Project Overview

The **ExoPlayer Video Stitcher** is an Android application that demonstrates how to seamlessly stitch video content with ad insertions using the latest Media3 (ExoPlayer) APIs. The app supports three ad insertion modes.

- **Preroll:** An ad plays before the main video starts.
- **Midroll:** Ads are inserted into the main video at regular intervals (every 30 seconds).
- **Postroll:** An ad plays after the main video finishes.

Implementation Approach

Content Stitching with ExoPlayer

The core of the application's functionality is encapsulated in the PlayerManager, which manages two ExoPlayer instances:

- **Main Content Player instance:** Handles the primary video playback.
- **Ad Player instance:** Manages the ad content.

This dual-player-instances system allows for smooth transitions between ad content and the main video, preserving the playback position of the main content throughout the process.

Ad Insertion Strategies

Depending on the selected ad mode, the application follows these strategies:

- **Preroll:**
  - **Flow:** Created a playlist approach by adding the ad as a media item before the main content.
- **Midroll:**
  - **Flow:** The main video begins playback. At every 30-second interval, the app pauses the main video, plays an ad, and then resumes the main video exactly where it left off.

- **Postroll:**
  - **Flow:** The main video plays completely. After finishing, the ad is played.

Playback Management

The PlayerManager is responsible for:

- Managing two separate ExoPlayer instances to minimize buffering and ensure smooth playback transitions.
- Handling the logic required to pause, switch, and resume playback, ensuring that the user's experience is uninterrupted.

User Interface

- **HomeActivity:**
    - Collects user input regarding the desired ad mode.
    - Launches the VideoPlayerActivity based on the selected mode.
- **VideoPlayerActivity:**
    - Provides the user interface for video playback.
    - Delegates playback responsibilities to the PlayerManager.

Data & Configuration

- **VideoRepository:**
    - Supplies the URLs for both the main video content and the ad content.
- **VideoConfig:**
    - Contains playback parameters, such as the ad interval for midroll insertion (e.g., every 30 seconds).

Error Handling

Robust error handling is implemented on both the main and ad players:

- **Error Listeners:**
    - Monitor playback and log issues as they occur.
    - Automatically fallback to the main content if ad playback fails, ensuring a continuous user experience.

Future Improvements

- **Enhanced Threading:**

- o Explore alternatives for offloading work from the main thread to further improve performance and responsiveness.
- **Advanced Ad Logic:**
  - o Investigate more sophisticated ad insertion strategies and customization options.
- **User Feedback:**
  - o Implement more detailed error feedback and recovery mechanisms to inform users during playback issues.