Multimedia Support in Android

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Multimedia Support

- Android provides comprehensive multimedia functionality:
  - Audio: all standard formats including MP3, Ogg, Midi, …
  - Video: MPEG-4, H.263, H.264,
  - Images: PNG (preferred), JPEG, GIF (not recommended)
- Several different media formats and codecs are supported
- You can play audio or video from:
  - Media files stored in the application's resources (raw resources)
  - Media files in the filesystem (e.g., SD Card)
  - Data stream arriving over a network connection.

Multimedia Support

- MediaPlayer class
  - Long sustained playing of audio/video
  - Primary API for sound and video
- SoundPool class
  - Short bursts of sound
- AudioManager
  - Managing audio output and audio sources

2D Graphics with SurfaceView Exercise

- Off to the next exercise:
  - Using SurfaceView instead of a View
  - Background thread

The MediaPlayer Class

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Media Playback and Recording

- Standard method to manipulate audio/video:
  - Media playback supported through the MediaPlayer class
  - Media recording supported through the MediaRecorder class
  - Creates its own thread for processing
  - Requires audio as file or stream based data

MediaPlayer Methods

- Creating a media player:

  ```
  MediaPlayer player = new MediaPlayer();
  ```

- Specifying the source of the media:
  - If file in the resource directory raw:

    ```
    player = MediaPlayer.create(context, R.raw.music_file);
    ```

  - If file or stream:

    ```
    player.setDataSource(path);
    player.prepare(); or player.prepareAsync();
    ```

    - Use prepareAsync() when media needs to be prepared or buffered offline
    - Will return when media is ready
    - Requires the implementation of OnPreparedListener() interface:

      onPrepared() method needs to be implemented

MediaPlayer Methods

- Start playback

  player.start();

- Pause playback

  player.pause();

- Stop playback

  player.stop();

  player.release();

MediaPlayer

- Rich API designed for long playing media streams, such as voice audio recordings, music and videos
  - seeking operations supported
  - Source buffering
- Heavyweight resource-wise
- Slow to initialize
- Not suitable for low-latency scenarios like playing short audio samples for sound effects, such as in games.
- Designed for situations with no more than one or two MediaPlayers working at the same time

Shooting Game with Sounds Exercise

- Off to the next exercise
  - Adding explosion sound when the AndroidGuy is hit by a bullet
  - Using SoundPool class

Generating Sounds using SoundPool

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SoundPool Class

- The SoundPool class manages and plays audio resources for applications.
- A SoundPool is a collection of samples that can be loaded into memory from a resource inside the APK or from a file in the file system
- The SoundPool library uses the MediaPlayer service to decode the audio into a raw 16-bit PCM mono or stereo stream
- This allows applications to ship with compressed streams without having to suffer the CPU load and latency of decompressing during playback
- Typical usage scenario includes games with sound where several sounds are used in a level and may have to be played with overlap sometimes

SoundPool Class Features

- Setting the maximum number of sounds to play at the same time
- Prioritizing the sounds so that the low-priority ones will be dropped when the maximum threshold is reached
- Pausing and stopping sounds before they finish playing
- Looping sounds
- Changing the playback rate (effectively, the pitch of each sound)
- Setting stereo volume (separate for left and right channels)

Android Audio Comparison

Audio Requirements	Audio Class Choice
Require low latency, such as in games or sound effects	SoundPool
Need to play video that has an audio track	MediaPlayer
Play a set of short sounds many times	SoundPool
Stream audio from an external source, e.g. HTTP or TCP stream	MediaPlayer
Play background music	MediaPlayer

Shooting Game with More Sounds

- Assignment:
  - Add more sounds to the Shooting Game
    - Android Guy falling off the screen
    - Bullets going off the screen at the top