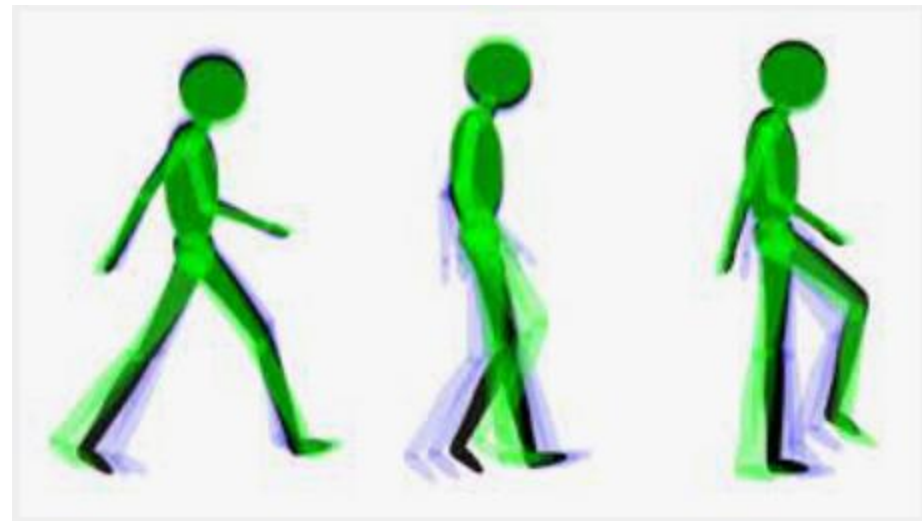# Frame by frame animation

Frame by frame animation

- Frame-by-frame animation changes the contents of the Stage in every frame.
- In Android Frame Animation, you will be **swapping frames repeatedly**, so that it appears continuous to the human eye and we feel that it is animated.
- Frame is referred to an image.
- So to implement frame by frame animation in android, one needs to have set of images, which describes a motion.

AnimationDrawable

- AnimationDrawable class is used for frame animation and it loads all images into memory at once so there are chances of **OOM**(Out of Memory Exception) so, be careful about the **size of images** and always try to use **less number of images** and lower size images to avoid Out of Memory Exception.

- The simplest way to create a frame-by-frame animation is to define the animation in an XML file, placed in the res/drawable/ folder, and set it as the background to a View object.

- Then, call start() to run the animation.

- An AnimationDrawable defined in XML consists of a single <animation-list> element and a series of nested <item> tags.

- Each item defines a frame of the animation.

Write a program to create frame animation

running.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<animation-list
xmlns:android="http://schemas.android.com/apk/res/android">
    <item android:drawable="@drawable/one"
android:duration="100" />
    <item android:drawable="@drawable/two"
android:duration="100" />
    <item android:drawable="@drawable/three"
android:duration="100" />
    <item android:drawable="@drawable/four"
android:duration="100" />
</animation-list>
```

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:gravity="center"
    tools:context=".MainActivity">

    <!--    image view to hold animation frame images   -->
    <ImageView
        android:id="@+id/img"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:src="@drawable/running" />

    <!--    button to start or pause animation   -->
    <Button
        android:id="@+id/btn_start_stop"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Start" />
</LinearLayout>
```

MainActivity.java

```java
package com.example.frameanimation;

import androidx.appcompat.app.AppCompatActivity;
import android.graphics.drawable.AnimationDrawable;
import android.os.Bundle;
import android.widget.Button;
import android.widget.ImageView;

public class MainActivity extends AppCompatActivity {
    ImageView img;
    Button btnStartStop;
    AnimationDrawable animation;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        img = findViewById(R.id.img);
        btnStartStop = findViewById(R.id.btn_start_stop);
        // fetching animation drawable from image view
        animation = (AnimationDrawable) img.getDrawable();
        // starting and stopping animation on button click
        btnStartStop.setOnClickListener(view -> {
            // if running then stop
            if (animation.isRunning()) {
                animation.stop();
                btnStartStop.setText("Start");
                return;
            }
            // else start animation
            animation.start();
            btnStartStop.setText("Stop");
        });
    }
}
```