College of Engineering

R&D Expo

University of North Texas

SENIOR DESIGN

Spring 2026

COLLEGE OF ENGINEERING
Department of Computer Science & Engineering

INFORMATION TECHNOLOGY
Senior Design Abstracts
Spring 2026

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Campus Navigation

Team Members

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External Sponsors/Mentors

Internal Sponsors/Mentors

Dr. David Keathly
Rahul Kumar

Abstract

Our project is a full-stack web application designed to improve campus navigation and enhance student engagement by providing a centralized platform for both location discovery and event management. The system allows users to search and get step-by-step directions to key campus resources with the option for accessible routes and well-lit paths, while also enabling them to browse, view, and register for campus events.
The application integrates a React-based frontend, an Express backend and a Postgres database with PostGIS to manage events, bookmarks, locations, routing, and user data. Events are automatically scraped from UNT's calendar, allowing for users to access detailed event information, register or unregister from events, receive event notifications via email, and view event locations through map integration. Website admins also have the ability to add, edit, and remove events and locations. Additional features include search and filtering functionality, user authentication with password reset support, and performance optimizations such as pagination to efficiently handle large datasets.
Overall, the goal of this project is to create a user-friendly and efficient platform that simplifies campus navigation, improves accessibility, and helps students stay connected with campus activities.

CypherCity

Team Members

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Dr. Jacob Hochstetler

Abstract

Social engineering is a common entry point for cyberattacks, yet many students struggle to recognize phishing attempts delivered through email, text, or phone. This project addresses the need for engaging, practical cybersecurity education by creating CypherCity, a mobile game that teaches users to identify social engineering tactics through gameplay.

The project was primarily programmed in Dart for the Flutter SDK and includes the Flame framework. Firebase was used for user authentication and cloud storage, GitHub for version control, and VS Code for development. We used Object Oriented programming conventions and Agile project management. We used various AI models in the development phase from Chat GPT 4/5 to Claude's Sonnet 4.6 model.

CypherCity combines base building/tower-defense mechanics (placing and deleting buildings, fighting a constant barrage of weak enemies), a fictional in-game economy (no microtransactions), interactive training quizzes, and then scripted encounters that present users with potential scams through popups of character dialogue and requires binary decisions. A backend template generator was designed to produce social engineering questions informed by ongoing research, keeping the content accurate and current. Using Flutter enabled us to easily make it available on iOS and Android devices.

Results show the app is operational and users can complete defined functional requirements, including account creation, gameplay progression, purchase and placement of buildings, randomized encounters, training questions for education and earning currency, and data persistence.

In conclusion, CypherCity demonstrates that gamified, scenario based learning can deliver accessible cybersecurity training on mobile devices, laying the groundwork for expanded content, analytics, and future evaluation of learning outcomes.

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DNAV

Team Members

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Anthony Carter
Tumi Oladimeji
Arsema Habte

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Abstract

DNAV is a Unity-based Virtual Reality (VR) navigation system that helps users move through a hospital-style environment. The project focuses on VR interaction, procedural environment generation, and goal-based navigation to simulate real-world wayfinding in healthcare settings. Built using Unity and C#, the system includes VR hand tracking, object interaction, and simple UI controls. Users can explore an automatically generated hospital layout, interact with objects, and follow navigation goals to reach specific destinations. The environment is created using procedural generation scripts to produce flexible and realistic hospital structures. A goal-based navigation system guides users through the environment, with triggers that detect when destinations are reached. The project also includes features such as object grabbing, wall color changes, and basic UI controls for interaction. Testing showed that DNAV provides a smooth and responsive VR experience with stable performance. Overall, the project demonstrates how VR can be used for navigation training, accessibility, and spatial orientation in complex environments like hospitals.

Eat Like the Rainbow™
Team 14 Eyes

Team Members

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Ethan Holley
Aayushma Bhattarai
Rowen Salazar
Lukas Kallus

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Chef Cathy Zeis

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Dr. Anastasia Sacharidou
David Keathly

Abstract

The Eat Like the Rainbow™ mobile app aims to combat childhood obesity, reduce exposure to artificial ingredients, and increase awareness of how food impacts health conditions by making healthy eating easy and affordable for everyone!

Users can scan product barcodes and receive immediate information about potentially harmful ingredients in a product and whether it aligns with their selected medical or dietary restrictions, which empowers them to make more informed and healthy decisions while shopping. The app also provides a nutrition library, sample recipes, "Child Mode", and general budgeting advice to help keep grocery shopping both healthy and affordable.

Our app is designed using a React Native framework and utilizes Google Firebase to handle information storage and retrieval for both user account information and nutritional data.

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FarmRA

Team Members

Brenden Morgan
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Professor David Keathly

Abstract

FarmRA is a scalable agricultural monitoring system designed to give farmers reliable insight into soil conditions across their farms. The system uses ESP32-based sensor nodes with LoRa communication and a Raspberry Pi gateway to collect and transmit soil moisture, temperature, and light data. Data is validated, queued, and forwarded to an AWS-hosted time-series database, where it becomes accessible through a secure role-based web dashboard optimized for both desktop and mobile views. Through real-time visualization. GPS-based node mapping, automated notifications, and flexible node management, FarmRA empowers users to make informed decisions about soil health and crop wate needs. This ultimately provides farmers with a robust platform for precision agriculture and long-term farm management.

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FlowState

Team Members

Cesar Regalado
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Abstract

Our Attendance Tracker App is a user-friendly solution designed to simplify how teachers monitor and manage attendance. The app provides an efficient way to record, track, and analyze attendance in real time.

With an intuitive interface, users can quickly check in or mark attendance, while teachers gain access to detailed reports and insights. The app supports automated record-keeping, reducing manual errors and saving time. Features such as real-time updates, secure data storage, and customizable attendance categories ensure flexibility for different use cases.

Key features include:

Easy check-in and attendance marking
Real-time tracking and updates
Detailed reporting and analytics
Secure and reliable data management

Food Log App

Team Members

Mary Adeeko, Ian Morrissey, Prapti Pyakurel, Ruby Estrada, Oyindamola Bade-Ojo

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Professor David Keathly

Abstract

We created the Food Log App to help simplify the process of tracking meals, symptoms, and restrictions. Allowing indivduals to record what they eat will make the process of monitoring reactions and managing dietary preferences much eaiser. This will also allow individuals to understand personal triggers, make better decisions regarding food, and live a healthier, smoother lifestyle.

FoodWise

Team Members

Jordyn Robinson, Joshua Tran, Loredana Fouonji, Paula Agyeman, Raj Patel

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Professor David Keathly

Abstract

The FoodWise App is a moblie and web application developed by Team PRJL's. The application is designed to help users track their diet and symptoms. As a result, the app can help identify potential allergies, sensitivities, and patterns that may be negatively impacting their health. Users log meals by entering food names, meal types, serving sizes, macros, ingredients, and separately recording symptoms experienced after eating.

The application is built on a relational database for users, food, ingredients, allergens, and symptom logs. The backend is powered by Node.js and connected to PostgreSQL database. The user interface guides users through a streamlined flow from meal entry to symptom logging to visual analytics.

HabitBuddy by Taskflow Tech

Team Members

Abyan Huq, Derian Mendez, Julian Bertrand, Rishav Dahal, Rowland Foster

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None

Internal Sponsors/Mentors

David Keathly

Abstract

HabitBuddy is a gamified habit-formation app designed to empower children aged 6 to 12 to develop essential daily routines, such as chores, study habits, or musical practive. Developed by Team TaskFlow Tech to address the friction often associated to habit reinforcement, our app utilizes behavioral science principles to break down complex habits into manageable, interactive steps. The system is build as a cross-platform Progressive Web Application that features a virtual "Habit Coin" economy, digital badge acheivements, and a customizable reward system where kids can redeem coins for parent-approved real-world incentives. By combining a visually engaging and intuitive interface with a secure PIN-protected dashboard for parental oversight, HabitBuddy encourages a sense of independence and accomplishment in young users while providing parent with a structured tool to support their child's development.

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Los 3 Reyes

Team Members

Aileen Arvizu
Myles Bennette
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Valentin Arvizu

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Abstract

This project is a mobile cattle management application designed to help users track and manage livestock efficiently. It allows users to view, add, and edit cow profiles, including important details such as identification, weight, and health information.

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Project Librus

Team Members

Griffith Fitzgerald
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None

Abstract

The main objective of this project was to design and develop a Library Management Website for the nonprofit Great Lakes Academy. The system includes both a front-end website for user interaction and a back-end database using SQL to manage library records. Our end users need access to a conventional web browser on a Computer or Mobile device and our Website is compatible with Apple OS, Chrome OS, and Windows Operating systems with compatibility with mobile web browsers. Great Lakes Academy students and teachers are the intended end-users and these users will need low technical proficiency with a computer or smartphone to operate the website effectively.

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SciKidz by Studio Z

Team Members

Kevin Tate
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Shuhail Serniabat

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Abstract

SciKidz by Studio Z is a mobile-first educational platform utilizing immersive AR experiences to help K-12 students learn and understand STEM concepts. The app is designed using modern web technologies (Vue 3 and Vite), making it compatible for most modern mobile devices. At its core, SciKidz aims to replace passive content consumption with experiential learning using a modular flow designed to help students learn, engage with, and retain information. SciKidz looks to redefine digital education by making complex scientific concepts tangible, interactive, and memorable, bridging the gap between learning and experience.

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ScreenTrap

Team Members

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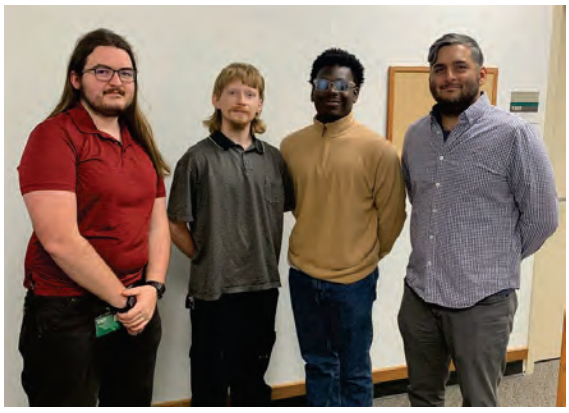
Dr. Keathly

Abstract

Parents have a hard time controlling the devices they purchased that they allow their children to use. There are applications that may simply give a notification when screen time is up or lock certain apps. Children are good about finding ways around these measures, especially when the device is not being supervised by the parents constantly. ScreenTrap tries to achieve a total lock on the device. Once ScreenTrap is installed and an IOS or Android device is paired to the parent's Computer, IOS, or Android, parents are able to manage a complete screen lock of their child's device with a click of a button. Their screen will essentially be 'trapped' until the parent lifts the lock from their device. Once the initial install and pairing is done, the screen trapping can be done remotely at any time. Child is grounded from devices? Spending too much time on it? Staying up to late on the device? These are problems ScreenTrap looks to solve while not overlooking kids these day's tech savviness that other solutions might.



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ByteBuilders RemindME

Team Members

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Hema Thallapareddy

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N/A

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Professor David Keathly

Abstract

RemindME is a user-friendly mobile application that will support users with time-management, habit tracking, and task completion, with a focus on neurodiverse users (including those with ADHD).

The app is available on iOS and Android, featuring two different modes - Kids and Adults mode, each one tailored to the target audience. The app allows for users or parents to create routines, set reminders and timers, and sync it with the in-app calendar.

For kids, all components of the app will be managed by the parents/guardians. There will be features to add reminders, tasks, and rewards for the children. For rewards, there will be gamification elements along with personalized prizes included.

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Team Apex

Team Members

Carllyn Barfi
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Samuel Asadu

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Abstract

The Student Organization Engagement Platform is a web-based application that simplifies attendance tracking and boosts student involvement in campus events. Students scan a QR code to check in, replacing slow manual processes. A leaderboard encourages participation, while an admin dashboard allows event creation and attendance reporting.

Built with a full-stack approach, the system integrates a responsive frontend, backend services, and a database to ensure reliable QR validation and accurate attendance tracking. Development followed a sprint-based workflow with continuous testing and iteration. Future enhancements may include push notifications, analytics, and personalized event recommendations.

VESTA
Team Shift

Team Members

Benjamin Murley
Michael Ronning
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Neuropsychology Innovation Lab (NIP)
Michael Barnett
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Internal Sponsors/Mentors

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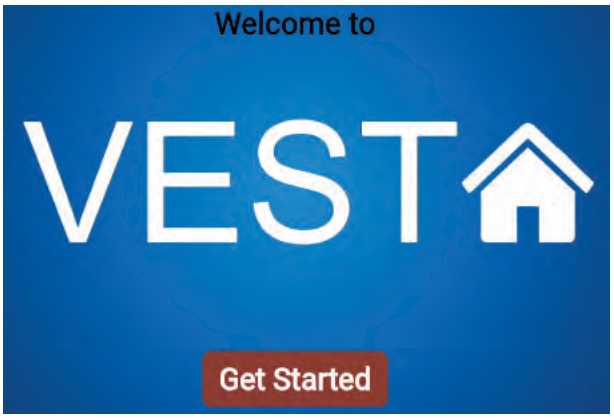
Abstract

VESTA is a mobile application designed to support cognitive and functional assessment through an interactive, user-friendly platform. The app combines results from a self-administered MoCA-style cognitive screening with a simulation-based task environment that evaluates skills such as financial decision-making, scam awareness, and everyday judgment. By presenting traditional assessment data and applied performance data in one system, VESTA aims to provide a complete picture of a user's abilities than either method alone. Our team focused on designing and implementing the app interface, integrating assessment workflows, and building a results screen that organizes cognitive and simulation outcomes into a concise summary. VESTA is being developed to compile user outcomes into a report format that can be reviewed by the project sponsor for analysis and follow-up. Current development is centered on connecting live user data to the results interface so that each participant can view assessment progress while also enabling sponsors to receive structured reports derived from those results. VESTA is intended to serve as a scalable foundation for future research and clinical use in cognitive and functional evaluation.



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