PYTHON PROJECT EXPLANATION

1. Imports:

- **os:** This module provides a way to interact with the operating system, such as handling file paths, but it isn't used explicitly in the code snippet provided.
- **pandas as pd:** A powerful data manipulation and analysis library. Here, it is used to read the Excel file containing the data for generating announcements.
- **pydub:** A library used for manipulating audio files. It supports various operations, such as merging, slicing, and exporting audio. The AudioSegment class is used here to handle audio files.
- **gTTS:** The Google Text-to-Speech library, which converts text into speech. The output is saved as an MP3 file.

2. Functions:

textToSpeech(text, filename)

- **Purpose:** Converts a given text to speech and saves it as an MP3 file.
- **Parameters:**
  - text: The text that needs to be converted into speech.
  - filename: The name of the file where the audio will be saved.
- **How it works:**
  - The text is converted into a string.
  - The gTTS object is created with the text and language ('hi' for Hindi).
  - The slow parameter is set to False to generate the audio at a normal speed.
  - The save method saves the generated speech as an MP3 file with the specified filename.

mergeAudios(audios)

- **Purpose:** Merges multiple audio files into a single audio segment.
- **Parameters:**
  - audios: A list of filenames of the audio files to be merged.
- **How it works:**
  - An empty AudioSegment object is created to hold the combined audio.
  - The function iterates over each audio file in the list, reads it as an AudioSegment object, and appends it to the combined audio.
  - The final combined audio segment is returned.

PYTHON PROJECT EXPLANATION

generateSkeleton()

- **Purpose:** Extracts specific segments from a pre-recorded audio file (railway.mp3) and saves them as individual MP3 files. These segments form the basic skeleton of the railway announcement.
- **How it works:**
    - The railway.mp3 file is loaded as an AudioSegment object.
    - The script extracts specific time intervals (in milliseconds) corresponding to different parts of the announcement.
    - Each segment is exported as a separate MP3 file (e.g., 1_hindi.mp3).
    - The segments correspond to phrases like "Kripaya Dhyan Dijiye," "Se Chalkar," etc.

generateAnnouncement(filename)

- **Purpose:** Generates the final announcement by combining the skeleton segments with dynamic information from an Excel file.
- **Parameters:**
    - filename: The name of the Excel file containing the announcement data (e.g., from-city, via-city, to-city, train number, train name, platform number).
- **How it works:**
    - The Excel file is read into a DataFrame using pandas.
    - The function iterates over each row of the DataFrame (each row represents a train announcement).
    - For each row, it generates the dynamic parts of the announcement (e.g., from-city, via-city, to-city) using the textToSpeech function.
    - The generated audio files are combined using the mergeAudios function.
    - The final combined announcement is exported as an MP3 file with a filename that includes the train number and the row index.

3. Main Execution:

- The script begins by calling generateSkeleton() to create the basic audio segments.
- Then, it calls generateAnnouncement("announce_hindi.xlsx"), which generates the full announcements using data from an Excel file.

Summary:

- **gTTS** is used for converting dynamic text (e.g., city names) into speech.

PYTHON PROJECT EXPLANATION

- **pydub** is used to slice and merge audio files.
- **pandas** handles the input data from an Excel sheet, making it easy to generate announcements for multiple trains.