Project work - Introduction

Advanced Python - Spring 2023

Introduction

As of April 20th you will be working on a group project. You can:

- Come up with your own project idea, or
- Choose one of the suggestions provided here.

Form groups of 2 students.
Use the Ilias forum or the Group Assignments document to find a group member.

Group Assignments document: `https://tinyurl.com/advpy23`

All groups must be registered to the above link.

The project work is split into milestones, described on the next page.

General guidelines for all projects:

- Submissions must contain "members.txt" with list of group members.
- Do ***not*** use Jupyter Notebook. Write code that can run in the terminal.
- A naive user must be able to execute your script without checking the code.
- Include a "requirements.txt" file.
- In each submission, include an updated README file.
- If relevant, database/table(s) necessary to test the project must be included in the submission.

Milestones

The details for what should be delivered for each milestone will be uploaded to Ilias weekly.

Choose a project; Project management , GitHub ..... *Deadline: April 27*

First deliverable ..... *Deadline: May 4*

Second deliverable; Classes; Refactoring ..... *Deadline: May 11*

Third deliverable; Unit tests; Issues ..... *Deadline: May 18*

Virtual environment ..... *Deadline: May 25*

Presentation (in person and in class) ..... *Deadline: June 1*

Project suggestions

Fitness Tracker

Create a fitness tracker to help users monitor their exercise routines and progress.

Task 1 - Exercise Logging

Allow users to input data about their workouts, including the type of exercise, duration, distance (if applicable), and calories burned. Store this data in a table or simple database.

Task 2 - Goal Setting and Progress Tracking

Enable users to set personal fitness goals, such as weekly exercise duration, distance, or calories burned. Retrieve and display their progress toward these goals based on their logged workouts.

Task 3 - Data Visualization and Trends

Provide users with visualizations of their exercise data, such as weekly/monthly summaries, progress charts, or comparisons of different exercise types. Allow users to analyze trends in their workout habits over time.

2

Recipe Manager

Create a recipe manager to help users store, organize, and discover new recipes.

Task 1 - Recipe Storage and Organization

Allow users to input and store recipes with details such as ingredients, instructions, cooking time, and serving size. Organize recipes in categories like cuisine type, meal type, or dietary preferences.

Task 2 - Recipe Search and Retrieval

Enable users to search for recipes based on keywords, ingredients, or categories. Retrieve and display relevant recipes with their details.

Task 3 - Data Visualization and Analysis

Provide users with visualizations of their recipe collection, such as a breakdown of recipes by cuisine type or meal type. Allow users to analyze trends in their recipe preferences, like the most common ingredients or preparation methods used.

3

Podcast Manager

This is a more difficult task aimed at groups wanting to work with external resources/web.

Create a podcast manager to help users organize and listen to their favorite podcasts.

Task 1 - Podcast Subscription and Organization

Allow users to subscribe to podcasts by inputting the podcast's RSS feed URL. Store and organize podcast information, such as title, author, and description. Display a list of subscribed podcasts.

Task 2 - Episode Management

Retrieve and display podcast episodes for each subscribed podcast. Allow users to download, play, pause, and resume episodes, as well as mark episodes as played or unplayed.

Task 3 - Playback Customization and Queue

Enable users to create a playback queue by adding episodes to the queue in their desired order. Allow users to customize playback options such as playback speed and skip intervals for a personalized listening experience.

Personal Task Manager

Create a personal task manager to help users organize and track their tasks and deadlines.

Task 1 - Task Input and Organization

Allow users to input tasks with details such as title, description, priority, due date, and status. Organize tasks into categories, like personal, work, or school.

Task 2 - Task Management and Notifications

Enable users to view, edit, and delete tasks. Provide a way to mark tasks as completed, and offer notifications for upcoming deadlines.

Task 3 - Data Visualization and Productivity Analysis

Provide users with visualizations of their task data, such as the number of tasks completed over time, tasks by category, or tasks by priority. Allow users to analyze their productivity trends and identify areas for improvement.

Movie Recommendation System

Create a movie recommendation system that helps users discover new movies based on their preferences.

Task 1 - Movie Input and Preferences

Allow users to input movies they have watched along with their ratings. Users can also input their favorite genres, actors, or directors to customize their recommendations.

Task 2 - Movie Recommendation Algorithm

Develop a basic recommendation algorithm that suggests new movies based on user preferences and ratings. Retrieve and display recommended movies along with their details.

Task 3 - Data Visualization and User Trend Analysis

Provide users with visualizations of their movie data, such as a breakdown of movies by genre, actor, or director. Allow users to analyze trends in their movie preferences and discover new content that aligns with their interests.

Sound Effect Mixer

This is a more difficult task aimed at groups wanting to work with signals.

Create a sound effect mixer that allows users to combine and modify sound effects for various purposes, such as video production, podcasts, or music.

Task 1 - Sound Effect Library and Import

Create a library of preloaded sound effects or allow users to import their own sound files in common formats like .wav or .mp3. Store and display sound effect information, such as file name, duration, and description.

Task 2 - Sound Effect Editing and Combination

Allow users to edit sound effects by adjusting volume, pitch, or applying filters. Enable users to combine multiple sound effects by layering and synchronizing them on a timeline.

Task 3 - Playback and Export

Enable users to preview their sound effect mix and make adjustments as needed. Provide options for exporting the final mix as a single audio file in a common format like .wav or .mp3.

Travel Planner

Create a travel planner to help users organize and plan their trips

Task 1 - Trip Details and Itinerary

Allow users to input trip details, such as destination, dates, transportation, and accommodations. Users can also add activities or points of interest to their itinerary.

Task 2 - Budget Management

Enable users to input their trip budget and track expenses, such as accommodation costs, transportation, meals, and activities. Provide a way to view the remaining budget and suggest adjustments if necessary.

Task 3 - Data Visualization and Trip Analysis

Provide users with visualizations of their trip data, such as a timeline of planned activities or a breakdown of expenses by category. Allow users to analyze their travel patterns and budget usage to optimize future trips.

3

Language Learning Assistant

Create a language learning assistant to help users practice and track their progress in learning a new language.

Task 1 - Vocabulary Management

Allow users to input and store vocabulary words along with their translations, pronunciation, and examples of usage. Organize words into categories, such as topic, difficulty, or part of speech.

Task 2 - Vocabulary Quiz and Practice

Generate quizzes or practice exercises for users based on their stored vocabulary words. Provide immediate feedback on user responses and track their progress over time.

Task 3 - Data Visualization and Progress Analysis

Provide users with visualizations of their learning progress, such as the number of words learned, accuracy in quizzes, or progress in specific categories. Allow users to analyze their strengths and weaknesses to inform future study sessions.

2

Event Planner

Create an event planner to help users organize and manage events, such as parties, conferences, or workshops.

Task 1 - Event Details and Attendee Management

Allow users to input event details, such as date, time, location, and description. Enable users to add and manage attendees, including names, contact information, and RSVP status.

Task 2 - Task Assignment and Timeline

Enable users to assign tasks to attendees or themselves, along with deadlines and status updates. Create a timeline view of the event preparation process, including completed and pending tasks.

Task 3 - Data Visualization and Event Analysis

Provide users with visualizations of event data, such as a breakdown of attendees by category (e.g., professional role, dietary preferences) or task completion status. Allow users to analyze the event planning process and identify areas for improvement.

2

Personal Journal

Create a personal journal application to help users record their thoughts, experiences, and memories.

Task 1 - Journal Entry Management

Allow users to create and store journal entries with details such as title, date, content, and tags or categories. Provide options for text formatting and the ability to add images or links.

Task 2 - Search and Retrieval

Enable users to search for journal entries based on keywords, tags, or date ranges. Retrieve and display relevant entries for review or editing.

Task 3 - Data Visualization and Sentiment Analysis

Provide users with visualizations of their journal data, such as the frequency of entries over time, the distribution of entries by tag or category, or word clouds of commonly used words. Implement a basic sentiment analysis to identify trends in users' emotions or experiences over time.

2

Environmental Noise Monitor

This is a more difficult task aimed at groups wanting to work with signals.

Create an environmental noise monitor that helps users measure and analyze noise levels in their surroundings.

Task 1 - Noise Recording and Processing

Allow users to record audio samples using their device's microphone or upload pre-recorded audio files. Apply basic signal processing techniques, such as Fast Fourier Transform (FFT), to analyze the frequency content of the audio signal and calculate the noise level in decibels (dB).

Task 2 - Noise Level Classification and Storage

Classify the calculated noise levels into categories, such as quiet, moderate, or loud, based on established noise level standards. Store the noise level data along with timestamps and optional location information in a table or simple database.

Task 3 - Data Visualization and Noise Trend Analysis

Provide users with visualizations of their noise data, such as noise level over time, frequency distribution, or noise level by location. Allow users to analyze trends in their environmental noise exposure and identify patterns or areas of concern.

2

Image Gallery and Editor

Create an image gallery and editor that allows users to store, organize, and edit their images.

Task 1 - Image Upload and Organization

Allow users to upload and store images in various formats (e.g., JPEG, PNG). Organize images into albums or categories, such as by date, event, or subject.

Task 2 - Basic Image Editing

Enable users to perform basic image editing tasks, such as cropping, resizing, adjusting brightness/-contrast, or applying filters. This can be done via input to the terminal. Provide a preview of the edited image before saving the changes.

Task 3 - Image Metadata and Analysis

Allow users to view and edit metadata associated with their images, such as date, location, and camera settings. Provide visualizations and analysis of image metadata, such as the distribution of images by date or location, or histograms of camera settings (e.g., aperture, shutter speed).