



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.

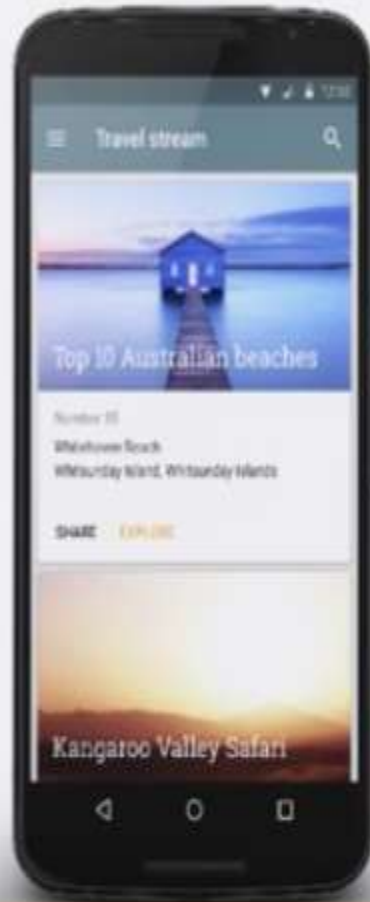
Layout Manager

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

- **Jenis layout manager:**

- ✓ **Table Layout**, TableLayout meletakkan 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 lainnya

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

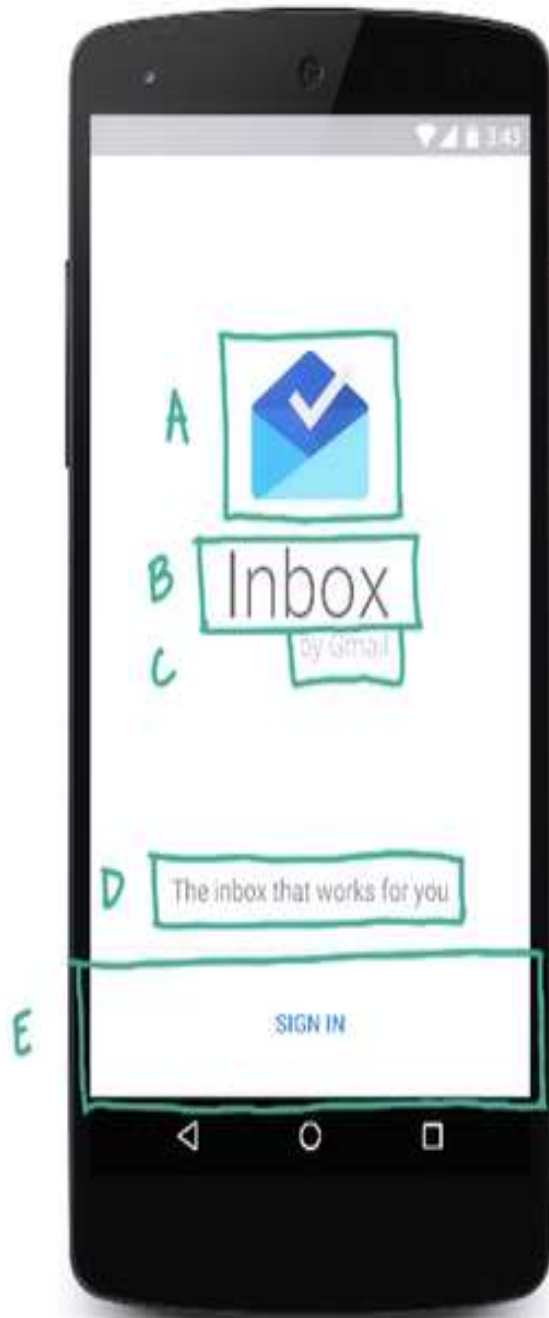


BUTTON

BUTTON

VIEWS

Identify the type of View



- | | | | |
|---|--------------------------------|---------------------------------|------------------------------|
| A | <input type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |
| B | <input type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |
| C | <input type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |
| D | <input type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |
| E | <input type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |

VIEWS

Identify the type of View



- | | | | |
|---|---|--|---|
| A | <input type="radio"/> TextView | <input checked="" type="radio"/> ImageView | <input type="radio"/> Button |
| B | <input checked="" type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |
| C | <input checked="" type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |
| D | <input checked="" type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |
| E | <input type="radio"/> TextView | <input type="radio"/> ImageView | <input checked="" type="radio"/> Button |

VIEWS

Identify the type of View



- | | | | |
|---|--------------------------------|---------------------------------|------------------------------|
| A | <input type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |
| B | <input type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |
| C | <input type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |
| D | <input type="radio"/> TextView | <input type="radio"/> ImageView | <input type="radio"/> Button |



VIEWS

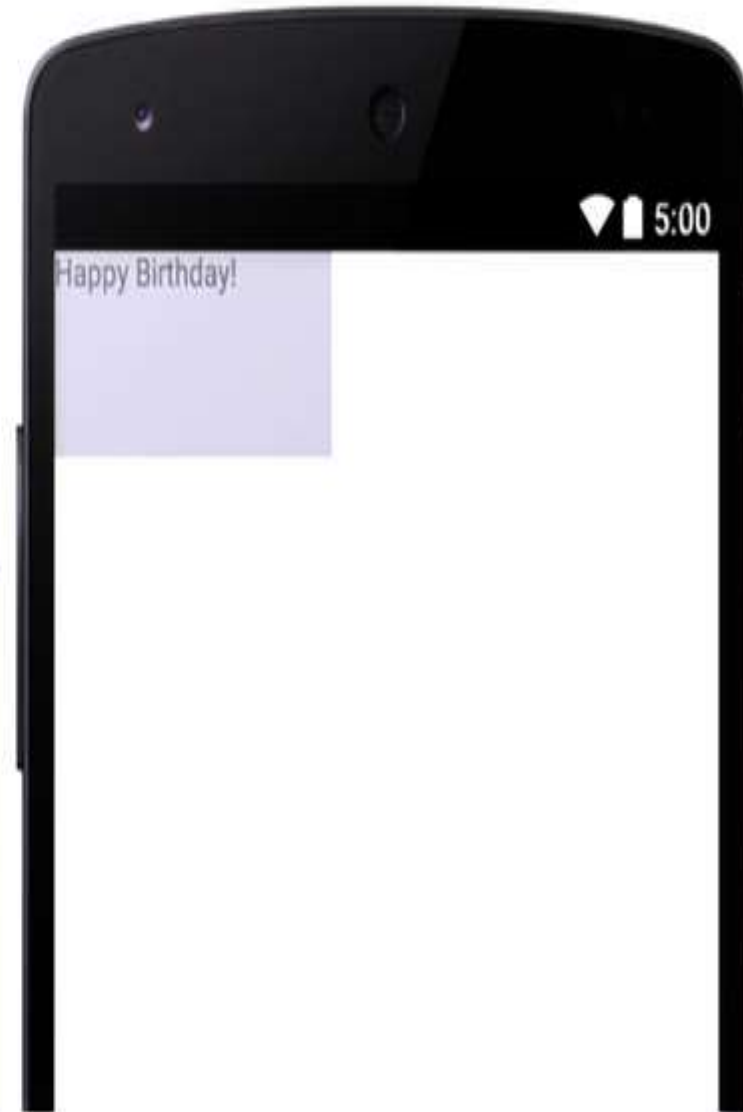
Identify the type of View

- | | | | |
|---|--|------------------------------------|--|
| A | <input checked="" type="checkbox"/> TextView | <input type="checkbox"/> ImageView | <input type="checkbox"/> Button |
| B | <input checked="" type="checkbox"/> TextView | <input type="checkbox"/> ImageView | <input type="checkbox"/> Button |
| C | <input type="checkbox"/> TextView | <input type="checkbox"/> ImageView | <input checked="" type="checkbox"/> Button |
| D | <input type="checkbox"/> TextView | <input type="checkbox"/> ImageView | <input checked="" type="checkbox"/> 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" />
```

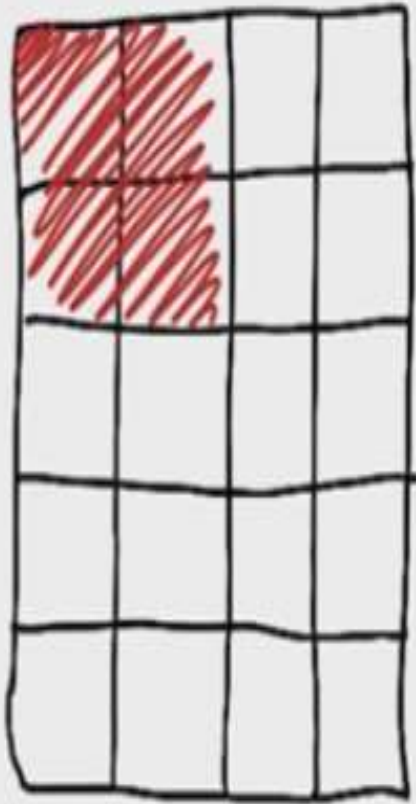
A mobile app interface showing a 'Happy Birthday!' message in a gray box. The text is white and centered within a rectangular gray area at the top of the screen. The rest of the screen is a solid light gray color.

px, dpi, dp, sp

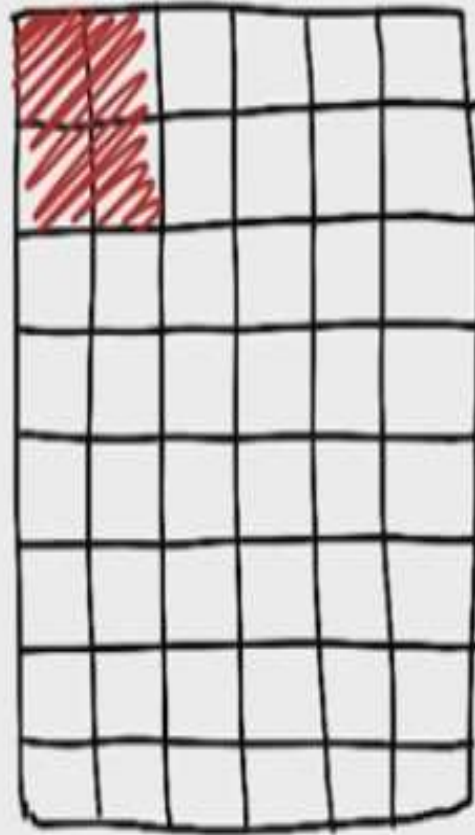
- px (pixel)
- dpi (*dots per inch*)
- dip/dp (*density independent pixel*)
- sp (scale independent *pixel*)

DENSITY-INDEPENDENT PIXELS

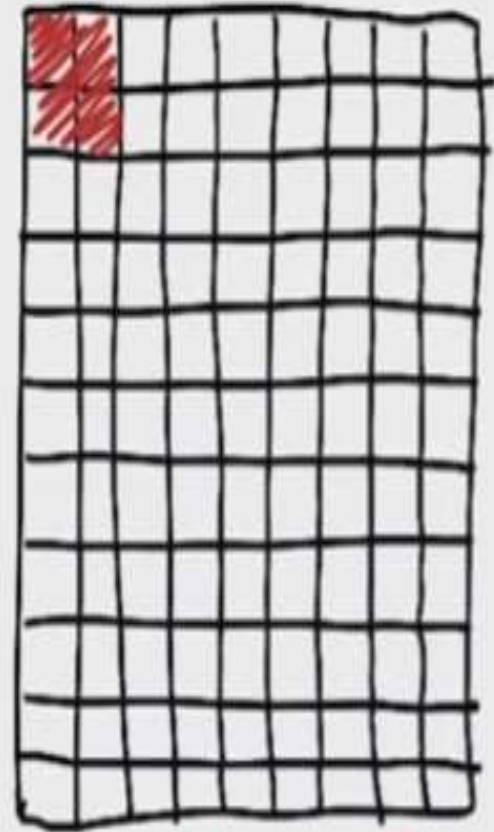
2 pixels by 2 pixels



Medium Resolution Device



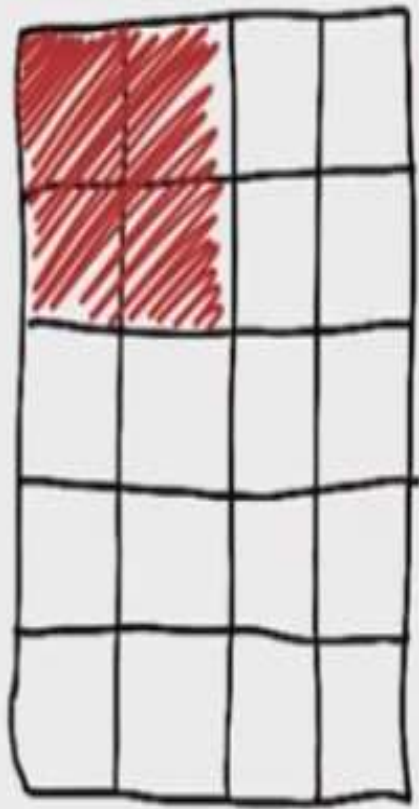
High Resolution Device



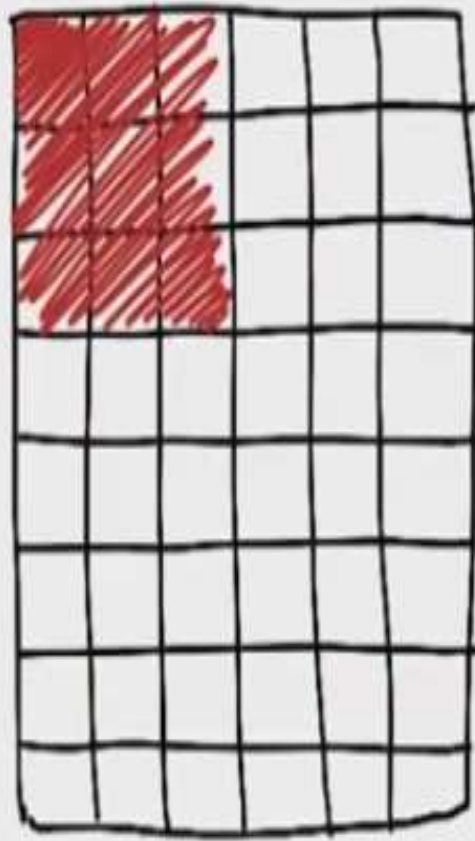
Extra-High Resolution Device

DENSITY-INDEPENDENT PIXELS

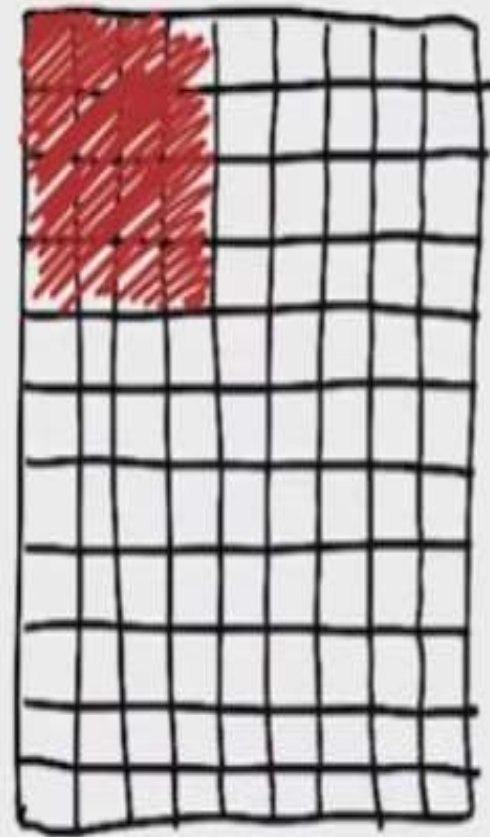
2 dp by 2 dp



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" />
```

My Photos

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" />
```



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
Relative Layout



Laura
Linear Layout

Children Views



Tommy
TextView



Ivy
ImageView

PARENTAL SUPERVISION



Laura
LinearLayout

- Tommy, sit here.
- Ivy, sit over there.
- Don't move!



Tommy
TextView



Ivy
ImageView



PARENTAL SUPERVISION



Laura
LinearLayout

- Tommy, sit here.
- Ivy, sit over there.
- Don't move!



Tommy
TextView



Ivy
ImageView



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



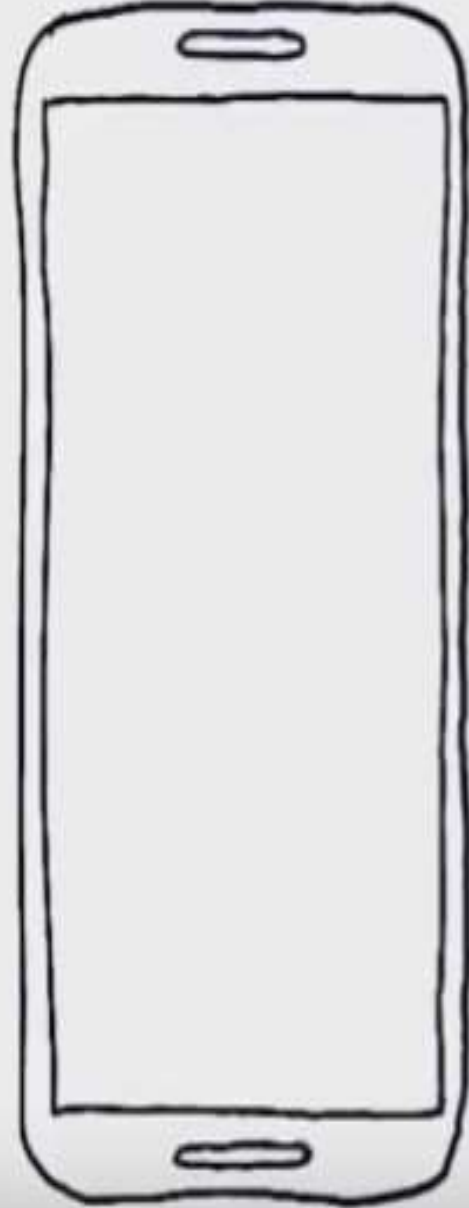
Laura
LinearLayout



Tommy
TextView



Ivy
ImageView



LINEAR LAYOUT

Vertical column



Laura
LinearLayout



Tommy
TextView



Ivy
ImageView



LINEAR LAYOUT

Horizontal row



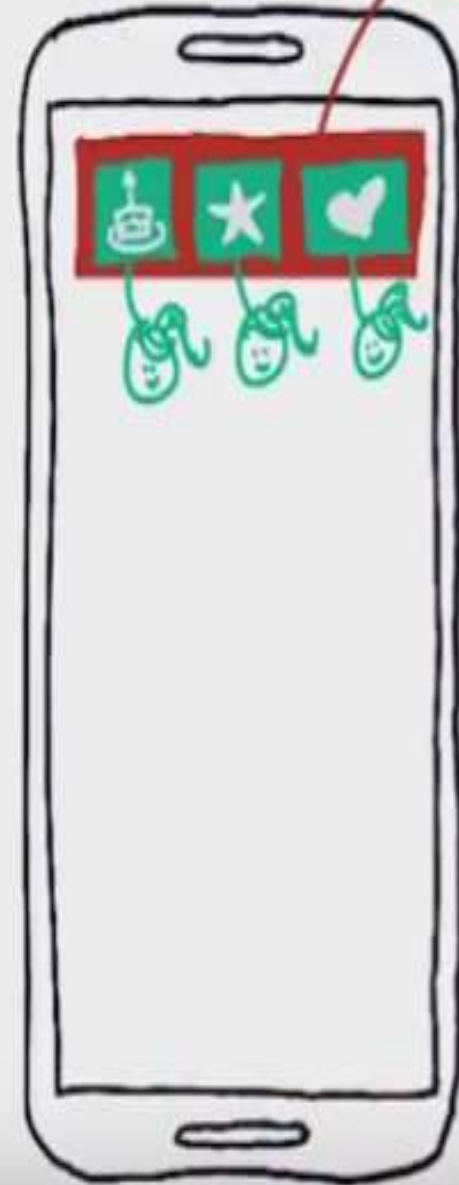
Laura
LinearLayout



Tommy
TextView



Ivy
ImageView



RELATIVE LAYOUT



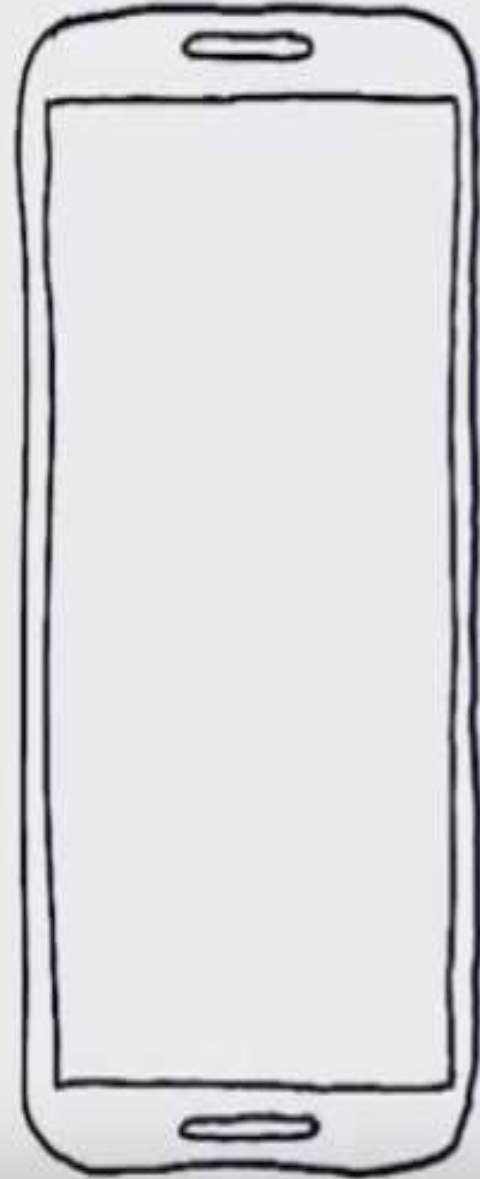
Ray
RelativeLayout



Tommy
TextView



Ivy
ImageView



RELATIVE LAYOUT

Relative to parent



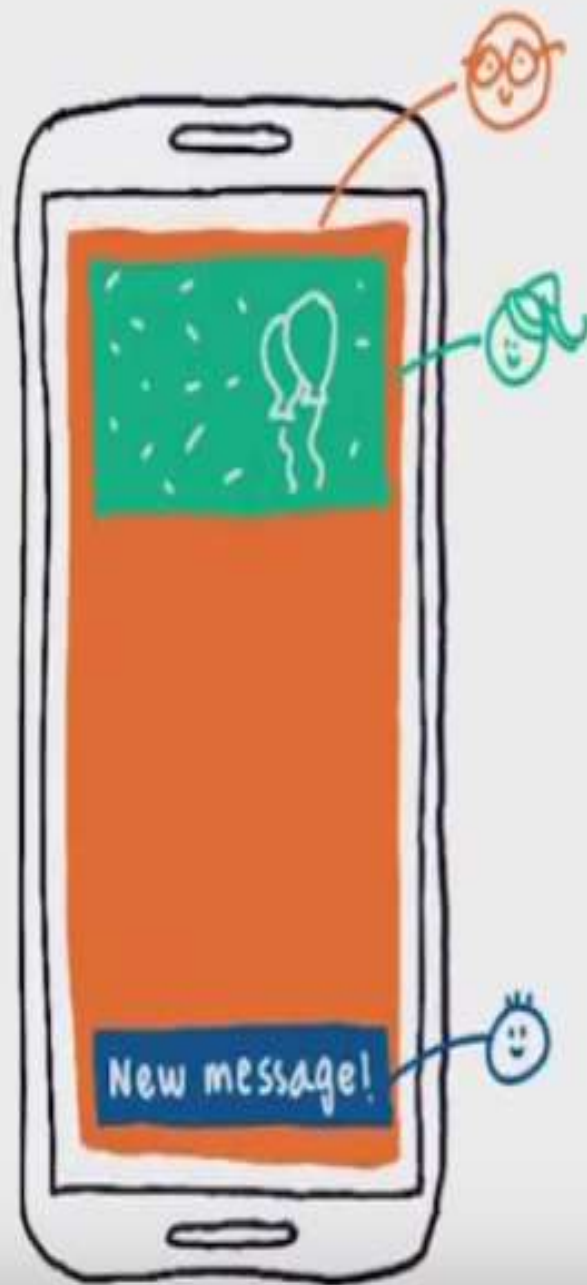
Ray
RelativeLayout



Tommy
TextView



Ivy
ImageView



RELATIVE LAYOUT

Relative to other children



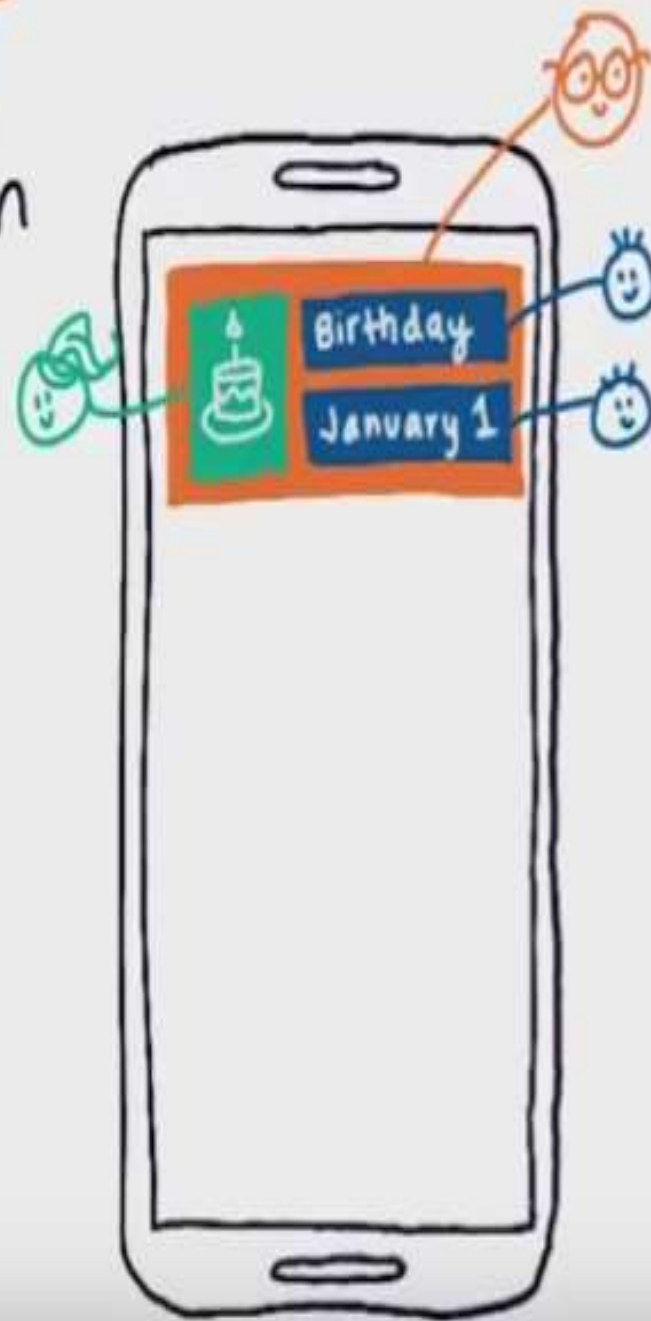
Ray
RelativeLayout



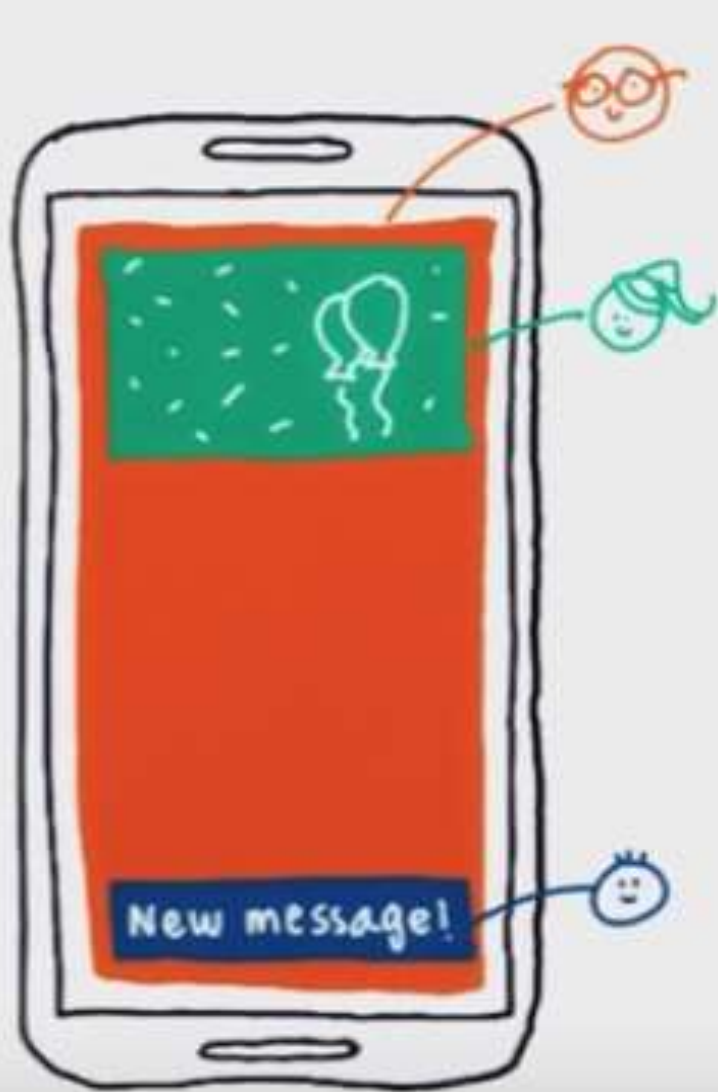
Tommy
TextView



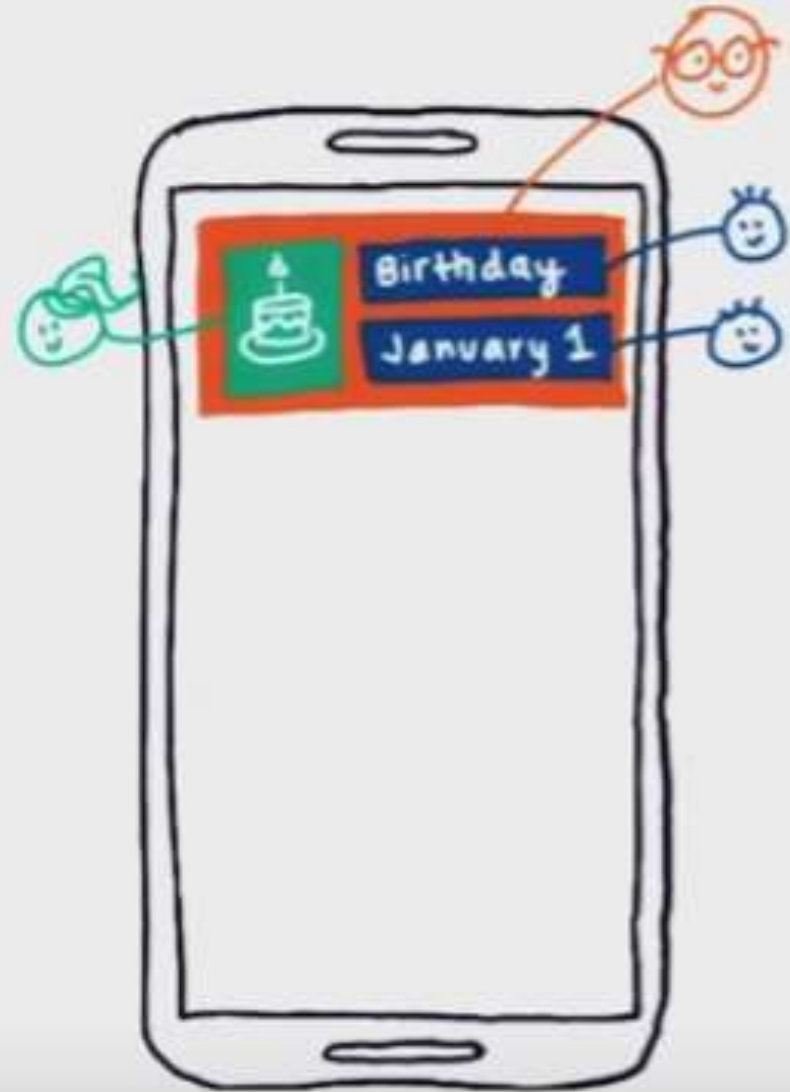
Ivy
ImageView



RELATIVE LAYOUT



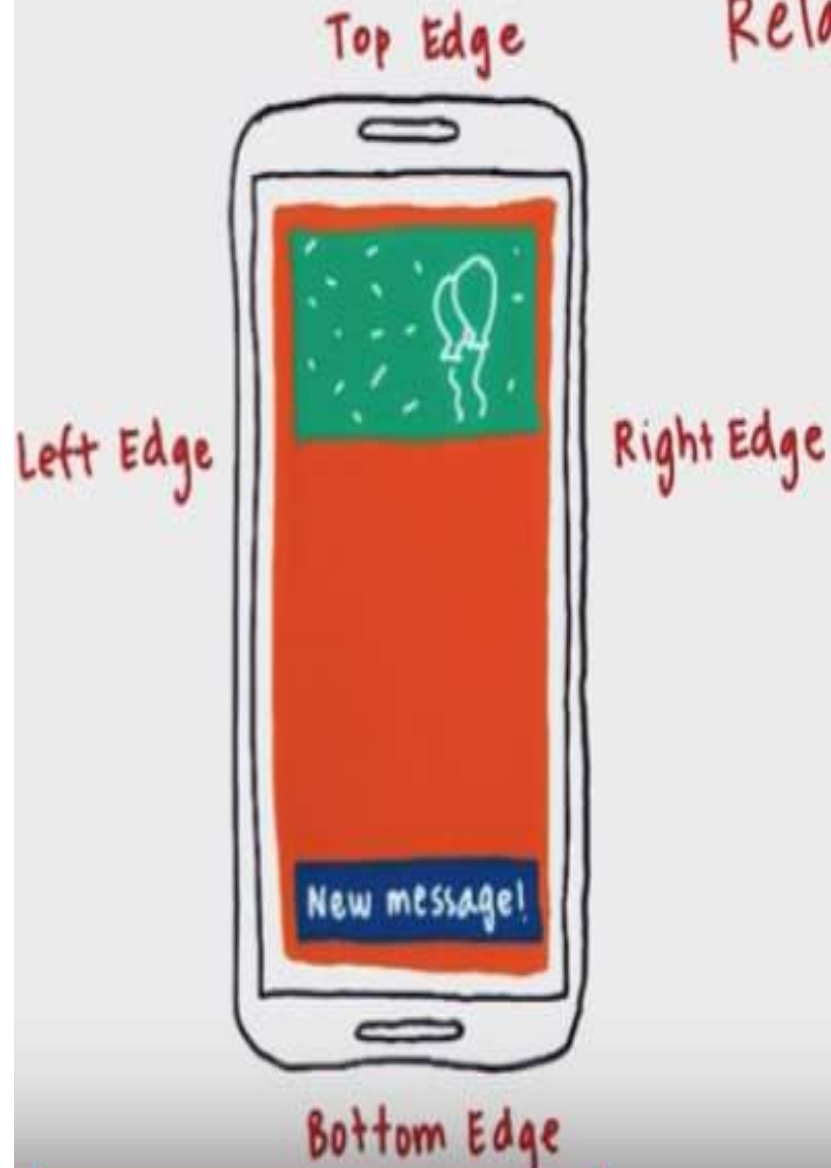
Relative to Parent



Relative to other children

RELATIVE LAYOUT

Relative to Parent



Child view attributes:

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

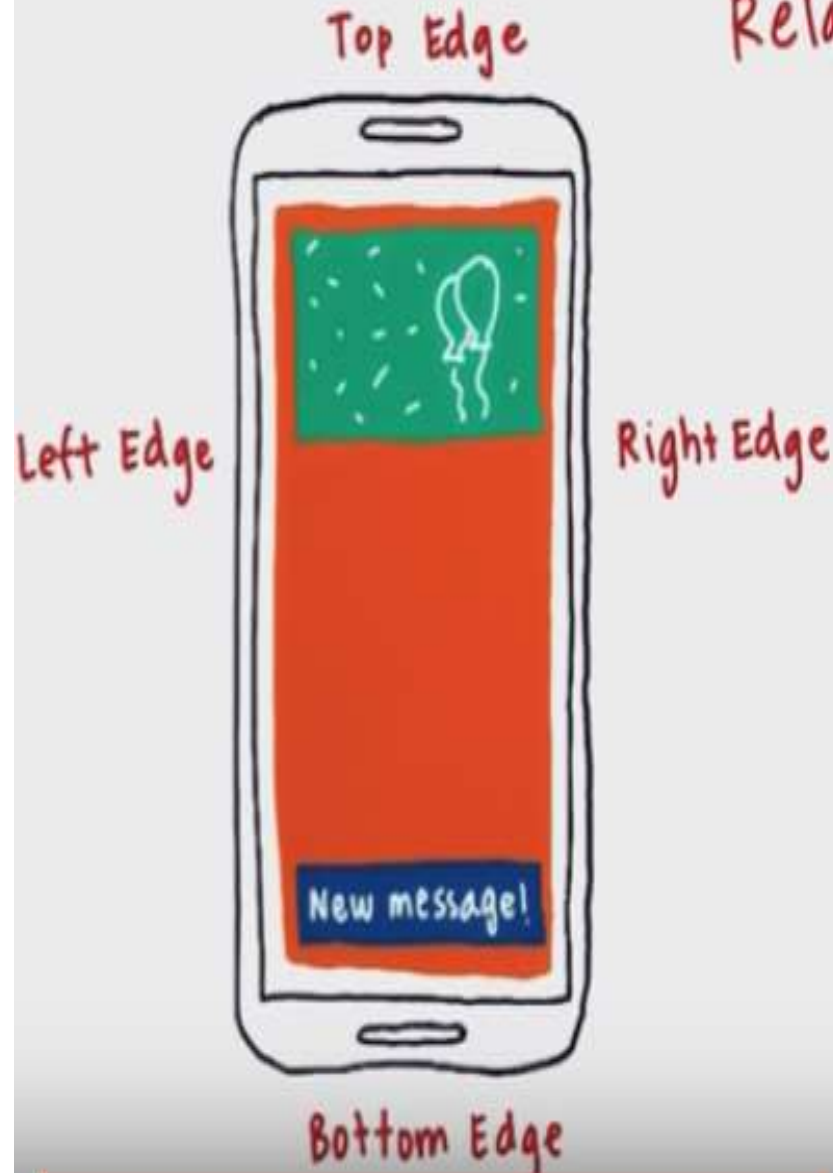
`android:layout_alignParentBottom`

`android:layout_alignParentLeft`

`android:layout_alignParentRight`

RELATIVE LAYOUT

Relative to Parent



TextView attributes:

`android:layout_alignParentTop = "false"`

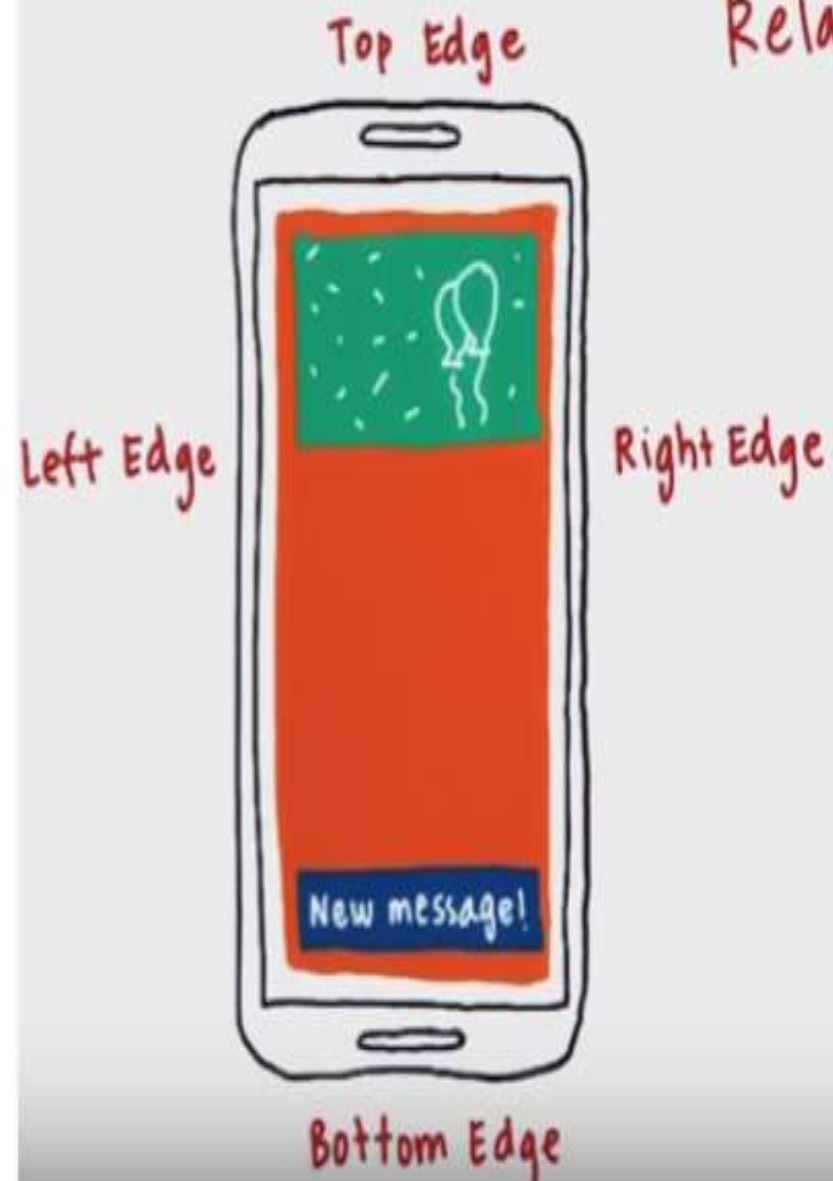
`android:layout_alignParentBottom = "true"`

`android:layout_alignParentLeft = "true"`

`android:layout_alignParentRight = "true"`

RELATIVE LAYOUT

Relative to Parent



ImageView attributes:

`android:layout_alignParentTop = "true"`

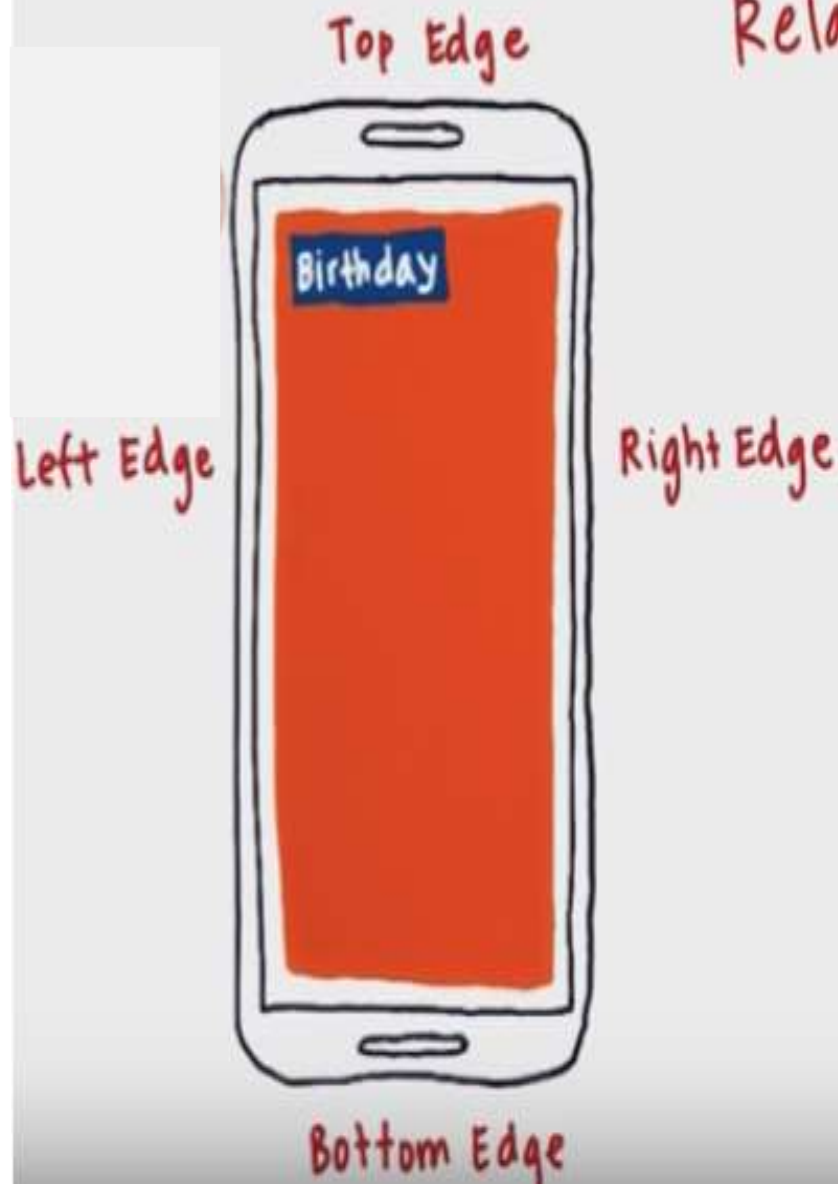
`android:layout_alignParentBottom = "false"`

`android:layout_alignParentLeft = "true"`

`android:layout_alignParentRight = "true"`

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"`

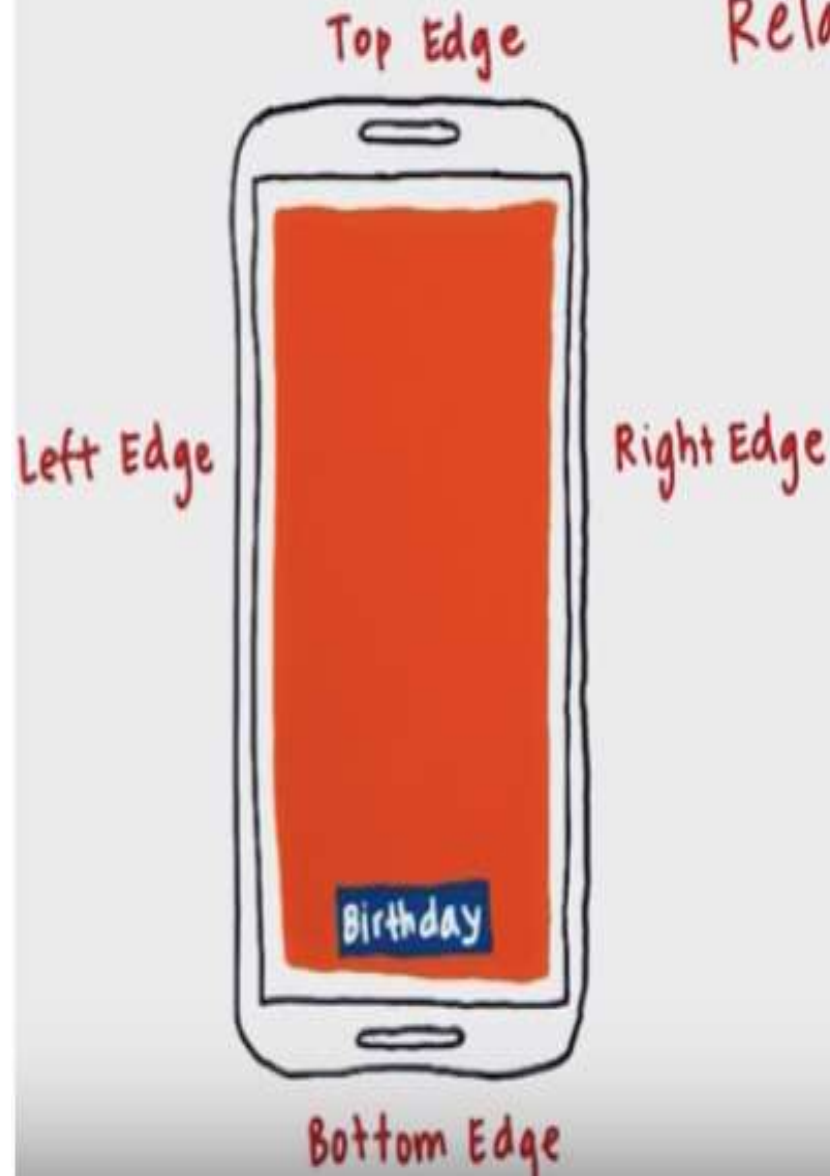
`android:layout_alignParentBottom`

`android:layout_alignParentLeft`

`android:layout_alignParentRight = "true"`

RELATIVE LAYOUT

Relative to Parent



Child view attributes:

`android:layout_alignParentTop`

`android:layout_alignParentBottom = "true"`

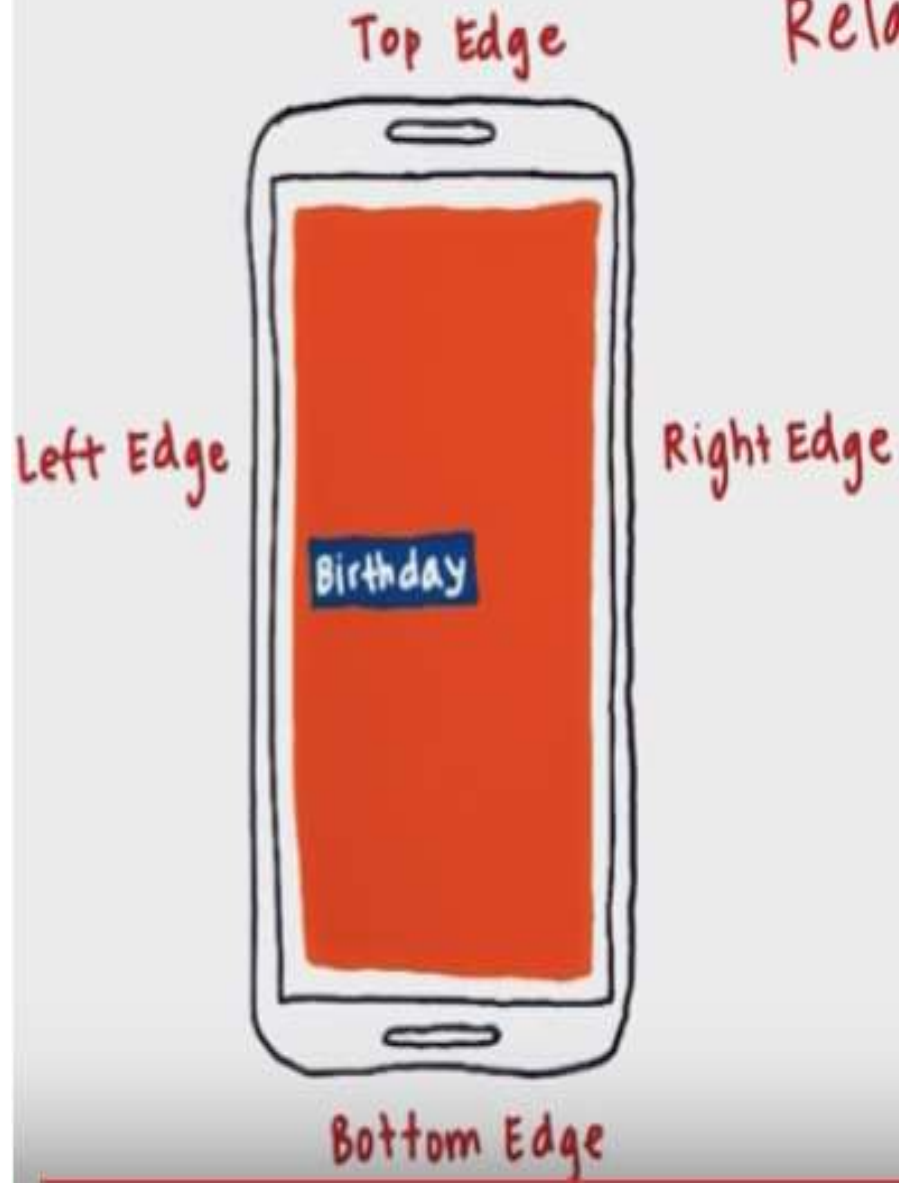
`android:layout_alignParentLeft`

`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"`


```
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

Natalie

Me

Ben

Kunal

Kagure

Jennie

Omoju

Amy

```
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"
```

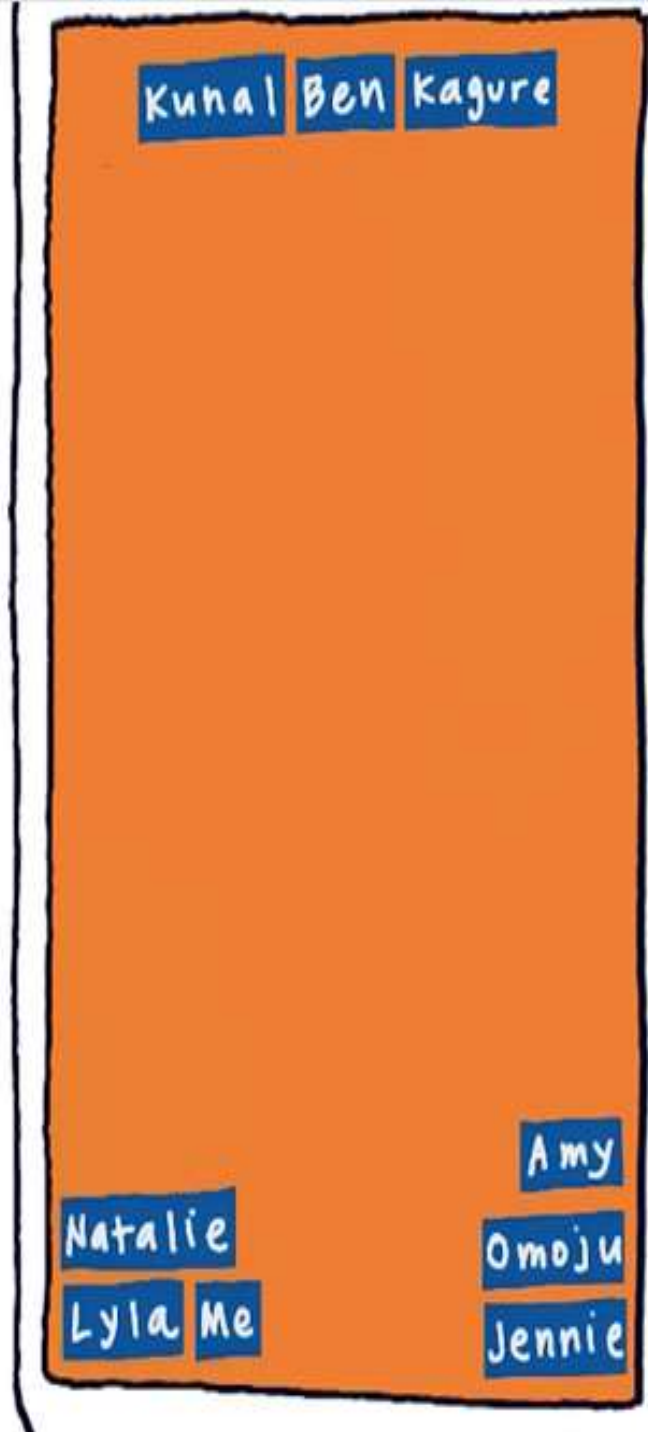



```
14
15 <TextView
16     android:id="@+id/jennie_text_view"
17     android:layout_width="wrap_content"
18     android:layout_height="wrap_content"
19     android:layout_alignParentBottom="true"
20     android:layout_alignParentRight="true"
21     android:textSize="24sp"
22     android:text="Jennie" />
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"
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>
```



```
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
```





RELATIVE LAYOUT

Positioning children relative
to other views

- ❑ Modify the provided XML layout to achieve this desired layout



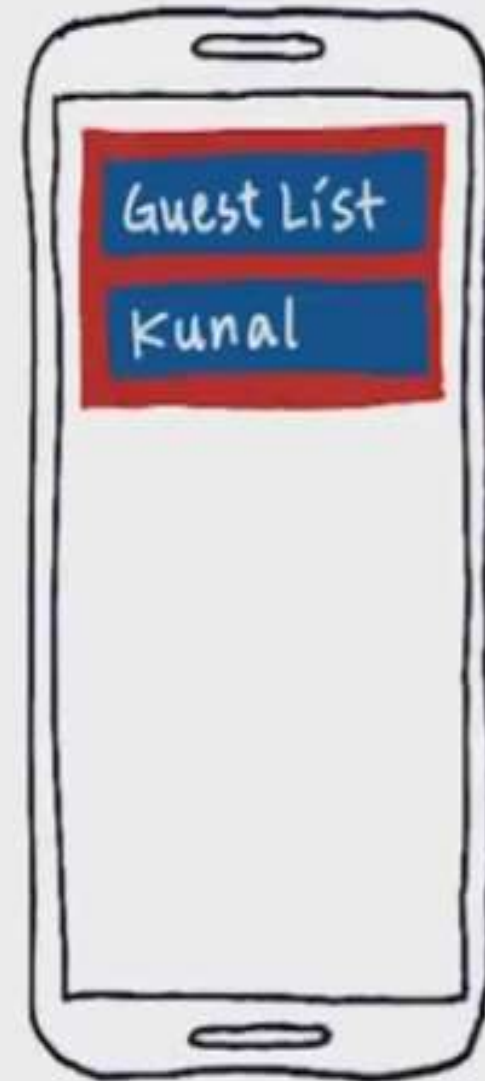
VIEW GROUPS

```
<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



```
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>
```



Guest ListKunalKunal

DIFFERENT WIDTHS ON CHILD VIEWS

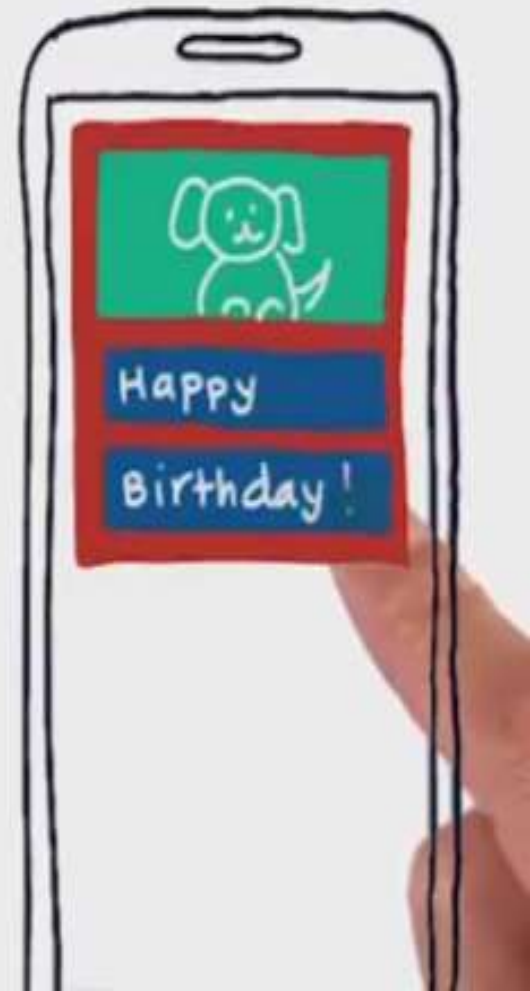
200 dp



wrap-content



match-parent



DIFFERENT HEIGHTS ON CHILD VIEWS

200 dp



wrap-content

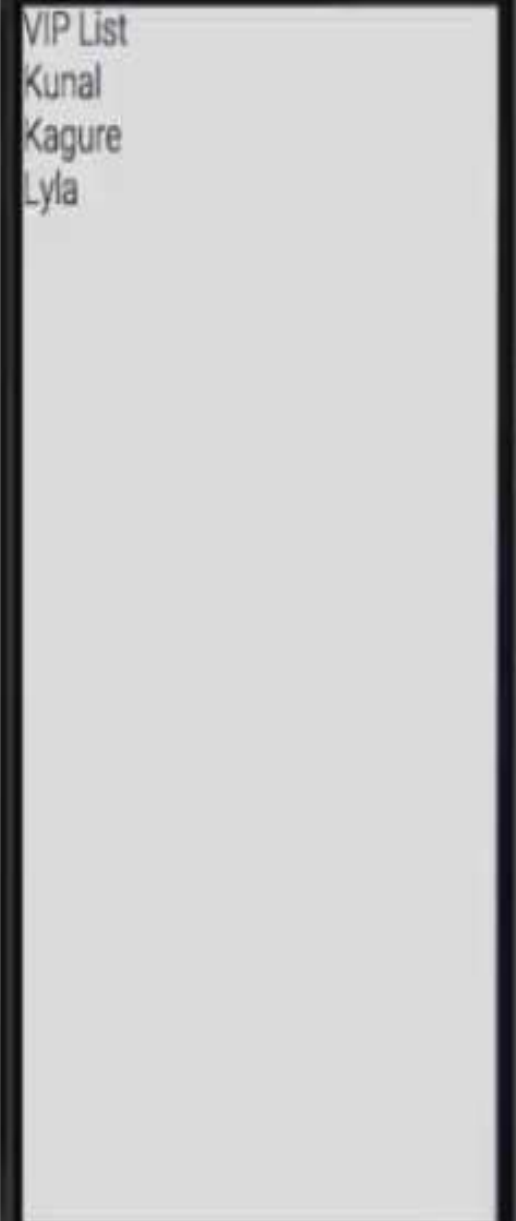


match-parent



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" />
```



VIP List
Kunal
Kagure
Lyla

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" />
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24     android:layout_width="wrap_content"
25     android:layout_height="wrap_content"
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28
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```



WIDTH and HEIGHT

☐ Try different width and height values for each `TextView`

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

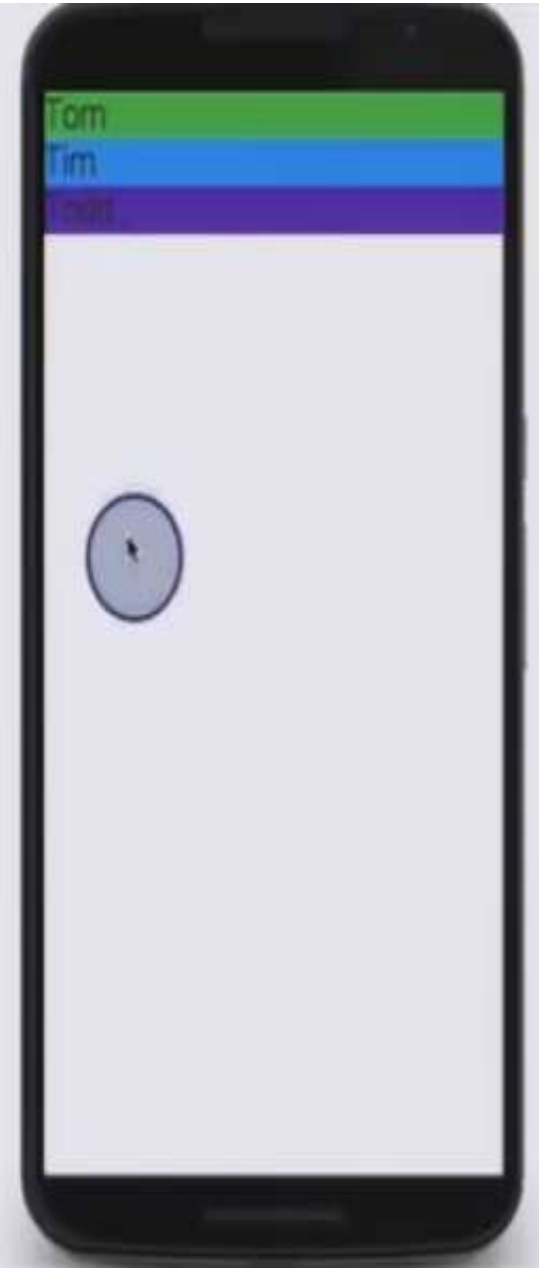
* Remember that width and height *
don't have to match



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>
```



```
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" />
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22   <TextView
23     android:text="Todd"
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25     android:layout_height="wrap_content"
26     android:textSize="24sp"
27     android:background="#673AB7" />
28
29 </LinearLayout>
```




```
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2   xmlns:android="http://schemas.android.com/apk/res/android"
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7   <TextView
8     android:text="Tom"
9     android:layout_width="match_parent"
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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" />
```



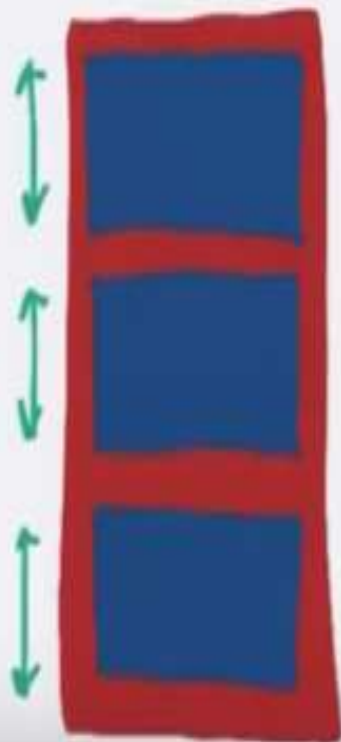

```
1 <LinearLayout
2   xmlns:android="http://schemas.android.com/apk/res/android"
3   android:orientation="vertical"
4   android:layout_width="match_parent"
5   android:layout_height="match_parent">
6
7   <TextView
8     android:text="Tom"
9     android:layout_width="match_parent"
10    android:layout_height="0dp"
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="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

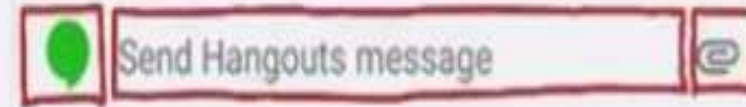


3 child views
width: 0 dp
weight: 1

HANGOUTS APP



Horizontal Linear Layout

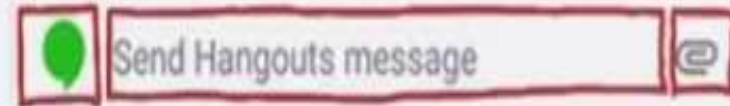


ImageView EditText ImageView

HANGOUTS APP



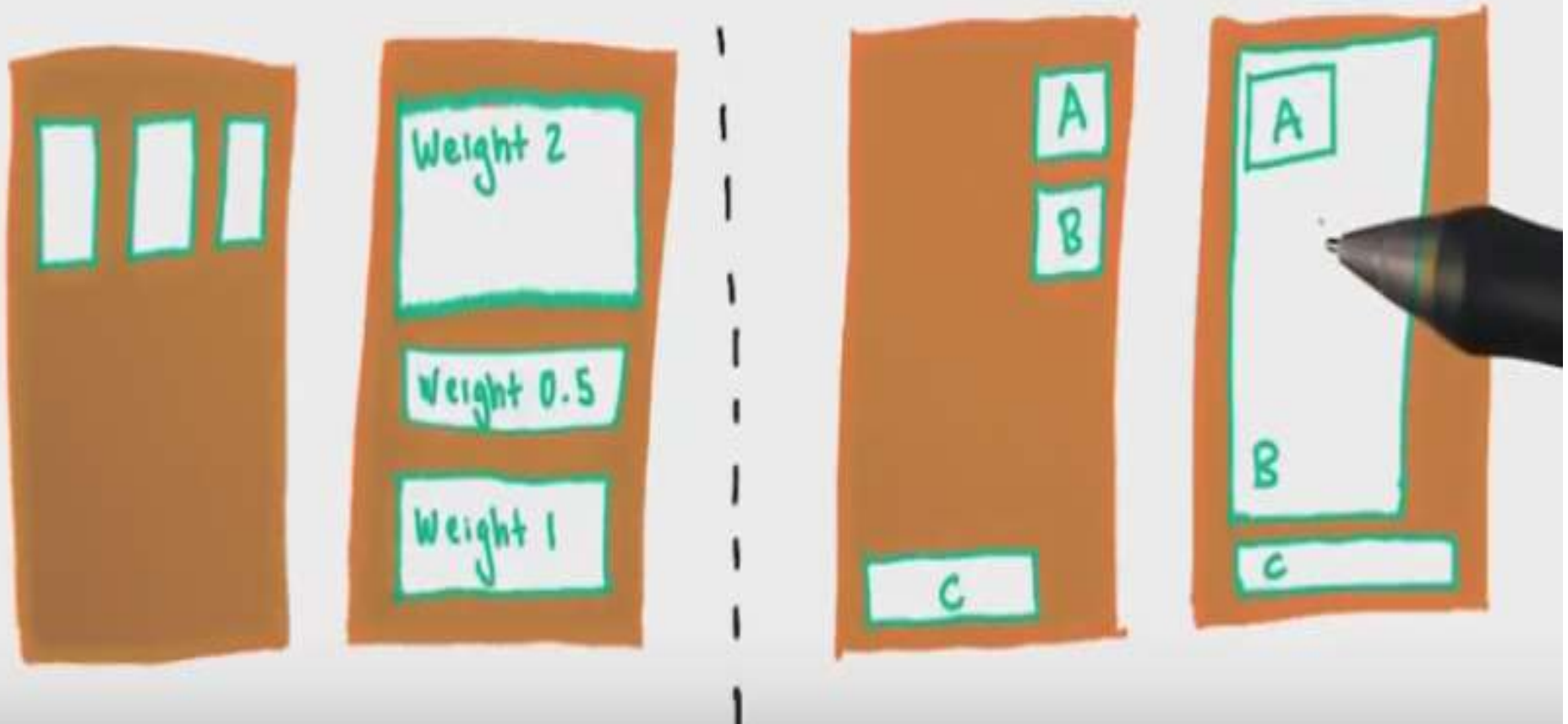
Horizontal LinearLayout



	ImageView	EditText	ImageView
Height	wrap_content	wrap_content	wrap_content
Width	wrap_content	0dp	wrap_content
weight	0	1	0

Position the Views

Linear Layout VS Relative Layout





Thank you!