



# PEMROGRAMAN ANTAR MUKA PENGGUNA (XML)

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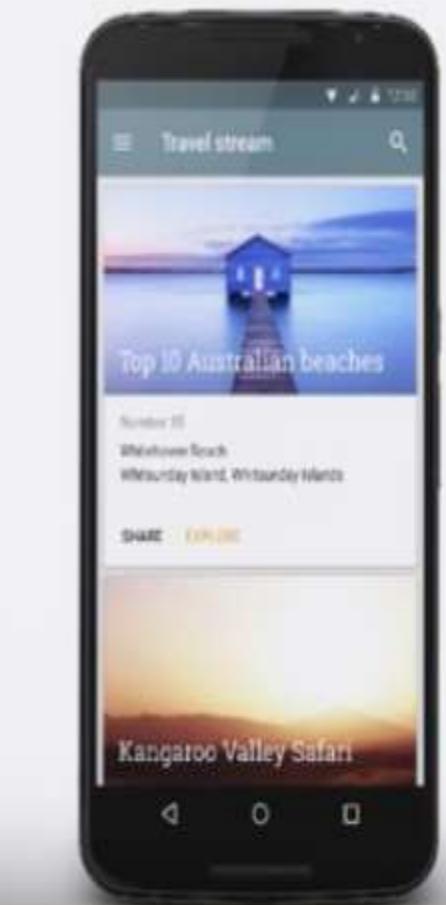
- *eXtensible Markup Language (XML)* dirancang untuk mendeskripsikan data dan memfokuskan diri pada data tersebut.
- HTML didesain untuk menampilkan data dan memfokuskan diri pada bagaimana data ditampilkan.
- XML bukanlah pengganti HTML karena memang dirancang berbeda. Hubungan antara XML dan HTML lebih ke arah pelengkap. Kita dapat menyimpan data dalam sebuah dokumen XML dan mempergunakan HTML untuk menampilkan data tersebut.

# Layout Manager

Berfungsi untuk meletakan komponen (view) pada layar, android menggunakan layout manager.

- **Jenis layout manager:**
  - ✓ **Table Layout**, TableLayout meletakan komponen dalam bentuk tabel (baris dan kolom), mirip seperti Table yang digunakan di HTML untuk mengatur layout
  - ✓ **Absolute Layout**, Absolute layout didasarkan pada ide sederhana dengan menempatkan masing-masing kontrol pada posisi absolut. Penentuan koordinat x dan y pada layar untuk setiap kontrol, Layout ini jarang digunakan karena membuat tidak fleksibel sehingga sangat berisiko dalam proses perbaikan
  - ✓ **Relative Layout**, merupakan sebuah layout dimana posisi dari sebuah komponen dapat diatur terhadap komponen lainnya
  - ✓ **Linear Layout**, merupakan layout yang memberikan susunan tata letak komponen secara garis lurus baik vertikal maupun horizontal
  - ✓ **Frame Layout**. merupakan layout yang memberikan susunan tata letak komponen yang bertumpuk. Di rancang untuk menyisipkan widget ke dalam widget lainya

# VIEWS



TextView

Morning Pizza

I'll be in your neighborhood doing errands  
this weekend if you want to meet up for  
brunch. Lemme know.

Show notifications

ImageView

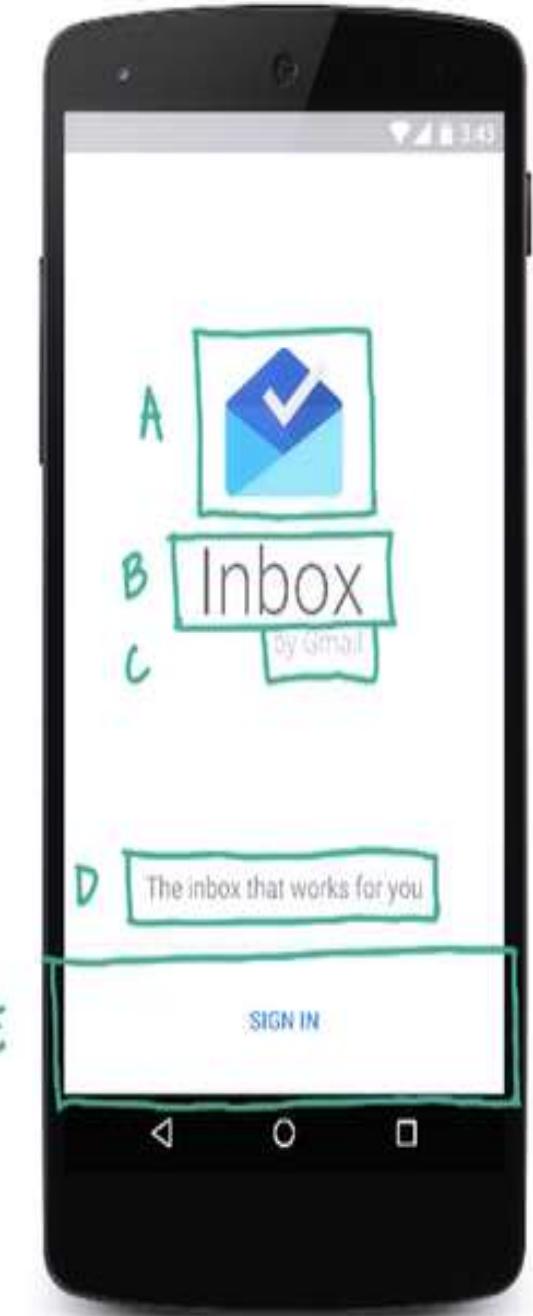


Button



BUTTON

BUTTON

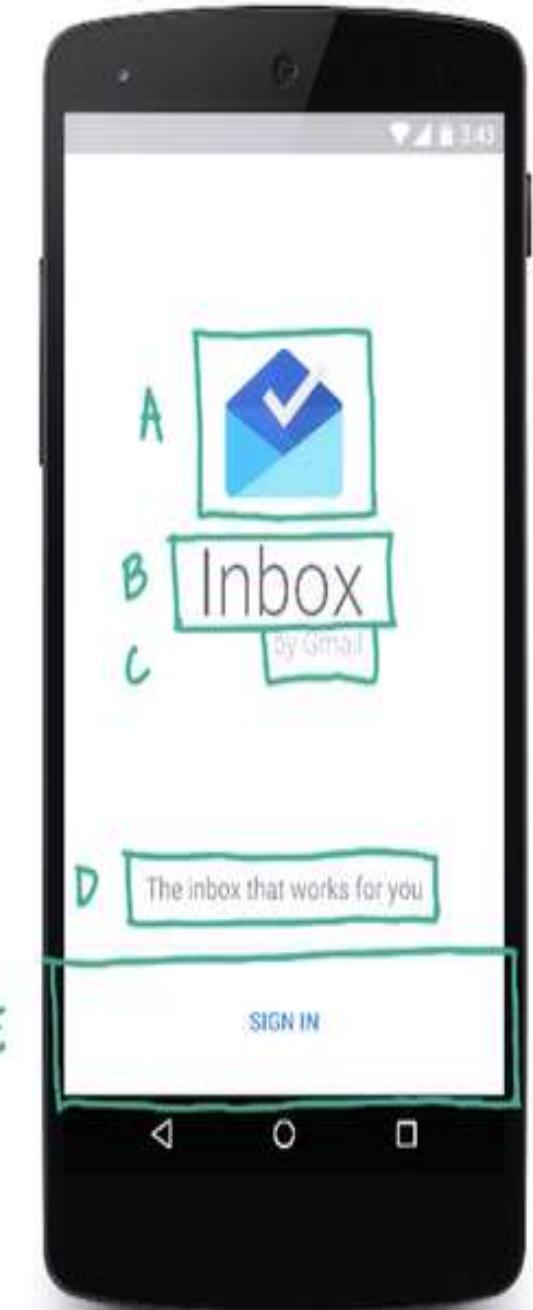


# VIEWS

Identify the type of View



- A  TextView  ImageView  Button
- B  TextView  ImageView  Button
- C  TextView  ImageView  Button
- D  TextView  ImageView  Button
- E  TextView  ImageView  Button



# VIEWS

Identify the type of View



- A  TextView  ImageView  Button
- B  TextView  ImageView  Button
- C  TextView  ImageView  Button
- D  TextView  ImageView  Button
- E  TextView  ImageView  Button

# VIEWS

Identify the type of View



- A  TextView  ImageView  Button
- B  TextView  ImageView  Button
- C  TextView  ImageView  Button
- D  TextView  ImageView  Button
- E  TextView  ImageView  Button

# VIEWS

Identify the type of View

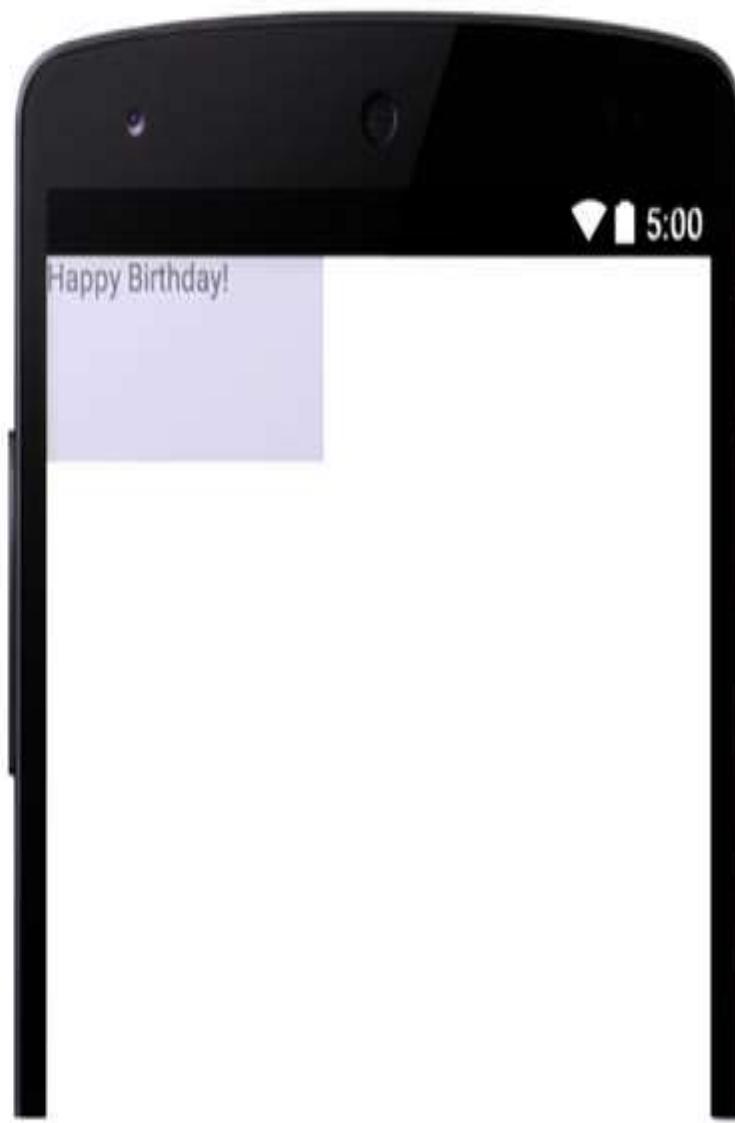


- A  TextView  ImageView  Button
- B  TextView  ImageView  Button
- C  TextView  ImageView  Button
- D  TextView  ImageView  Button

# TEXTVIEW

```
<TextView  
    android:text="Happy Birthday!"  
    android:background="@android:color/darker_gray"  
    android:layout_width="150dp"  
    android:layout_height="75dp" />
```

Write your observations here:



# XML SYNTAX

```
<TextView  
    android:text="Happy Birthday!"  
    android:background="@android:color/darker_gray"  
    android:layout_width="150dp"  
    android:layout_height="75dp" />
```

↑  
Attribute  
Name

↑  
Attribute  
Value in

# XML SYNTAX

Line  
numbers ↴

```
1 <TextView  
2     android:text="Happy Birthday!"  
3     android:textColor="@android:color/white"  
4     android:background="@android:color/black"  
5     android:layout_width="200dp"  
6     android:layout_height="300dp" />
```

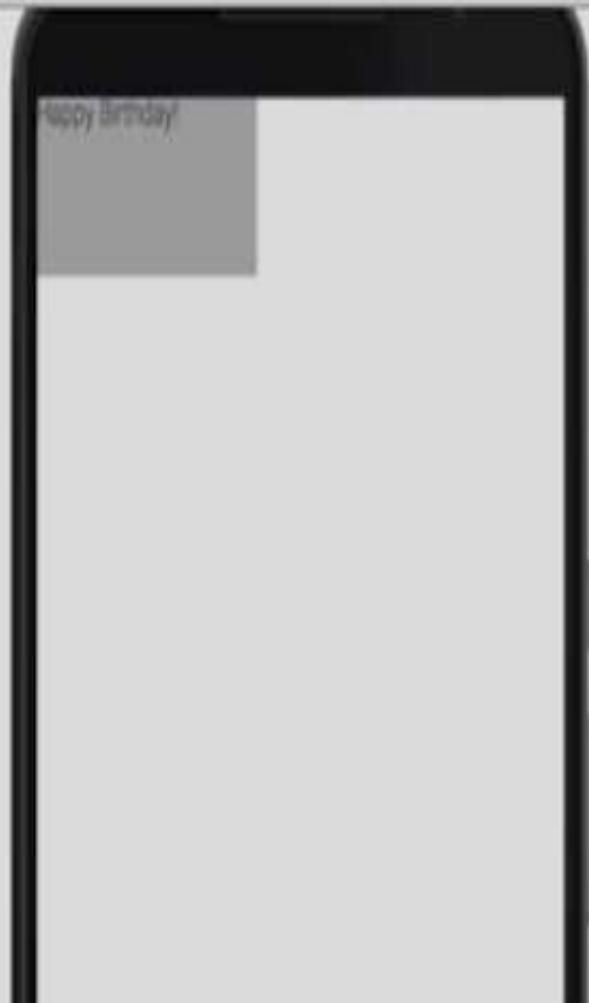
1. What's the name of the XML element?

2. List all attribute names (not attribute values) separated by commas

3. On what line number is the tag closed?

## XML Layout Code

```
1 <TextView  
2     android:text="Happy Birthday!"  
3     android:background="@android:color/darker_gray"  
4     android:layout_width="150dp"  
5     android:layout_height="75dp" />
```

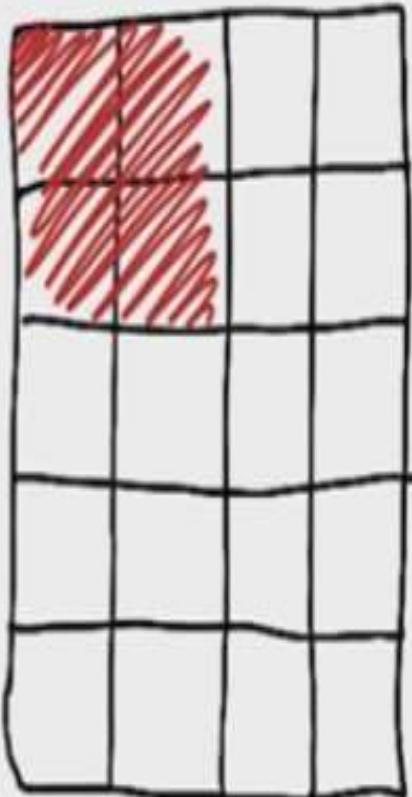


# px, dpi, dp, sp

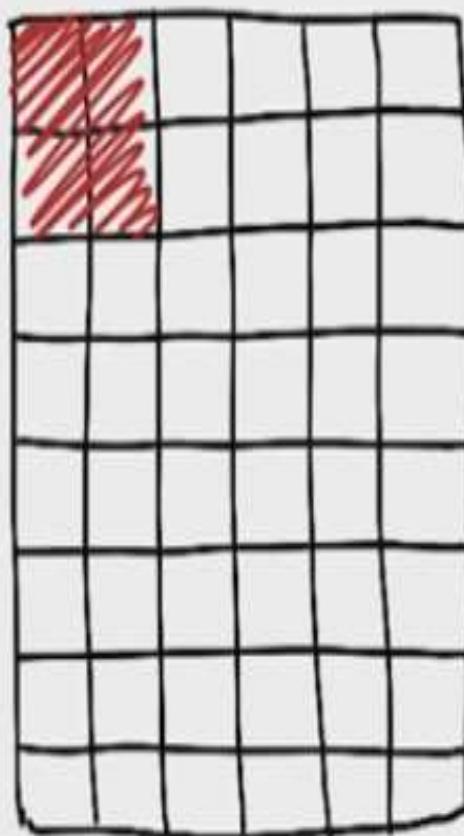
- px (pixel)
- dpi (*dots per inch*)
- dip/dp (*density independent pixel*)
- sp (scale independent pixel)

# DENSITY-INDEPENDENT PIXELS

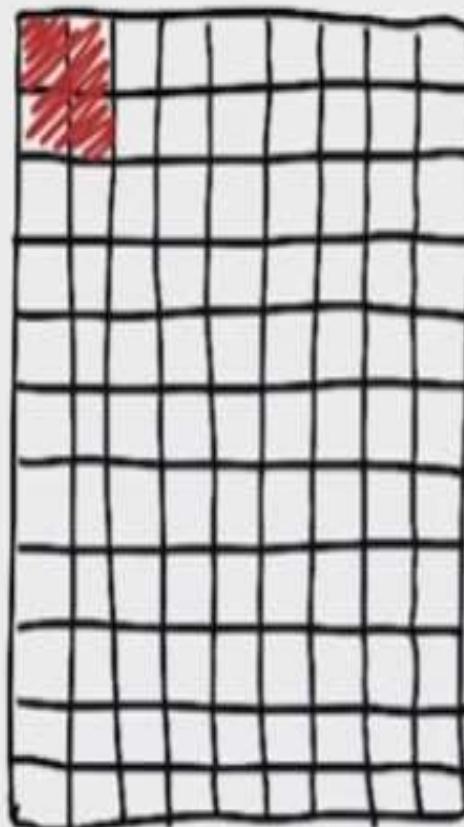
2 pixels by 2 pixels



Medium Resolution Device



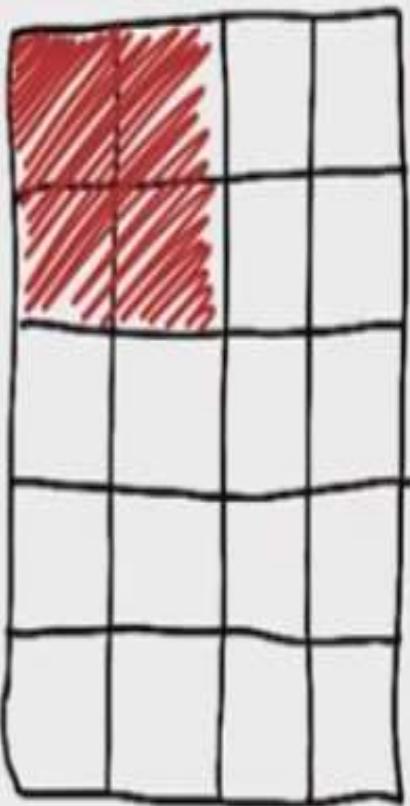
High Resolution Device



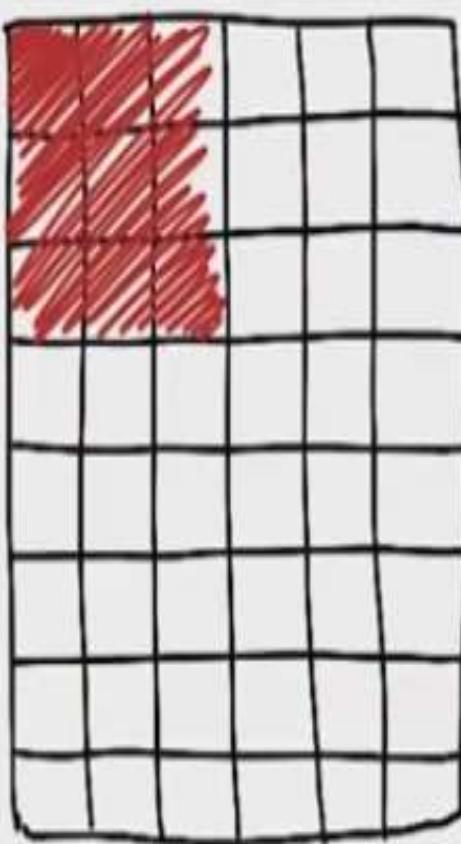
Extra-High Resolution Device

# DENSITY-INDEPENDENT PIXELS

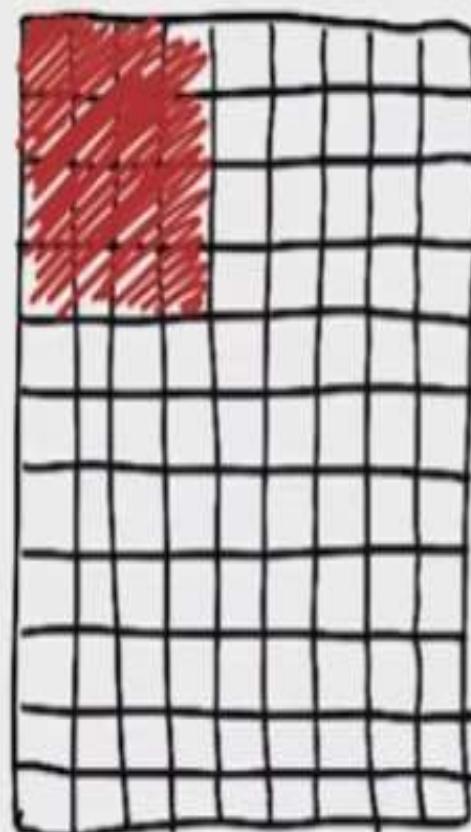
2 dp by 2 dp



Medium Resolution Device



High Resolution Device



Extra-High Resolution Device

## TextView

Displays text

```
<TextView  
    android:id="@+id/title_text_view"  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content"  
    android:text="@string/my_photos"  
    android:textAppearance="?android:textAppearanceLarge"  
    android:textColor="#4689C8"  
    android:textStyle="bold" />
```

## ImageView

Displays image

```
<ImageView  
    android:id="@+id/photo_image_view"  
    android:layout_width="match_parent"  
    android:layout_height="match_parent"  
    android:scaleType="centerCrop"  
    android:src="@drawable/beach" />
```

My Photos



## Button

Button with text label

```
<Button  
    android:id="@+id/next_button"  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content"  
    android:text="@string/next" />
```

NEXT

## View

Plain rectangle (can be used as a divider)

```
<View  
    android:layout_width="match_parent"  
    android:layout_height="100dp"  
    android:background="#4E4B4F" />
```



## EditText

Text field that you can type into

```
<EditText  
    android:id="@+id/album_description_view"  
    android:layout_width="match_parent"  
    android:layout_height="wrap_content"  
    android:hint="@string/album_description"  
    android:inputType="textMultiLine" />
```

Album Description

# GETTING PAST ERRORS

```
<Text View  
    android:text="Hapy Birthday"  
    android:layout_width="150dp"  
    android:layout_height="150"  
    android:background="@android:color/darker_groy"  
>
```

Uh oh! Invalid  
XML... help!

Describe at least 2 problems you see.

## XML Layout Code

UNDO

REDO

Code has been saved

RESET CODE

```
1 <TextView  
2     android:text="Wait, today's your birthday?"  
3     android:background="@android:color/darker_gray"  
4     android:layout_width="200dp"  
5     android:layout_height="150dp" />
```

Wait, today's your birthday?

## XML Layout Code

UNDO

REDO

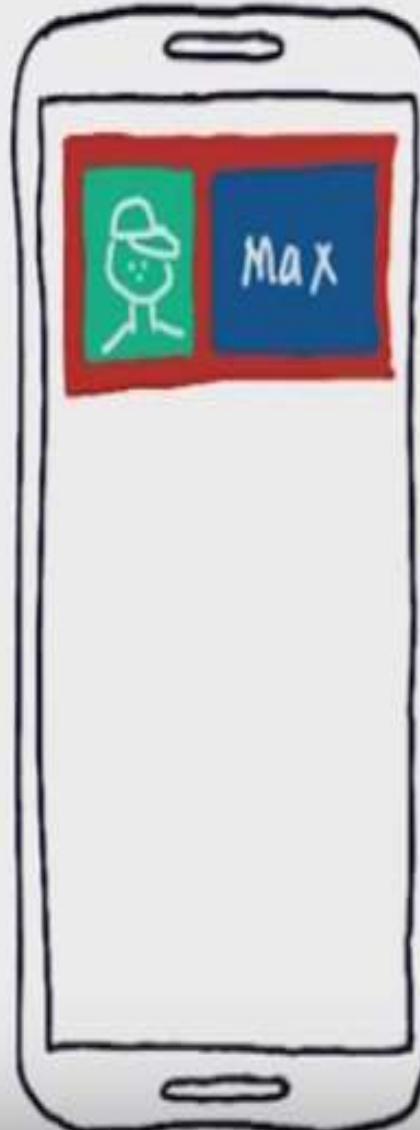
Code has been saved

RESET CODE

```
1 <TextView  
2     android:text="Wait, today's your birthday?"  
3     android:background="@android:color/darker_gray"  
4     android:layout_width="wrap_content"  
5     android:layout_height="wrap_content" />
```

Wait, today's your birthday?

# VIEW GROUPS



# MEET THE VIEWS

Parent Views



Ray  
RelativeLayout



Laura  
LinearLayout

Children Views



Tommy  
TextView

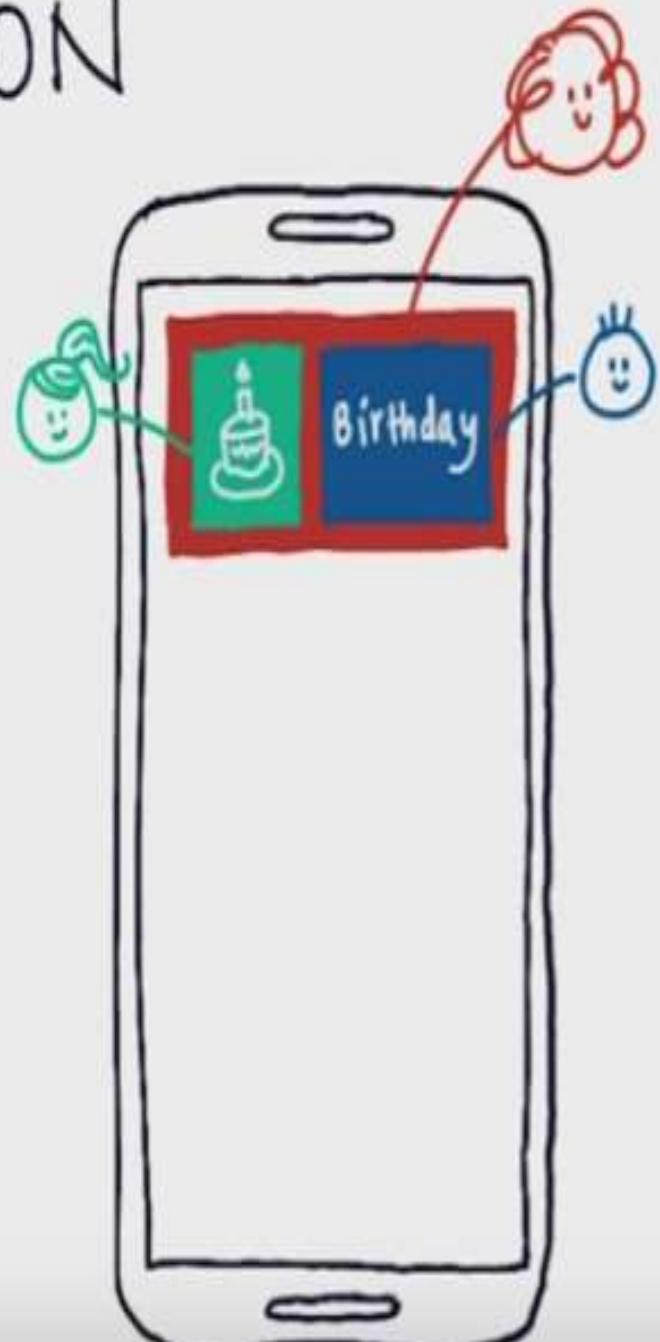
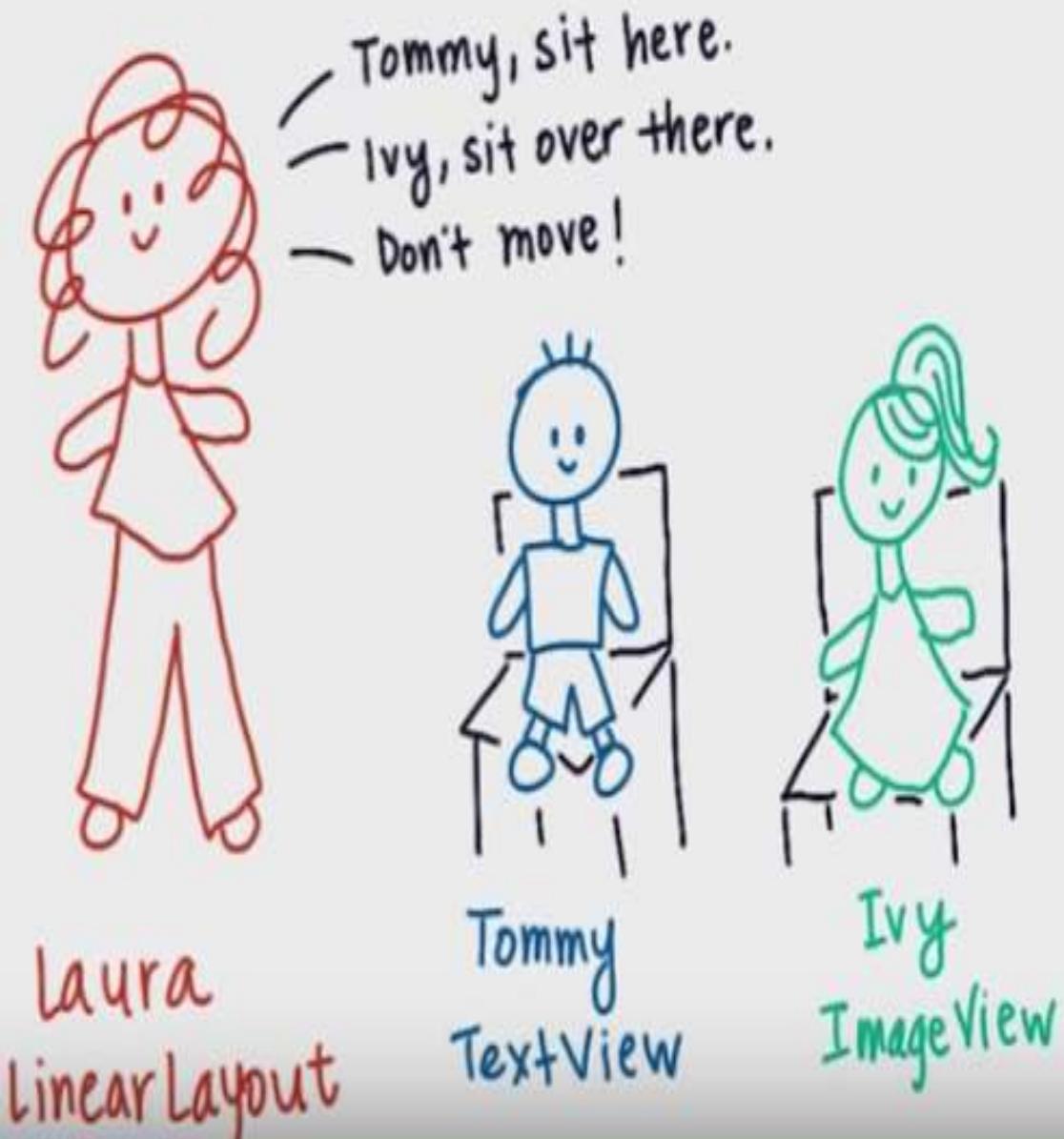


Ivy  
ImageView

# PARENTAL SUPERVISION



# PARENTAL SUPERVISION



# VIEW GROUPS

1. How many views are there?

2. The mountain image is a \_\_\_\_\_ of the red ViewGroup.

- child
- parent

3. The red ViewGroup is the \_\_\_\_\_ of the "Hiking" TextView.

- child
- parent

4. Which views are siblings of each other?



# LINEAR LAYOUT



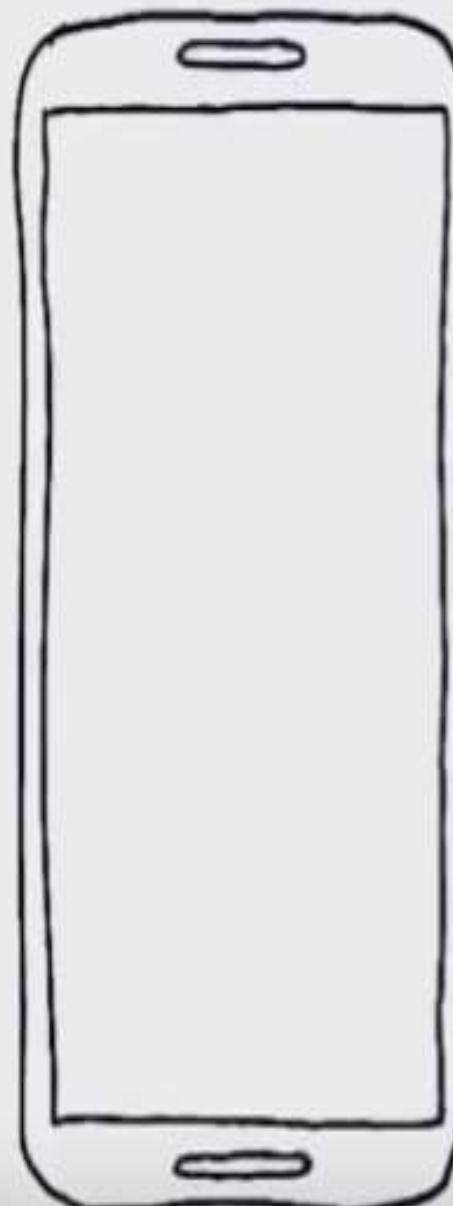
Laura  
Linear Layout



Tommy  
TextView



Ivy  
ImageView



# LINEAR LAYOUT

vertical column



Laura  
LinearLayout



Tommy  
TextView



Ivy  
ImageView



# LINEAR LAYOUT

Horizontal row



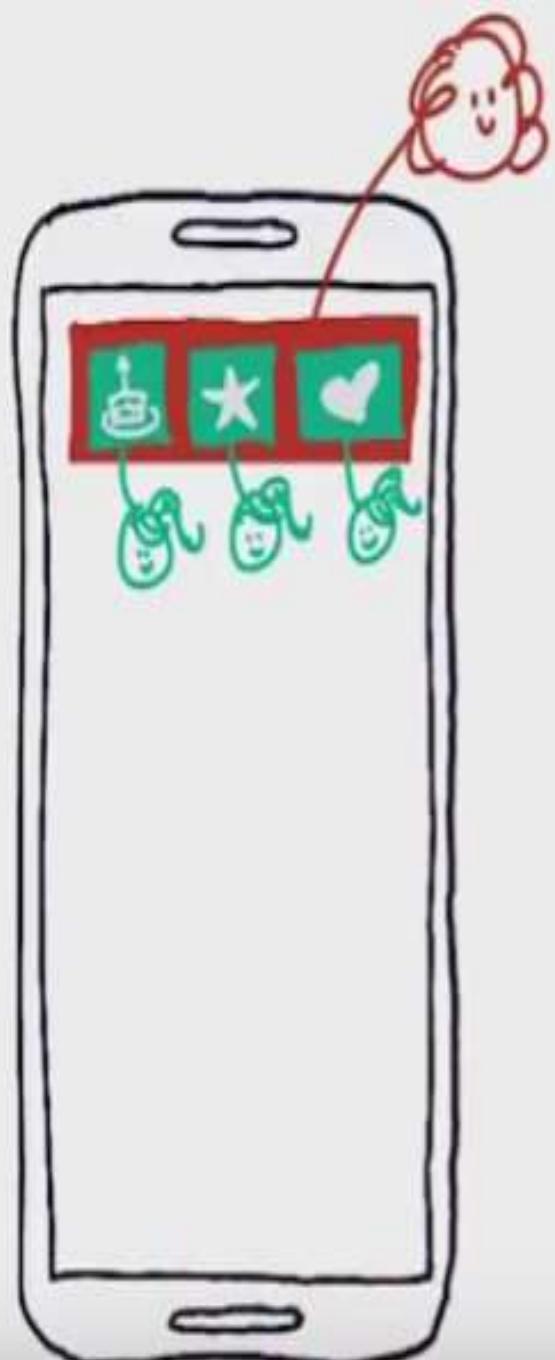
Laura  
LinearLayout



Tommy  
TextView



Ivy  
ImageView



# RELATIVE LAYOUT



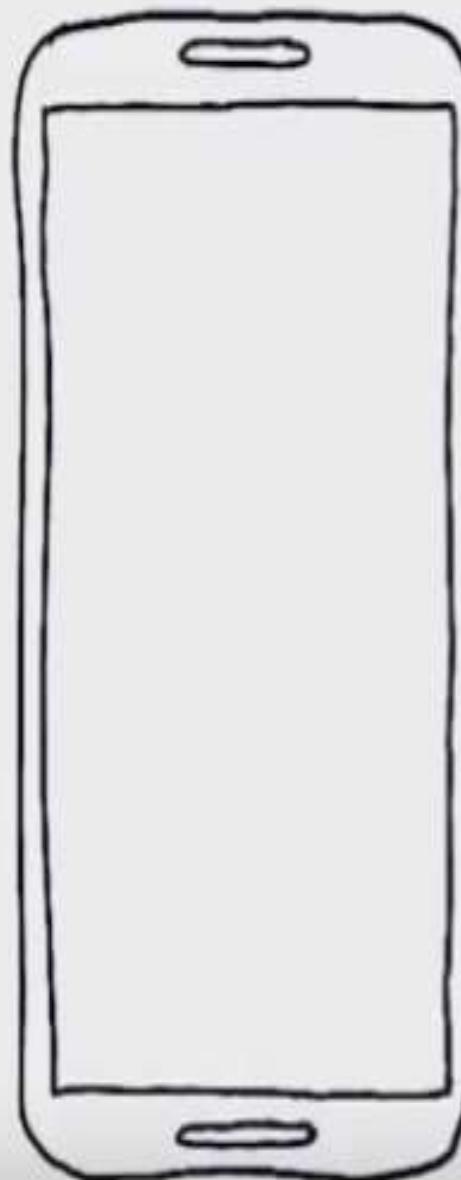
Ray  
RelativeLayout



Tommy  
TextView



Ivy  
ImageView



# RELATIVE LAYOUT

Relative to parent



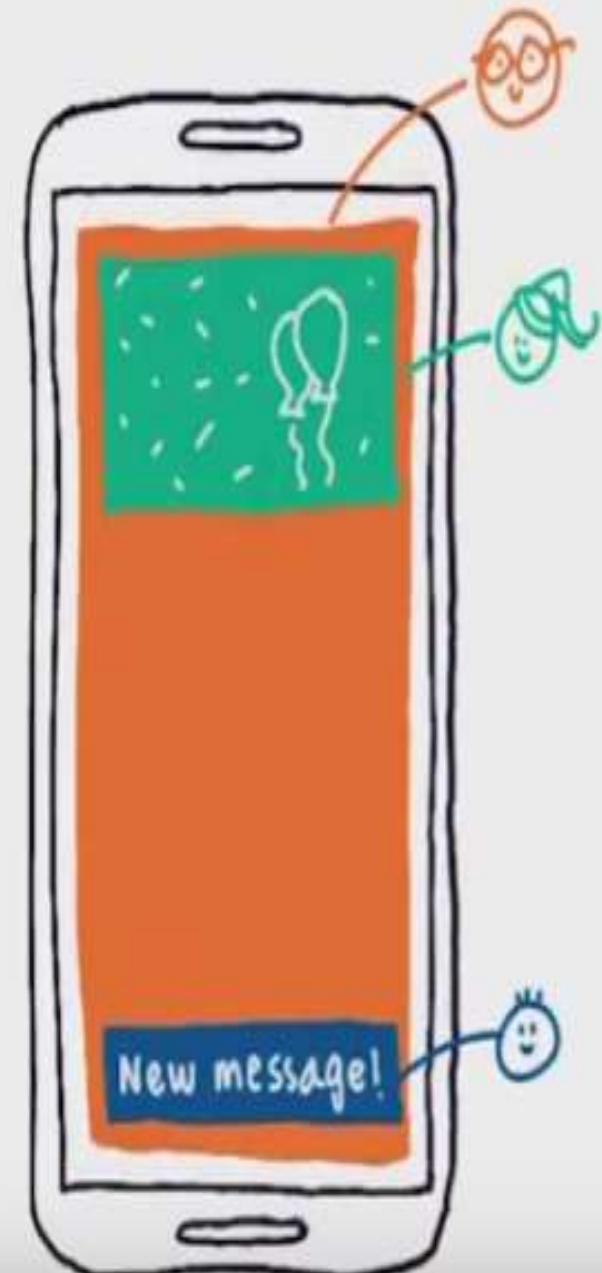
Ray  
Relative Layout



Tommy  
TextView



Ivy  
ImageView



# RELATIVE LAYOUT

Relative to other children



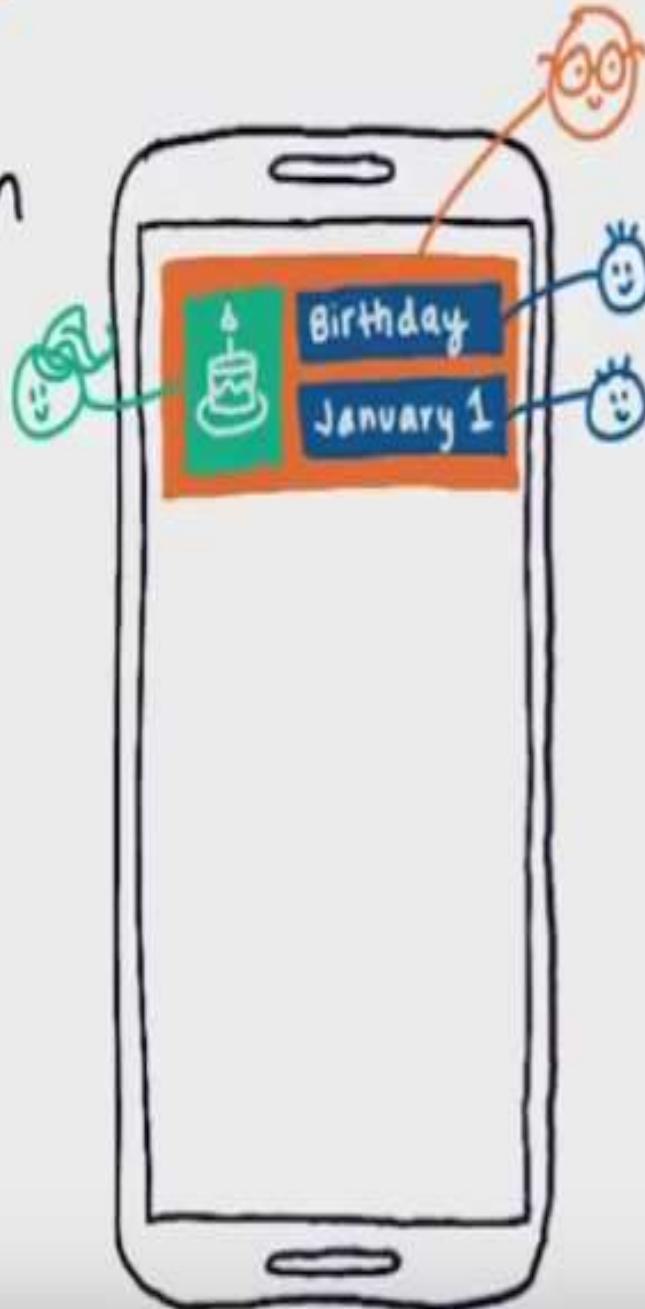
Ray  
RelativeLayout



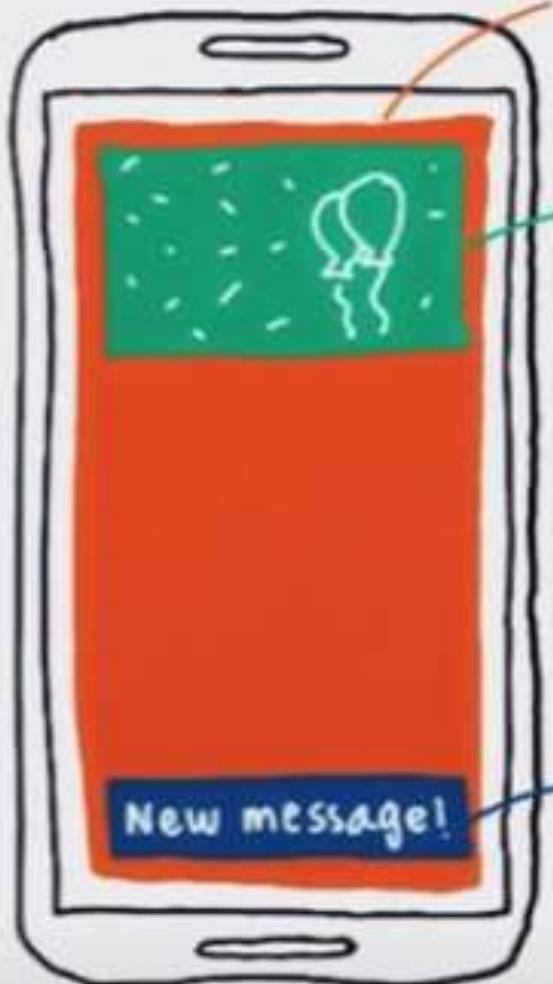
Tommy  
TextView



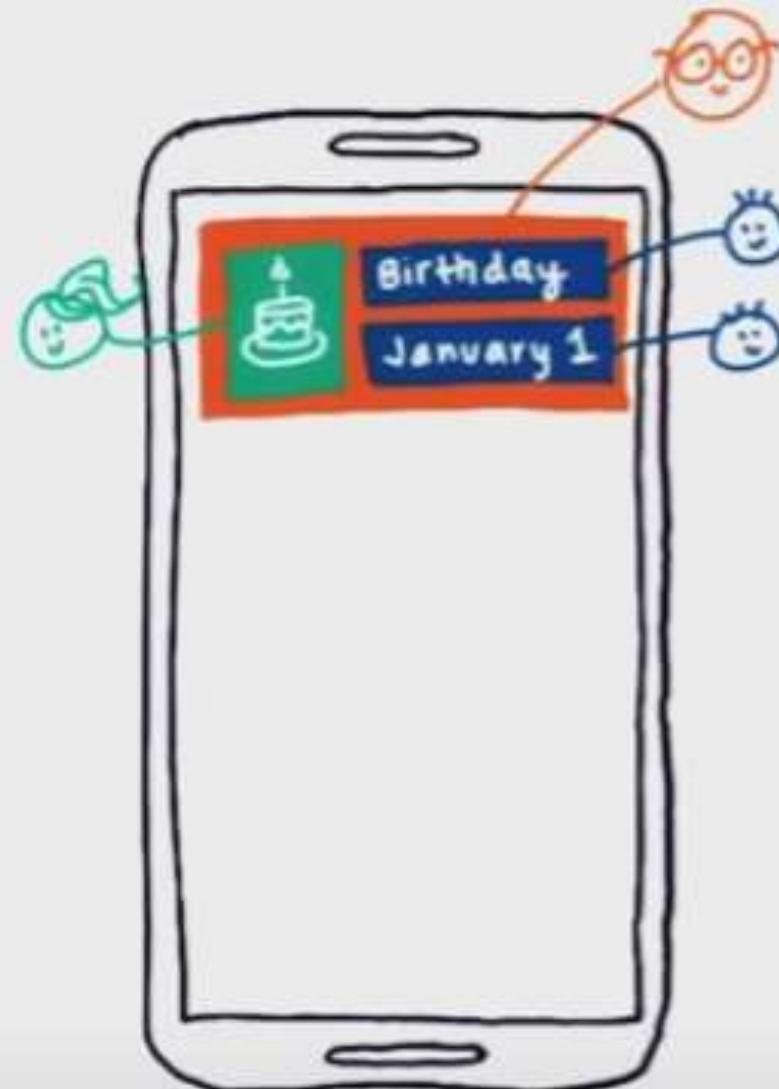
Ivy  
ImageView



# RELATIVE LAYOUT



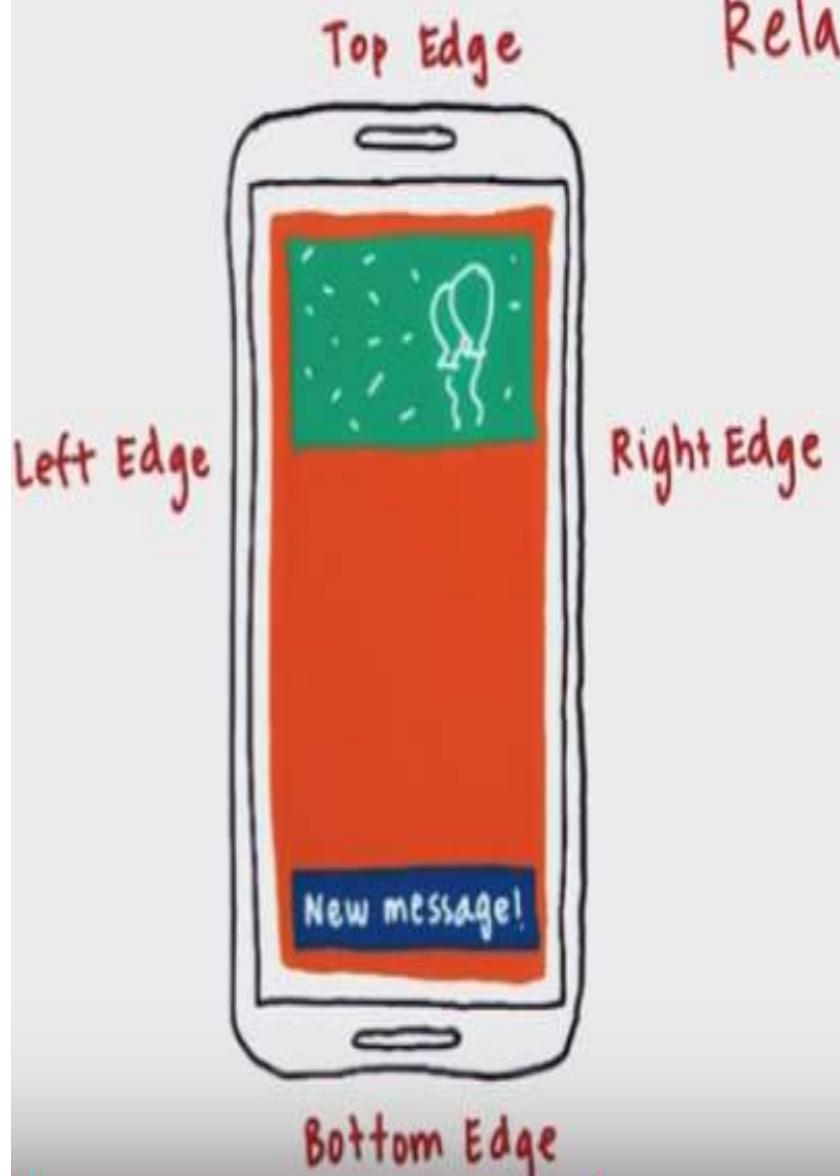
Relative to Parent



Relative to other children

# RELATIVE LAYOUT

Relative to Parent



Child view attributes:

`android:layout_alignParentTop = "true"  
OR  
"false"`

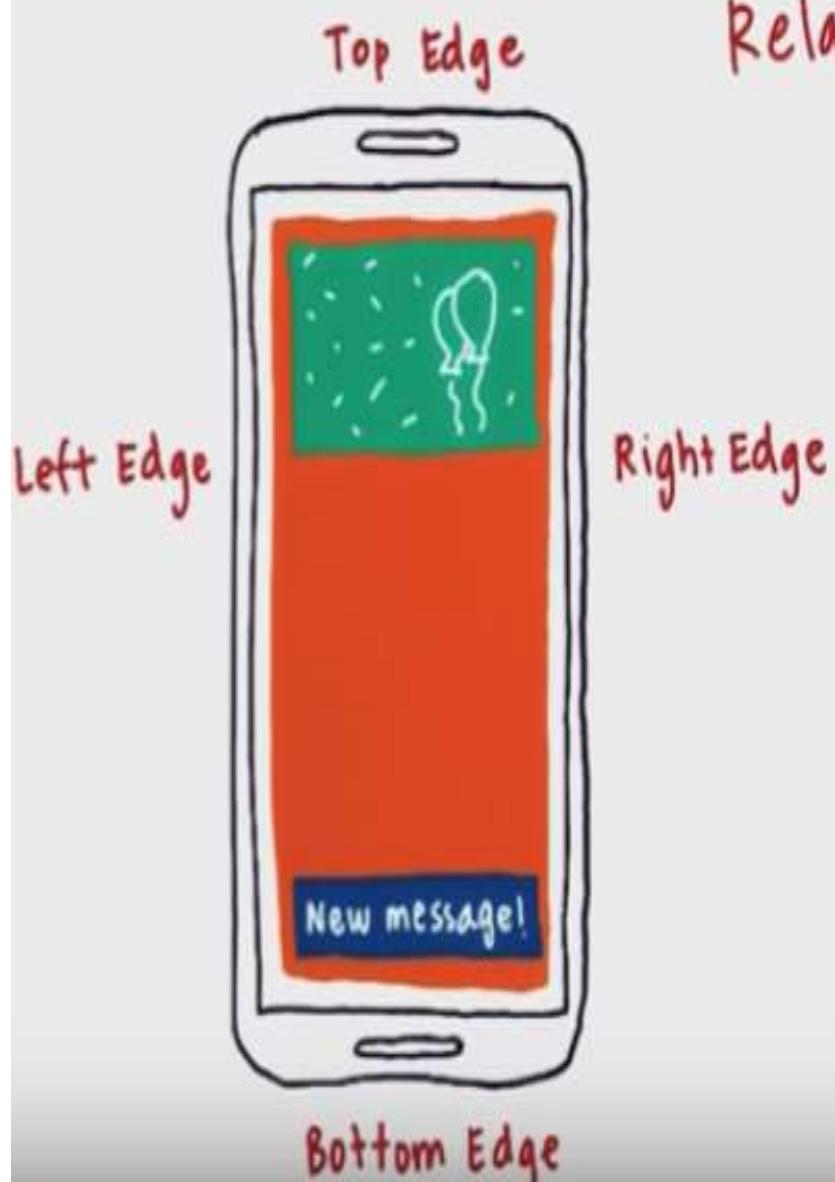
`android:layout_alignParentBottom`

`android:layout_alignParentLeft`

`android:layout_alignParentRight`

# RELATIVE LAYOUT

Relative to Parent



TextView attributes:

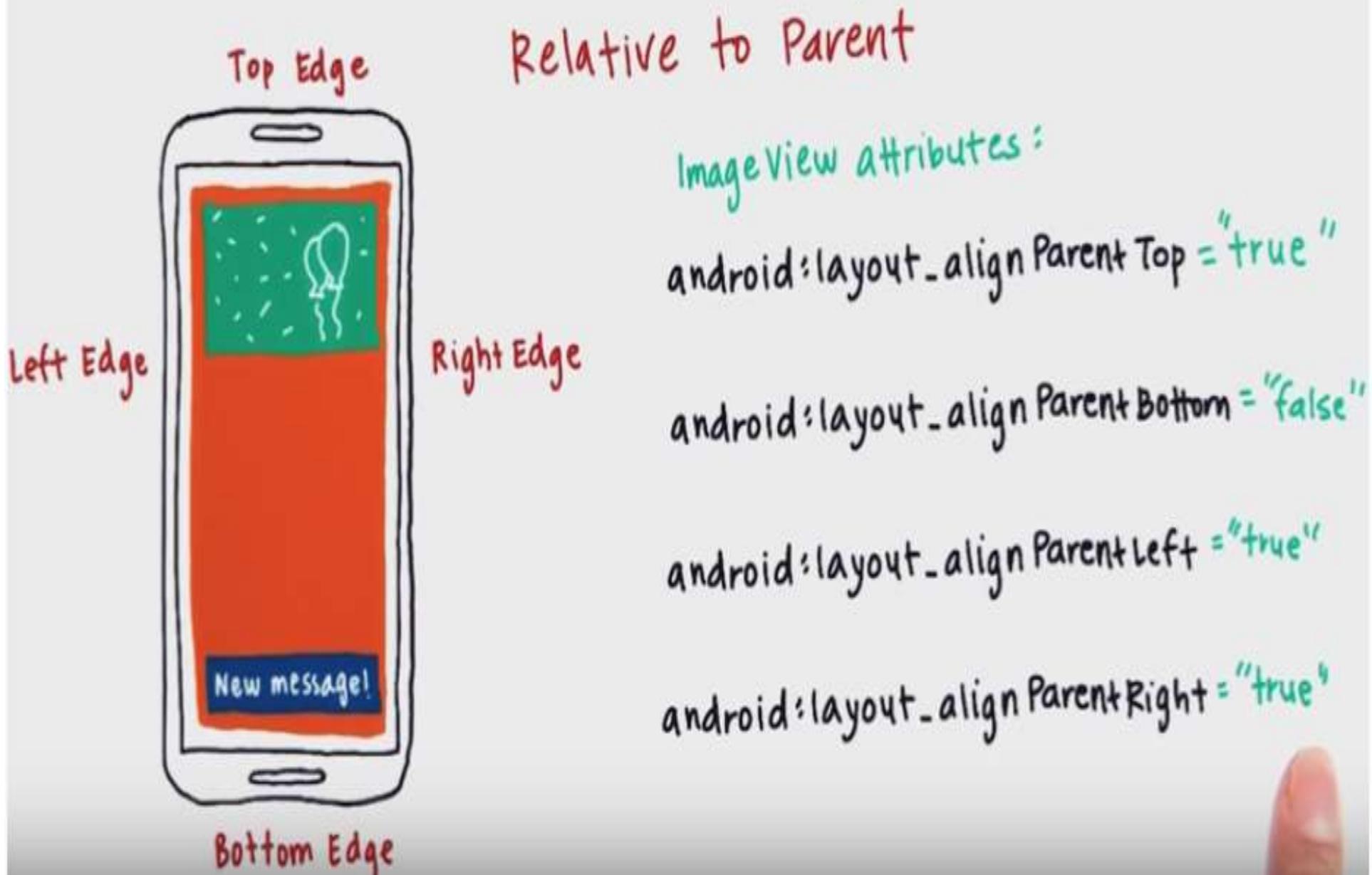
`android:layout_alignParentTop = "false"`

`android:layout_alignParentBottom = "true"`

`android:layout_alignParentLeft = "true"`

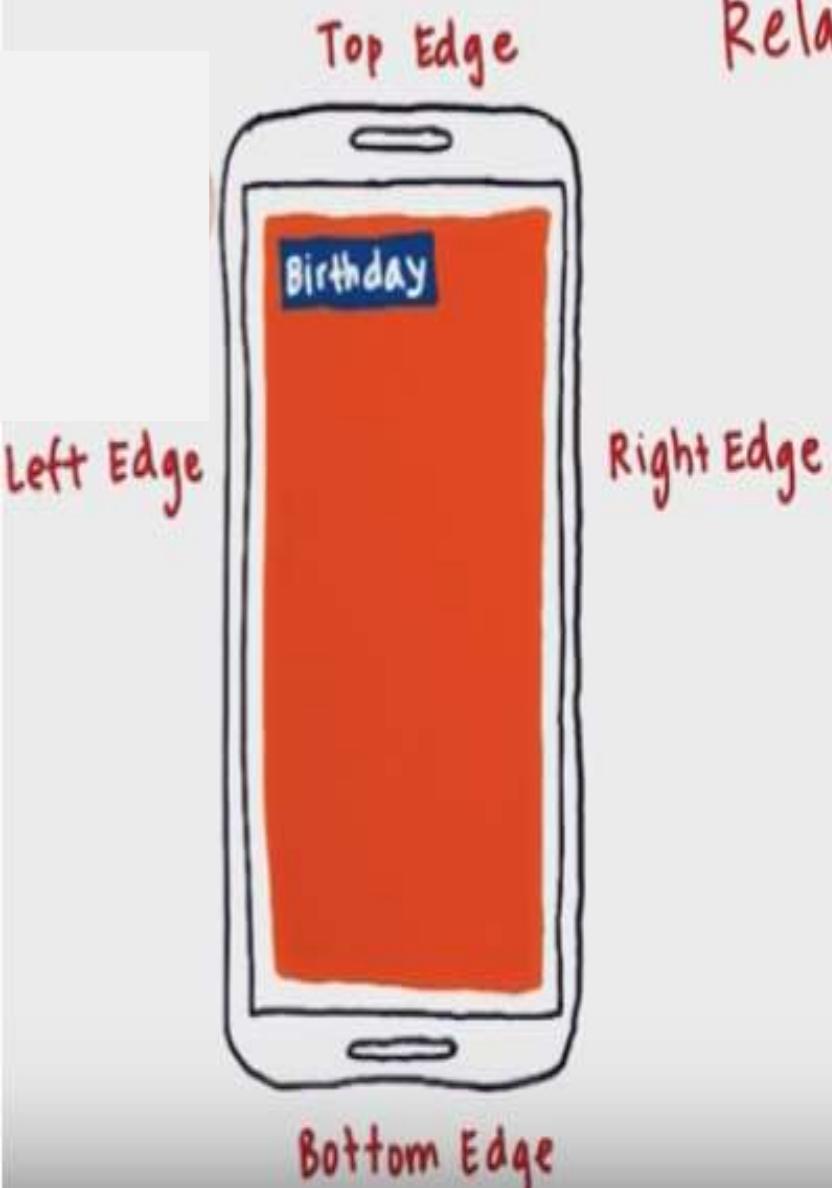
`android:layout_alignParentRight = "true"`

# RELATIVE LAYOUT



# RELATIVE LAYOUT

Relative to Parent



Child view attributes:

`android:layout_alignParentTop = "true"`

`android:layout_alignParentBottom`

`android:layout_alignParentLeft = "true"`

`android:layout_alignParentRight`

# RELATIVE LAYOUT

Relative to Parent



Child view attributes:

`android:layout_alignParentTop = "true"`

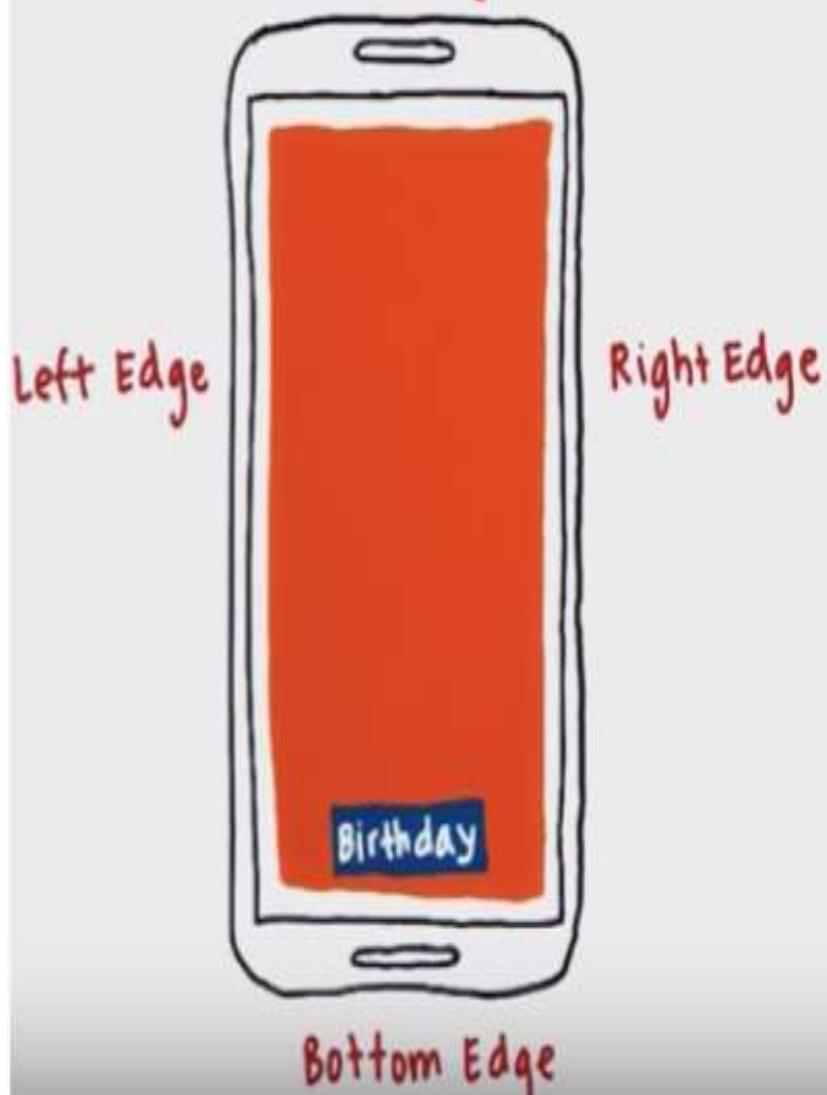
`android:layout_alignParentBottom`

`android:layout_alignParentLeft`

`android:layout_alignParentRight = "true"`

# RELATIVE LAYOUT

Relative to Parent



Child view attributes:

`android:layout_alignParentTop`

`android:layout_alignParentBottom = "true"`

`android:layout_alignParentLeft`

`android:layout_alignParentRight`

`android:layout_centerHorizontal = "true"`

# RELATIVE LAYOUT



Relative to Parent

Child view attributes:

`android:layout_alignParentTop`

`android:layout_alignParentBottom`

`android:layout_alignParentLeft`

`android:layout_alignParentRight`

`android:layout_centerVertical = "true"`

## XML Layout Code

```
1 <RelativeLayout  
2     xmlns:android="http://schemas.android.com/apk/res/android"  
3     android:layout_width="match_parent"  
4     android:layout_height="match_parent">  
5  
6     <TextView  
7         android:layout_width="wrap_content"  
8         android:layout_height="wrap_content"  
9         android:layout_alignParentRight="true"  
10        android:layout_alignParentTop="true"  
11        android:textAppearance="?android:textAppearanceLarge"  
12        android:text="Happy" />  
13  
14     <TextView  
15         android:layout_width="wrap_content"  
16         android:layout_height="wrap_content"  
17         android:layout_alignParentBottom="true"  
18         android:layout_alignParentLeft="true"  
19         android:textAppearance="?android:textAppearanceLarge"  
20         android:text="Birthday" />  
21  
22     <TextView  
23         android:layout_width="wrap_content"  
24         android:layout_height="wrap_content"  
25         android:textAppearance="?android:textAppearanceLarge"  
26         android:text="To You" />  
27  
28 </RelativeLayout>  
29
```



Kunal Ben Kagure

Natalie  
Lyla Me  
Amy  
Omoju  
Jennie

# RELATIVE LAYOUT

Positioning children relative  
to other views

Lyla                    Ben                    Jennie  
Natalie                Kunal                Omoju  
Me                     Kagure                Amy

## XML Layout Code

```
1 <RelativeLayout  
2     xmlns:android="http://schemas.android.com/apk/res/android"  
3     android:layout_width="match_parent"  
4     android:layout_height="match_parent">  
5  
6     <TextView  
7         android:id="@+id/lyla_text_view"  
8         android:layout_width="wrap_content"  
9         android:layout_height="wrap_content"  
10        android:layout_alignParentBottom="true"  
11        android:layout_alignParentLeft="true"  
12        android:textSize="24sp"  
13        android:text="Lyla" />  
14  
15     <TextView  
16         android:id="@+id/jennie_text_view"  
17         android:layout_width="wrap_content"  
18         android:layout_height="wrap_content"  
19         android:layout_alignParentBottom="true"  
20         android:layout_alignParentRight="true"  
21         android:textSize="24sp"  
22         android:text="Jennie" />  
23  
24     <TextView  
25         android:id="@+id/ben_text_view"  
26         android:layout_width="wrap_content"  
27         android:layout_height="wrap_content"  
28         android:layout_alignParentTop="true"  
29         android:layout_centerHorizontal="true"
```



## XML Layout Code

```
14<TextView  
15    android:id="@+id/jennie_text_view"  
16    android:layout_width="wrap_content"  
17    android:layout_height="wrap_content"  
18    android:layout_alignParentBottom="true"  
19    android:layout_alignParentRight="true"  
20    android:textSize="24sp"  
21    android:text="Jennie" />  
23  
24<TextView  
25    android:id="@+id/ben_text_view"  
26    android:layout_width="wrap_content"  
27    android:layout_height="wrap_content"  
28    android:layout_alignParentTop="true"  
29    android:layout_centerHorizontal="true"  
30    android:textSize="24sp"  
31    android:text="Ben" />  
32  
33<TextView  
34    android:id="@+id/kunal_text_view"  
35    android:layout_width="wrap_content"  
36    android:layout_height="wrap_content"  
37    android:layout_alignParentTop="true"  
38    android:layout_toLeftOf="@+id/ben_text_view"  
39    android:textSize="24sp"  
40    android:text="Kunal" />  
41  
42</RelativeLayout>
```

KunalBen

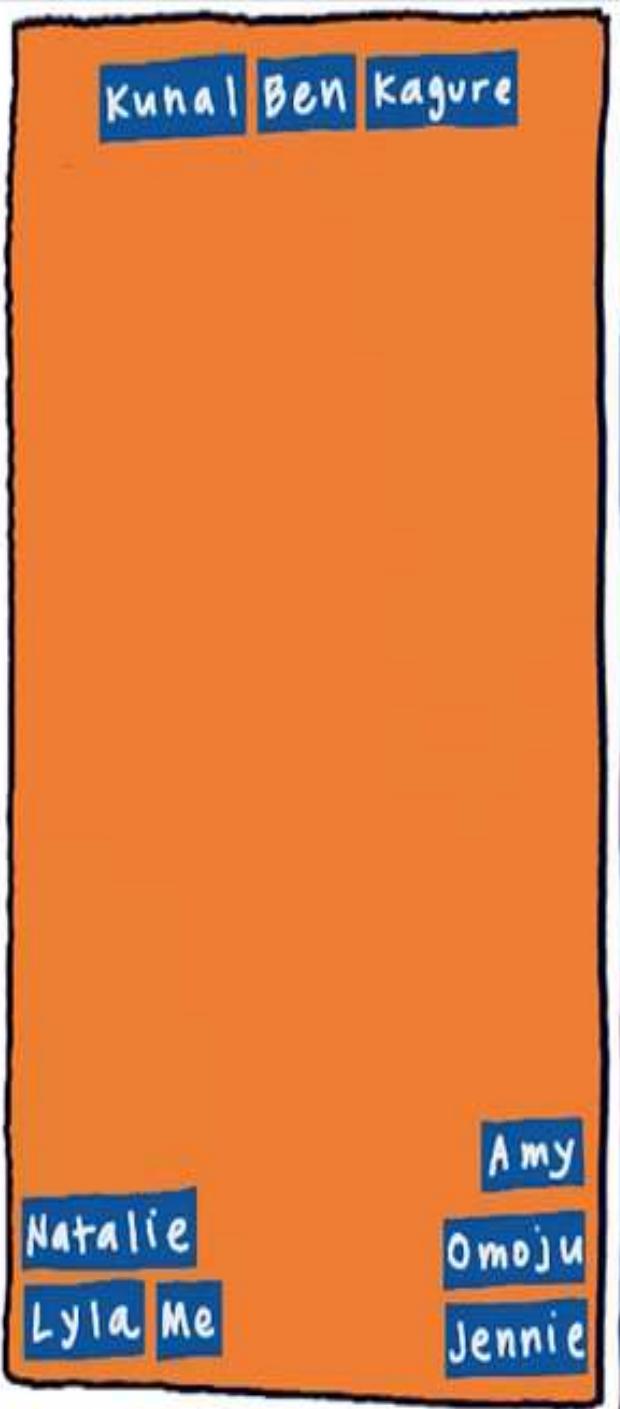


## XML Layout Code

```
13     android:text="Lyla" />
14
15 <TextView
16     android:id="@+id/jennie_text_view"
17     android:layout_width="wrap_content"
18     android:layout_height="wrap_content"
19     android:layout_alignParentBottom="true"
20     android:layout_alignParentRight="true"
21     android:textSize="24sp"
22     android:text="Jennie" />
23
24 <TextView
25     android:id="@+id/omoju_text_view"
26     android:layout_width="wrap_content"
27     android:layout_height="wrap_content"
28     android:layout_alignParentRight="true"
29     android:layout_above="@+id/jennie_text_view"
30     android:textSize="24sp"
31     android:text="Omoju" />
32
33 <TextView
34     android:id="@+id/ben_text_view"
35     android:layout_width="wrap_content"
36     android:layout_height="wrap_content"
37     android:layout_alignParentTop="true"
38     android:layout_centerHorizontal="true"
39     android:textSize="24sp"
40     android:text="Ben" />
41
```

KunalBen





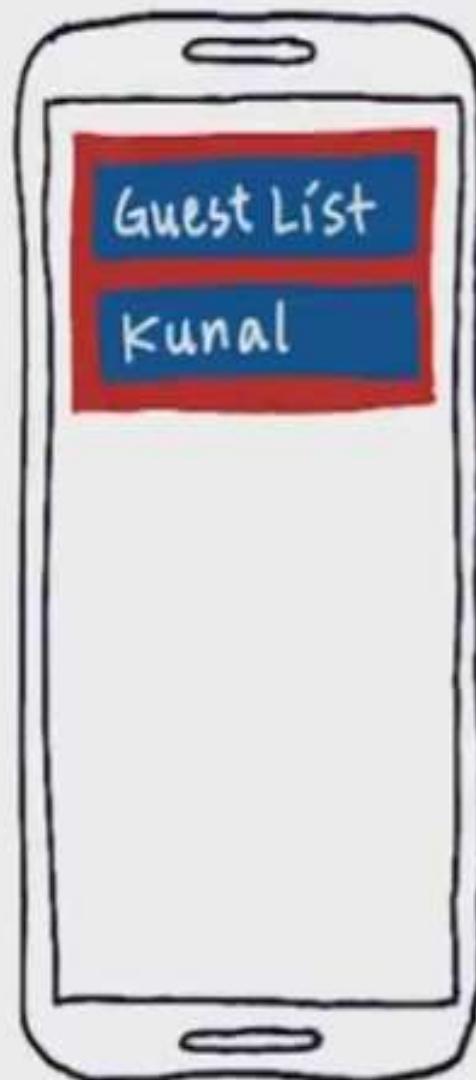
## RELATIVE LAYOUT

Positioning children relative  
to other views

- Modify the provided XML layout to achieve this desired layout

# VIEW GROUPS

```
<LinearLayout  
    android:orientation="vertical"  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content">  
  
    <TextView  
        android:text="Guest List"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content" />  
  
    <TextView  
        android:text="Kunal"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content" />  
  
</LinearLayout>
```





## XML Layout Code

```
1 <LinearLayout  
2     xmlns:android="http://schemas.android.com/apk/res/android"  
3     android:orientation="vertical"  
4     android:layout_width="wrap_content"  
5     android:layout_height="wrap_content">  
6  
7     <TextView  
8         android:text="Guest List"  
9         android:layout_width="wrap_content"  
10        android:layout_height="wrap_content"  
11        android:textSize="24sp" />  
12  
13    <TextView  
14        android:text="Kunal"  
15        android:layout_width="wrap_content"  
16        android:layout_height="wrap_content"  
17        android:textSize="24sp" />  
18  
19    <TextView  
20        android:text="Kunal"  
21        android:layout_width="wrap_content"  
22        android:layout_height="wrap_content"  
23        android:textSize="24sp" />  
24 </LinearLayout>
```

AVAILABLE IMAGES

CHEAT SHEET



## XML Layout Code

```
1 <LinearLayout  
2     xmlns:android="http://schemas.android.com/apk/res/android"  
3     android:orientation="horizontal"  
4     android:layout_width="wrap_content"  
5     android:layout_height="wrap_content">  
6  
7     <TextView  
8         android:text="Guest List"  
9         android:layout_width="wrap_content"  
10        android:layout_height="wrap_content"  
11        android:textSize="24sp" />  
12  
13    <TextView  
14        android:text="Kunal"  
15        android:layout_width="wrap_content"  
16        android:layout_height="wrap_content"  
17        android:textSize="24sp" />  
18  
19    <TextView  
20        android:text="Kunal"  
21        android:layout_width="wrap_content"  
22        android:layout_height="wrap_content"  
23        android:textSize="24sp" />  
24  
25 </LinearLayout>
```



# DIFFERENT WIDTHS ON CHILD VIEWS

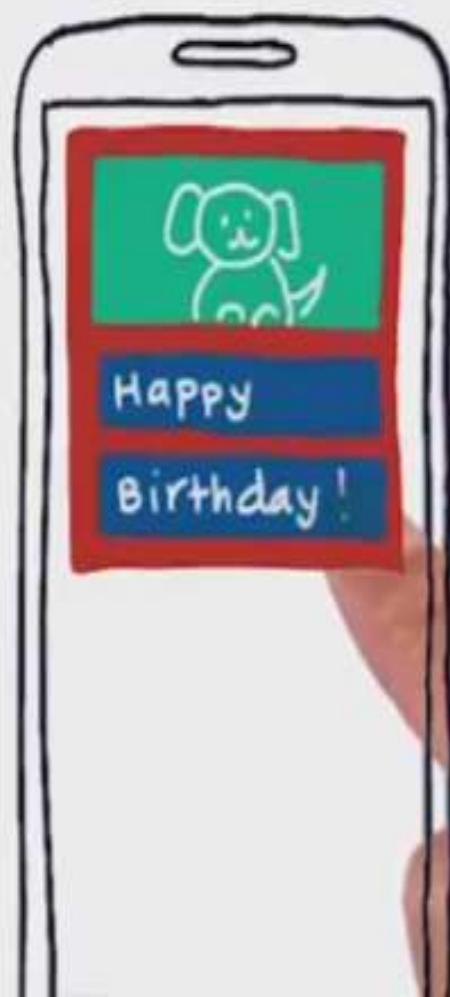
200 dp



wrap-content



match-parent



# DIFFERENT HEIGHTS ON CHILD VIEWS

200 dp



wrap-content



match-parent



## XML Layout Code

```
1 <LinearLayout  
2     xmlns:android="http://schemas.android.com/apk/res/android"  
3     android:orientation="vertical"  
4     android:layout_width="match_parent"  
5     android:layout_height="match_parent" |>  
6  
7     <TextView  
8         android:text="VIP List"  
9         android:layout_width="wrap_content"  
10        android:layout_height="wrap_content"  
11        android:textSize="24sp" />  
12  
13    <TextView  
14        android:text="Kunal"  
15        android:layout_width="match_parent"  
16        android:layout_height="wrap_content"  
17        android:textSize="24sp" />  
18  
19    <TextView  
20        android:text="Kagure"  
21        android:layout_width="wrap_content"  
22        android:layout_height="wrap_content"  
23        android:textSize="24sp" />  
24  
25    <TextView  
26        android:text="Lyla"  
27        android:layout_width="wrap_content"  
28        android:layout_height="wrap_content"  
29        android:textSize="24sp" />
```



## XML Layout Code

```
1 <LinearLayout  
2     xmlns:android="http://schemas.android.com/apk/res/android"  
3     android:orientation="vertical"  
4     android:layout_width="match_parent"  
5     android:layout_height="match_parent"  
6     android:background="@android:color/darker_gray">  
7  
8     <TextView  
9         android:text="VIP List"  
10        android:layout_width="wrap_content"  
11        android:layout_height="wrap_content"  
12        android:background="#4CAF50"  
13        android:textSize="24sp" />  
14  
15     <TextView  
16         android:text="Kunal"  
17         android:layout_width="wrap_content"  
18         android:layout_height="wrap_content"  
19         android:background="#4CAF50"  
20         android:textSize="24sp" />  
21  
22     <TextView  
23         android:text="Kagure"  
24         android:layout_width="wrap_content"  
25         android:layout_height="wrap_content"  
26         android:background="#4CAF50"  
27         android:textSize="24sp" />  
28  
29     <TextView
```



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20        android:textSize="24sp" />  
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29    <TextView
```



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```



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25        android:layout_height="wrap_content"  
26        android:background="#4CAF50"  
27        android:textSize="24sp" />  
28  
29    <TextView
```

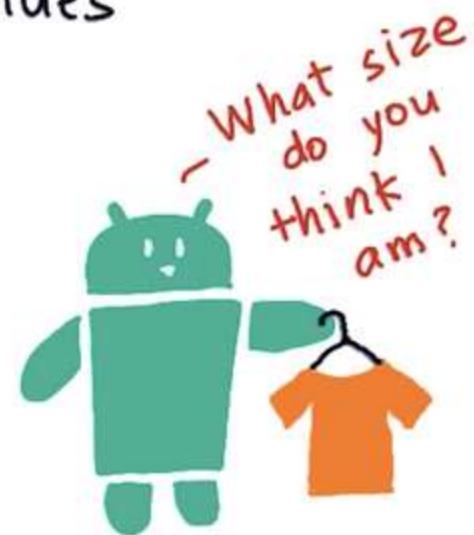


## WIDTH and HEIGHT

- Try different width and height values for each TextView

- fixed dp values
- wrap-content
- match-parent

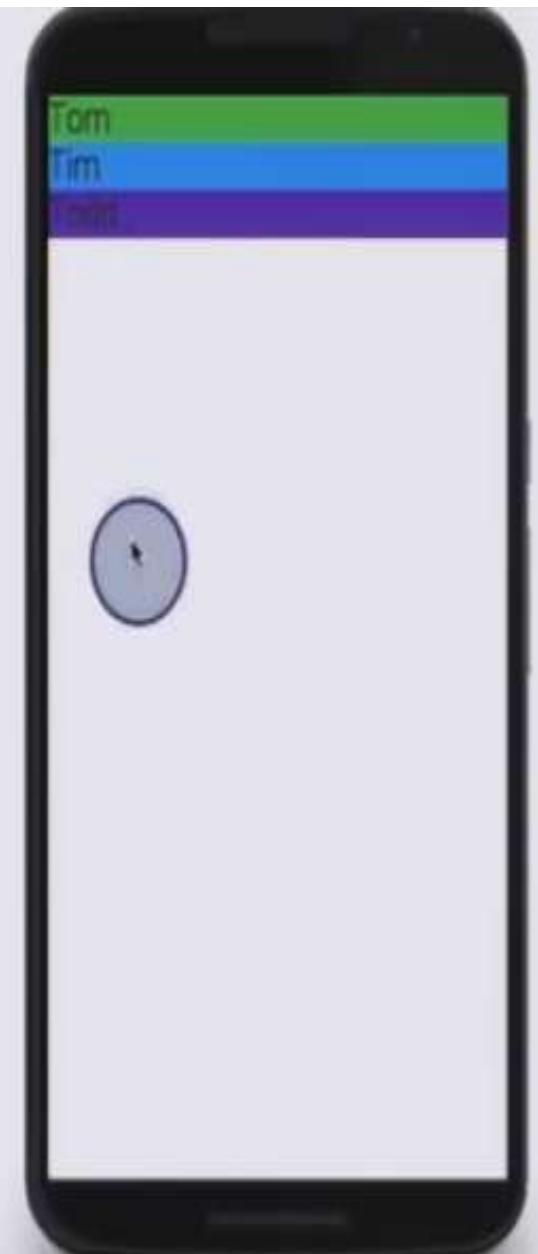
- \* Remember that width and height \* don't have to match



# LAYOUT WEIGHT

## XML Layout Code

```
1 <LinearLayout  
2     xmlns:android="http://schemas.android.com/apk/res/android"  
3     android:orientation="vertical"  
4     android:layout_width="match_parent"  
5     android:layout_height="match_parent">:  
6  
7     <TextView  
8         android:text="Tom"  
9         android:layout_width="match_parent"  
10        android:layout_height="wrap_content"  
11        android:textSize="24sp"  
12        android:background="#4CAF50" />  
13  
14    <TextView  
15        android:text="Tim"  
16        android:layout_width="match_parent"  
17        android:layout_height="wrap_content"  
18        android:textSize="24sp"  
19        android:background="#2196F3" />  
20  
21    <TextView  
22        android:text="Todd"  
23        android:layout_width="match_parent"  
24        android:layout_height="wrap_content"  
25        android:textSize="24sp"  
26        android:background="#673AB7" />  
27  
28 </LinearLayout>
```



## XML Layout Code

```
1 <LinearLayout  
2     xmlns:android="http://schemas.android.com/apk/res/android"  
3     android:orientation="vertical"  
4     android:layout_width="match_parent"  
5     android:layout_height="match_parent">  
6  
7     <TextView  
8         android:text="Tom"  
9         android:layout_width="match_parent"  
10        android:layout_height="0dp"  
11        android:layout_weight="1"  
12        android:textSize="24sp"  
13        android:background="#4CAF50" />  
14  
15    <TextView  
16        android:text="Tim"  
17        android:layout_width="match_parent"  
18        android:layout_height="wrap_content"  
19        android:textSize="24sp"  
20        android:background="#2196F3" />  
21  
22    <TextView  
23        android:text="Todd"  
24        android:layout_width="match_parent"  
25        android:layout_height="wrap_content"  
26        android:textSize="24sp"  
27        android:background="#673AB7" />  
28  
29 </LinearLayout>
```



## XML Layout Code

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1 <LinearLayout  
2     xmlns:android="http://schemas.android.com/apk/res/android"  
3     android:orientation="vertical"  
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5     android:layout_height="match_parent">  
6  
7     <TextView  
8         android:text="Tom"  
9         android:layout_width="match_parent"  
10        android:layout_height="0dp"  
11        android:layout_weight="1"  
12        android:textSize="24sp"  
13        android:background="#4CAF50" />  
14  
15    <TextView  
16        android:text="Tim"  
17        android:layout_width="match_parent"  
18        android:layout_height="0dp"  
19        android:layout_weight="1"  
20        android:textSize="24sp"  
21        android:background="#2196F3" />  
22  
23    <TextView  
24        android:text="Todd"  
25        android:layout_width="match_parent"  
26        android:layout_height="0dp"  
27        android:layout_weight="1"  
28        android:textSize="24sp"  
29        android:background="#673AB7" />
```



## XML Layout Code

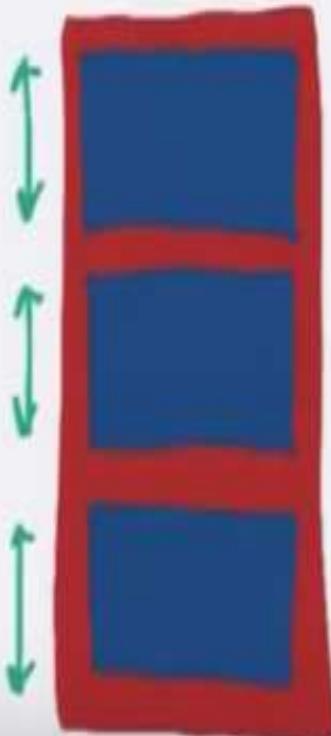
```
1 <LinearLayout  
2     xmlns:android="http://schemas.android.com/apk/res/android"  
3     android:orientation="vertical"  
4     android:layout_width="match_parent"  
5     android:layout_height="match_parent">  
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7     <TextView  
8         android:text="Tom"  
9         android:layout_width="match_parent"  
10        android:layout_height="0dp"  
11        android:layout_weight="1"  
12        android:textSize="24sp"  
13        android:background="#4CAF50" />  
14  
15    <TextView  
16        android:text="Tim"  
17        android:layout_width="match_parent"  
18        android:layout_height="0dp"  
19        android:layout_weight="8"  
20        android:textSize="24sp"  
21        android:background="#2196F3" />  
22  
23    <TextView  
24        android:text="Todd"  
25        android:layout_width="match_parent"  
26        android:layout_height="0dp"  
27        android:layout_weight="1"  
28        android:textSize="24sp"  
29        android:background="#673AB7" />
```



# LINEAR LAYOUT WEIGHT

## Vertical Linear Layout

equal weights means equal heights



3 child views  
height: 0 dp  
weight: 1

## Horizontal linear layout

equal weights means equal widths

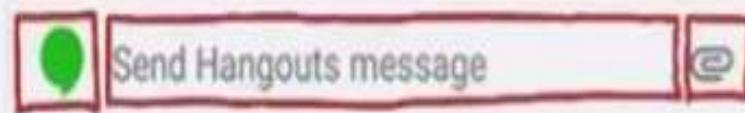


3 child views  
width: 0 dp  
weight: 1

# HANGOUTS APP



Horizontal linear layout

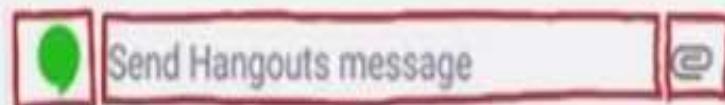


ImageView      EditText      ImageView

# HANGOUTS APP



Horizontal linear layout



ImageView      EditText      ImageView

Height

wrap-content

EditText

ImageView

width

wrap-content

0dp

wrap-content

weight

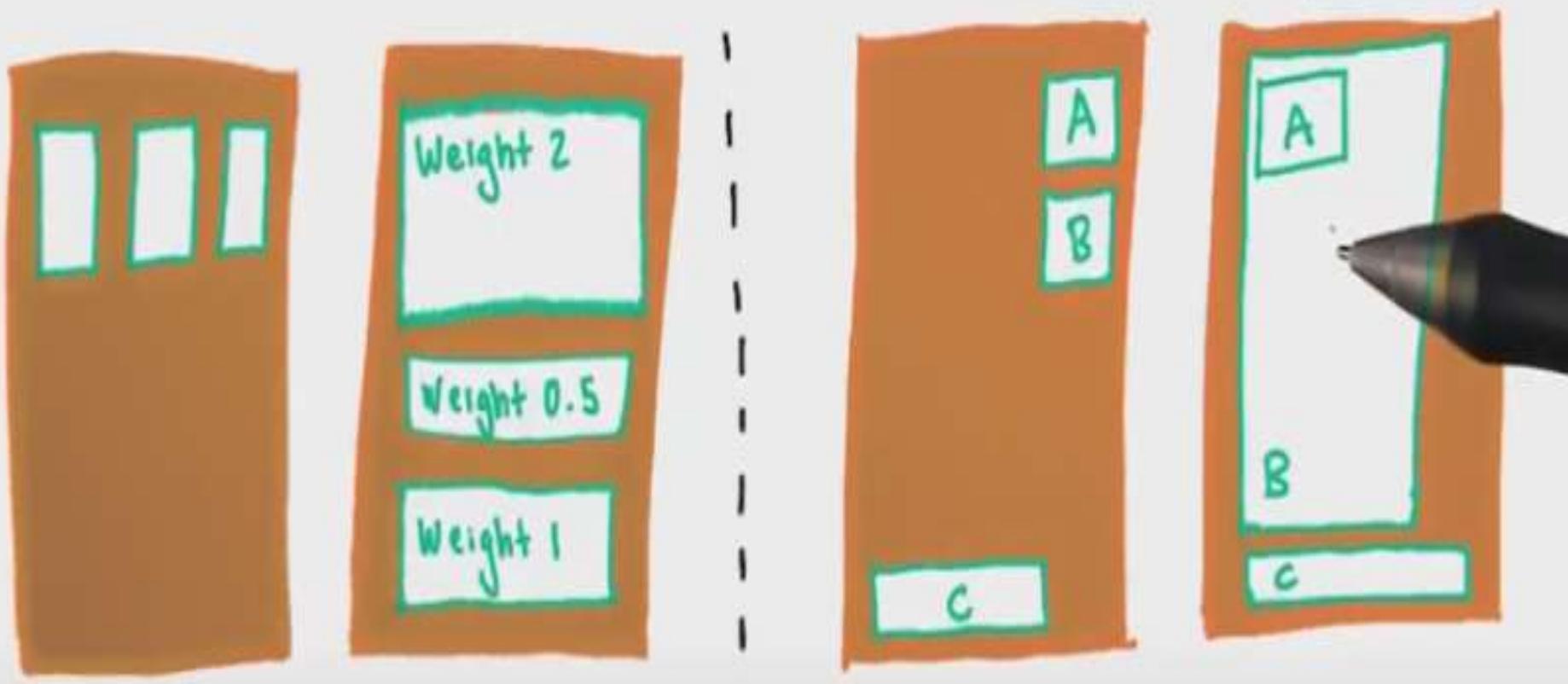
0

1

0

# Position the Views

## Linear Layout VS Relative Layout





Thank you!