



Software Design Project: Project List



1. Shopping List

- In this project you will be designing and implementing a shopping list app. Among other features, users should be able to:
 - Add and remove items from a shopping list
 - Track how much they are spending
 - Keep track of their current groceries/household products/etc. and any pertinent information (e.g. expiry dates)
 - Automatically add items to shopping lists on a regular basis (e.g. add milk to the shopping list every week)
 - Share lists with other users (e.g. family members)
 - etc.

2. Wits Academy

- In this project you will be designing and implementing an online learning platform, similar to Udemy. This can be in the form of an app and/or desktop application.

Among other features, users should be able to:

- Create (teacher) and subscribe to (student) online courses
- Upload resources to a course (e.g. slides, videos, etc.) (teacher)
- Rate and comment on a course (student)
- Run quizzes for a course (teacher)
- Ask and answer questions on a forum
- Send notifications to students (teacher)
- etc.

3. Wits Overflow

In this project you will be designing and implementing an online forum for the school of CSAM, in the vein of other such forums like Stack Overflow. Among other features, users should be able to:

- Ask and answer questions
- Comment on questions and answers
- Vote on questions and answers
- Mark answers as correct (question asker)
- Moderate questions and answers (moderator)
- Earn achievements for participating in the forum
- etc.

4. Harvest

In recent times there has been a greater push towards sustainability and food sovereignty. As part of this, many people have begun growing food in gardens and public spaces. In this project you will be designing and implementing an app to facilitate the process of growing and harvesting food. Among other features, users should be able to:

- Keep track of the food they have sowed/planted/harvested
- View analytics of their food yield (e.g. weight harvested this month, predictions for future yields, etc.)
- View planting information for listed foods (e.g. when to sow, when to harvest, etc.)
- View nutritional information for listed foods (e.g. calories, carbs, protein, fibre, etc.)
- Share their progress with other users
- etc.

5. SwapShop

In an effort to avoid waste and grow communities, many people have begun operating swap shops, where people swap food, clothes, furniture, etc. In this project you will be designing and implementing an app to facilitate this process for a community. Among other features, users should be able to:

- List items they wish to swap, which may include food, clothes, etc.
- Browse listed items
- Contact people who have listed an item to swap (via some chat system)
- Keep track of what will be traded during a swap
- Organise to meet once a swap has been agreed upon (with measures in place to avoid scams and other dangers)
- etc.

6. Givealittle

In this project you will be designing and implementing an online marketplace, similar to Takealot. Among other features, users should be able to:

- Browse items for sale
- Add items to a shopping cart
- Process dummy transactions
- Track deliveries
- Rate items
- etc.

7. Wits Social

In this project you will be designing and implementing a social media platform, taking inspiration from platforms like Twitter, Facebook, Instagram and WhatsApp. Required features will differ depending on the type of social media platform, but may include:

- Being able to create an account and find accounts belonging to friends/brands/influencers
 - Some sort of follower/friend system
 - Some sort of chat system
 - Being able to make posts, set a status, etc.
 - etc.
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- Together with your client, you will decide the kind of social media platform you will be developing. If you have any clear preferences, please put them in your email to me.

8. μ -sician

In this project you will be designing and implementing an app for musicians. Among other features, users should be able to:

- Identify a musical note by playing a pitch (i.e. a tuner)
 - Activate a metronome for any bpm and time signature input
 - Create simple beat loops for accompaniment
 - Track their practice schedule
 - Read pdf sheet music
 - Practice their ear training with some exercises
 - Read and play midi files
 - etc.
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- **Note:** this project requires that some members of the dev team are familiar with the basics of music theory

9. Interactive Reinforcement Learning Platform

Reinforcement Learning is a type of machine learning in which an autonomous agent interacts with an environment in order to learn a policy that maximises some reward. Interactive Reinforcement Learning (IRL) is a framework in which an expert advises an agent while it is learning in order to speed up the learning process. In this project you will be using python to build an IRL platform. The project consists of:

- Creating one or more RL or contextual bandit environments for an RL agent
- Creating an interface by which a human expert can watch the agent train
- Creating an interface by which a human expert can pause training and offer advice
- Creating a system that allows previously trained agents to act as experts
- Creating a system to store advice for later training episodes

If you are interested in working in RL during honours and beyond, this project may give you some practical experience.

10. Music Player

In this project you will be designing and implementing a music playing app. Users on the app should be able to:

- See a song, complete with title, album, artist, album art, etc.
- Play a song (with options to play in order, shuffle, etc.)
- Adjust volume
- Create playlists
- Configure more complicated settings (e.g. fade out between tracks)
- Automatically create playlists based on artist, genre, mood, etc.

Your app may be a local app that uses mp3 files on a device, or a streaming app.

11. Public Peer Review

In this project you will be designing and implementing an online platform through which researchers can rate and comment on published academic papers in order to clarify positions in the paper or offer critiques. Users should be able to:

- View ratings and comments for published papers
- Add a comment to an existing paper
- Create entries for papers that don't have any ratings or comments yet
- Comment on other comments, creating forum-like discussion threads

It may even be possible to integrate this software with existing platforms like Google Scholar.

12. Wits Software Organiser

In this project you will be designing and implementing a Kanban-based platform for organising large software projects, in the vein of Taiga or Trello. Users should be able to:

- Create accounts and join a dev team
- Create new software projects
- Create user stories and add them to sprints / backlogs
- Create tasks for a user story and assign them to team members
- Mark tasks as In Progress, Testing, Done, Rejected, etc.
- Assign points to tasks and user stories
- Create a wiki for documentation
- Display productivity metrics (e.g. points per day, etc.)

Ideas welcome

If your group has an idea for a software project that does not appear on this list, please email me as soon as possible before your project choices are due so that I can review it and let you know if the idea is feasible and in line with the course requirements.

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