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| **CS102** | **Fall 2020/21** | Project Group | 1d |
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| **Criteria** | **TA/Grader** | **Instructor** |
| Presentation |  |  |
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| Overall |  |  |

~ Sustainibility Coach ~

SavioursOfTheGreenWorld

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# Introduction

This project, named Sustainability Coach, is a coaching program that guides users to  [pursue](https://tureng.com/tr/turkce-ingilizce/pursue) an eco-friendlier lifestyle. The main objective is to change living habits through gamification and mild social competition. In simple words, the project consists of three connected parts. The first is a list of daily achievements supported by a reward system. The second part contains a forum where users can comment on environmental issues and discuss them. The third part includes a news section where admins can enter news that users comment on or share. The connection between these parts is explained in the next section. The user will have to verify all the tasks they have done themselves; eventually, we do not check whether the user cheats in the program. Gamified Sustainable Lifestyle coach will help the environment and contribute to saving the green world. After all, we are all Saviors of the Green World. Hence, we, the developers, are working on this program to remind our effort can make a world more livable habitat. We wanted to practice the CS101-102 concepts taught in class. Our group is diverse one, so we wanted to have the same ground. For this reason, we will be using Java as the genesis block. This is also why we are not developing a mobile application. First, it is not that object-oriented, which is the core of CS101-102. And secondly, we didn’t want to expose some of our team members who are not CS students to tools such as Android Studio or Swift as they would probably never use them again in their careers. We would like to extend the NPC capabilities of our project using GPT-3 pre-trained language model.

# Details

## Project Topic and its Importance

The world is warming with acceleration, according to statistics. There are fierce debates about the effects of climate change. Disasters and havoc are taking a toll on every continent due to excessive disruptive human activity. Farms are being destroyed, and people are being forced out of their homes. So much is happening unnaturally due to by-products of human activity. The political debate (*Forbes*) about whether we should care for the planet or not has become whether who will pay the price of ignorance. Policymakers are discussing the steps that their governments and their successors should take. Mass debates are happening worldwide on how to solve the climate change issue by causing an artificial volcano explosion blocking the sunrays, which would decrease the hothouse effect, completely disregarding the earth and heading towards space (Mars, it seems, in the short term).

The world is suffering, and we are consequently suffering as well. The idea that technology would solve all problems seems to have limits. The most effective solutions seem in policy changes (*World Economic Forum*) and public awareness. There have been efforts to raise public awareness (*Bilkent University,KTH*), showing how “small” simple changes in lifestyle could make a big difference.

Every incremental change will have an effect that will cascade and grow under sustainability. From the repetition of the individual, some thinking styles become the mindset of the whole generation. Thus, by at least providing ways for people to become helpful to the planet, we decided to make a Sustainability Coach. Many live programs and counselling services offer advice on how to live sustainably (*Sustainablehabits*). However, those programs are not that accessible and primarily entertaining. While being observed in all those services, Saviors of the Green World aims to combine all learning elements with Sustainability Coach. Technology, Entertainment, and Design (*TED*) are our core principles while we design Sustainability Coach.

So, with the app, everybody will have at least the opportunity to learn how to live sustainably. Our app thus intends to educate people to live more sustainably in an entertaining way. One will eventually understand that living sustainably is also suitable for the budget. This aspect also makes the app perfect for gaining habits that help the budget.

## Differences and Similarities to Existing Projects

Three leading mobile apps are like our project in serval regards. These are Duolingo, Fabulous Daily Routine Planner (abbreviated FDRP for convenience), and Dr Wolf (*Dr Wolf*).

The common feature of these apps is that they guide users to do better in their relevant topics in a gamified (*Valamis*) way. The subject is learning a language in the Duolingo case, life habits in the FDRP case, and chess in Dr Wolf.

The layout of Duolingo (*Duolingo*) and its concept is like our project. The objectives are ordered from easy to challenging, and the user is rewarded with points. It also has a streak feature where you are awarded if you do the tasks daily. The heart feature allows the user to make five wrong attempts, preventing tasks from becoming trivial by trying countless times and not learning anything. It also allows us to share progress. The duties and missions in Duolingo have a graph structure we would like to imitate because of its unique style and the sense of connections between the tasks.

FDRP first surveys the user and then helps to set up personal goals like drinking water. It does so by telling a story. The standard and relevant feature of Duolingo and FDRP are that they remind the user do the tasks daily.

Doctor Wolf is a bit different. It coaches the user to do better in chess. Our project's relevant feature is that an NPC (non-player character) talks to the user. These listed features could be added to our project though our project is more likely to be a web applet due to time constraints and expectations in CS102.

The difference between Duolingo, FDRP, and Dr Wolf is that all these apps target personal development. Our concern considers both the globe and the individual. The motto could be “Not development for self but the globe.” So, it is more of a social response. Social forums and news feeds are possible in our case. In that forum, people will comment on and discuss news regarding the planet. the app will supply information. These features are not part of the apps listed. There are optional aspects we would like to develop as well. For our concern, we would like to mint NFTs for specific achievements. An NFT is a token recorded in Blockchain that gives unique digital asset ownership via smart contracts to a wallet address. Because Blockchain Technology is new, no other app has incentivized using the app with real-world tradable assets. Hence, we solve the problem with the scoring systems in the games that are only sought only for the game. The SWOT analysis can be found in the appendices figure a)

## Technologies and Libraries Used

**Java SE 19:** Our project is abstracted in Java. As a natural consequence, the applet will function the way Java functions.

**AWT (Abstract Window Toolkit) and Swing:** Since the desktop software of our project will be written in Java, we will use these GUI tools for a graphical interface. We also chose those because Professor Güdükbay taught the very essentials. We will use NetBeans for GUI design helper tool.

**Python and MATLAB:** We will use some Python libraries, such as Pandas and NumPy, for data manipulation and management. Although we may not use Python in our applet directly, some decisions and modelling will have experimented with Python. Similarly, MATLAB may be used for data manipulation and visualisation but not directly with the program.

**MySQL:** To store, manipulate and use the data, we will use MySQL, a relational database. We will store user data, forum data, achievements data, etc., with MySQL.

**DALL-E:** Our project will contain many visual elements, such as images and graphics. At this point, DALL-E will help us to create compelling images using AI. We may also use GPT-3 for image descriptions to input DALL-E.

**GPT-3:** We will synthesise content from this powerful AI agent. We will use APIs for in-app generation and pre-loaded content in case network issues arise.

**Apache Spark’s Machine Learning Library:** Will be used to track progress and offer level adjustments in Sustainability Coach. The Machine Learning part may be optional.

**GitKraken and Git:** Since we are working as a group, we should collaborate to complete the project. To accomplish this, we will use GitKraken and Git to control our project.

**Solana Protocol:** Solana has introduced PoH, an innovative consensus mechanism among Layer 1 protocols such as Ethereum. PoH makes Solana faster, cheaper, and stronger than Ethereum itself. The only drawback seems to be occasional congestion issues which are being tended to by the Solana Foundation. We will use Solana and its ecosystem to generate NFTs created by DALL.E for achievements in our applet. The NFT achievements part may be optional.

**Umlet:** To generate UML diagrams and visualize them.

## The final product

The main objective is to change living habits through gamification and mild social competition. Three parts of the projects are as follows. The first part is a tree of daily achievements that will be completed one by one. For example, the List of achievements includes using public transportation instead of a personal car or using your thermos instead of a plastic cup in the coffee shop.

We assume the user is well-informed about himself, which is the case in most cases. Hence, they will provide self-validated information to the program, where they will be rewarded. So, why would anyone be interested in providing valid information? To overcome this problem, we want in-game tokens, which will be digital gold. We plan to have a basic anomaly algorithm that detects random inputs. So, the penalised scores will motivate players to do their best, to be honest. The user completes tasks and reports them to the program. The program gives points or tokens. The goals are drawn in a tree diagram where objectives get more challenging, and achievements are sorted according to their content. It should be noted that this application is a gamified way of improving habits, so we are not detrimentally focused on decreasing the cheating rates but on helping form sustainable practices.

The forum will be a social interface where users can comment on news related to the environment and discuss. People’s ranks gained through achievements are displayed in this forum next to their names. Their ranks are also displayed in an online list in the forum. The third part is a news section where admins can enter news that users comment on or share. Everyone does not publish the news due to quality and disinformation concerns. Admins are, again, users, but they have additional responsibilities.

The tasks and sustainability advice are gamified; hence, when the player creates an account and logs in, they will be directed to their game tree. There they will be able to see what they have done and will be doing. Once the player completes the tasks and validates, they will gain an in-game score. After a certain threshold and specific additional charges, they will earn an NFT minted from Solana Blockchain. Players can also make Social Sustainable NFT if they engage in the forum. After completing all the tasks, they will be granted the Coach’s NFT, a tokenised certificate of completion.

# Summary & Conclusions

In conclusion, Sustainability Coach is an app that has many valuable features. It helps people communicate about significant problems and encourages them to act on them. It encourages people to work and changes their lifestyle for a better world and society. It enables users in many ways: gamification, NFTs incentives, social status, etc.

The Sustainability Coach has the potential to solve one of the biggest problems of our world. It is doing it by making people’s lives more joyful and making their life more connotative. So, our project will help all of us to create a better world, and it will open the opportunity to be the Saviors of our World.

We may switch to just in-game achievements of images created by DALL.E rather than NFTs because NFTs do not enhance the complexity element of our software that much.

# Sources

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*Fabulous: Daily Habit Tracker.* Fabulous*.* [Fabulous: Daily Habit Tracker on the App Store (apple.com)](https://apps.apple.com/ua/app/fabulous-daily-routine-planner/id1203637303)

#### Figures

Figure a)

A picture containing table

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