ScrumBuddies – Sustainability Game

Overview

This technical document is set to lay out all relevant information about the source code for [Sustainability Game]. All source code has been included in the ZIP file. The instructions on deploying the deploying the software will also be provided in this document. This game has now **finished** development. This document applies **only** to such version.

Source Code Structure

Below is the structure of Sustainability Game, with all of the most significant files and folders displayed:

/Sustainability-Game

/gamekeepers

/\_\_pycache\_\_

/migrations

/templates

accounts.html

create\_gamekeeper.html

create\_multiple\_choice\_question.html

create\_person\_based\_code.html

multiple\_choice\_questions.html

person\_based\_codes.html

\_\_init\_\_.py

admin.py

apps.py

forms.py

models.py

tests.py

urls.py

views.py

/img

/profile\_pictures

default.png

/pollution

/qr\_codes

/members

/\_\_pycache\_\_

/migrations

/templates

delete.html

login.html

privacy\_policy.html

profile.html

profileViewer.html

register.html

update\_password.html

update\_user.html

upload\_profile\_picture.html

\_\_init\_\_.py

admin.py

apps.py

forms.py

models.py

tests.py

urls.py

views.py

/pollution

/\_\_pycache\_\_

/migrations

/templates

carbon\_monsters.html

create\_carbon\_monster.html

fight\_carbon\_monsters.html

find\_carbon\_monsters.html

\_\_init\_\_.py

admin.py

apps.py

forms.py

models.py

tests.py

urls.py

views.py

/ScrumBuddies

/\_\_pycache\_\_

\_\_init\_\_.py

asgi.py

settings.py

urls.py

wsgi.py

/static

/css

/img

/Sustain

/\_\_pycache\_\_

/migrations

/templates

base.html

how\_to\_play.html

index.html

leaderboard.html

learning.html

navbar.html

\_\_init\_\_.py

admin.py

apps.py

models.py

tests.py

urls.py

views.py

/tasks

/\_\_pycache\_\_

/migrations

/templates

location.html

MCQchallenge.html

person\_explain.html

PersonChallenge.html

qr\_explain.html

tasks.html

\_\_init\_\_.py

admin.py

apps.py

forms.py

models.py

tests.py

urls.py

views.py

.gitignore

db.sqlite3

manage.py

README.md

The Django backend system is compartmentalised into various aspects of the web app. The Sustain folder is the default folder, in which all the basic templates for the rest of the web app to use are stored. This includes the HTML files that hold the basic layout of the web page and the navigation bar. The members folder holds all the information about the users. This includes the account creation system, the account login system, the account deletion system, etc. The folder also includes an extension to the Users class – which is provided by Django and cannot be directly changed. The tasks folder includes all aspects of the challenges that the users will have to complete. This includes a class identifying the type of tasks that must interact with, as well as a class which holds all the information about one specific task. The gamekeepers folder holds all the information relevant to the gamekeepers and allows them to interact with the database in order to make changes to certain aspects of the game. The pollution folder includes everything to do with the ‘Carbon Monsters’, and how the users can interact with these.

Deployment Instructions

Prerequisites:

* Django **must** be installed (<https://docs.djangoproject.com/en/4.2/topics/install/>)
* Pillow **must** be installed (<https://pypi.org/project/Pillow/>)
* Responses **must** be installed (<https://pypi.org/project/responses/>)
* QRCode **must** be installed (<https://pypi.org/project/qrcode/>)

Deployment Steps (for Windows):

* Open command prompt
* Clone the git repository ‘git clone <https://github.com/CharlieSilver1108/Sustainability-Game>’
* Navigate to the project directory ‘cd Sustainability-Game’
* Apply migrations ‘python manage.py migrate’
* Run the server ‘python manage.py migrations’
* Open the web app by entering the URL ‘<http://127.0.0.1:8000>’
* The login is ‘testAdmin’, with the password set to ‘test’

Authorship Identification

Authors:

* Charlie Silver
* Luke Hales
* Achille Fossiez-Revenu
* Gregory Goursaud
* William Smith
* Liam Buchanan

All source code has been accredited to its respective author with comments in the code itself.

Coding Conventions

**Python**:

* 4 spaces per indentation.
* No whitespace in expressions and statements.
* Different types of imports are on new lines.
* Functions use underscores and classes follow the CamelCase convention.
* Comments explaining functionality of code.

**HTML**:

* Tags are indented when one element is inside another and indented by 4 spaces.
* Double quotes for attribute values.
* Attributes are in a consistent order.
* Comments explaining functionality of code.

Testing Strategy

**Members**:

* **testUserCreation**:
  + **Purpose:** This test is designed to test the user creation functionality.
  + **Steps:** 
    - The test creates an instance of the website that can be interacted with in a testing environment.
    - The initial number of users is stored in a local variable so that it can be compared with the number of accounts after the test account has been attempted to be created.
    - Test data is created to be used as the test account’s details. The details are checked using the RegisterUserForm – a form for adding users. The form is validated by using ‘assertTrue’.
    - The test attempts to create the test account by using the test data and the view ‘register\_user’.
    - The number of accounts is checked against the original number of accounts by using ‘assertEquals’ on the current number of accounts and the initial number of accounts plus one.
    - Since the test account is the last account in the table, it can be easily accessed, stored in a local variable and used for further testing.
    - The name of the user is checked against the data that was initially inputted to again verify that the account is in the database using ‘assertEquals’. The status code is also checked against what it should be by using ‘assertEquals’. The final part of the test is to ensure that the user has been redirected to the correct page by using ‘assertRedirects’.
* **testUserLogin**:
  + **Purpose**: This test is designed to test the user login functionality.
  + **Steps:** 
    - The test begins by creating an instance of the website that can be interacted with in a testing environment.
    - A test user is created by using test data. This data is replicated in another variable.
    - The test data is used in an attempt to log the user into their account using the view ‘login\_user’.
    - ‘assertEquals’ is used to compare the status code of the response and what the status code should be.
* **testUserLogout**:
  + **Purpose:** This test is designed to test the user creation functionality.
  + **Steps:**
    - The test begins by creating an instance of the website that can be interacted with in a testing environment.
    - A test user is created and logged into the system.
    - The test attempts to log the test user out of their account by using the view ‘logout\_user’ and the status of the response is then checked using ‘assertEquals’ to ensure that the code is what it should be.
* **testUserDelete**:
  + **Purpose**: This test is designed to test the user deletion functionality.
  + **Steps**:
    - The test begins by creating an instance of the website that can be interacted with in a testing environment.
    - A test user is created and the number of users in the system is counted and stored in a local variable. This variable will be compared with the number of users once the test has attempted to delete the test user from the system.
    - The test account is logged into in order to test the ‘delete\_user’ view, as it requires the user that is currently logged in.
    - Once the view is used, ‘assertEquals’ is used to compare the current number of users in the system with the number of users before the view was called.
* **testUserUpdate**:
  + **Purpose**: This test is designed to test the user/profile updating functionality.
  + **Steps**:
    - The test begins by creating an instance of the website that can be interacted with in a testing environment.
    - A test user is created and stored in a variable so that the changes in its attributes can be assessed and analysed. Since the user class has a one-to-one relationship with the profile class, the profile of the test user is also stored in a variable.
    - The test user is logged in so that the forms can be processed correctly.
    - Test data is created that will be used to update the attributes of the test user and their associated profile.
    - All of the attributes that will be updated are checked using ‘assertEquals’ to make sure that they are empty or of type ‘None’.
    - The data is passed through the relevant forms with the correct instances. The forms are all validated using ‘assertTrue’ after the data has been passed through.
    - The view ‘update\_user’ is called to attempt to update the attributes of the test user and their profile. Each time the view is called, the status code is checked using ‘assertEquals’. The attributes that have been updated are also checked using ‘assertEquals’ to ensure that the attributes are what was expected.

**Gamekeepers:**

* **testMCQCreationAndDeletion:**
  + **Purpose:** This test is designed to test the multiple-choice question creation and deletion functionality.
  + **Steps:**
    - The test begins by creating an instance of the website that can be interacted with in a testing environment.
    - A test gamekeeper is created and the number of multiple-choice questions stored in the database is stored in a local variable for comparison once an attempt to create the question is made.
    - Test data is created for the multiple-choice question and is submitted using ‘MultipleChoiceTaskForm’. This form is validated using ‘assertTrue’.
    - The view ‘create\_multiple\_choice\_question’ is used to attempt to create the question using the test data provided.
    - This is validated by comparing the number of questions in the database with the initial number of questions using ‘assertEquals’. The ‘question’ attribute of the multiple-choice question is the compared with the expected data in the attribute by also using ‘assertEquals’.
    - The test attempts to delete the question using the view ‘delete\_multiple\_choice\_question’.
    - This is validated by comparing the number of questions in the database with the initial number of questions using ‘assertEquals’.
* **testPBCCreationAndDeletion:**
  + **Purpose:** This test is designed to test the person-based challenge creation and deletion functionality.
  + **Steps:**
    - The test begins by creating an instance of the website that can be interacted with in a testing environment.
    - A test gamekeeper is created and the number of person-based challenges stored in the database is stored in a local variable for comparison once an attempt to create the challenge is made.
    - Test data is created for the multiple-choice question and is submitted using ‘PersonBasedCodeForm’. This form is validated using ‘assertTrue’.
    - The view ‘create\_person\_based\_code’ is used to attempt to create the challenge using the test data provided.
    - This is validated by comparing the number of questions in the database with the initial number of challenges using ‘assertEquals’. The ‘name’ attribute of the person-based challenge is the compared with the expected data in the attribute by also using ‘assertEquals’.
    - The test attempts to delete the challenge using the view ‘delete\_person\_based\_code’.
    - This is validated by comparing the number of challenges in the database with the initial number of questions using ‘assertEquals’.
* **testRemoveAccount:**
  + **Purpose:** This test is designed to test the account deletion functionality for the gamekeepers.
  + **Steps:**
    - The test begins by creating an instance of the website that can be interacted with in a testing environment.
    - A test gamekeeper is created, as well as a user for the gamekeeper to delete.
    - The gamekeeper account is logged into.
    - The number of accounts that is in the database is stored in a local variable for comparison once an attempt to delete the account has been made.
    - The view ‘remove\_account’ is used to attempt to delete the account.
    - This is validated by comparing the number of accounts in the database with the initial number of accounts using ‘assertEquals’.
* **testCreateGamekeeper:**
  + **Purpose:** This test is designed to test the gamekeeper creation functionality.
  + **Steps:**
    - The test begins by creating an instance of the website that can be interacted with in a testing environment.
    - A test gamekeeper is created and used to attempt to create the new gamekeeper.
    - Test data is created for the new gamekeeper and is submitted using ‘RegisterGamekeeperForm’. This form is validated using ‘assertEquals’.
    - Since the new gamekeeper is the last account in the table, it can be easily accessed, stored in a local variable and used for further testing.
    - The name of the user is checked against the data that was initially inputted to again verify that the account is in the database using ‘assertEquals’.

**Tasks:**

* **testMCQCompletion:**
  + **Purpose:** This test is designed to test the multiple-choice question completion functionality.
  + **Steps:**
    - The test begins by creating an instance of the website that can be interacted with in a testing environment.
    - A test user is created and its associated profile is stored in a local variable. A test question is also created and since this has been tested before it does not need to be tested again.
    - The number of points in the profile is checked to be 0 using ‘assertEquals’.
    - The view ‘MCQchallenge’ is used with the incorrect choice to the question. The number of points the profile has is checked to have stayed the same by using ‘assertEquals’.
    - The view ‘MCQchallenge’ is used with the correct choice to the question. The number of points the profile has is checked to have gone up by the correct amount by using ‘assertEquals’.
* **testPBCCompletion:**
  + **Purpose:** This test is designed to test the person-based challenge completion functionality.
  + **Steps:**
    - The test begins by creating an instance of the website that can be interacted with in a testing environment.
    - A test user is created and its associated profile is stored in a local variable. A test challenge is also created and since this has been tested before it does not need to be tested again.
    - The number of points in the profile is checked to be 0 using ‘assertEquals’.
    - The view ‘submit\_code’ is used with the correct code to the question. The number of points the profile has is checked to have gone up by the correct amount by using ‘assertEquals’.
    - The view ‘submit\_code’ is used with the correct code to the question again. The number of points the profile has is checked to have stayed the same by using ‘assertEquals’.

Conclusion

The source code of the Sustainability Game, provided in the attached ZIP file, demonstrates a cohesive and well-built product. The code follows established coding conventions, includes robust testing, and is well documented and commented to help developers understand each aspect of the code. The source code is easily expandable, allowing for more features to be added in the future.