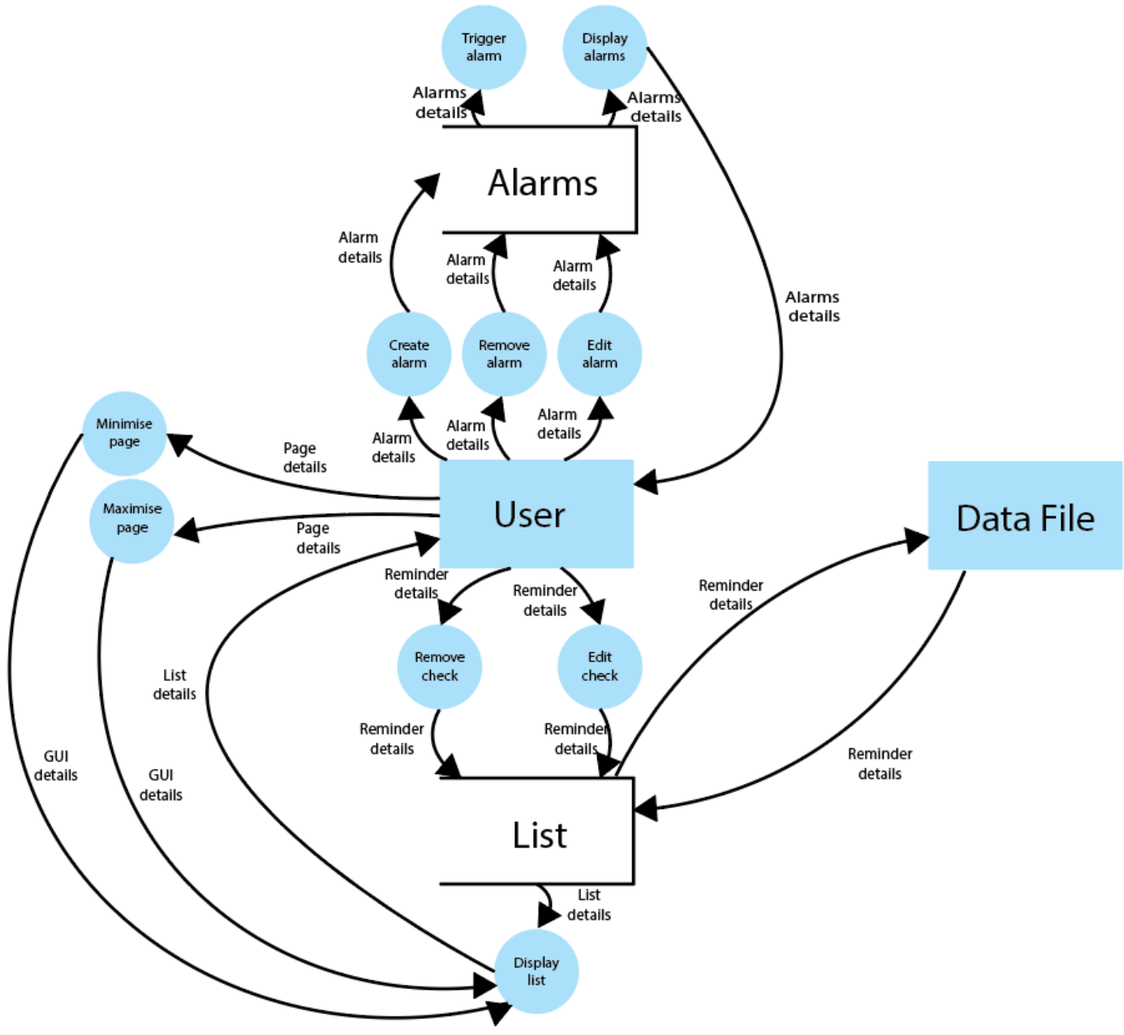
Name	Inputs	Processes	Outputs
Modify reminder	Which reminder, new details	Replace the details of the existing reminder with the new details	A changed reminder
Clear reminder	Which reminder	Removes the existing reminder	A reminder now gone
Close tab	N/A	Closes a page	Current page is closed
Date/time set alarm	Date, message	Creates a new alarm on the specified day with the specified message	A new alarm is created
Modify alarm	Which alarm, new date, new message	Replaces the date and message of the specified alarm with the new date and message	An alarm is changed
Delete alarm	Which alarm	Removes the specified alarm	An alarm is removed
Import	Data file	Reads data file and writes data into reminders	Saved reminders set
Export	Reminders	Reads reminders and writes data into data file	Reminders saved into file

UPDATED CASE TOOLS (CONTINUED)

Context Diagram

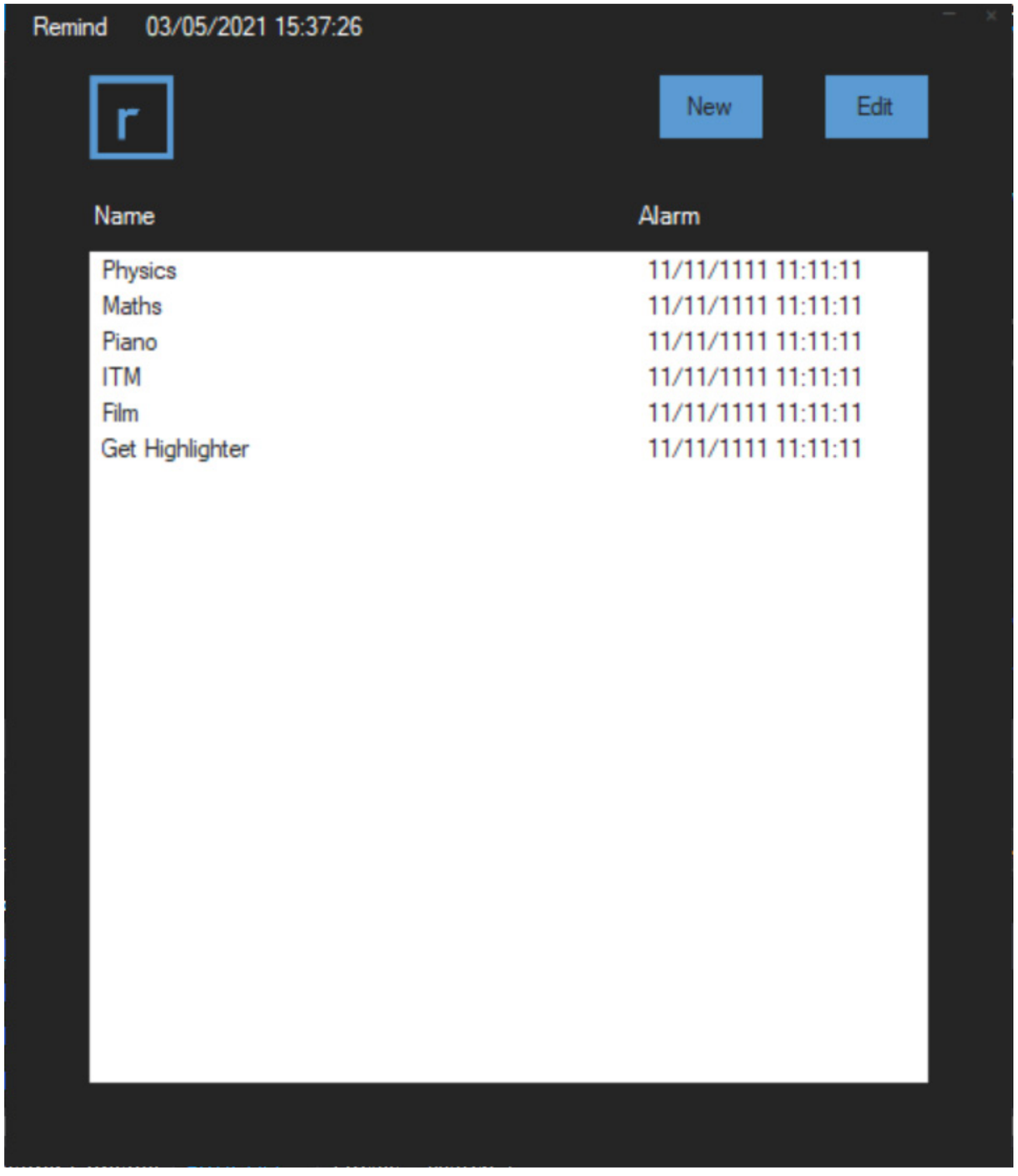


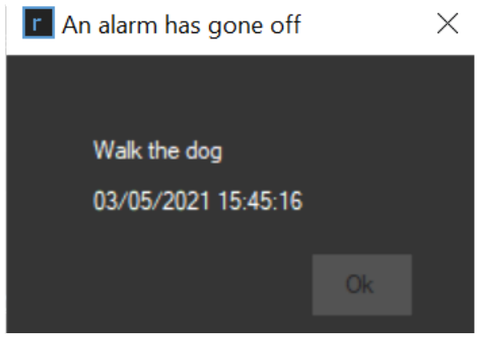
DFD (Data Flow Diagram)

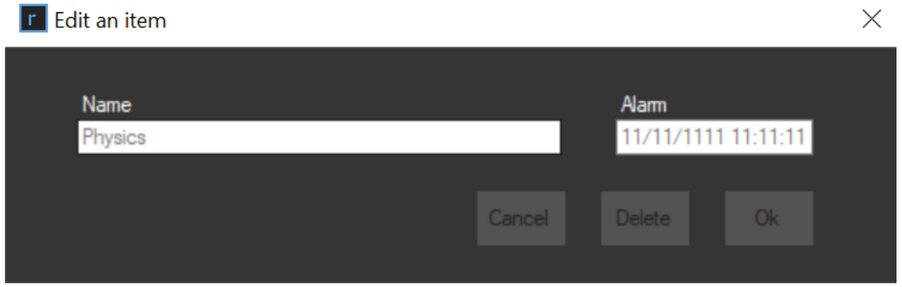


PROTOTYPES (CONTINUED)

Final prototype:



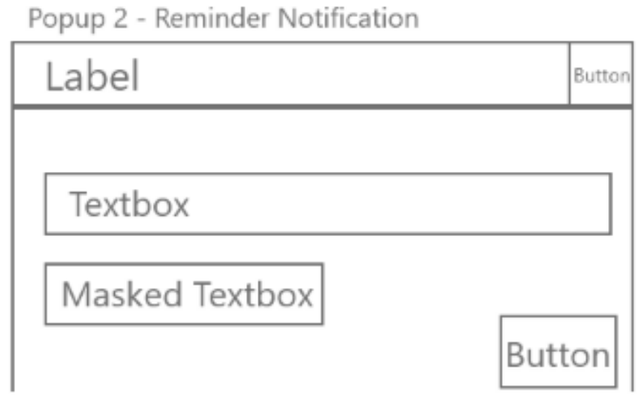




The client evaluated that the fourth prototype looked too old-fashioned and the page should be simplified down. In our final prototype we therfore completely changed the GUI design, and utilised multiple window pop-ups to allow the GUI to be spatially efficient. The main functions remained the same. This has been approved by the client.

WIREFRAME (CONTINUED)

Final wireframe:

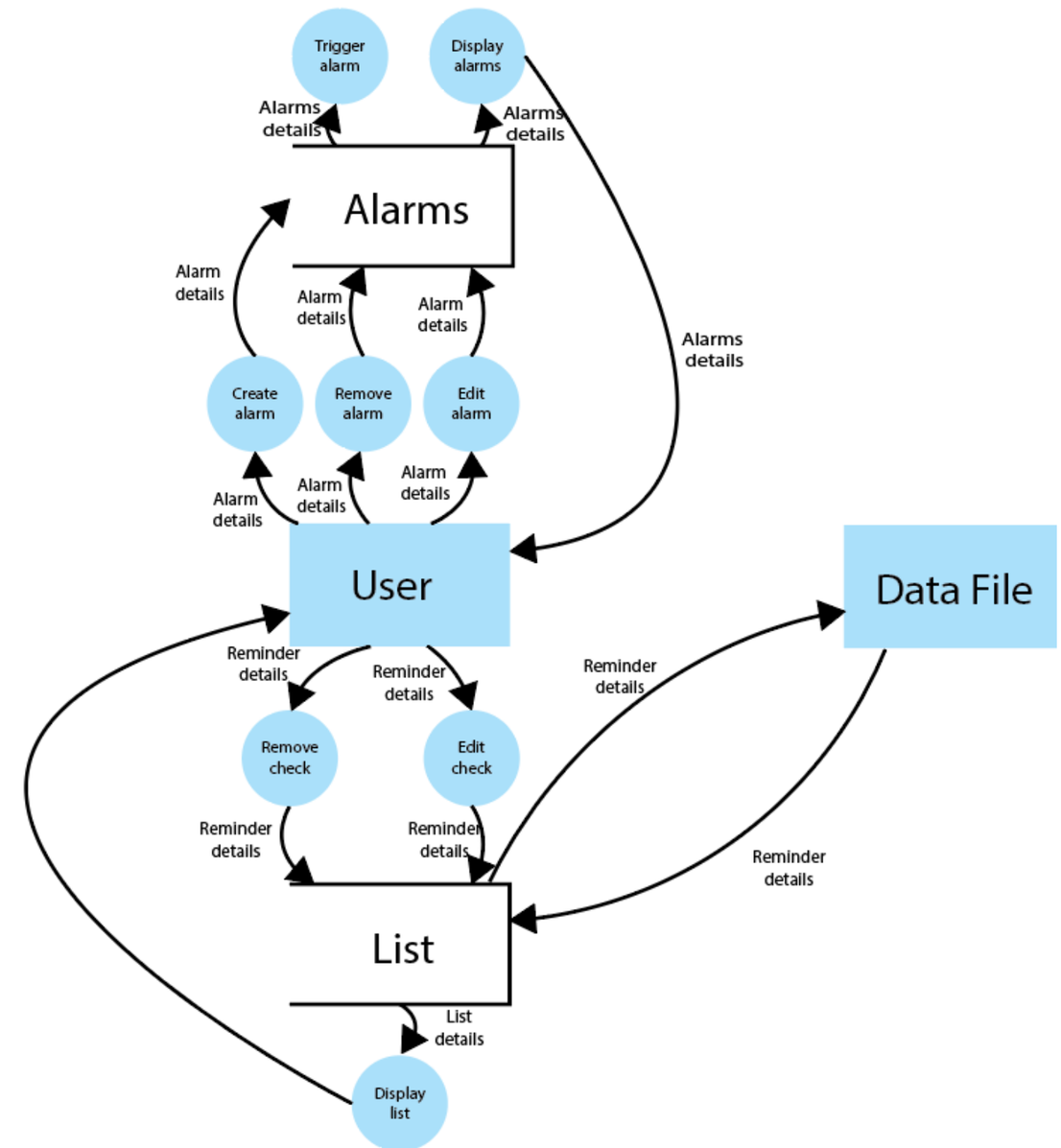


UPDATED CASE TOOLS

For the final solution, we updated the CASE tools according to the finalised program's functions. Below is the IPO chart and next few pages display the updated DFD, Context Diagram, System Flowchart and Structure Chart for the final solution.

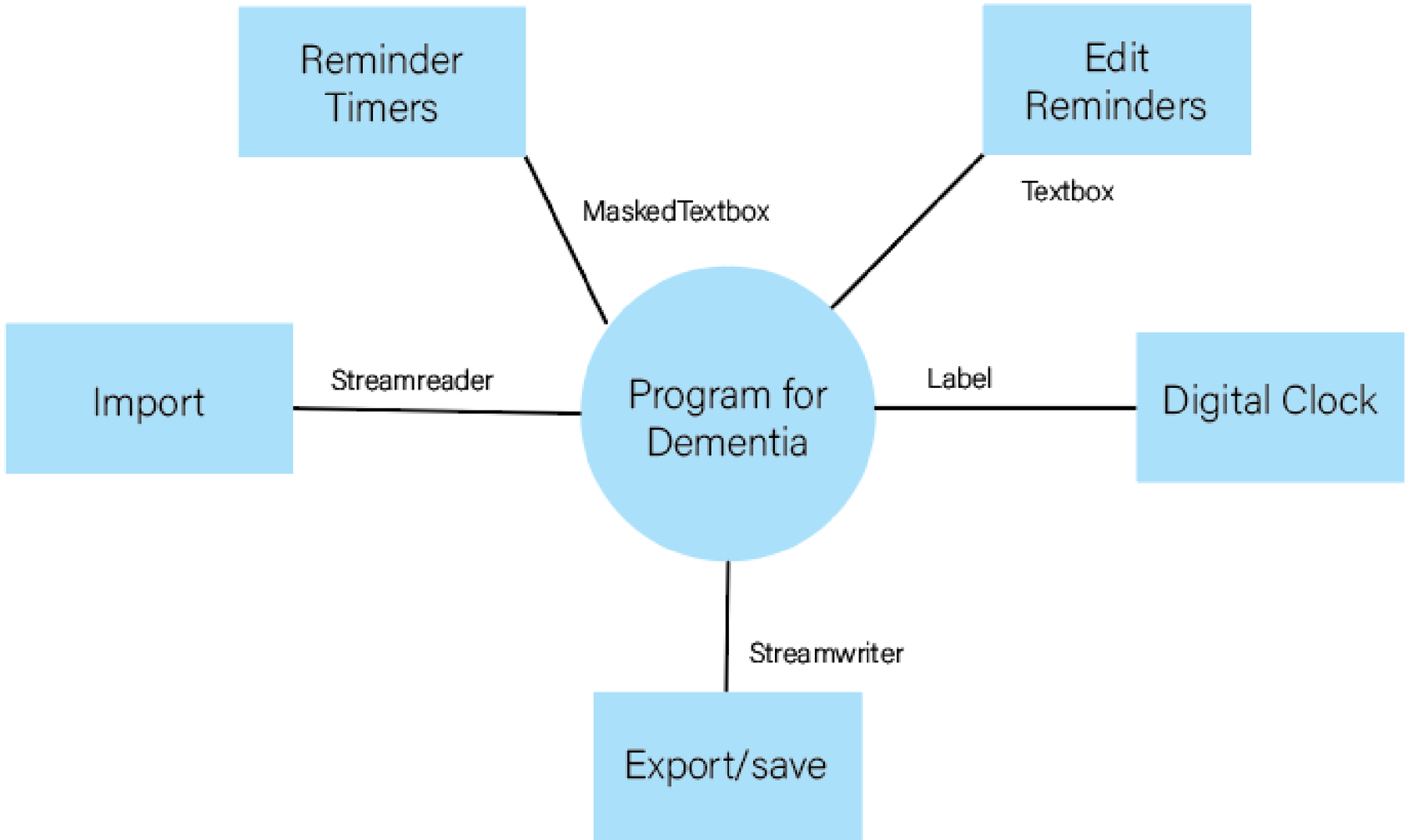
Name	Input	Process	Output
New	- Reminder name, due date	- Saves the user-input data.	- A new reminder is added to the list
Edit	- New reminder name, new date and time	- Saves the latest version of the reminder.	- The updated reminder replaces the old version in the list
Delete (Edit an item)	- User clicks "Delete"	- True/false	- **True**, reminder is removed - **False**, do nothing

DFD



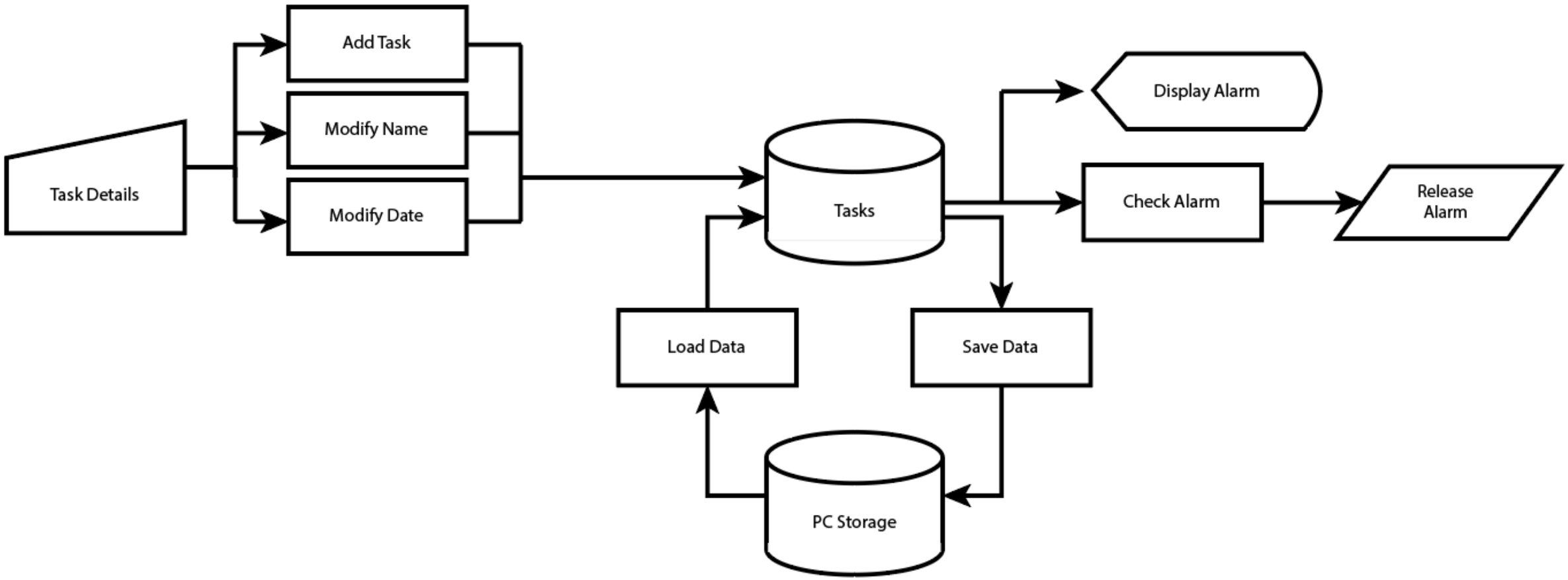
UPDATED CASE TOOLS (CONTINUED)

Context Diagram



UPDATED CASE TOOLS (CONTINUED)

System Flowchart



UPDATED CASE TOOLS (CONTINUED)

Structure Chart