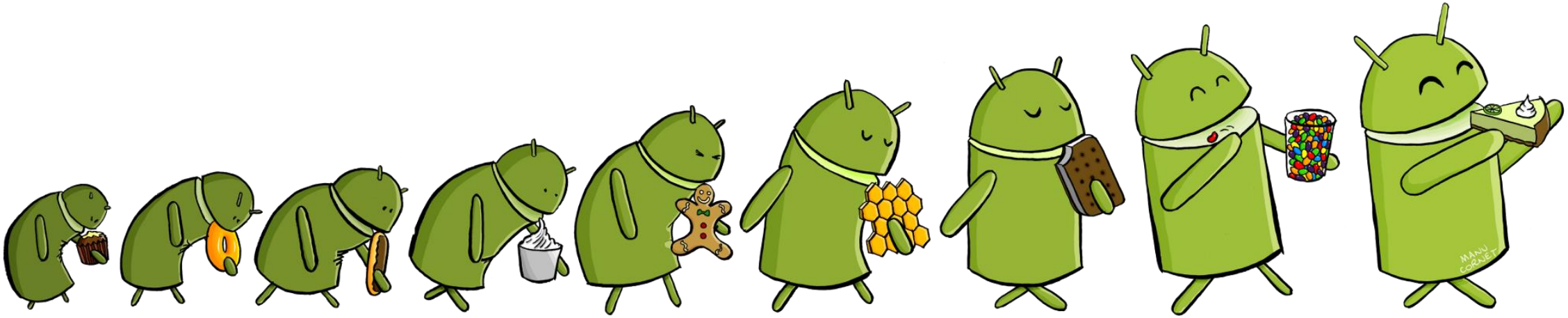


In the name of Allah

Layouts (part two)

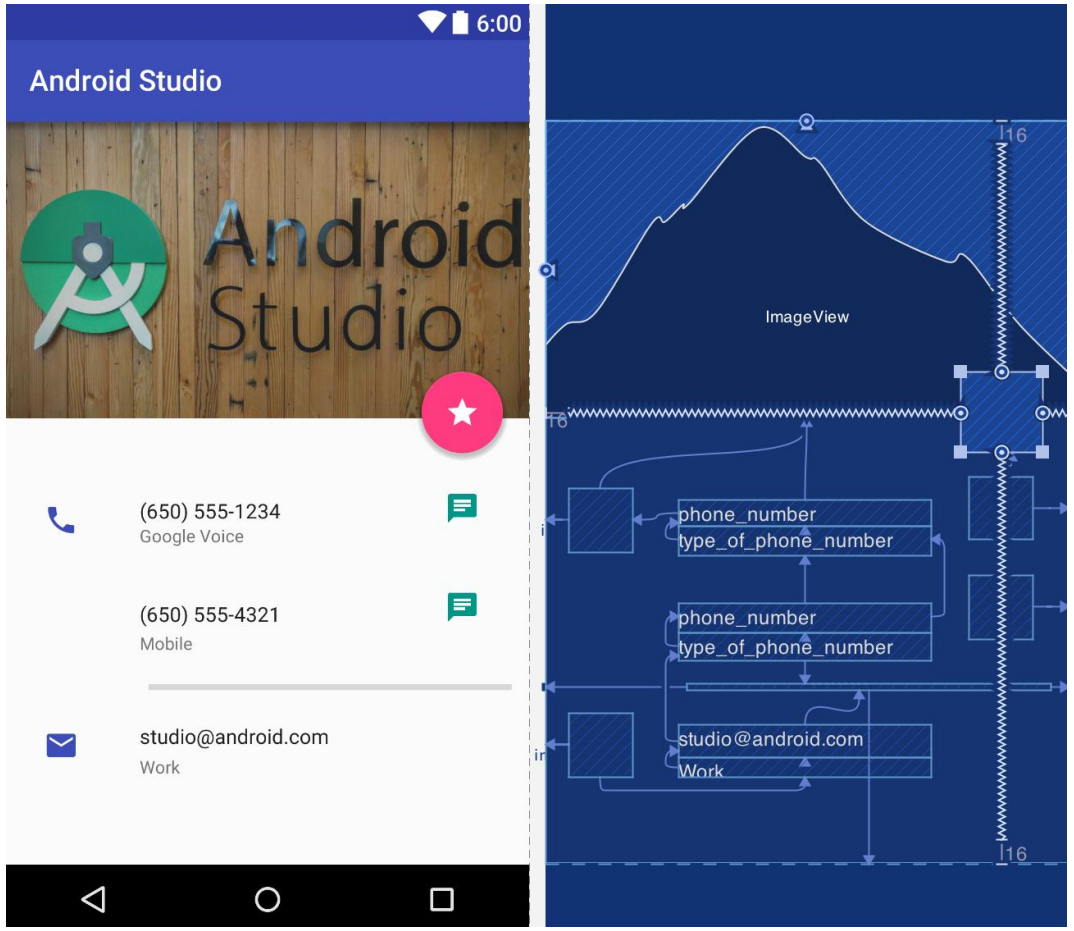
Lecture #09

Subject: Mobile App Development
Instructor: Ehsan Hasin {ehsanhasin@gmail.com}
Date: Sunday, May 12, 2024

Table of Content

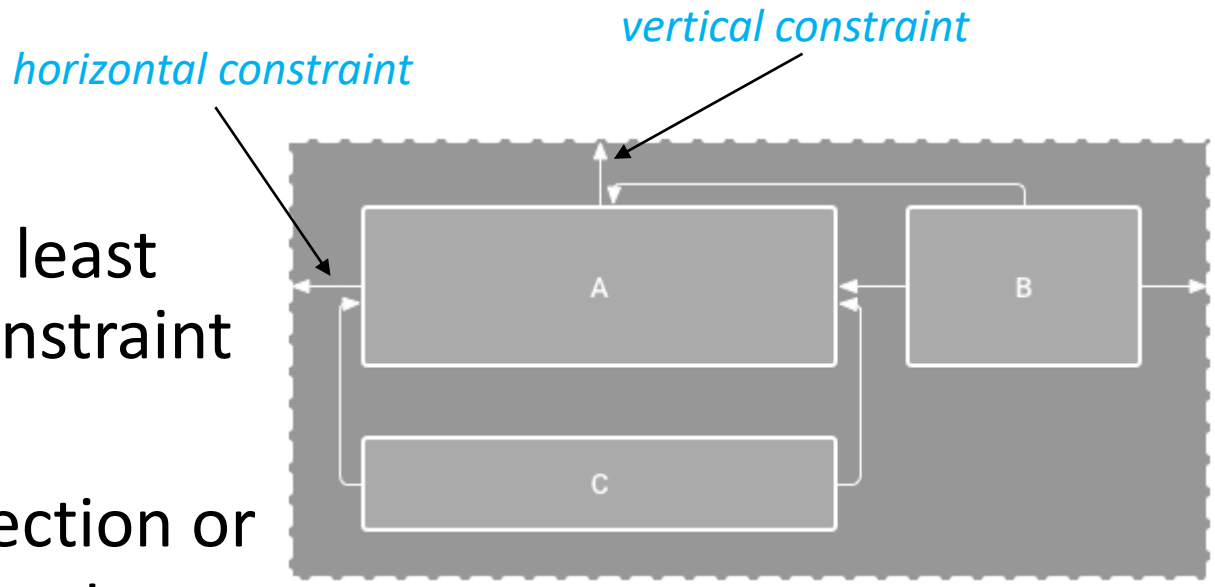
ConstraintLayout

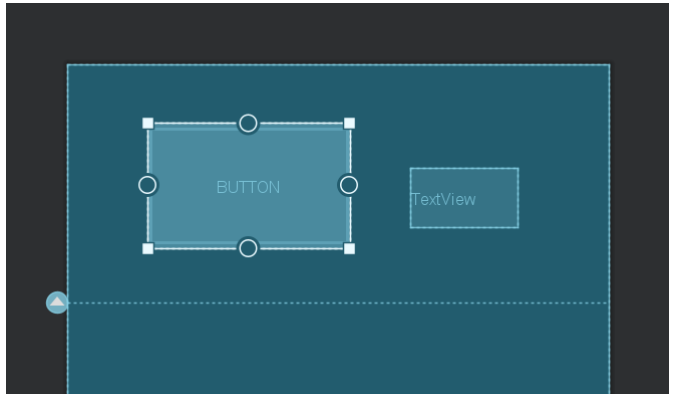
- **ConstraintLayout** allows you to create large and complex layouts with a flat view hierarchy (no nested view groups).
- A ConstraintLayout is a **ViewGroup** which allows you to position and size widgets in a **flexible** way.
- It's **similar** to RelativeLayout but is more flexible and easier to use with Android Studio's Layout Editor.



Constraints overview

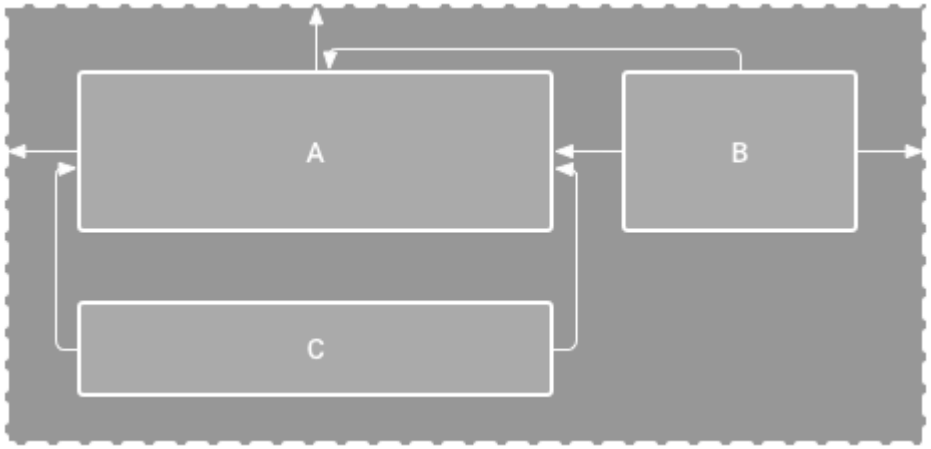
- To define a **view's position** in ConstraintLayout, you must add at least one **horizontal** and one **vertical** constraint for the view.
- Each **constraint** represents a connection or alignment to another view, the parent layout, or an invisible guideline.



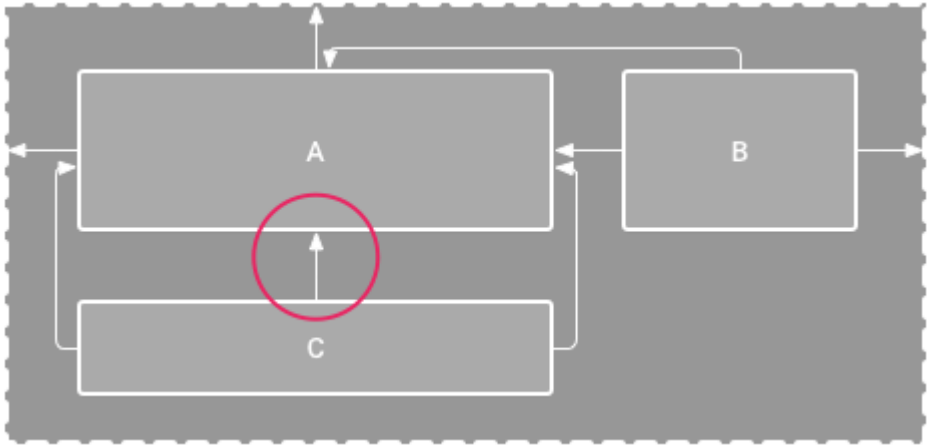


Constraints overview

- If a view has **no constraints** when you run your layout on a device, it is drawn at position [0,0] (the top-left corner).
- In above figure ,
  - the layout looks good in the editor,
  - but there's no vertical constraint on view C.
  - When this layout draws on a device, view C horizontally aligns with the left and right edges of view A, but appears at the top of the screen because it has no vertical constraint.



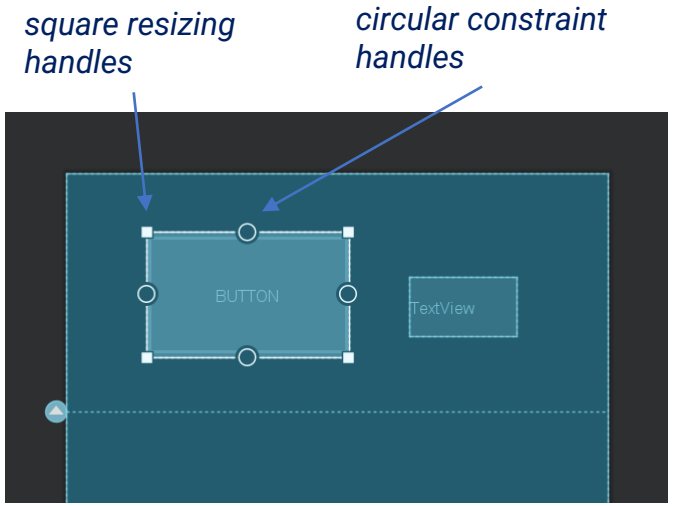
The editor shows view C below A, but it has no vertical constraint

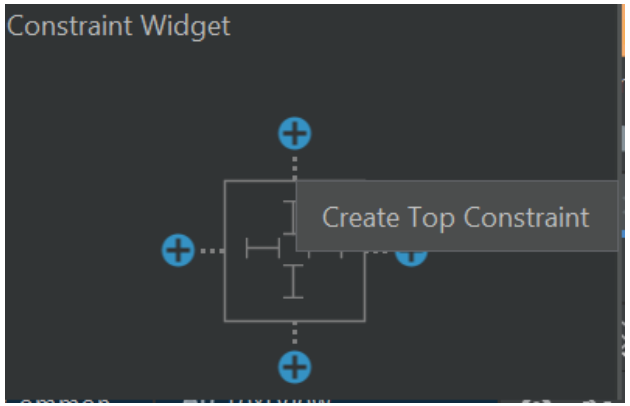


View C is now vertically constrained below view A

Add or remove a constraint

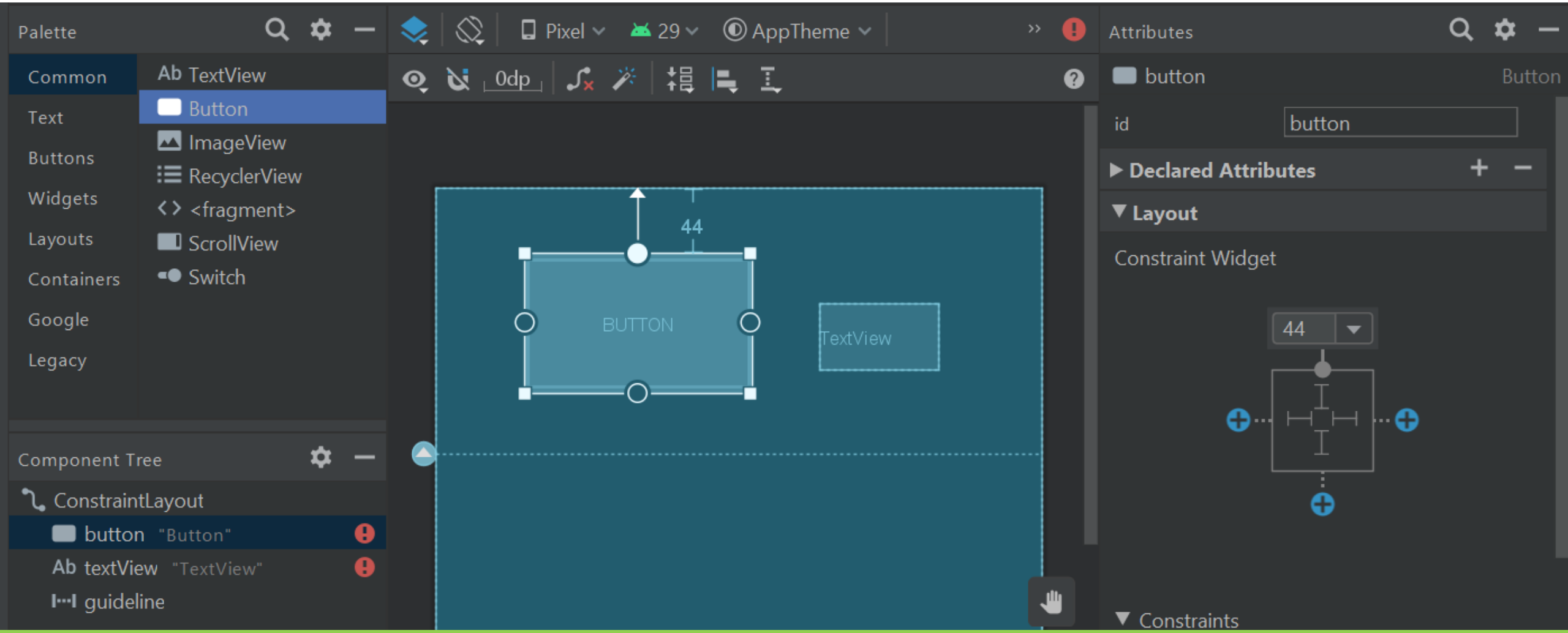
- To **add** a constraint, do the following:
  1. Drag a view from the Palette window into the editor (here we dragged a Button).
  2. Click the view to select it.
  3. Do one of the following:
     - Click a constraint handle and drag it to an available anchor point. This point can be the edge of another view, the edge of the layout, or a guideline.
     - Click one of the Create a connection buttons ⊕ in the Layout section of the Attributes window, as shown in figure bellow.
- When the constraint is created, the editor gives it a default margin to separate the two views.





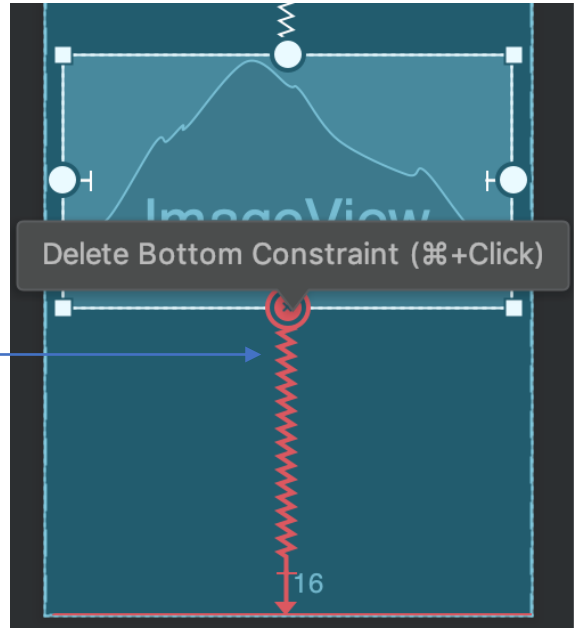
The Layout section of the Attributes window lets you create connections.

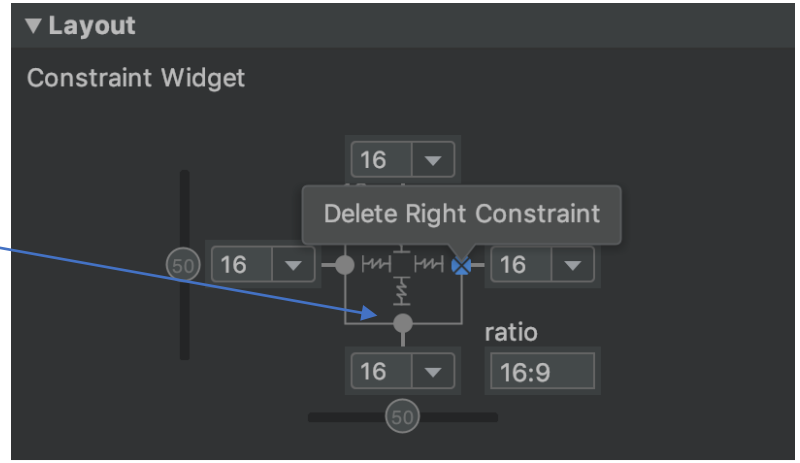
Add or remove a constraint – example



Add or remove a constraint

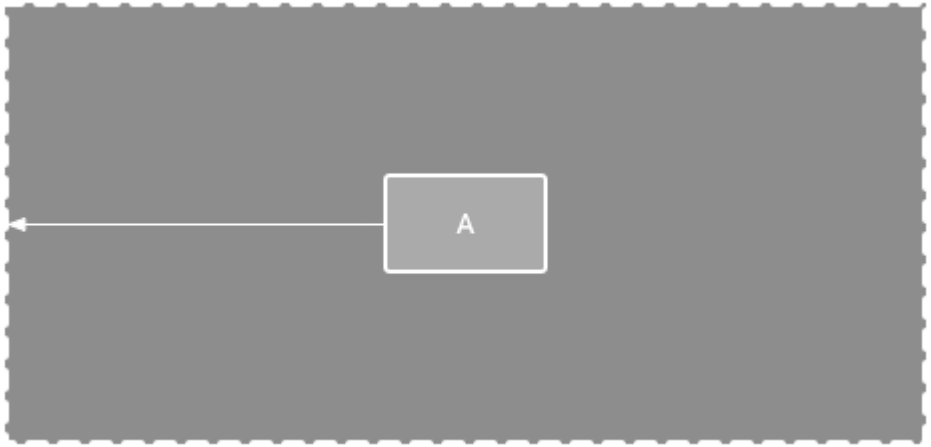
- You can **delete** a constraint by doing any of the following:
  - Click on a constraint to select it, and then **press Delete**.
  - **Press and hold Control** and then click on a constraint anchor.
  - In the Layout section of the Attributes window, click on a **constraint anchor**, as shown in the bellow figure.





Add or remove a constraint - Parent position

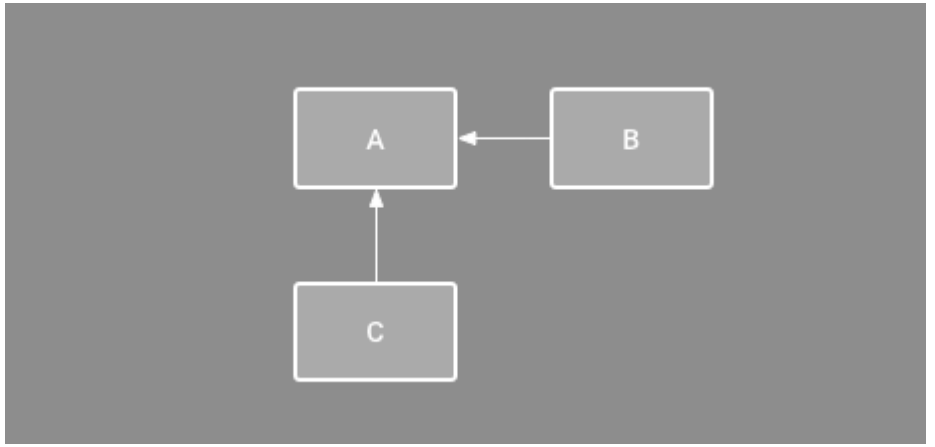
- **Constrain** the **side of a view** to the **corresponding edge** of the layout.
- In the figure, the left side of the view is connected to the left edge of the parent layout. You can define the distance from the edge with margin.



A horizontal constraint to the parent

Add or remove a constraint - Order position

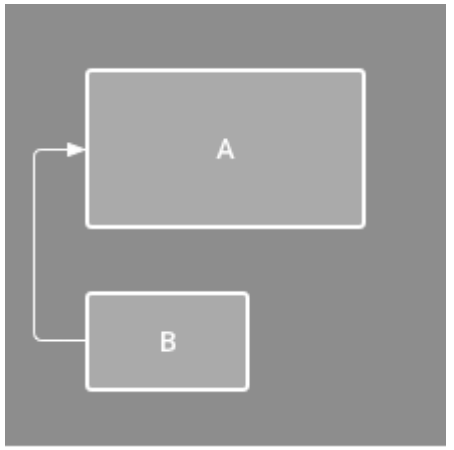
- Define the **order of appearance** for two views, either **vertically** or **horizontally**.
- In the figure, B is constrained to always be to the right of A, and C is constrained below A. However, these constraints do not imply alignment, so B can still move up and down



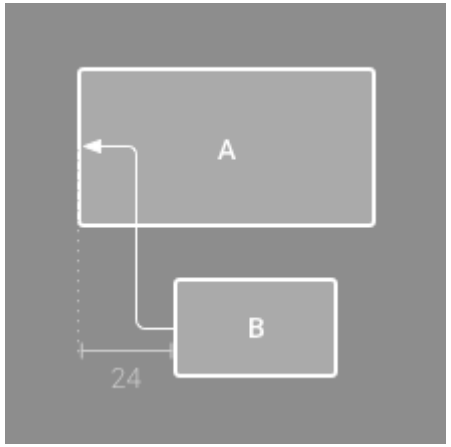
A horizontal and vertical constraint

Add or remove a constraint - Alignment

- Align the **edge of a view** to the **same edge of another view**.
- In the figure above, the left side of B is aligned to the left side of A. If you want to align the view centers, create a constraint on both sides.
- You can offset the alignment by dragging the view inward from the constraint. For example, in the figure below shows B with a 24dp offset alignment. The offset is defined by the constrained view's margin.
- You can also select all the views you want to align, and then click Align in the toolbar to select the alignment type



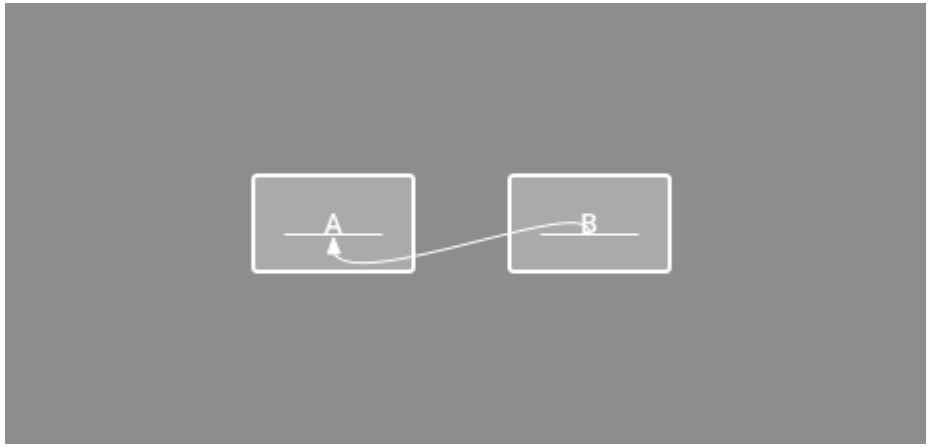
A horizontal alignment constraint



An offset horizontal alignment constraint

Add or remove a constraint - Baseline alignment

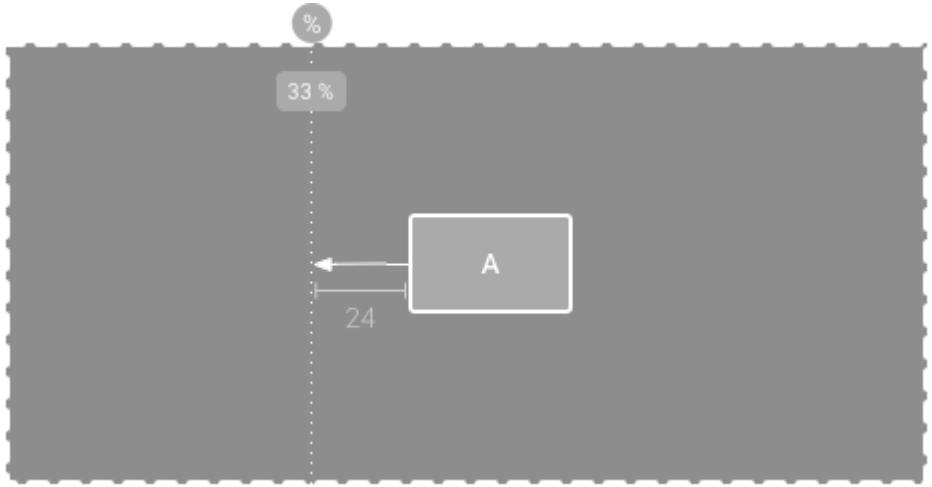
- Align the **text baseline of a view** to the text baseline of **another view**.
- In the figure, the first line of B is aligned with the text in A.
- To create a baseline constraint, right-click the text view you want to constrain and then click Show Baseline. Then click on the text baseline and drag the line to another baseline.



A baseline alignment constraint

Add or remove a constraint - Guideline

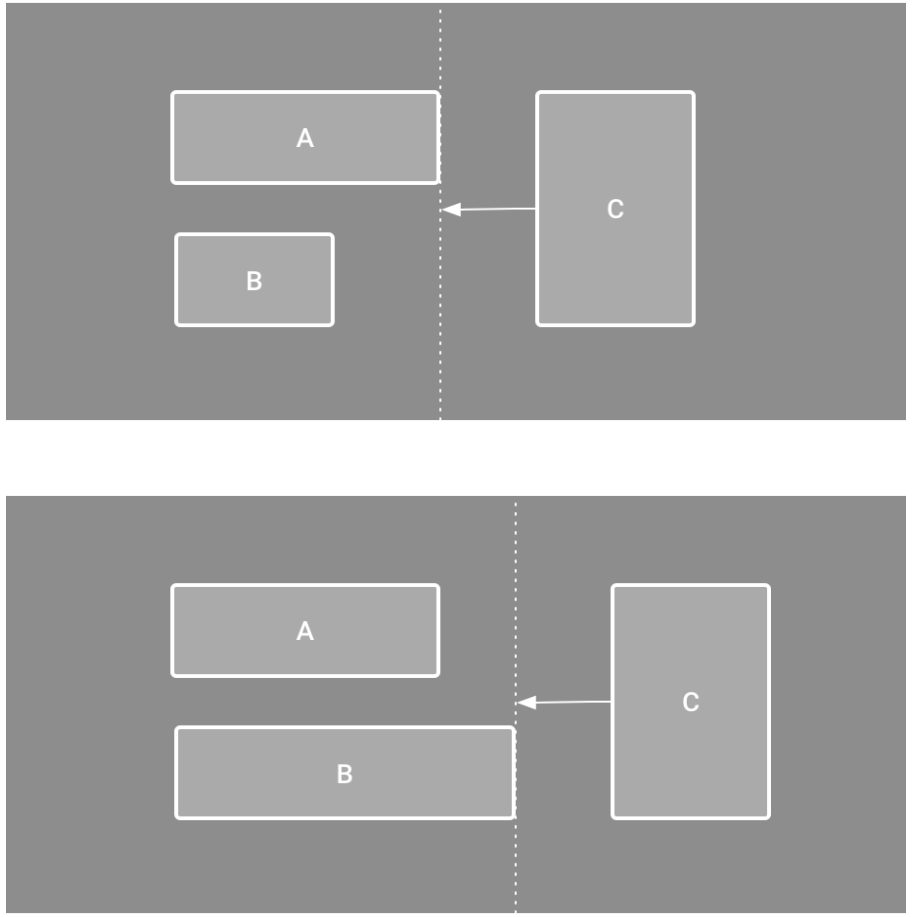
- You can add a vertical or horizontal **guideline** to which you can constrain views, and the guideline will be **invisible** to app users. You can **position** the guideline within the layout based on either dp units or percent, relative to the layout's edge.
- **To create a guideline**, click Guidelines in the toolbar, and then click either Add Vertical Guideline or Add Horizontal Guideline.
- Drag the **dotted line** to reposition it and click the **circle** at the edge of the guideline to toggle the measurement mode.



A view constrained to a guideline

Add or remove a constraint - Barrier

- Similar to a **guideline**, a barrier is an **invisible** line that you can constrain views to. Except a barrier does not define its own **position**; instead, the barrier position moves based on the position of views contained within it. This is useful when you want to constrain a view to a set of views rather than to one specific view.
- For example, figure below shows view C is constrained to the right side of a barrier. The barrier is set to the "end" (or the right side in a left-to-right layout) of both view A and view B. So the barrier moves depending on whether the right side of view A or view B is farthest right.

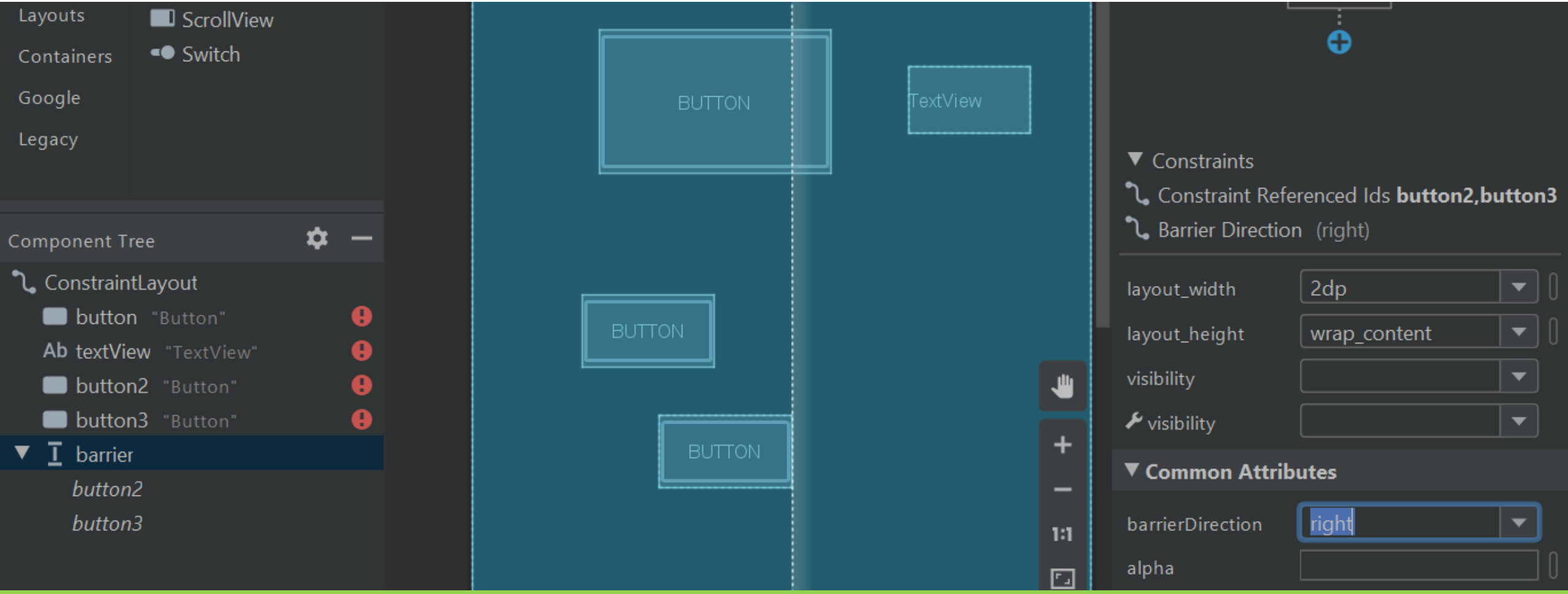


View C is constrained to a barrier, which moves based on the position/size of both view A and view B

Add or remove a constraint - Barrier

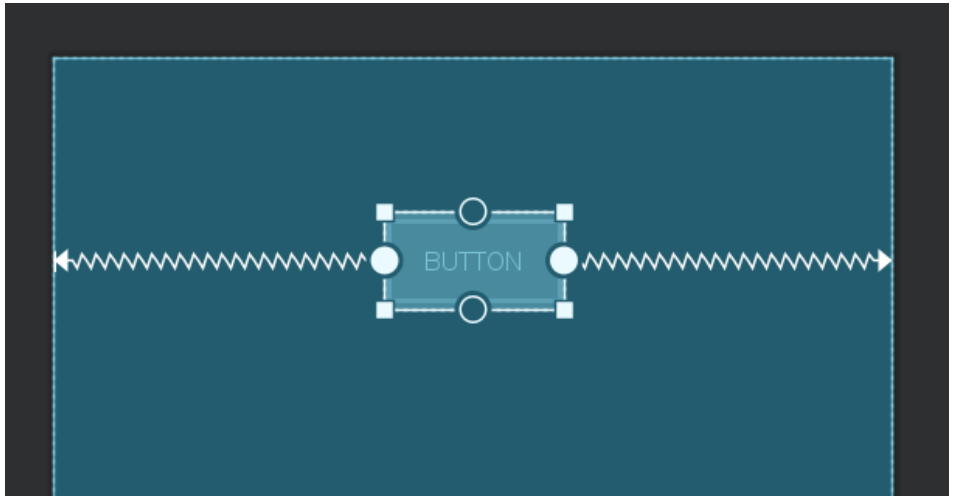
- To create a barrier, follow these steps:
  - Click Guidelines  in the toolbar, and then click Add Vertical Barrier or Add Horizontal Barrier.
  - In the Component Tree window, select the views you want inside the barrier and drag them into the barrier component.
  - Select the barrier from the Component Tree, open the Attributes window, and then set the barrierDirection.

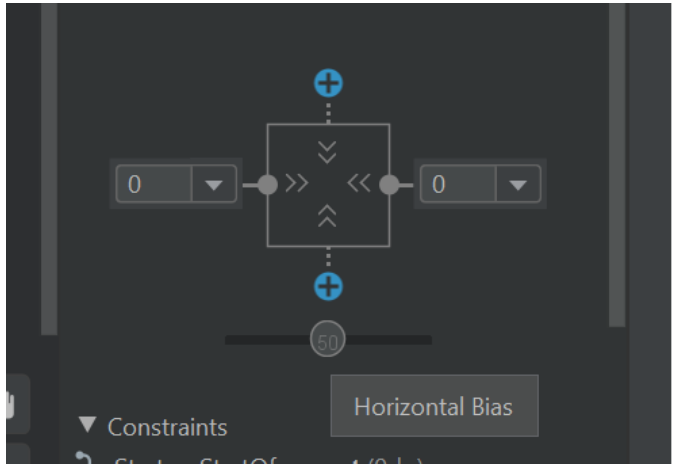
Add or remove a constraint – Barrier example



Adjust the constraint bias

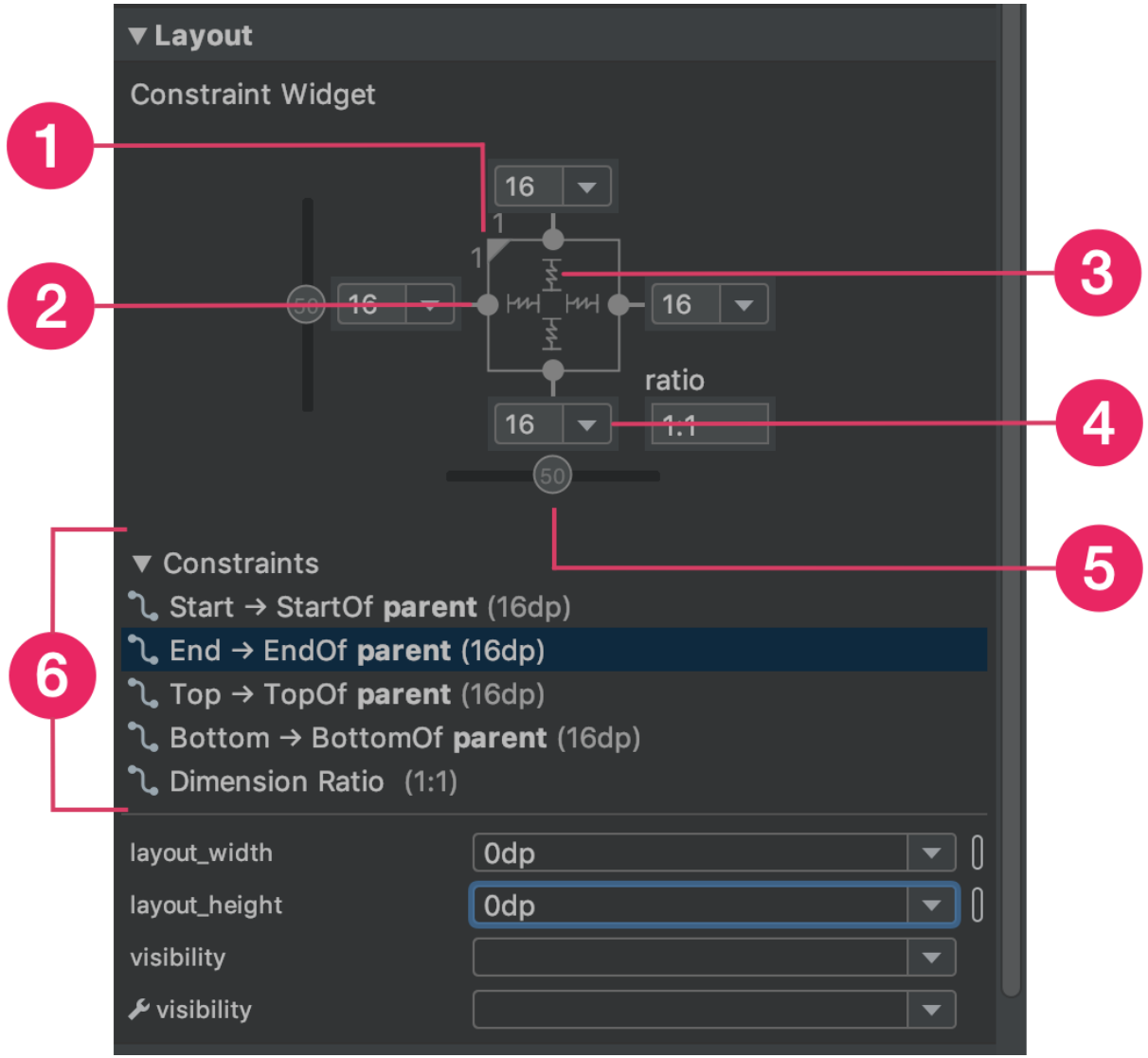
- When you **add a constraint** to **both sides** of a view, the view becomes centered between the two constraints with a bias of 50% by default.
- You can adjust the bias by dragging the bias slider in the Attributes window or by dragging the view itself.





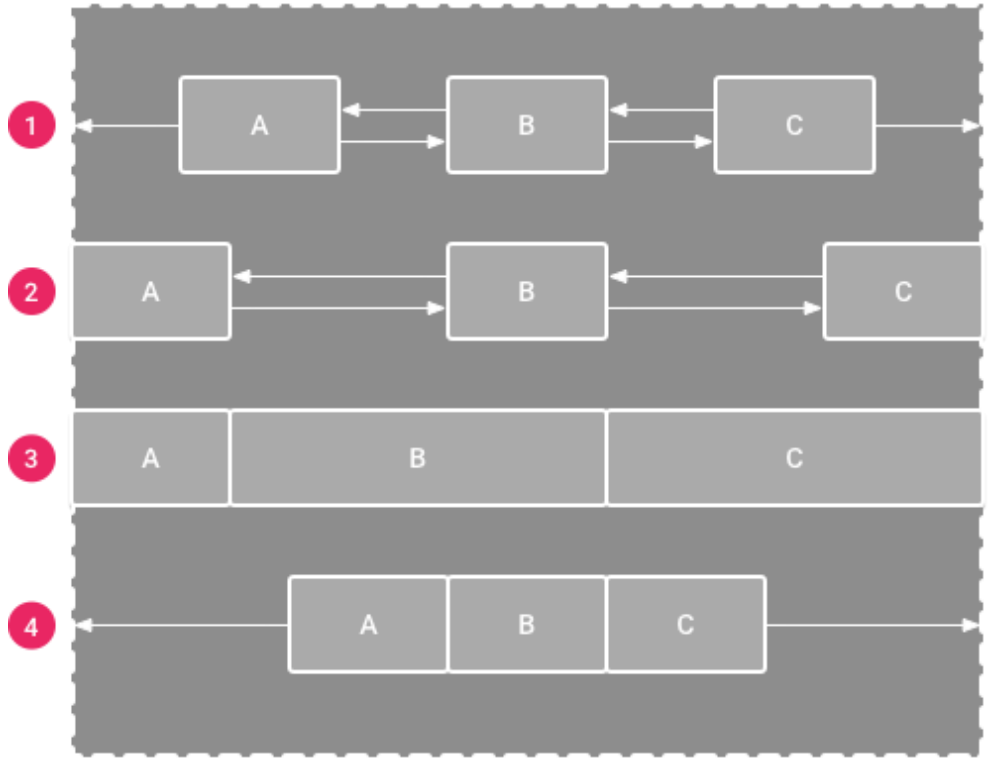
Adjust the view size

- When selecting a view, the Attributes window includes controls for
- 1 **size** ratio,
- 2 **deleting** constraints,
- 3 **height/width** mode,
- 4 **margins**,
- 5 **constraint bias**. You can also highlight individual constraints in the Layout Editor by clicking on them in the
- 6 **constraint list**.



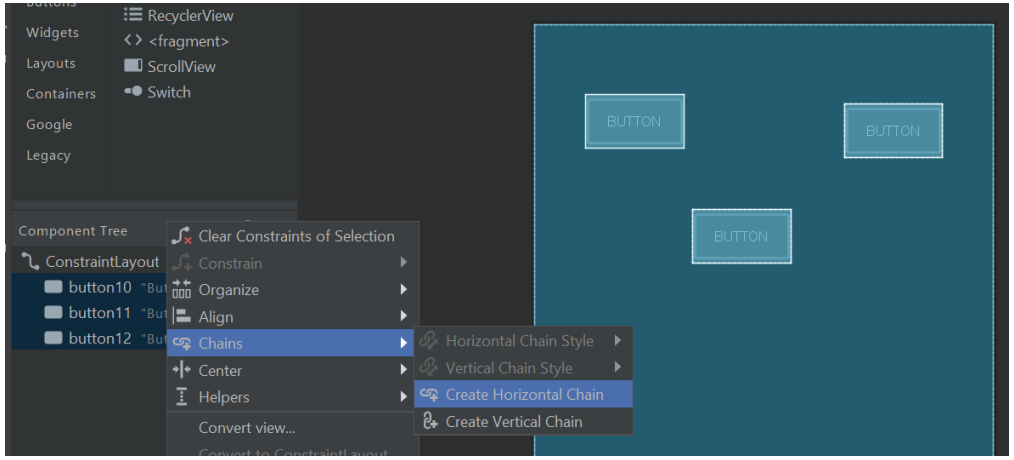
Control linear groups with a chain

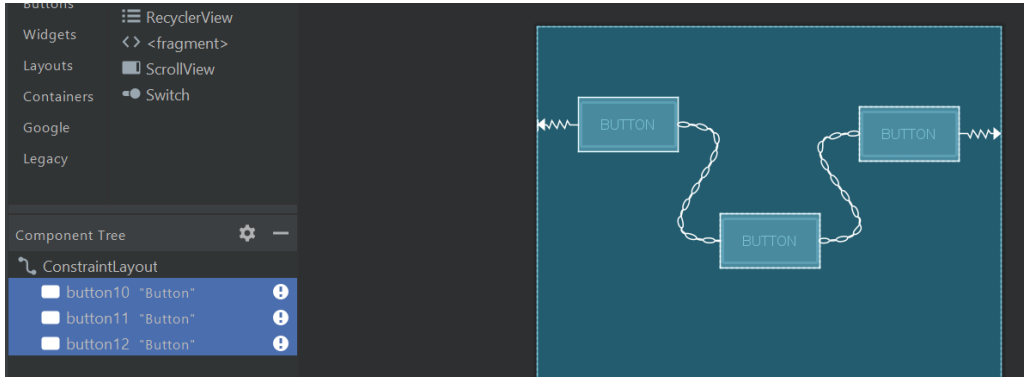
- A **chain** is a group of views that are linked to each other with **bi-directional** position constraints. The views within a chain can be **distributed** either vertically or horizontally.
- Chains can be **styled** in one of the following ways:
  1. Spread
  2. Spread inside
  3. Weighted
  4. Packed



Control linear groups with a chain

- **To create a chain**, select all of the views to be included in the chain, right-click one of the views, select Chains and then select either Center Horizontally or Center Vertically
- The **chain's "head" view** (the left-most view in a horizontal chain and the top-most view in a vertical chain) defines the chain's style in XML.
- However, you can toggle between spread, spread inside, and packed by selecting any view in the chain.





Summary

- A **ConstraintLayout** is a ViewGroup which allows you to position and size widgets in a flexible way.
- Each **constraint** represents a connection or alignment to another view, the parent layout, or an invisible guideline.

The End

Thank You