Custom Views

Upon completion of this module, a student will be able to

- create and use a basic custom view
- create simple shapes in canvas
- add a XML layout to a custom view
- create custom attributes for the view
- retrieve custom attributes for use in the custom view

Assignment

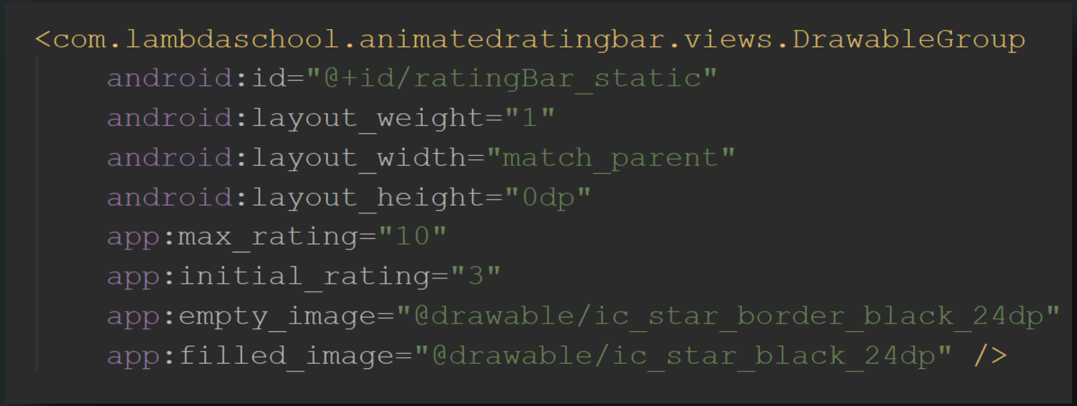
- Task
  - Build a custom volume control knob view which indicates the volume and rotates with swipe
- Repo
  - https://github.com/LambdaSchool/Android_Threads
- Submission
  - Create a pull request on the main project repo and your PM will review it

A Student Can

create and use a basic custom view

Custom View

- Extend any other View
- Implement all required methods
- Draw view in onDraw



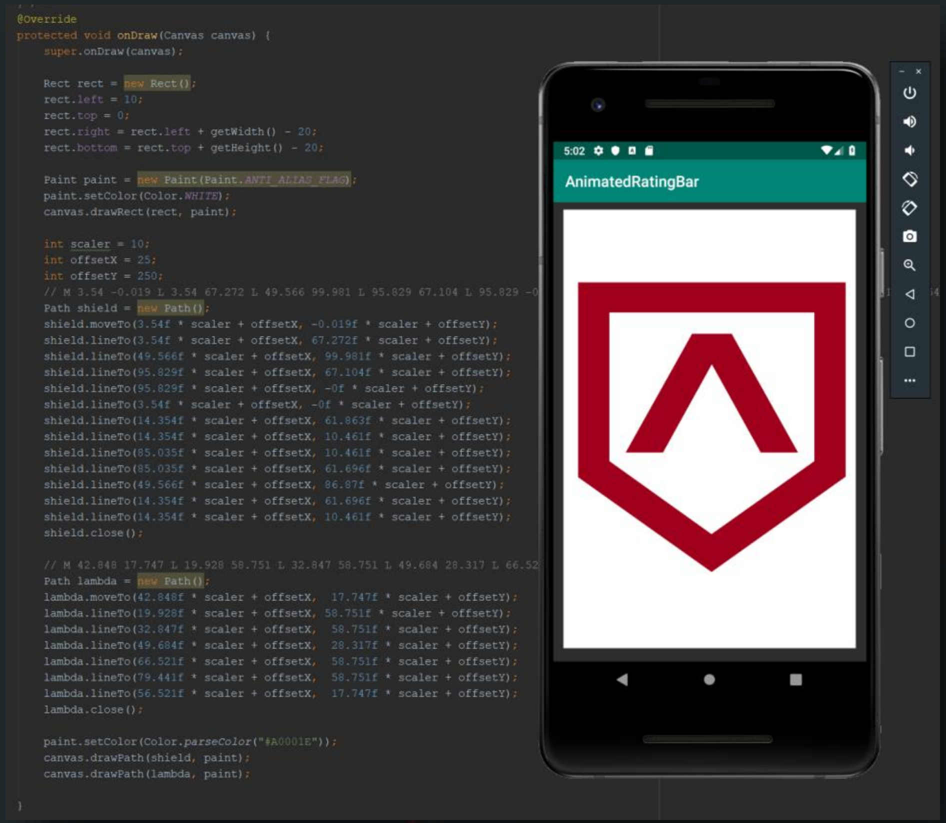
```
<com.lambdaschool.animatedratingbar.views.DrawableGroup
    android:id="@+id/ratingBar_static"
    android:layout_weight="1"
    android:layout_width="match_parent"
    android:layout_height="0dp"
    app:max_rating="10"
    app:initial_rating="3"
    app:empty_image="@drawable/ic_star_border_black_24dp"
    app:filled_image="@drawable/ic_star_black_24dp" />
```

A Student Can

create simple shapes in canvas

Canvas

- Draw custom shapes
- Manual Layout

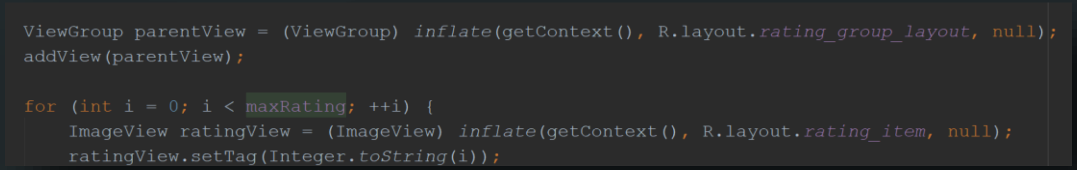


```
@Override
protected void onDraw(Canvas canvas) {
    super.onDraw(canvas);

    Rect rect = new Rect();
    rect.left = 10;
    rect.top = 0;
    rect.right = rect.left + getWidth() - 20;
    rect.bottom = rect.top + getHeight() - 20;

    Paint paint = new Paint(Paint.ANTI_ALIAS_FLAG);
    paint.setColor(Color.WHITE);
    canvas.drawRect(rect, paint);

    int scaler = 10;
    int offsetX = 25;
    int offsetY = 250;
    // M 3.54 -0.019 L 3.54 67.272 L 49.566 99.981 L 95.829 67.104 L 95.829 -0
    Path shield = new Path();
    shield.moveTo(3.54f * scaler + offsetX, -0.019f * scaler + offsetY);
    shield.lineTo(3.54f * scaler + offsetX, 67.272f * scaler + offsetY);
    shield.lineTo(49.566f * scaler + offsetX, 99.981f * scaler + offsetY);
    shield.lineTo(95.829f * scaler + offsetX, 67.104f * scaler + offsetY);
    shield.lineTo(95.829f * scaler + offsetX, -0f * scaler + offsetY);
    shield.lineTo(3.54f * scaler + offsetX, -0f * scaler + offsetY);
    shield.lineTo(14.354f * scaler + offsetX, 61.863f * scaler + offsetY);
    shield.lineTo(14.354f * scaler + offsetX, 10.461f * scaler + offsetY);
    shield.lineTo(85.035f * scaler + offsetX, 10.461f * scaler + offsetY);
    shield.lineTo(85.035f * scaler + offsetX, 61.696f * scaler + offsetY);
    shield.lineTo(49.566f * scaler + offsetX, 86.87f * scaler + offsetY);
    shield.lineTo(14.354f * scaler + offsetX, 61.696f * scaler + offsetY);
    shield.lineTo(14.354f * scaler + offsetX, 10.461f * scaler + offsetY);
    shield.close();

    // M 42.848 17.747 L 19.928 58.751 L 32.847 58.751 L 49.684 28.317 L 66.52
    Path lambda = new Path();
    lambda.moveTo(42.848f * scaler + offsetX,  17.747f * scaler + offsetY);
    lambda.lineTo(19.928f * scaler + offsetX, 58.751f * scaler + offsetY);
    lambda.lineTo(32.847f * scaler + offsetX,  58.751f * scaler + offsetY);
    lambda.lineTo(49.684f * scaler + offsetX,  28.317f * scaler + offsetY);
    lambda.lineTo(66.521f * scaler + offsetX,  58.751f * scaler + offsetY);
    lambda.lineTo(79.441f * scaler + offsetX,  58.751f * scaler + offsetY);
    lambda.lineTo(56.521f * scaler + offsetX,  17.747f * scaler + offsetY);
    lambda.close();

    paint.setColor(Color.parseColor("#A0001E"));
    canvas.drawPath(shield, paint);
    canvas.drawPath(lambda, paint);

}
```

A Student Can

add a XML layout to a custom view

Layout Inflation



```
ViewGroup parentView = (ViewGroup) inflate(getContext(), R.layout.rating_group_layout, null);
addView(parentView);

for (int i = 0; i < maxRating; ++i) {
    ImageView ratingView = (ImageView) inflate(getContext(), R.layout.rating_item, null);
    ratingView.setTag(Integer.toString(i));
```

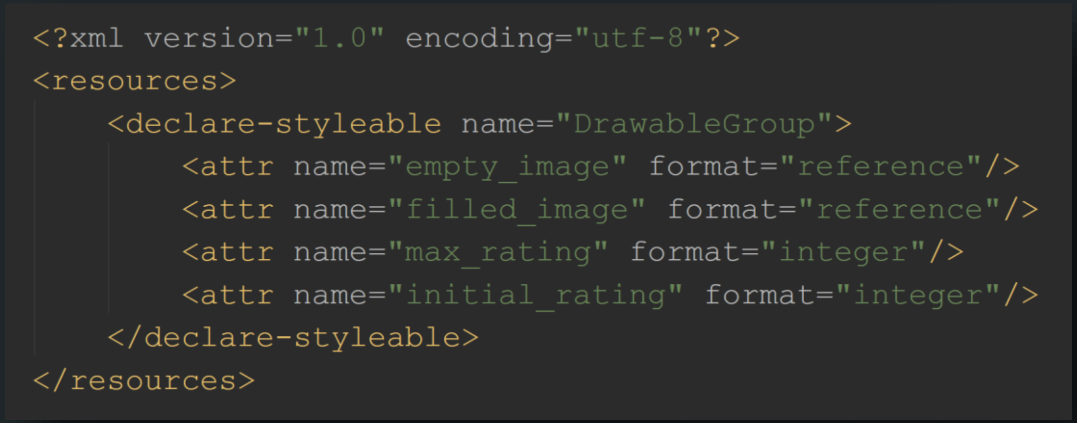
- Extend viewgroup
  - Call addView

A Student Can

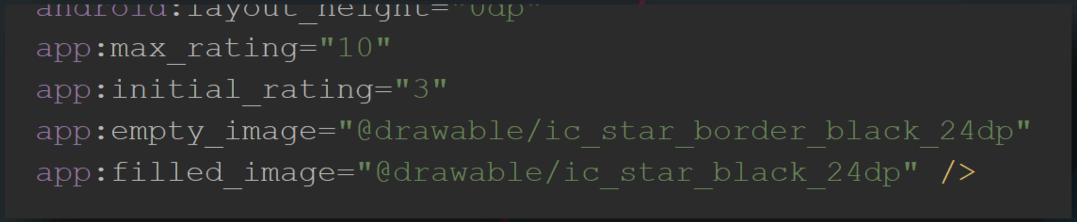
create custom attributes for the view

Custom Attributes

- Defined in attrs.xml
- Referenced in Layout



```
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <declare-styleable name="DrawableGroup">
        <attr name="empty_image" format="reference"/>
        <attr name="filled_image" format="reference"/>
        <attr name="max_rating" format="integer"/>
        <attr name="initial_rating" format="integer"/>
    </declare-styleable>
</resources>
```

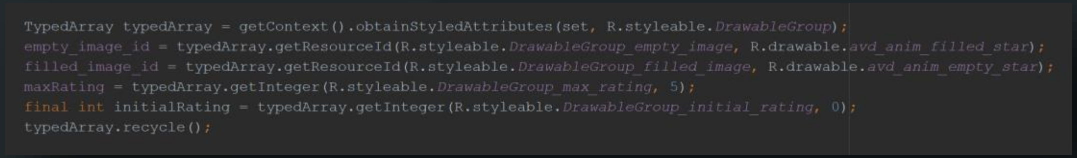


```
android:layout_height="0dp"
app:max_rating="10"
app:initial_rating="3"
app:empty_image="@drawable/ic_star_border_black_24dp"
app:filled_image="@drawable/ic_star_black_24dp" />
```

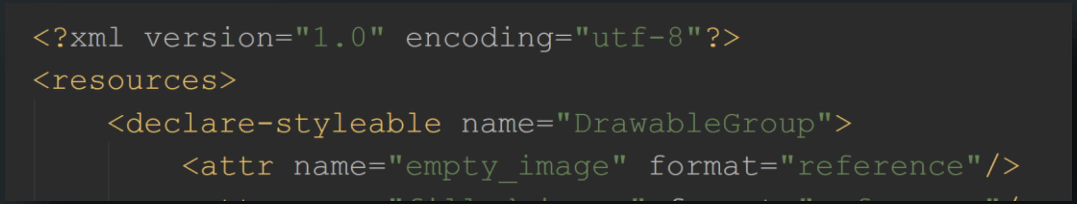
A Student Can

retrieve custom attributes for use in the custom view

TypedArray



```
TypedArray typedArray = getContext().obtainStyledAttributes(set, R.styleable.DrawableGroup);
empty_image_id = typedArray.getResourceId(R.styleable.DrawableGroup_empty_image, R.drawable.avd_anim_filled_star);
filled_image_id = typedArray.getResourceId(R.styleable.DrawableGroup_filled_image, R.drawable.avd_anim_empty_star);
maxRating = typedArray.getInteger(R.styleable.DrawableGroup_max_rating, 5);
final int initialRating = typedArray.getInteger(R.styleable.DrawableGroup_initial_rating, 0);
typedArray.recycle();
```



```
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <declare-styleable name="DrawableGroup">
        <attr name="empty_image" format="reference"/>
```

- Wraps AttributeSet
- Get by type
- Id located in styleable subclass
- Id is styleable name plus attribute name