C1: Individual Reflection and Evaluation Report

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Introduction

This report is here to outline my personal experience with CET 257 enterprise project as well as providing some evidence towards my contributions and how that shaped the project as a whole. This project is based on the premise that we as a group are to form a small fictitious software company, in which our company has an online presence, in order to respond to or client brief. In this case our client was the Gateshead Health NHS Foundation Trust. Our brief was to create a piece of software in order to assist in the improvement of patients mental health, with it working alongside the NHS. In the team, which will be refereed to as our team name (MY software), I was Development Lead which means I was to architect the software solution and push forward the production of code.

Working through the project

I have never worked on software in a collaborative setting before this project meaning this was the first time for me I was putting to use knowledge I have learnt through the university course as well as outside it such as git and GitHub in a collaborative setting as well as an effective use of group programming paradigms which in this case is the Agile approach (Figure 4) with a sprint every week (Figure 6). We chose agile as it lends itself to a more modular web based solution very well especially in comparison to an approach such as the waterfall approach. This is not my first time working for a client however this is my first time working for a non-individual client so it required a very different set of skills of which I learnt through our interactions such as being able to interpret multiple ideas and how to be able to architect them. As well as this the requirements where a lot larger than I was used to from clients so learning how to engineer both a software and time efficient solution was a new angle to consider for me. This has overall lead me to being a more adaptable and flexible programmer, being able to adapt to new requests from multiple representatives. As well as this I learnt how to build a technical solution in a group setting which changed my workflow as to get the best out of every person in the group I would also have to work around their needs and workflows which was a new and informative experience. I am lucky to already be comfortable with the use of git and GitHub so that allowed me to focus on a lot of the team and client facing problems which for me were the biggest points to learn from.

Teamwork and Group Experience

The team itself was structured as follows; we had a design, development and marketing team with a project lead as well. In each team we had a lead and another contributor however due to small team size we did have people doing multiple roles that they were comfortable with. However we all had an agreement in which if you wish to help with a different aspect of the project as long as you have your responsibility's done that is encouraged. We assigned tasks through a spreadsheet (Figure 9) and through written communication to each other, we felt that this was apt due to the smaller team size. As a team we were very respectful to each other and friendly through the project leading to minimal conflict. As a team collaboration was slow to start however when the time came to start getting the more difficult stuff done we worked well in communicating and implementing ideas collaborative in the development team, we would work on complex ideas such as voice activation, user experience and user interfaces efficiently as a team alongside our project manager.

In the team dynamic I brought forward solutions to programming problems and issues that any other person who was trying to implement features as well as centralising and documenting progress as a team through the GitHub (Figure 8). I was a positive member, always encouraging team members and trying to uplift them especially during work they wanted feedback on. With that I also tried to be as constructive and empathetic with criticism. I do however feel I could have been a bigger positive force for the marking team as my input on that side of the project was minimal.

We had challenges when it came to design of our brand identity due to a multitude of factors such as inconstant submission in terms of punctuality as well as trying to find a final design. We resolved this by coming together as a group and talking through each design, from that came the idea of a tournament style voting for the designs which eventually lead us to out final design. The punctuality issues became evident when it cam time for meeting with people not coming to the meeting with no prior notice or coming to the meeting late in front of the clients.

Personal Performance Evaluation

In this project I designed multiple systems such as the article recommendation system (Figure 1) as well as the profile system (Figure 2) and did do the analysis of the problem (Figure 18). As I was designated to do the back-end early on I designed the database before programming any of the API (Figure 3). I wrote code for the API (Figure 12), the Unity server (Figure 13) and the Unity Game (Figure 15) as well as a substantial amount of the front-end code (Figure 14) and the code to link all of the systems together (Figure 11). While writing the software I kept documentation for my team to be able to implement features and work on the system more effectively such as a README for the system (Figure 10) and API documentation (Figure 16). Alongside the practical solution I also contributed to the structural elements of the group such as the Sprint reviews (Figure 6) and the Agile structure document (Figure 4). Through the client meetings I kept detailed notes (Figure 5) to get ideas for changes and features to implement as well as client communication (Figure 7). I am happy with my contribution to this project and I feel I worked alongside my team to keep the project going at a fast pace to be able to produce some of these features with my development team. I could have however given my team more time to be able to implement some UI changes. UI is not a field I consider myself particularly strong in which is why I should’ve asked for more assistance from my Project Manager and my team.

I believe the pace I kept through the project could have been tapered back more , allowing the rest of the team time to analyse and give detailed feedback on changes I made, as we had session were we went through features I had implemented but they didn’t have time to give a detailed responses to which I believe does partially lie on my shoulders. However I do believe that the pace I kept through the project did contribute to the scale of the project that we managed to achieve as a group. As a group I feel in person presence was lacking without ample notice from some of our members meaning that we were forced to work around issues relating to a lack of people to perform some work meaning that delegation of tasks became difficult. However the meetings we did have were very productive even with our problems we had. The response from the client to our solution was very positive which gave a massive morale boost to me and the group as a whole. I’m also proud about my continuous punctuality when it comes to task submission, meetings (both in person and online) as well as our client interactions.

Development Lifecycle Reflection

We started with planning very quickly in which we established a baseline on how we will work, such as outlining our Agile framework, group structure and meeting times. During planning the

development team worked on any overarching solutions and breaking them down in sub systems and designing them. That was done over the course of 2 sprints, after planning sprints we started with development of which was implementing designs discussed in the first few weeks and as the project went forward we started implementing ideas discussed in the previous week as is the best part of the agile framework. Testing came through with short informal surveys in which we asked a few strangers around university about our app (Figure 17). All of this was interspersed with delivery sections to our clients which was matched against the PACT analysis of which I written (Figure 18).

The process went well in some areas such as progress relating to development and our design team however some other teams struggled to produce work in key areas for delivery and planning making the first stages difficult in some aspects. The management of tasks was clear for development however could have been made clearer for other teams in which the requirements are naturally more vague.

Employability and Skills Development

I learned a lot about working with and around people through this project and what makes effective communication, which I will take forward through future projects in the form of being able to present information in a clearer manner and being able to work in group settings better whether that's in a work or academic environment. I have also learnt about how key it is to not only know how to solve a problem but how to effectively present that solution to stakeholders. I have also learnt about the role of empathy within a group project and how important morale is within a team environment as I could find clear links between a higher standard of work, from all of us as a group, and when we had received positive feedback alongside criticism to act upon from either clients or others in the group. These soft skills will allow me to become a more effective co worker in a software job as well as being key skills in leadership positions.

I have become more knowledgable on game development (as that was a key part of our project) and how web technologies interface with games, in the case of this project; communicating with api’s to track progress on an account, logging into to an account in game and cosmetic generation. I have also become more knowledgable on advanced api development especially in the ExpressJS framework. I have also found out about how important tooling is in solving large, complex problems. In the case of this project developed my own C++ tooling to parse articles to a txt format to be able to be used on my backend (Figure 19). This will be important to my professional development as a lot of large projects taken on by company's at some stage require in house tooling to be built such as scripts to automate laborious tasks.

Conclusion

My experience with this project was an extremely informative one, on how to work with others in a group setting making software and how to manage conflict in such a setting. It was rife with unexpected turns leading to demoralising defeats as well as many successes for our group. Overall I believe as a group we made a project, we can all be proud of contributing to, for a client.

I contributed heavily to the programming and architectural side of the project implementing a wide range of software from a full stack web app to a computer game as well as tooling for further development as evidenced in the figures mentioned earlier in the report.

I have used this experience as a moment for an immeasurable amount of professional growth being able to learn how to effectively present and communicate to clients as well as how to work effectively in a team setting are lessons I consider personally invaluable.

Evidence Of Personal Contributions

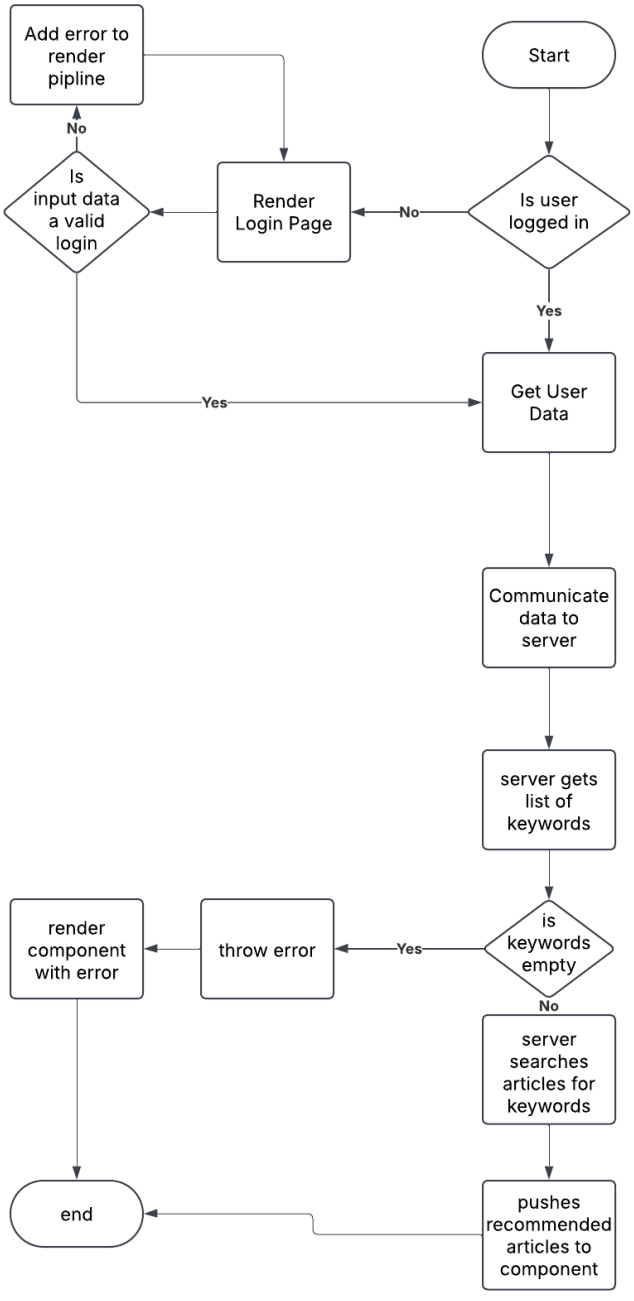

Figure 1: Article recommendation system flowchart

Figure 2: Profile Page Flowchart

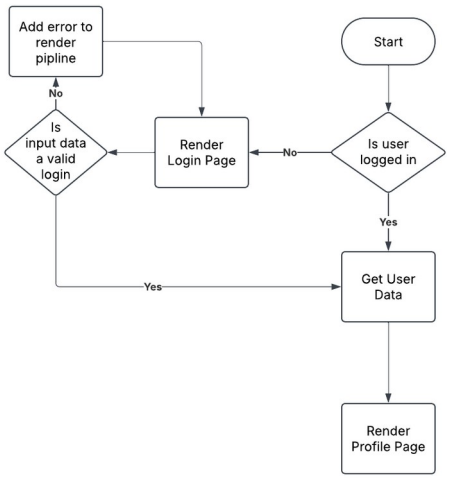

Figure 3: Database Entity Relationship Diagram

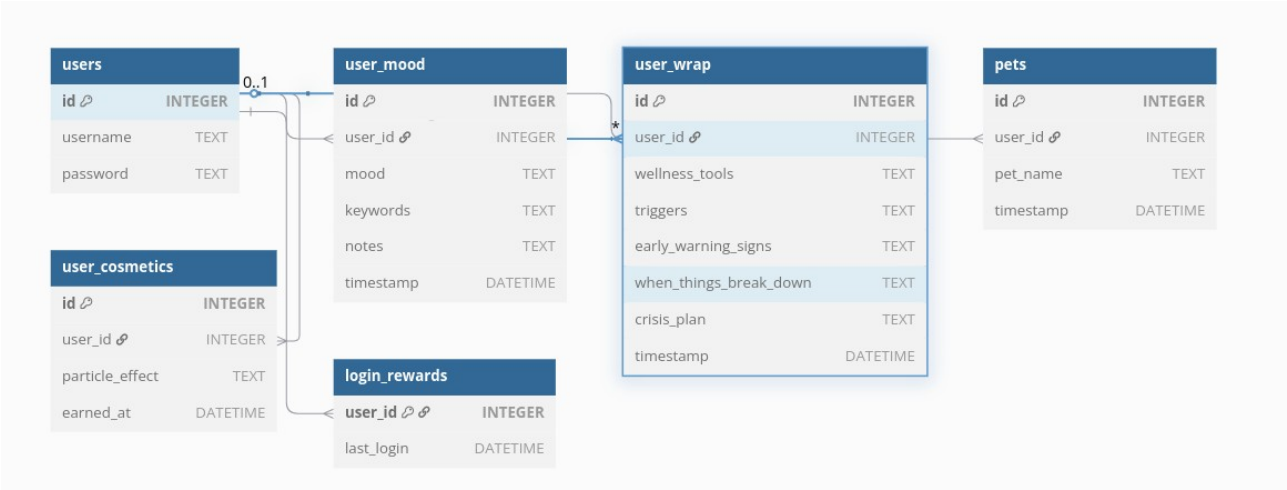

Figure 4: Agile Document

Project Overview

- **Project Description**: A web app that will have multiple pages , a mood tracking page which will allow users to select a mood on a scale , fill in keywords based on their mood as well as submit some notes, on this page they may get articles recommended to them based on submissions. The next page will be a tamogochi style game that allows users to care for a cat, feed , pet , etc.
- **Client**: NHS UK
- **Project Manager**: Jeremy
- **Development Manager:** Cameron
- **Date**: 28th January 2025 – 7th March 2025

Project Scope

- **Objective:**
  - To create an interactive tool for customers of NHS mental health services in Gateshead to use in order to improve and maintain a positive mental health. This tool should aid the NHS not attempt to replace it.
- **Features & User Stories:**
  - To be able to log mood in both a granular and non granular manner
  - To be given recommendation on NHS articles and resources based on my mood history
  - To be able to pet, feed and interact with the chosen being within the game
  - To be able to view my mood log
  - To be able to register , login and logout

Agile Methodology

- **Agile Framework:**
    - Agile / SCRUM
- **Sprint Duration:**
    - 1 week per sprint with Tuesdays and Saturdays being review / meeting
- **Team Members:**
    - All normal documented roles apply with Jeremy being the SCRUM master

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User Stories

- **Title: App From The Perspective Of A Practitioner**
- **As a** GP / Therapist,
  I want be able to reference patients to this recourse to assist me and the patient on maintaining a positive mental health
  So that I can give them more effective care
- **Acceptance Criteria:**
    - **The website is inclusive to all (disabilities: eg deaf or blind)**
    - **Personalised experience**
    - **Easy / intuitive to use**
- **Priority: [High]**

- **Title: User System**
- **As a** end user,
  I want be able to register , log in and log out
  So that I can access the content of the site
- **Acceptance Criteria:**
    - Users can register with a custom username and password
    - username and password are stored on the database
    - password is encrypted
    - users can login with their custom username and password combination
    - all data is attached to the “profile” based on the combination
- **Priority:** [High]

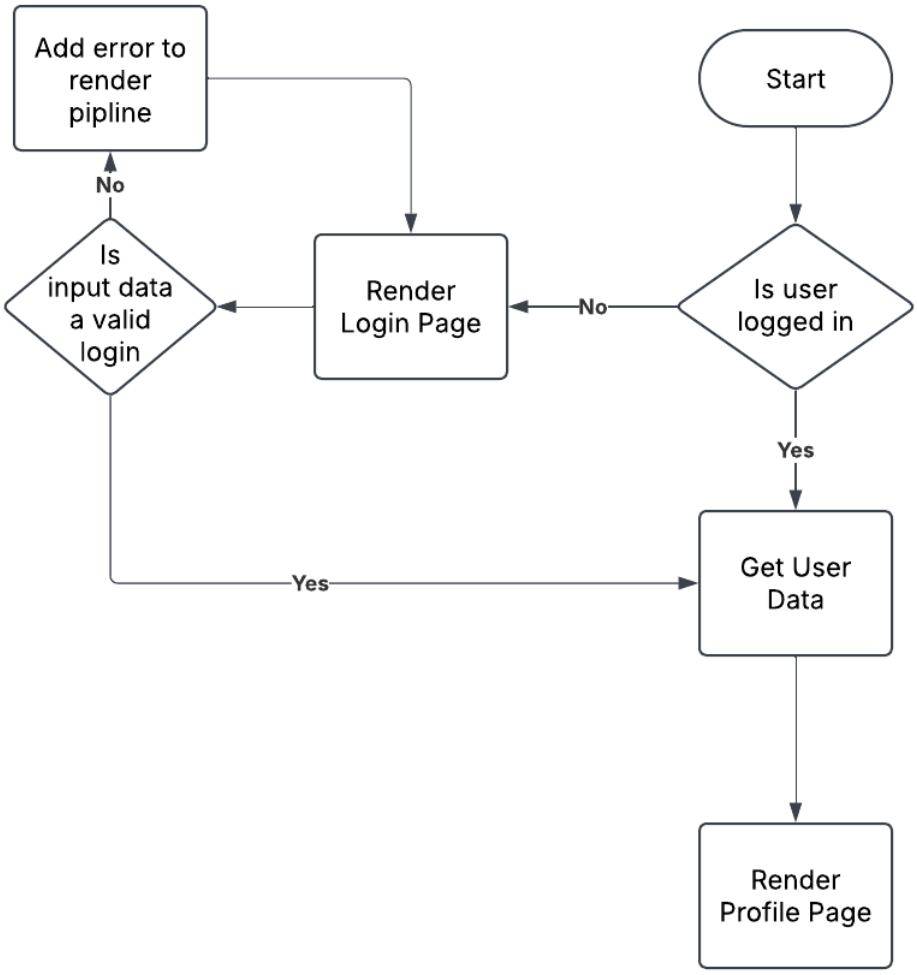
  Title: User Progress
- **As a** end user,
  I want to be able to access my previous progress
  So that I can track my progress of my mental health
- **Acceptance Criteria:**
    - **Progress is stored effectively**
    - **Progress can be retrieved even after a logout**

  Priority: [High]

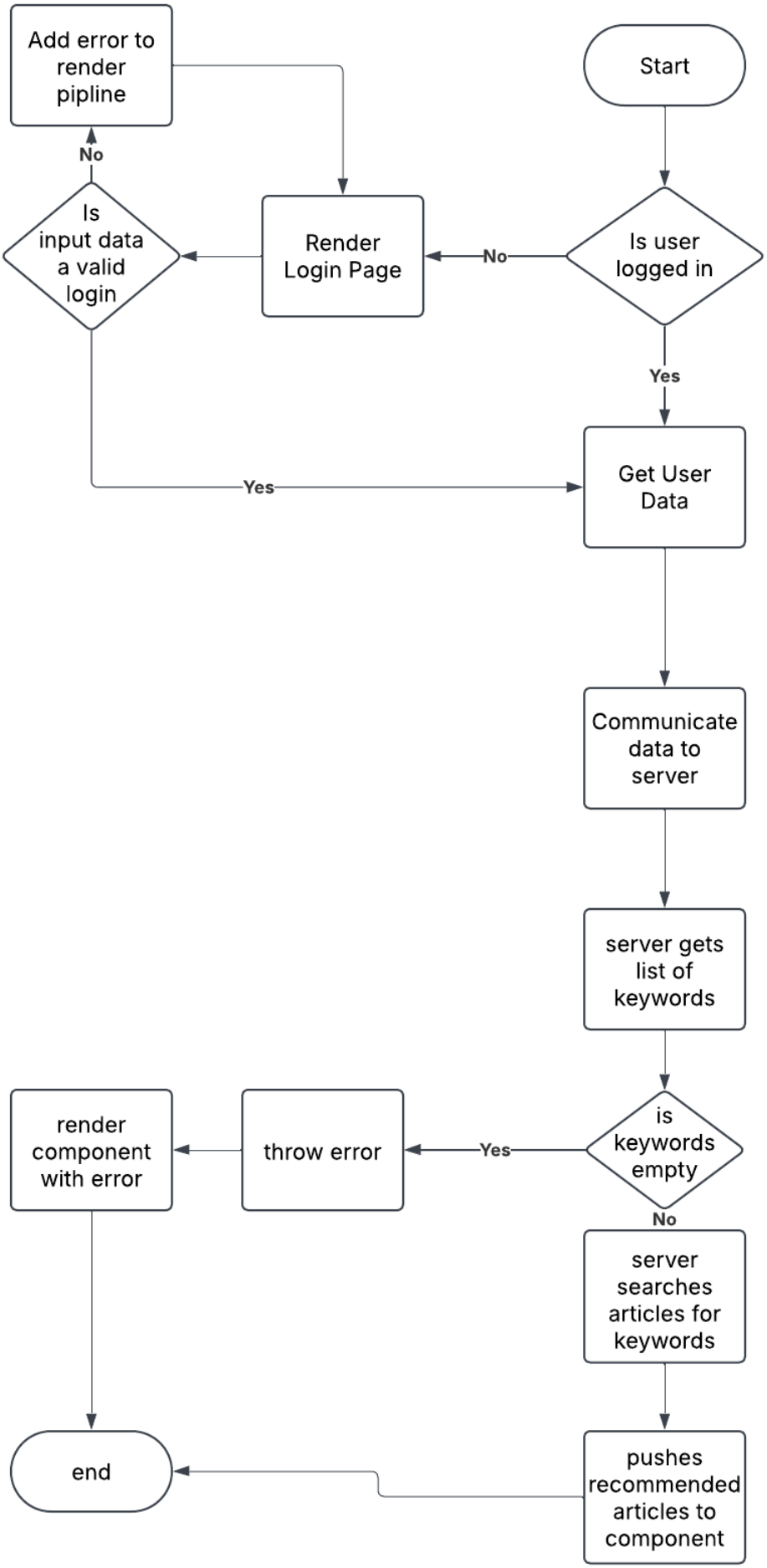
Technical Documentation

- **System Architecture:**
  - A React Frontend with a ExpressJS API with a sqllite database.
  - Frontend -POST→ API → Database (or vice versa)

    Flow Charts
    - Login



    - Article Recommendation


Add error to render pipline
Start
No
Is input data a valid login
Render Login Page
No
Is user logged in
Yes
Yes
Get User Data
Communicate data to server
server gets list of keywords
render component with error
throw error
Yes
is keywords empty
No
server searches articles for keywords
end
pushes recommended articles to component

- **API Documentation:**

POST /register

- **Description**: Register a new user by providing a `username` and `password`. The password is hashed before storing in the database.
- **Request Body**:
  - `username` (string): The user's chosen username.
  - `password` (string): The user's password.
- **Responses**:
  - `201 Created`: If the user is successfully registered.
    - Example: `{ "message": "User registered successfully" }`
  - `500 Internal Server Error`: If an error occurs while hashing the password or saving the user to the database.
    - Example: `{ "error": "Hashing error" }`

POST /login

- **Description**: Log in a user by verifying their `username` and `password`. Returns a JWT token if successful.
- **Request Body**:
  - `username` (string): The user's username.
  - `password` (string): The user's password.
- **Responses**:
  - `200 OK`: If the login is successful, returns a JWT token.
    - Example: `{ "token": "<JWT_TOKEN>" }`
  - `400 Bad Request`: If the username does not exist or the password is incorrect.
    - Example: `{ "error": "Invalid username or password" }`

GET /profile

- **Description**: Get the profile information of the logged-in user. Requires a valid JWT token.
- **Headers**:
  - `Authorization` (string): Bearer token containing the JWT.
- **Responses**:
  - `200 OK`: If the token is valid, returns the user's profile data.
    - Example: `{ "message": "Welcome to your profile!", "user": { "id": 1, "username": "example" } }`
  - `401 Unauthorized`: If no token is provided.
    - Example: `{ "error": "Token required" }`
  - `403 Forbidden`: If the token is invalid or expired.
    - Example: `{ "error": "Invalid or expired token" }`

Moods

GET /userMoods

- **Description**: Get the mood entries for the logged-in user. Requires a valid JWT token.
- **Headers**:
  - `Authorization` (string): Bearer token containing the JWT.
- **Responses**:
  - `200 OK`: If the token is valid, returns the list of mood entries.
    - Example: `{ "moods": [{ "id": 1, "mood": "Happy", "keywords": "joy", "notes": "Feeling great!", "visible_to_gps": true }] }`
  - `401 Unauthorized`: If no token is provided.
    - Example: `{ "error": "Token required" }`
  - `403 Forbidden`: If the token is invalid or expired.
    - Example: `{ "error": "Invalid or expired token" }`

POST /saveMood

- **Description**: Save a new mood entry for the logged-in user. Requires a valid JWT token.
- **Request Body**:
  - `mood` (string): The mood description (e.g., "Happy", "Sad").
  - `keywords` (string): Comma-separated keywords associated with the mood.
  - `notes` (string): Additional notes for the mood entry.
- **Headers**:
  - `Authorization` (string): Bearer token containing the JWT.
- **Responses**:
  - `201 Created`: If the mood is saved successfully.
    - Example: `{ "message": "Mood saved successfully" }`
  - `401 Unauthorized`: If no token is provided.
    - Example: `{ "error": "Token required" }`
  - `403 Forbidden`: If the token is invalid or expired.
    - Example: `{ "error": "Invalid token" }`

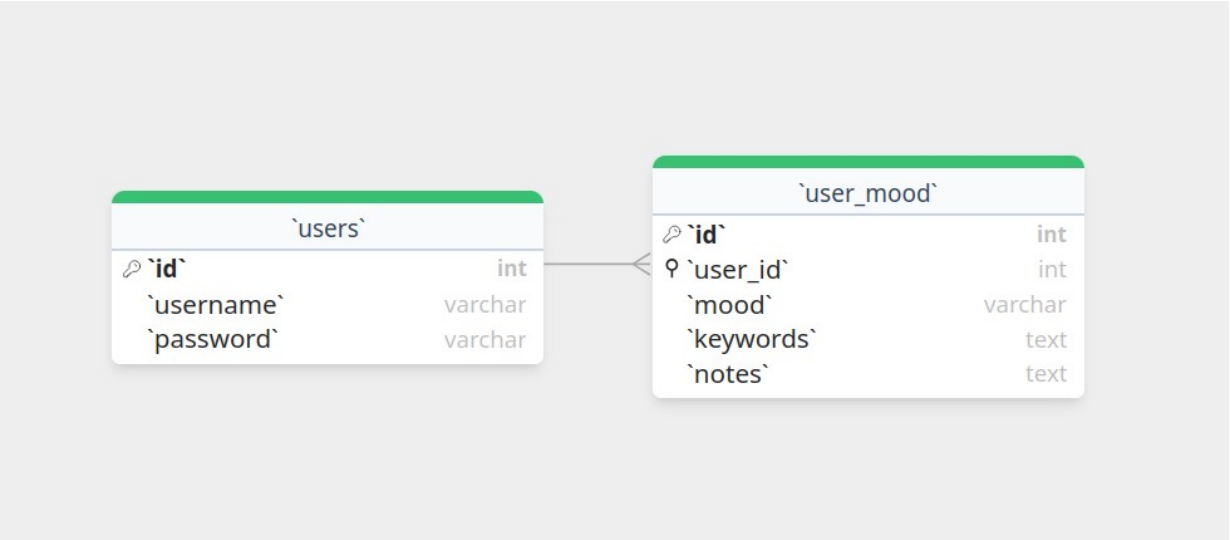
Articles

GET /recommendedArticles

- **Description**: Get a list of articles that match the provided keywords.
- **Parameters**:
  - `keywords` (string): A comma-separated list of keywords to search for in the articles.
- **Responses**:
  - `200 OK`: If articles matching the keywords are found, returns the list of recommended articles.
    - Example: `{ "recommendedArticles": [{ "title": "Article 1", "content": "This is the article content..." }] }`

- `400 Bad Request`: If no keywords are provided.
    - Example: `{ "error": "No keywords provided" }`
- `500 Internal Server Error`: If there is an error reading the articles directory.
    - Example: `{ "error": "Failed to read articles directory" }`

- **Database Design:**
    - **ER Diagram**



Data Dictionary

- **users**

Field Name	Data Type	Description	Example	Constraints
id	INTEGER	A unique identifier for a user	8	Primary key,AUTOINCREMENT
username	TEXT	A username	“admin”	NOT NULL
password	TEXT	A password	“password”	NOT NULL

- user_mood

Field Name	Data Type	Description	Example	Constraints
id	INTEGER	A unique identifier for the mood data	5	Primary Key,AUTOINCREMENT
user_id*	INTEGER			REFERENCES "users"("id")
mood	TEXT	A single word describing mood from slider	depressed	NOT NULL
keywords	TEXT	A list of keywords stored as a string (processed by server to)	“this,is,the,example”	NOT NULL

notes	TEXT	A chunk of text	Lorum ipsum	

- **Code Standards:**
  - Function names in PascalCase.
  - Indentation is done via tab
  - Function signatures should be done using Kernighan and Ritchie style

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Test Plan

- **Types of Tests:**
  - Unit testing using a testing framework for example testcafe
- **Test Cases:**
  - Any API endpoint failure such as 404 errors
  - API: Erroneous data, Correct data and bounds errors
  - Component rendering correctly

Risks & Mitigations

- **Risk:**
  - That information given by articles is either incorrect / not helpful or too vague
- **Probability:**
  - [Medium]
- **Impact:**
  - [High]
- **Mitigation Plan:**
  - We will only refer to the resources written by mental health professions by the NHS or the resources provided to us by the NHS for our articles
- **Risk:**
  - That user data is compromised
- **Probability:**
  - [High]
- **Impact:**
  - [High]
- **Mitigation Plan:**
  - We shall encrypt all data with a JWT key only known to the backend at the API level

Figure 5: Multiple Meeting Notes

Meeting 1 Notes

Our idea has to fall into the guidelines of a good tool but not a substitute for mental health support. We must assist the NHS not take it over.
App has to be reliable / robust and effective

Must be interaction by the whole of Gateshead (people who can read / write, hard of hearing / deaf , those who can speak english)
Must be accessible by all over the age of 16
NHS Gateshead mental health design colours NHS blue, purple, teal (https://www.gatesheadhealth.nhs.uk/services/mental-health/)
Refer to Becky to check if the use of our software is appropriate

Suggestions:
Reminder system / daily check in
Recommend articles based on keywords, personalised article recommendation (in article link to external resources)
Lead to help in crisis
To make the app more self lead instead of linking with GP
audio alternative
try to add pictures as a resume for written stuff
translation options??? (need to ask about the vast majority of languages to use)
to respond to the educational part they want us to add, maybe we can do a library that directs to nhs official pages
they want something durable, I think we can solve this automatically if our work is original enough

Meeting 1.5 Notes

Gateshead Peer Support Service Background:
- Service To the Community
- Lots of gaps in mental health service
- For people who arent ready / dont need clinical therapy but want some help
- in-between primary and secondary care
- This service is for people who are registered to a gateshead gp

A non clinical approach
- Mostly for accessing resources and more self learning
- day to day health monitoring
- if they need they can signpost themselfs using the app
- non clinical and clinical articles
- accessibility : can listen to articles as well as read
- for ages 16 and up , reading age 8
- 2 sides to the app , Information/Signposting | Interactive
- Meditation articles
- Refer to apps such as Calm, they were referenced in meeting as good

Cat Ideas:

name cat
calm music in background

WRAP plan (wellness recovery action plan)
- use as a base for wellbeing forum

Meeting 2 Notes

WRAP plan phrasing changes need to be made (avoid the words crisis and triggers)
Daily maintenance can be added through game mechanics
Good that you can change animal, give more customisation
Add voice control
Dyslexic friendly font and colours need to be added
No place that had videos, relaxation, helpful links. Is a must add

Figure 6: Sprint 2 Review

Sprint 2

Planning

Goals for Sprint:

- To create out identity and to start implementing the proposed changes from our meeting into the project
- Get meeting notes from second talk with NHS representatives

- **Stories for Sprint:**
  - Create Final Logo
  - Start on design for corporate website

Stand-up

- **Team Members Updates:**
  - We had got to touch base with Heytham , Jermay and Cameron and we all managed to plan a lot through wireframes, flowcharts and face to face discussion.

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8. Sprint Review

- **Summary of Completed Stories:**
  - **Proposed changes are being implemented**

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9. Sprint Retrospective

- **What went well?**

    - The confirmation of our ideas from the NHS was lovely, development has started quickly
- **What didn’t go well?**
    - No further updates on brand identity
- **Action Items for Next Sprint:**
    - further updates on brand identity

Figure 7: Draft Email To Client

Subject: MY Software: NHS x Sunderland University Web App

Hello all, I hope you are doing well!

I'm reaching out to share this demo that the development team has put together to show our progress on the app, following up on our second meeting.
The demo video will be attached to this email.

If you would like any further resources, please follow up via email, and we will gladly send any details or sources over.
Any questions and/or comments are greatly appreciated.

Thank you very much for taking the time to read, watch, and respond to us.

All the best,
Cameron Haynes
Development Lead, MY Software

Figure 8: Commit History (at : https://github.com/CamH04/Enterprise-Project-Group-9)

Link: https://docs.google.com/spreadsheets/d/1lm6aAjhLLnl98Cx606N4ktome--PYmLsmeCCCwbtvCg/edit?usp=sharing

Figure 9: Tasks Sheet (Refer To Developers Plan Sheet For Relevant Information)

Link:
https://docs.google.com/spreadsheets/d/1Xc7SuQBNc4fcEegZjPHtaxyanuOReEsclpDip1XUyz8/edit?usp=sharing

Figure 10: Script to run application (run.sh) documentation

Notes About Prototype Product
This is a react website with 2 express scripts acting as the apps backend (one being the api script (index.js) and the game server (server.js) to be able to locally host the game)

Run App

prerequisite installs for run.sh: node , npm

run: start.sh
(Note)Linux: Make sure to chmod the file (run: chmod +x run.sh)

To run the site run the run.sh script

APi Docs
api docs are veiwable at localhost:3000/dev/api-docs when site is running

Figure 11: Script to run application (run.sh)

```
#!/bin/bash
npm install
cd api || { echo "Failed to navigate to api directory"; exit 1; }
node server.js &
node index.js &
cd ../site || { echo "Failed to navigate to site directory"; exit 1; }
npm install
npm run start &
wait
```

Figure 12: Main API Code (Assignment2/prototype/api/index.js)

```
const express = require('express');
const sqlite3 = require('sqlite3').verbose();
const bcrypt = require('bcryptjs');
const jwt = require('jsonwebtoken');
const cors = require('cors');
const bodyParser = require('body-parser');
const fs = require('fs');
const path = require('path');

const app = express();
const db = new sqlite3.Database('./database.db');
const JWT_SECRET = 'key';
const articlesDirectory = path.join(__dirname, 'articles');

app.use(cors());
app.use(bodyParser.json());

db.serialize(() => {
  db.run("CREATE TABLE IF NOT EXISTS users (id INTEGER PRIMARY KEY AUTOINCREMENT, username TEXT, password TEXT)");
  db.run("CREATE TABLE IF NOT EXISTS user_mood (id INTEGER PRIMARY KEY AUTOINCREMENT, user_id INTEGER, mood TEXT, keywords TEXT, notes TEXT, timestamp DATETIME DEFAULT CURRENT_TIMESTAMP, FOREIGN KEY(user_id) REFERENCES users(id))");
  db.run(`  CREATE TABLE IF NOT EXISTS user_wrap (    id INTEGER PRIMARY KEY AUTOINCREMENT,    user_id INTEGER,    wellness_tools TEXT,    triggers TEXT,    early_warning_signs TEXT,    when_things_break_down TEXT,    crisis_plan TEXT,    timestamp DATETIME DEFAULT CURRENT_TIMESTAMP,    FOREIGN KEY(user_id) REFERENCES users(id)  ) `);
  db.run(`CREATE TABLE IF NOT EXISTS pets ( id INTEGER PRIMARY KEY AUTOINCREMENT,user_id INTEGER,pet_name TEXT,timestamp DATETIME DEFAULT CURRENT_TIMESTAMP,FOREIGN KEY(user_id) REFERENCES users(id))`);
  db.run(`CREATE TABLE IF NOT EXISTS user_cosmetics (id INTEGER PRIMARY KEY AUTOINCREMENT,user_id INTEGER,particle_effect TEXT,earned_at DATETIME DEFAULT CURRENT_TIMESTAMP,FOREIGN KEY(user_id) REFERENCES users(id))`);
```

```
  db.run(`CREATE TABLE IF NOT EXISTS login_rewards (user_id INTEGER PRIMARY KEY,last_login DATETIME,FOREIGN
KEY(user_id) REFERENCES users(id))`);
});
//============================ Cosmetics ============================
app.post('/daily-login', (req, res) => { // have youloggedd in in 24 hrs
  const token = req.headers['authorization'];
  if (!token) return res.status(401).json({ error: 'Token required' });
  const tokenWithoutBearer = token.split(' ')[1];
  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) return res.status(403).json({ error: 'Invalid token' });
    const userId = decoded.id;
    db.get('SELECT last_login FROM login_rewards WHERE user_id = ?', [userId], (err, row) => {
      const now = new Date();
      const nowISO = now.toISOString();
      if (err) return res.status(500).json({ error: 'Database error' });
      const giveReward = () => {
        const cosmetic = `particle_${Math.floor(Math.random() * 10)}`; // particle ID
        db.run("INSERT INTO user_cosmetics (user_id, particle_effect) VALUES (?, ?)", [userId, cosmetic]);
        db.run("REPLACE INTO login_rewards (user_id, last_login) VALUES (?, ?)", [userId, nowISO]);
        res.status(200).json({ message: 'Reward granted', cosmetic });
      };
      if (!row) {
        giveReward();
      } else {
        const lastLogin = new Date(row.last_login);
        const diffHours = (now - lastLogin) / (1000 * 60 * 60);

        if (diffHours >= 24) {
          giveReward();
        } else {
          res.status(200).json({ message: 'Already claimed today' });
        }
      }
    });
  });
});
app.get('/my-cosmetics', (req, res) => {
  const token = req.headers['authorization'];
  if (!token) return res.status(401).json({ error: 'Token required' });
  const tokenWithoutBearer = token.split(' ')[1];
  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) return res.status(403).json({ error: 'Invalid token' });
    const userId = decoded.id;
    db.all('SELECT particle_effect, earned_at FROM user_cosmetics WHERE user_id = ?', [userId], (err, rows) => {
      if (err) return res.status(500).json({ error: 'Failed to retrieve cosmetics' });
      res.json({ cosmetics: rows });
    });
  });
});



//============================ Pets ============================
app.post('/savePetName', (req, res) => {
  const { petName } = req.body;
  const token = req.headers['authorization'];
  if (!token) return res.status(401).json({ error: 'Token required' });
  const tokenWithoutBearer = token.split(' ')[1];
  if (!tokenWithoutBearer) return res.status(401).json({ error: 'Token malformed' });
  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) return res.status(403).json({ error: 'Invalid token, Please Login' });
    const userId = decoded.id;
    const stmt = db.prepare("INSERT INTO pets (user_id, pet_name) VALUES (?, ?)");
    stmt.run(userId, petName, function (err) {
      if (err) return res.status(500).json({ error: 'Failed to save pet name' });
      res.status(201).json({ message: 'Pet name saved successfully' });
    });
  });
});
app.get('/getPetName', (req, res) => {
```

```
  const token = req.headers['authorization'];
  if (!token) return res.status(401).json({ error: 'Token required' });
  const tokenWithoutBearer = token.split(' ')[1];
  if (!tokenWithoutBearer) return res.status(401).json({ error: 'Token malformed' });

  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) return res.status(403).json({ error: 'Invalid token' });
    const userId = decoded.id;
    db.get("SELECT pet_name FROM pets WHERE user_id = ? ORDER BY timestamp DESC LIMIT 1", [userId], (err, row) => {
      if (err) return res.status(500).json({ error: 'Failed to fetch pet name' });
      if (!row) return res.status(404).json({ error: 'Pet not found' });
      res.json({ petName: row.pet_name });
    });
  });
});
app.put('/updatePetName', (req, res) => {
  const { petName } = req.body;
  const token = req.headers['authorization'];
  if (!token) return res.status(401).json({ error: 'Token required' });
  const tokenWithoutBearer = token.split(' ')[1];
  if (!tokenWithoutBearer) return res.status(401).json({ error: 'Token malformed' });
  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) return res.status(403).json({ error: 'Invalid token' });
    const userId = decoded.id;
    db.run(
      `UPDATE pets SET pet_name = ?, timestamp = CURRENT_TIMESTAMP WHERE user_id = ?`,
      [petName, userId],
      function (err) {
        if (err) return res.status(500).json({ error: 'Failed to update pet name' });
        if (this.changes === 0) {
          db.run(
            "INSERT INTO pets (user_id, pet_name) VALUES (?, ?)",
            [userId, petName],
            (insertErr) => {
              if (insertErr) return res.status(500).json({ error: 'Failed to insert pet name' });
              res.status(200).json({ message: 'Pet name saved successfully' });
            }
          );
        } else {
          res.status(200).json({ message: 'Pet name updated successfully' });
        }
      }
    );
  });
});


//============================ Users ==========================
app.post('/register', (req, res) => {
  const { username, password } = req.body;
  bcrypt.hash(password, 10, (err, hashedPassword) => {
    if (err) {
      console.log('Error hashing password:', err);
      return res.status(500).json({ error: 'Hashing error' });
    }
    const stmt = db.prepare("INSERT INTO users (username, password) VALUES (?, ?)");
    stmt.run(username, hashedPassword, function (err) {
      if (err) {
        console.log('Error during user registration:', err);
        return res.status(500).json({ error: 'User registration failed' });
      }
      console.log('User registered successfully:', username);
      res.status(201).json({ message: 'User registered successfully' });
    });
  });
});

app.post('/login', (req, res) => {
  const { username, password } = req.body;
  db.get("SELECT * FROM users WHERE username = ?", [username], (err, row) => {
```

```
    if (err || !row) {
      console.log('Error or invalid username:', err);
      return res.status(400).json({ error: 'Invalid username or password' });
    }
    bcrypt.compare(password, row.password, (err, match) => {
      if (err || !match) {
        console.log('Password mismatch or error:', err);
        return res.status(400).json({ error: 'Invalid username or password' });
      }
      const token = jwt.sign({ id: row.id, username: row.username }, JWT_SECRET, { expiresIn: '1h' });
      console.log('User logged in, token generated:', row.username);
      res.json({ token });
    });
  });
});

app.get('/profile', (req, res) => {
  const token = req.headers['authorization'];
  if (!token) {
    console.log('No token provided');
    return res.status(401).json({ error: 'Token required' });
  }
  const tokenWithoutBearer = token.split(' ')[1];
  if (!tokenWithoutBearer) {
    console.log('Token is malformed');
    return res.status(401).json({ error: 'Token is malformed' });
  }
  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) {
      console.log('Invalid or expired token');
      return res.status(403).json({ error: 'Invalid or expired token' });
    }
    console.log('Token verified, user:', decoded.username);
    res.json({ message: 'Welcome to your profile!', user: decoded });
  });
});
app.post('/reset-password', (req, res) => {
  const { username, password } = req.body;
  db.get('SELECT * FROM users WHERE username = ?', [username], (err, row) => {
    if (err || !row) {
      return res.status(404).json({ error: 'User not found' });
    }
    bcrypt.hash(password, 10, (err, hashedPassword) => {
      if (err) {
        return res.status(500).json({ error: 'Error hashing password' });
      }
      db.run('UPDATE users SET password = ? WHERE username = ?', [hashedPassword, username], function(err) {
        if (err) {
          return res.status(500).json({ error: 'Failed to reset password' });
        }
        res.json({ message: 'Password reset successfully' });
      });
    });
  });
});
//========================== Moods ==========================
app.get('/userMoods', (req, res) => {
  const token = req.headers['authorization'];
  if (!token) {
    console.log('No token provided');
    return res.status(401).json({ error: 'Token required' });
  }
  const tokenWithoutBearer = token.split(' ')[1];
  if (!tokenWithoutBearer) {
    console.log('Token is malformed');
    return res.status(401).json({ error: 'Token is malformed' });
  }
  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) {
      console.log('Invalid or expired token');
```

```
      return res.status(403).json({ error: 'Invalid or expired token' });
    }
    const userId = decoded.id;
    console.log('User ID:', userId);
    db.all("SELECT id, mood, keywords, notes, timestamp FROM user_mood WHERE user_id = ?", [userId], (err, rows) => {
      if (err) {
        console.log('Error fetching moods:', err);
        return res.status(500).json({ error: 'Failed to retrieve mood data' });
      }
      console.log('Moods retrieved:', rows.length);
      console.log('==========================================');
      res.json({ moods: rows });
    });
  });
});
app.post('/saveMood', (req, res) => {
  const { mood, keywords, notes } = req.body;
  const token = req.headers['authorization'];
  if (!token) {
    console.log('No token provided');
    return res.status(401).json({ error: 'Token required' });
  }
  const tokenWithoutBearer = token.split(' ')[1];
  if (!tokenWithoutBearer) {
    console.log('Token is malformed');
    return res.status(401).json({ error: 'Token is malformed' });
  }
  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) {
      if (err.name === 'TokenExpiredError') {
        console.log('Token expired');
        return res.status(403).json({ error: 'Token has expired' });
      }
      console.log('Invalid token');
      return res.status(403).json({ error: 'Invalid token' });
    }
    const userId = decoded.id;
    console.log('Saving mood for user ID:', userId);
    const stmt = db.prepare("INSERT INTO user_mood (user_id, mood, keywords, notes) VALUES (?, ?, ?, ?)");
    stmt.run(userId, mood, keywords, notes, function (err) {
      if (err) {
        console.log('Error saving mood data:', err);
        return res.status(500).json({ error: 'Failed to save mood data' });
      }
      console.log('Mood saved successfully for user ID:', userId);
      res.status(201).json({ message: 'Mood saved successfully' });
    });
  });
});

/*========================== Wrap ==========================*/
app.post('/saveWRAP', (req, res) => {
  const { wellnessTools, triggers, earlyWarningSigns, whenThingsBreakDown, crisisPlan } = req.body;
  const token = req.headers['authorization'];

  if (!token) {
    return res.status(401).json({ error: 'Token required' });
  }

  const tokenWithoutBearer = token.split(' ')[1];
  if (!tokenWithoutBearer) {
    return res.status(401).json({ error: 'Token is malformed' });
  }

  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) {
      return res.status(403).json({ error: 'Invalid or expired token' });
    }

    const userId = decoded.id;
```

```
    const stmt = db.prepare(`
      INSERT INTO user_wrap (
        user_id, wellness_tools, triggers, early_warning_signs, when_things_break_down, crisis_plan
      ) VALUES (?, ?, ?, ?, ?, ?)
    `);

    stmt.run(userId, wellnessTools, triggers, earlyWarningSigns, whenThingsBreakDown, crisisPlan, function (err) {
      if (err) {
        return res.status(500).json({ error: 'Failed to save WRAP data' });
      }
      res.status(201).json({ message: 'WRAP saved successfully' });
    });
  });
});
app.get('/userWRAP', (req, res) => {
  const token = req.headers['authorization'];

  if (!token) {
    return res.status(401).json({ error: 'Token required' });
  }

  const tokenWithoutBearer = token.split(' ')[1];
  if (!tokenWithoutBearer) {
    return res.status(401).json({ error: 'Token is malformed' });
  }

  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) {
      return res.status(403).json({ error: 'Invalid or expired token' });
    }

    const userId = decoded.id;
    console.log('Fetching WRAP data for user ID:', userId);

    db.get("SELECT * FROM user_wrap WHERE user_id = ?", [userId], (err, row) => {
      if (err) {
        console.log('Error fetching WRAP data:', err);
        return res.status(500).json({ error: 'Failed to retrieve WRAP data' });
      }

      if (!row) {
        return res.status(404).json({ error: 'To See Your Profile Please Fill Out A WRAP plan and a Mood Tracker' });
      }

      console.log('WRAP data retrieved:', row);
      res.json({ wrapData: row });
    });
  });
});
app.put('/updateWRAP', (req, res) => {
  const { wellnessTools, triggers, earlyWarningSigns, whenThingsBreakDown, crisisPlan } = req.body;
  const token = req.headers['authorization'];

  if (!token) {
    return res.status(401).json({ error: 'Token required' });
  }

  const tokenWithoutBearer = token.split(' ')[1];
  if (!tokenWithoutBearer) {
    return res.status(401).json({ error: 'Token is malformed' });
  }

  jwt.verify(tokenWithoutBearer, JWT_SECRET, (err, decoded) => {
    if (err) {
      return res.status(403).json({ error: 'Invalid or expired token' });
    }

    const userId = decoded.id;

    db.run(
```

```
      `UPDATE user_wrap
       SET wellness_tools = ?, triggers = ?, early_warning_signs = ?,
           when_things_break_down = ?, crisis_plan = ?, timestamp = CURRENT_TIMESTAMP
       WHERE user_id = ?`,
      [wellnessTools, triggers, earlyWarningSigns, whenThingsBreakDown, crisisPlan, userId],
      function (err) {
       if (err) {
         console.log('Error updating WRAP data:', err);
         return res.status(500).json({ error: 'Failed to update WRAP data' });
       }

       if (this.changes === 0) {
         return res.status(404).json({ error: 'No WRAP data found for this user' });
       }

       res.status(200).json({ message: 'WRAP updated successfully' });
      }
    );
  });
});



/*============================ Articles ==========================
 *    Description of how a article becomes recommended:
 *    1. - Keywords are served to backend
 *    2. - Backend looks through articles and ranks articles by
 *    counting how many keyword matches occur in its content, ignoring stop words
 *    3. - Sort the articles based on the match count
 *    4. - Return top article
*/
const stopWords = [
  'a', 'an', 'the', 'and', 'but', 'or', 'for', 'nor', 'so', 'yet', 'on', 'at', 'by', 'with', 'as', 'from', 'of', 'to', 'in', 'that', 'which', 'who', 'whom', 'whose',
'this', 'these', 'those', 'it', 'its', 'is', 'are', 'was', 'were', 'be', 'been', 'being', 'have', 'has', 'had', 'having', 'do', 'does', 'did', 'doing', 'will',
'would', 'shall', 'should', 'can', 'could', 'may', 'might', 'must', 'cannot', 'cannot' , 'i', 'I' , 'want' , 'Want'
];
function filterStopWords(words) {
  return words.filter(word => !stopWords.includes(word));
}

app.get('/recommendedArticles', (req, res) => {
  const { keywords } = req.query;
  if (!keywords) {
    console.log('No keywords provided');
    return res.status(400).json({ error: 'No keywords provided' });
  }
  const keywordArray = filterStopWords(keywords.split(',').map((keyword) => keyword.trim().toLowerCase()));
  console.log('Received keywords for article recommendation:', keywordArray);
  fs.readdir(articlesDirectory, (err, files) => {
    if (err) {
      console.log('Error reading articles directory:', err);
      return res.status(500).json({ error: 'Failed to read articles directory' });
    }
    let articleScores = [];
    files.forEach((file) => {
      const filePath = path.join(articlesDirectory, file);
      const fileContent = fs.readFileSync(filePath, 'utf-8').toLowerCase();
      const contentWords = filterStopWords(fileContent.split(/\W+/));
      let matchCount = 0;
      keywordArray.forEach((keyword) => {
        if (contentWords.includes(keyword)) {
          matchCount++;
        }
      });
      if (matchCount > 0) {
        articleScores.push({
          title: file.replace('.txt', ''),
          content: fileContent,
          matchCount,
        });
```

```
      }
    });
    const mostRelevantArticle = articleScores.sort((a, b) => b.matchCount - a.matchCount)[0];
    if (mostRelevantArticle) {
      res.json({ recommendedArticles: [mostRelevantArticle] });
    } else {
      console.log('No articles matched the keywords');
      res.json({ recommendedArticles: [] });
    }
  });
});
//============================ Server ==========================
const PORT = 5000;
app.listen(PORT, () => {
  console.log(`Server is running on http://localhost:${PORT}`);
});
```

Figure 13: Server Code To Run Unity Game (Assignment2/prototype/api/server.js)

```
const express = require('express');
const path = require('path');
const app = express();
const port = 4040;
var f_path = '../site/public/game/build'
app.use((req, res, next) => {
    res.setHeader('Access-Control-Allow-Origin', '*');
    next();
});
app.use((req, res, next) => {
    if (req.url.endsWith('.gz')) {
        res.set('Content-Encoding', 'gzip');
        res.set('Content-Type', 'application/javascript');
    } else if (req.url.endsWith('.br')) {
        res.set('Content-Encoding', 'br');
        res.set('Content-Type', 'application/javascript');
    }
    next();
});
app.use(express.static(path.join(__dirname, f_path), {
    setHeaders: (res, path) => {
        if (path.endsWith('.gz')) {
            res.set('Content-Encoding', 'gzip');
            res.set('Content-Type', 'application/javascript');
        } else if (path.endsWith('.br')) {
            res.set('Content-Encoding', 'br');
            res.set('Content-Type', 'application/javascript');
        }
    }
}));
app.listen(port, () => {
    console.log(`Server running at http://localhost:${port}`);
});
```

Figure 14: Website Code I Contributed (Assignment2/prototype/site)

Note: Could not add all web files to document for brevity
Link to all website files I have written / altered (41 items): *https://github.com/CamH04/Public-Ver-E-P-MYSoftware-G9*

Figure 15: Game Scripts (Assignment2/prototype/raw-game-build)

Note: Could not add all game script files to document for brevity
Link (5 items): *https://github.com/CamH04/-Public-Ver-E-P-MYSoftware-G9-GAME*

Figure 16: Final API Documentation

Users

`POST /register`

Register a new user.

- **Body:** `{ "username": string, "password": string }`
- **Response:** 201 Created or 500 on error.

`POST /login`

Login user and receive JWT.

- **Body:** `{ "username": string, "password": string }`
- **Response:** `{ "token": string }` or 400 on failure.

`GET /profile`

Get user profile info.

- **Headers:** `Authorization: Bearer <token>`
- **Response:** `{ message, user }` or 401/403 on error.

`POST /reset-password`

Reset user's password.

- **Body:** `{ "username": string, "password": string }`
- **Response:** Success message or 404 if user not found.

Moods

`GET /userMoods`

Retrieve user's saved moods.

- **Headers:** `Authorization: Bearer <token>`
- **Response:** `{ moods: [...] }`

`POST /saveMood`

Save a new mood entry.

- **Body:** `{ "mood": string, "keywords": string, "notes": string }`
- **Headers:** `Authorization: Bearer <token>`
- **Response:** 201 Created or error.

WRAP

`POST /saveWRAP`

Save a new WRAP entry.

- **Body:** `{ wellnessTools, triggers, earlyWarningSigns, whenThingsBreakDown, crisisPlan }`
- **Headers:** `Authorization: Bearer <token>`
- **Response:** 201 Created or error.

`GET /userWRAP`

Get current WRAP for a user.

- **Headers:** `Authorization: Bearer <token>`
- **Response:** `{ wrapData }` or 404 if not present.

`PUT /updateWRAP`

Update existing WRAP entry.

- **Body:** same as `saveWRAP`
- **Headers:** `Authorization: Bearer <token>`
- **Response:** Success or 404 if no WRAP found.

Pets

`POST /savePetName`

Save a pet's name.

- **Body:** `{ "petName": string }`
- **Headers:** `Authorization: Bearer <token>`
- **Response:** 201 Created or error.

`GET /getPetName`

Get the latest saved pet name.

- **Headers:** `Authorization: Bearer <token>`
- **Response:** `{ petName }`

`PUT /updatePetName`

Update or insert a new pet name.

- **Body:** `{ "petName": string }`
- **Headers:** `Authorization: Bearer <token>`
- **Response:** Success or insert if no previous entry.

Cosmetics / Daily Login Rewards

`POST /daily-login`

Checks if user is eligible for daily login reward.

- **Headers:** `Authorization: Bearer <token>`
- **Response:** Reward message or already claimed.

`GET /my-cosmetics`

Retrieve user's earned cosmetics.

- **Headers:** `Authorization: Bearer <token>`
- **Response:** `{ cosmetics: [...] }`

Articles

`GET /recommendedArticles?keywords=word1,word2,...`

Recommends an article based on keywords (stop words filtered).

- **Query Param:** `keywords` (comma-separated)
- **Response:** Top matching article or error.

Figure 17: Response to informal surveys

Response 1:
good UI , easy to navigate
Response2:
wish buttons were consistent styling

Figure 18: PACT

People

The primary users will consist of customers of the NHS both those who are referenced to this source and those who may find it on their own.
Secondary stakeholders will consist of Project managers , web designers , fullstack developers , testers and people within the mental health profession at the NHS.

The website must be able to be used by non technical people as it is meant for the general public to have access to this product meaning that we have to cater the UI to people who have no technical skills. We must therefore make it easy to navigate and interact with the product as well as intuitive.

The end users will want an easy to navigate and familiar UI so we must be able to use a similar or the same style as the in house NHS website. Developers will want to be able to make an easy to develop and maintain website as well as it not being to complex systems wise for quick debugging due to the limited time of the

project. The client will want an app that is effective to the goal in assisting with the aid seeking process within mental health as well as an effective source to signpost people to.

Users currently face a difficult system to try and receive mental health aid from due to the long wait times associated with trying to gain access to the resources. This must be apart of the NHS Digital webspace so it can be easily accessed by end users allowing it to work cohesively with the rest of the NHS tech stack such as the NHS websites or Apps.

Activities

Mood Tracking Page:
users will be interacting with a slider of some verity in order to indicate their mood, this slider will have icons ranging from a smiley face to sad face with degrees of magnetite labelled along the slider to be more granular with the data submitted by the user.

As well as this users with have 2 text boxes, one to put keywords describing their mood and another to be able to write a longer body of text. These options are here to be able to give the user the ability to be able to be specific with the data they provide and how expressive they wish to be. This would also assist in the recommendation of articles based on the data they have provided.

Lastly there will be a tick box as to opt in or out of this being viewable by your GP, this is to give patients that sense of optionality with how they keep track of their mental health.

Cat Caring Game:
users will be able to feed and pet the cat to keep it happy. They will also be allowed to name the cat upon first viewing the game. Whenever the cat is pet or fed that data is stored in a counter. We considered these good ideas as it helps to provide a scene of calm that comes with caring for another being, of which is hard if people don't own a pet.

All of these actions results will have to be securely stored onto the server database with hashing involved in order to protect patient confidentiality as defined in section 251 (11) of the National Health Service Act 2006:

- "was given in circumstances where the individual is owed an obligation of confidence"
- "conveys some information about the physical or mental health or condition of an individual, a diagnosis of their condition, or information on their care or treatment."
- "is identifiable or likely to be identifiable, for example from other data likely to be held by the person or organisation receiving the data - if a patient could be identified from it"

NHS England (2019)

Context
As it it a website based application it should be able to work well on mobile devices as approximately 60% of all web traffic comes from mobile devices as of mid 2024 (Michel Smith 2024). This refers to it being performant with load times not exceeding ~5 seconds on a average connection download speed ranging from 40mbps to 70mbps. As well as this the website layout must be responsive for Desktop, Mobile and Tablets. As it is a website based app performance may be limited as web browser in the modern day such as Google Chrome are known for being resource intensive on their own which does mean we will need to pay attention to performance on limited hardware.

This product is aimed to be used by end users within their own homes on their mobile devices / desktop or laptops. This may be demonstrated by clinicians so that will be considered by making it performant on mobile / older desktop hardware to the best of our ability.

As this product will be hosted on a server access times are not a limiting factor of this product, however this does mean that users will need a stable internet connection in order to interact with the product.

Web apps tend to be a client heavy process meaning that the users device does a lot of the processing power when interacting with the product, this primarily comes from having to render a lot of dynamic content on a web page such as frames or rendering any state changes on the profile page.

This will be an easier adoption than other systems such as patients as the likelihood of them having to access the NHS website is high and with the product being on the NHS website it will already be integrated into a suite of software that many end users are used to using. However due to it being on a web page it may be considered as more of a hassle to interact with compared to an app.

As well as this in order for the user to get as much use as they can out of this software they do have to be active in submitting information , playing the game , readding articles , performing the exercises in the articles or mini-games, etc. This may make it a hard adoption for some users especially considering we are dealing with people that may find technology difficult to adapt to or with people who wont want to interact heavily with such activity's due to them being neurodivergent.

Technologies

This app will be web based so a JavaScript framework, in this case react will be most suited for this task due to its built in features to manipulate the DOM easily (inherited from JavaScript). The reason that React was chosen over standard JavaScript is due to the innate ability to handle complex changes of state on the frontend as well as being able to robustly handle data transition with the UseEffect hook for components. As well as this the components features of React will allow for a compartmentalised and efficient development process , especially considering the agile approach taken to the development process, usually equating a component per sprint.

For our database we will be using SQLite as it is a lightweight , server-less, relational database. A relational database is important in this scenario as data retrieval needs to be quick and as we are only working with more simple data structures the positives of a document store database will not be as present. For storing JSON data we can store it as a string inside a TEXT field in a SQLite database by converting between strings and JSON objects in the middleware.

For the back end we will be using an ExpressJS API due to the speed of development being substantially quicker for API development due to familiarity with our development team. As well as this it allows for robust error handling which is extremely important in web based applications due to the constant back and forth of data. Also ExpressJS is quick to implement into a application that has a SQLite database.

The game will be developed in Unity ~ 2023.2.20f1 and Built using WebGL to be able to run into the browser. These games are compiled to web assembly (WASM) which provides good support for modern 64bit browsers however may experiance performance degradation on legacy systems.

The development of the website itself will take place on a average spec’d laptop (8GB of RAM , Intel N100 (4) @ 3.400GHz CPU) allowing for accurate performance testing, this means the laptop during development will be running the server locally to handle API requests as well as running the website, this means we can see how the website will perform even when the device is under load.

This will be have to be run on either 64bit or 32bit machines, 16 bit machines wont be compatible due to the lacking support by the web browsers for 16 bit CPU’s and OS’s. This is not much of a roadblock due to the fact that near to all computers are running on at least 32 bit processers in the modern day. However 32bit systems may struggle to keep up with the computational demands of a complex web app.

All data will be encrypted before being stored on the database at the API using the JSON web token encryption algorithm in order to comply with the strict data protection requirements that comes with working with a medical partner such as the NHS.

Citations

NHS England (2019). *Patient Data and Confidential Patient Information*. [online] NHS Digital. Available at: https://digital.nhs.uk/services/national-data-opt-out/understanding-the-national-data-opt-out/confidential-patient-information.

Michael Smith (2024). *Mobile Phone Traffic Statistics and Trends - Indectron*. [online] Indectron. Available at: https://www.indectron.com/blog/mobile-traffic-stats-trends/.

Meeting Appendices:

Our idea has to fall into the guidelines of a good tool but not a substitute for mental health support. We must assist the NHS not take it over.

App has to be reliable / robust and effective

Must be intellectible by the whole of Gateshead (people who can read / write, hard of hearing / deaf , those who can speak English)

Must be accessible by all over the age of 16

NHS Gateshead mental health design colours NHS blue, purple, teal (https://www.gatesheadhealth.nhs.uk/services/mental-health/)

Refer to Becky to check if the use of our software is appropriate

Suggestions:

Reminder system / daily check in

Recommend articles based on keywords, personalised article recommendation (in article link to external resources)

Lead to help in crisis

To make the app more self lead instead of linking with GP

audio alternative

try to add pictures as a resume for written stuff

translation options??? (need to ask about the vast majority of languages to use)

to respond to the educational part they want us to add, maybe we can do a library that directs to nhs official pages

they want something durable, I think we can solve this automatically if our work is original enough

Gateshead Peer Support Service Background:

Service To the Community

Lots of gaps in mental health service

For people who arent ready / dont need clinical therapy but want some help

in-between primary and secondary care

This service is for people who are registered to a Gateshead gp

A non clinical approach

Mostly for accessing resources and more self learning

day to day health monitoring

if they need they can signpost themselfs using the app

non clinical and clinical articles

accessibility : can listen to articles as well as read

for ages 16 and up , reading age 8

2 sides to the app , Information/Signposting | Interactive

Meditation articles

Refer to apps such as Calm, they were referenced in meeting as good

Cat Ideas:

name cat

calm music in background

WRAP plan (wellness recovery action plan)

- use as a base for wellbeing forum

Figure 19: C++ Article Parser:

```
#include <iostream>
#include <fstream>
#include <sstream>
#include <string>
#include <zip.h>
#include <tinyxml2.h>
```

```
using namespace std;
using namespace tinyxml2;

string ExtractTextFromXML(const string& XmlContent) {
    XMLDocument Doc;
    Doc.Parse(XmlContent.c_str());
    XMLElement* Body = Doc.FirstChildElement("w:document")->FirstChildElement("w:body");
    if (Body) {
        stringstream TextStream;
        for (XMLElement* P = Body->FirstChildElement("w:p"); P != nullptr; P = P->NextSiblingElement("w:p")) {
            for (XMLElement* R = P->FirstChildElement("w:r"); R != nullptr; R = R->NextSiblingElement("w:r")) {
                XMLElement* T = R->FirstChildElement("w:t");
                if (T) {
                    const char* Text = T->GetText();
                    if (Text) {
                        TextStream << Text;
                    }
                }
            }
        }
        return TextStream.str();
    }
    return "";
}

string ReadDocxFile(const string& DocxFile) {
    int Err = 0;
    zip* DocxZip = zip_open(DocxFile.c_str(), 0, &Err);
    if (!DocxZip) {
        cerr << "Failed to open docx file" << endl;
        return "";
    }
    zip_file* DocFile = zip_fopen(DocxZip, "word/document.xml", 0);
    if (!DocFile) {
        cerr << "Failed to find document.xml in the DOCX file" << endl;
        zip_close(DocxZip);
        return "";
    }
    char Buffer[4096];
    stringstream Ss;
    int BytesRead = 0;
    while ((BytesRead = zip_fread(DocFile, Buffer, sizeof(Buffer))) > 0) {
        Ss.write(Buffer, BytesRead);
    }
    zip_fclose(DocFile);
    zip_close(DocxZip);
    return ExtractTextFromXML(Ss.str());
}

void SingleFile(){
    string inp;
    cin >> inp;
    string DocxFile = inp + ".docx";
    cout << DocxFile << endl;
    string Text = ReadDocxFile(DocxFile);
    if (!Text.empty()) {
        cout << "Extracted Text: " << endl << Text << endl;
    } else {
        cout << "No text extracted from the DOCX file" << endl;
    }
}

int main() {
```

```
    SingleFile();
    return 0;
}
```

Weekly Reports

Week 1

<table>
<tr><td>Name: Cameron Haynes</td><td>Date: 28/01/2025</td></tr>
<tr><td>Individual objectives for this week:</td><td>Evaluation of performance:</td></tr>
<tr><td>

- Use this space to list your main objectives for the week

To get everyone's roles assigned and to get everyone on the same starting page

To start a potential prototype

Get a team name

Establish a nice working environment

To start getting development documentation in order and to establish some requirement questions for the client

</td><td>

Use this space to reflect on your individual performance against these objectives and how you could improve next week

I have got wire frames sorted solo as well as submitted a lot of user requirement questions
:

- any specifics on data security that needs to be abided by
- any specific platforms that need to be started
- any design or UI/UX preferences
- key functionalities you want in the software
- as much contact info as you can give / your preferred method of communication during the project

I kept consistent communication with everyone through the agreed apon platform as well as contributed a lot to docs on the github
https://github.com/CamH04/Enterprise-Project-Group-9

</td></tr>
<tr><td colspan="2">Individual objectives for next week:</td></tr>
<tr><td colspan="2">

- Use this space to plan your objectives for next week

To start on establishing a portable template for the website using the NHS github provided dev tools

</td></tr>
</table>

Week 2

Name: Cameron Haynes	**Date: 04/02/2025**
Individual objectives for this week:	**Evaluation of performance:**
I want to get a very basic prototype with the powerpoint for the client interview as well all wire frames completed. As well as this I would like to wrangle what we have of our group to get a full company identity sorted. I will try to get some web development done such as a login system. I will also to try delegate a lot more of the client facing stuff to the project lead and marking now	*I managed to get the design team to be able to come up with a proper more appropriate brand identity* *I got all I set out to do here this week even though a lot of this shouldve been delegated to other teams.* *The powerpoint has come along with help from Jeremy for the scripting side as well as Tony for some of the design.* *The template for the nhs website got set up , its great. Got it done using the Nhsuk-design CDN.* *As well as this I got a login system working on the website that is connected to a sqlite db through an expressjs backend.* *I have sorted out our shared file structure as well* *This week has been especially productive and has allowed me to be able to get the ball rolling for our client meeting next week.*

- *Use this space to plan your objectives for next week*

Build of our plans and docs based on feedback given apon by the clients, adjust any ideas / concepts needed that the client has requested.
Get started on the waterfall docs for the development side after meeting with client

Week 3

Name: Cameron Haynes	**Date: 11/02/2025**
Individual objectives for this week:	**Evaluation of performance:**
Finish Pact Analysis Finish The Presentation Get some designs ready for the presentation to be able to show as prototypes	*I had gotten a lot done this week, the PACT , presentation and all designs ready for the presentation was done, the initial client consultation went well will a genuinely good reception to our idea which was novel so we had a doubts about a corporate clients reception.* *The clients were receptive to our ideas and our proposed implementation of the idea within the context. Our constraints were to keep to the NHS Gateshead mental health team colours which are on display of the website, the colours I got fro the client were NHS blue, purple and teal* *I lead the meeting as I have taken over for this week as PM as Jemery couldn't make it to the meeting.* *On top of that I have implemented the mood tracking pages functionality* *As well as this I have manged to wrangle our group into a more proactive development style.* *As well as this our feedback from our supervisor from our meeting was astounding other than the aspect that we said we have instead of we will (as its a proposition). As someone who previously wouldn't have stepped up to the task of having to lead the meeting I am extremely proud of what me and most importantly the team has pushed through with as they all did there parts in assisting and solving their problems.*

Week 4

Name: Cameron Haynes	**Date:**
Individual objectives for this week:	**Evaluation of performance:**
Finish agile docs , start on getting flow charts for design, start API docs (and db schema for agile doc), Get more details on the marking strategy from team and to try to get them to round up some final designs for corporate website	*Got Done:* *API Docs , **Some** Of the Agile doc , implemented the article recommendation system , login and recommendation system flow chart , started docs for weekly sprint reviews* *I am extremely happy with my contribution to the team this week, I have provided my own solutions and documents consistently (as I have and will continue to do). I have also been there to assist with anything my team needs from me (wether that's just a small clarification that takes a few min or things like direction and wrangling people together). I have really had to grow my team work skills in order to accomplish what I have however I feel I have a lot more to offer.*

Week 5

Name: Cameron Haynes	**Date:**
Individual objectives for this week:	**Evaluation of performance:**
Refining Requirements Continue small parts of development : Icons , frontend , UX To embed the game build within the website To develop the company website	*Requirements were refined through appendices to the pact analysis, the notes were worked through as a general group from the meetings. They were a help to narrow down the parts of the app to figure out. The requirements are a key part of a project to nail down so im happy we all managed to narrow them down for out 2nd*

	meeting. *Development has continued on the frontend with designs of icons from the design team which was very nice however I still wish for further input from others even though im very happy with the state of development as we are just approaching our 2nd meeting. Ux has been narrowed down from our meetings however I do wish to continue to refine it* *The game has been compiled to a basic standard within unity, I am behind in terms of embedding it into the site however I will catch up. I feel I fell behind due to me trailing off what I shoulve been focusing on in development.* *I havent been able to start our website for our company as I haven't received any design ideas from our marking team due to a lack of input from them. I have been prompting them to input but I shall start development of the site without a concrete design to push the ball harder.* *This week I have been slowly chipping away at development and documents. I am happy with the progress I have made however I do need to push forward without getting sidetracked in development and be more willing to call a block to my PM if something is taking to long.*

Week 6

Name: Cameron Haynes	**Date:04 03 2025**
Individual objectives for this week:	**Evaluation of performance:**
Work on game prototype as well as refining the smaller aspects of the site that we got from the clients such as implementing a WRAP plan	*I have been consistent of working towards my collection of smaller goals such as implementing the wrap plan and working towards implementing some accessibility features such as a text to speech feature*

To aid the design team in getting some more refined high fidelity designs To help alongside the rest of the team in the creation of the powerpoint as well as give a good presentation as a group to our clients	*I have fixed quite a few small visual bugs on the site to improve overall user experience* *I have also embedded the first build of the game into the site in a safe way (originally I was going to use a DangerouslySetInnerHTML prop which leaves us open to XSS attacks without a lot of text sanitation, instead I hosted the game locally of another server and used an iframe tag to embed the hosted game* *The meeting went well , jeremy was really helpful throught the planning stage and was very receptive to any changes and improvements I suggested. T'was a good dialogue.* *The clients seemed reseptive of out current work, most questions and improvements were small eg change of phrasing in the wrap plan from crisis plan to wellness plan*

Week 7

Name: Cameron Haynes	**Date:11 03 2025**
Individual objectives for this week:	**Evaluation of performance:**
To update the styles of the website to make a more appealing prototype Implementing accessibility features such as text to speech for articles To restructure a part of the repo to match our current stage of development Work and add features to the game	*Im happier than last week at my progress towards the demo as well as the project as a whole. I have communicated with my team to a much better standard this week as well as done a much wider array of tasks. I feel I am putting in well above the standard of time and effort in comparison to my own and other groups.* *I have:* *Update the game build* • created the feeding mechanic • created the happines mechanic • added "zleep" the alien to the game • added particle effects to zleep

	Added text to speech with the articles (using the std dom tts, rather than the talkify lib I wanted to use, however there were many issues implementing it) *I restructured the repo / files to keep clarity of where we are* *added a lot of the NHS styles to the website*

Week 8

Name: Cameron Haynes	**Date:18 03 2025**
Individual objectives for this week:	**Evaluation of performance:**
- Add password reset functionality -Be able to update your wrap plan -update styles to match the hi res plans closer -update some game styles	*I have managed to make some progress on the app, not as much as previous weeks which is a point I wish to improve on for next week.* *I did however meet all the requirements bar the update game styles as I wished to focus on the website as it is a lot quicker to implement while being extremely important to match the first hi fi presentation we shown them* *The game styles will be implemented next week, this week our communication as a group as a lot more consistent and productive as well as getting Heytham on board with the more technical stages of development.*

Week 9

Name: Cameron Haynes	**Date:18 03 2025**
Individual objectives for this week:	**Evaluation of performance:**
- Continue building the game and fixing a lot of the presentation issues with the game - contribute to the power point from the dev side	*The group in general has been a lot quieter this week but that is due to a lot of bigger tasks being filled as well as a lot of out of project factors. However we still have made valuable contributions to the project through this week such as more development changes as well as the presentation to the client and our company presence. I am happy with my contribution to these aspects such as the development side to the powerpoint as the development itself which we are nearing the end of.*

Week 10

Name: Cameron Haynes	**Date:18 03 2025**
Individual objectives for this week:	**Evaluation of performance:**
Continue development on the game	*I helped with development as Jeremy and Heytham wanted to contribute to development but implementing the speech to text system. It was a clean and good process and they were lovely to work with on this component.* *Development is slowing down as we come near to completion of the prototype due to a very very fast development process at the start of the project by me.* *Next week I would like to fix some of the bugs related to the login system*

Week 11

Name: Cameron Haynes	**Date:29 04 2025**
Individual objectives for this week:	**Evaluation of performance:**
Wrap Up Game Development in order to	*I developed the game systems for the HUD,*

assist as much as possible with the presentation planning and any other small tasks left to do by other teams	*cosmetics and some code to be able to make the game more presentable. Along with this I worked on the recommendation systems on the website to include some audio and video resources as provided by the NHS.* *As well as the development I assisted in the production of the presentation alongside most of our team members to be able to get a well rounded and clear presentation for our clients as we all want to be able to covey the effort we have put in through our results in which as a team we are proud of. As a team we have communicated much more often and in a much more constructive manner as it comes down to nearing the end of the project and we still have a few things to wrap up. We are positive while also providing ample constructive criticism while providing consistent and clear updates as a team. I am proud of my contributions to all of these factors listed this week as well as my contributions over the Easter break.*

You are required to complete a weekly reflection for each week of the project – you will be required to submit these as part of Assignment 3.

Week 12

Name: Cameron Haynes	**Date:06 05 2025**
Individual objectives for this week:	**Evaluation of performance:**
Prepare for our presentation by practicing my parts I am reading out as (technical breakdown and live demo) well as delivering the presentation to the best of my ability	I have prepared for the presentation by adding screenshots of development build and sharing them to the team to add to posters and powerpoints. As well as this I assisted in the making of the powerpoint in a long meeting with jeremy and heytham. In this we created the presentation structure and content. We had a further one where we discussed who had responsibility of presenting which part, I had it over the live demo. We made notes and discussed our parts further. We then done the same on the day of the presentation. Th presentation itself went really well I thought, I put my all

	into to conveying the ideas we had developed over the time of this project as well as making it engaging for the clients. I am immensely happy with the effort but In by the 4 of us who were present that day. I involved the clients in the demo as well as trying to show the good work we had all put into developing the soloution.