

# Introduction to Touch screen

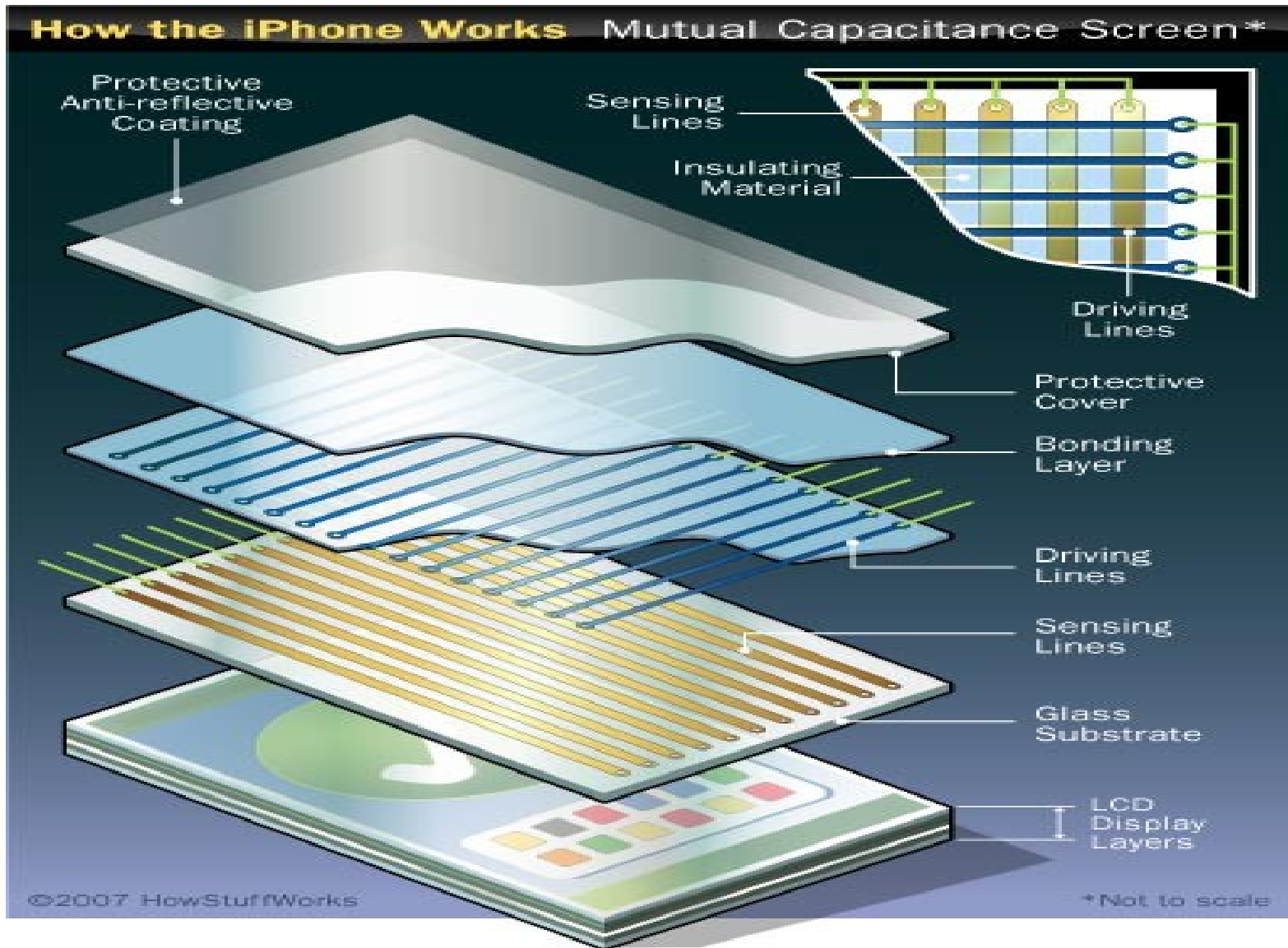
CS 436 Software Development on Mobile

**Dr.Paween Khoenkaw**

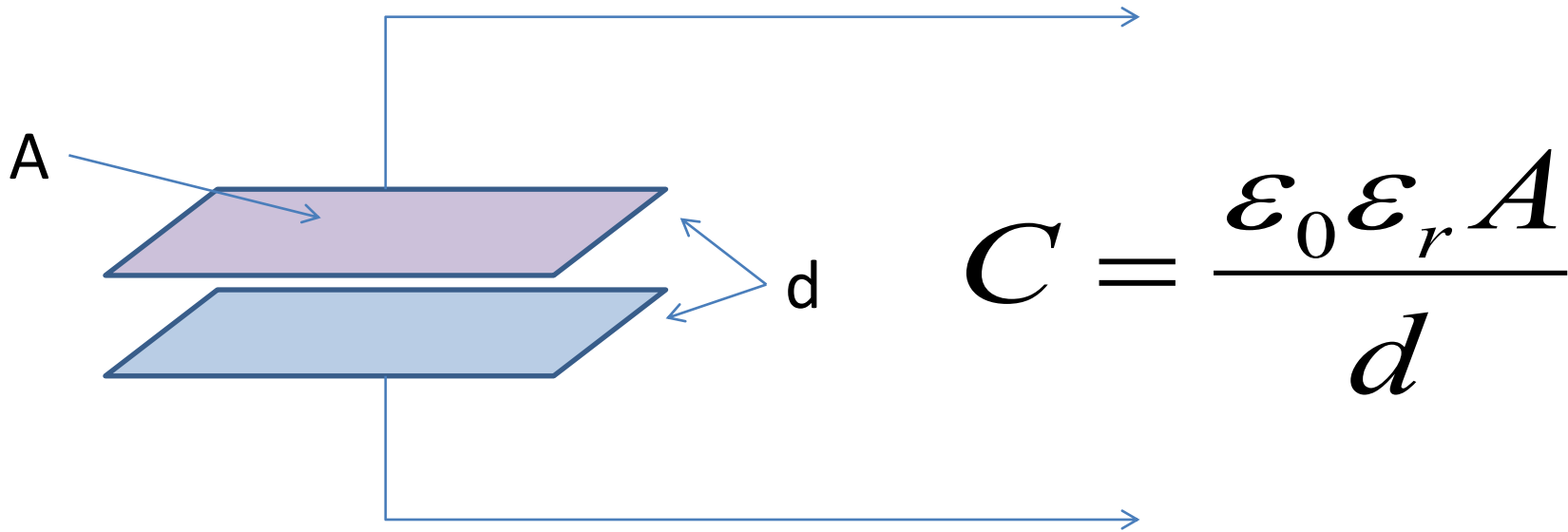
Department of Computer Science  
Maejo University



# Multi-touch



# Multi-touch



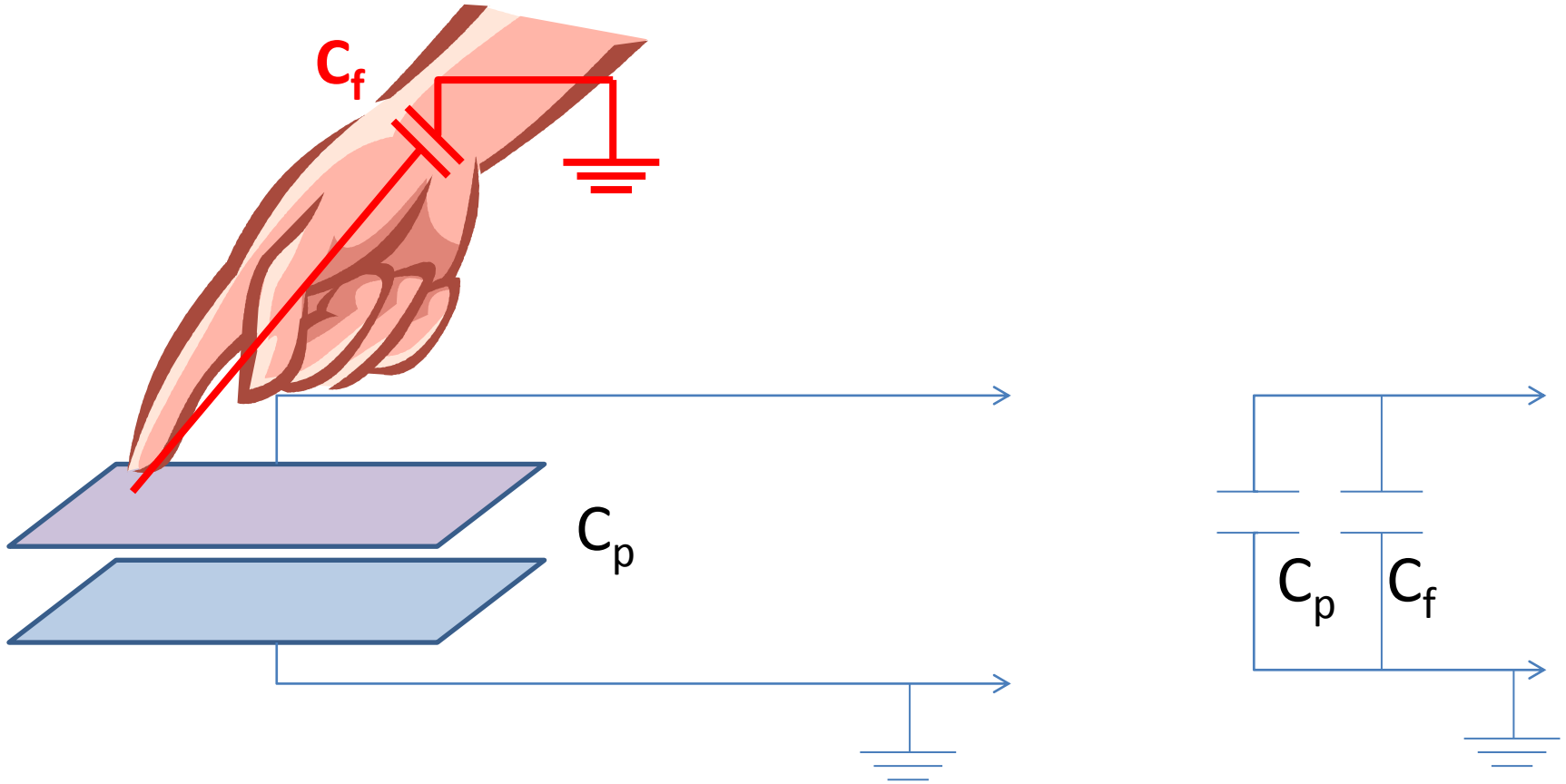
C = Capacitance (Farads)

$\epsilon_0$  = Permittivity of free space (0.854pico-Farad/meter)

$\epsilon_r$  = Relative Dielectric Constant

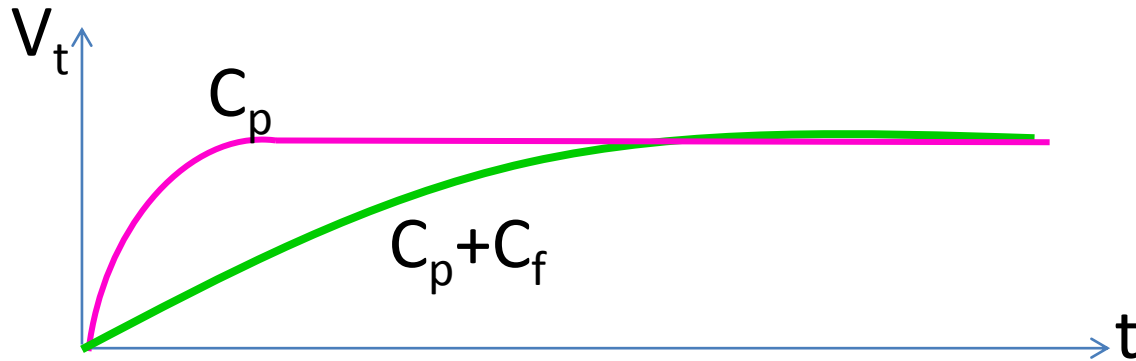
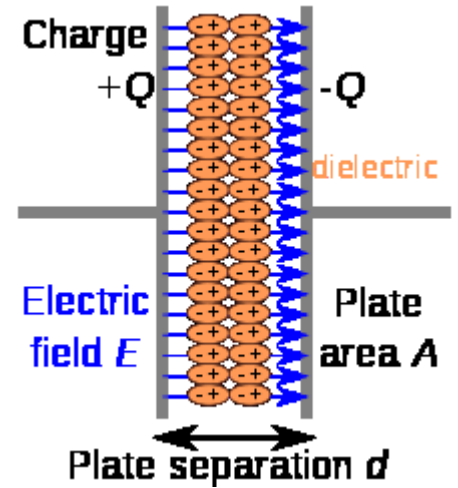
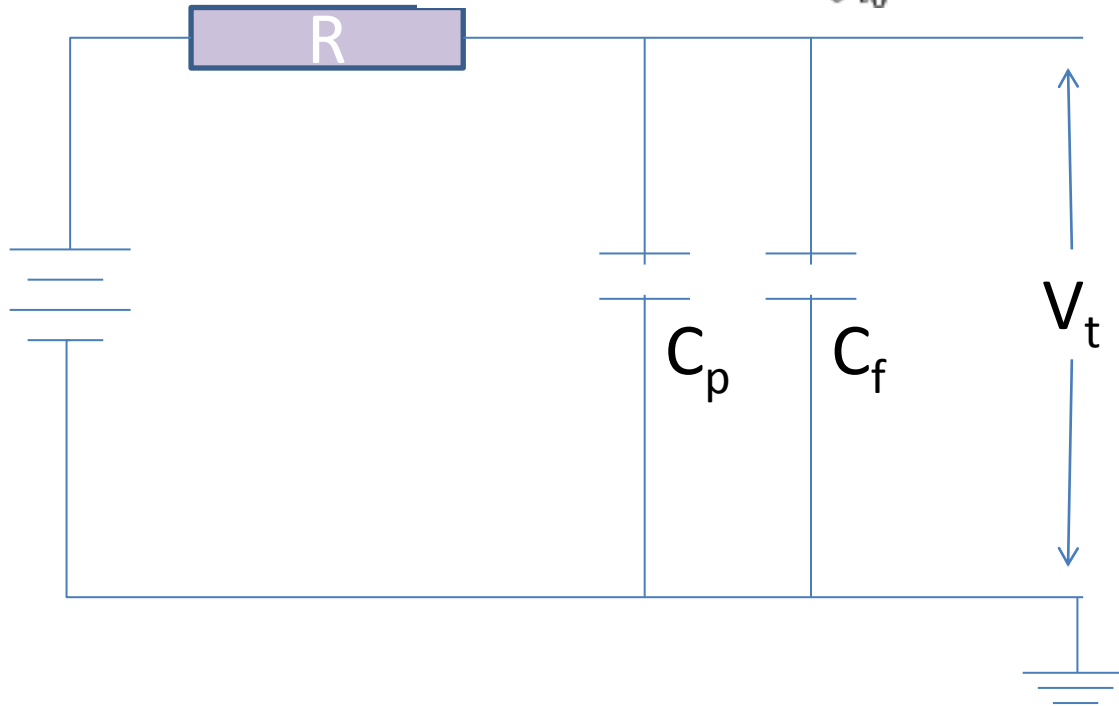
A = Area of plates

# Multi-touch

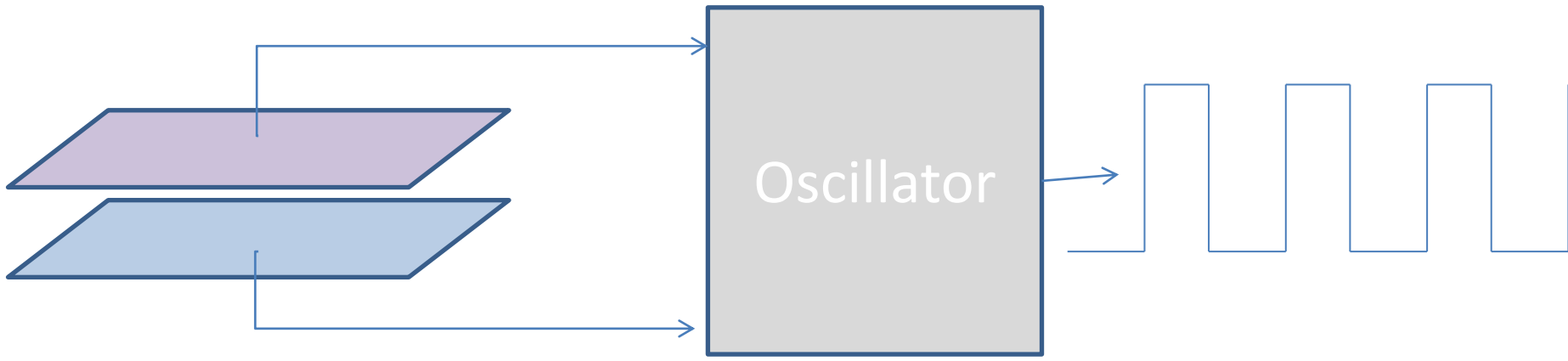


# Multi-touch

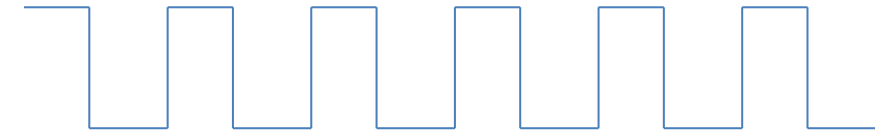
$$V(t) = \frac{Q(t)}{C} = \frac{1}{C} \int_{t_0}^t I(\tau) d\tau + V(t_0)$$



# Multi-touch



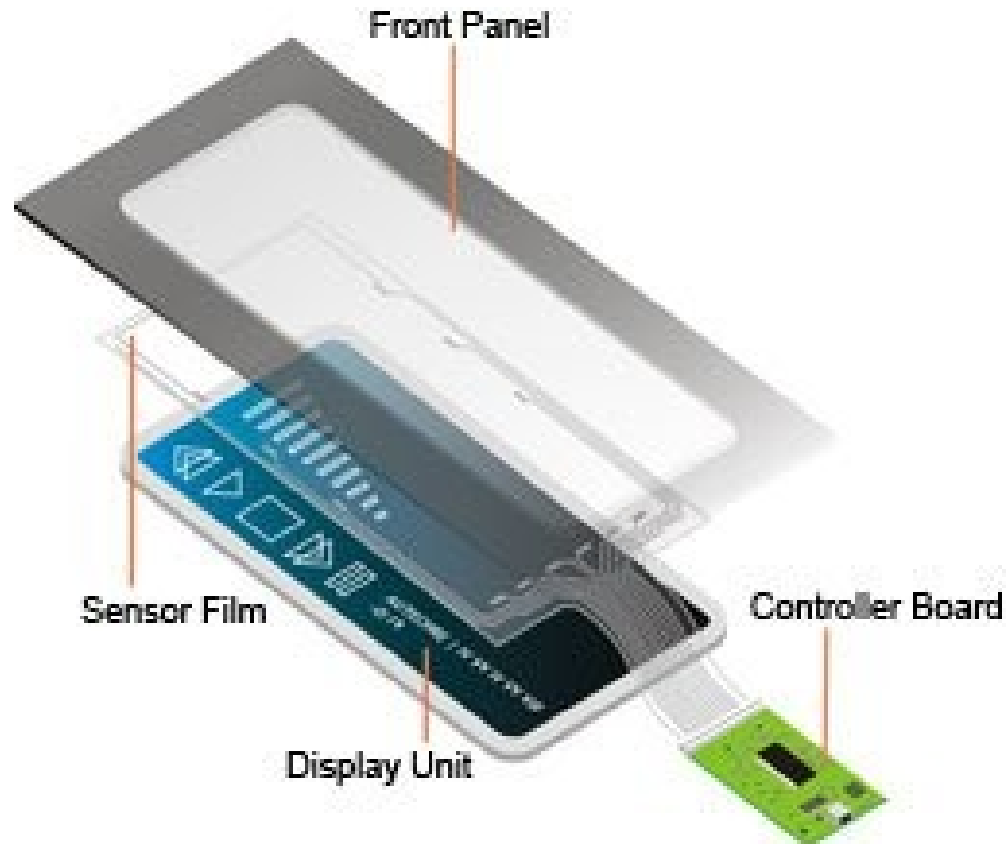
No touch



Touch



# Multi-touch



Atmel's touchscreen offering includes the touch controller IC and board reference designs as well as sensor reference.

# Multi-touch

Android Activity only single touch

How to detect multi-touch in activity ?



# Multi-touch

## Enable multi-touchable button

```
<RelativeLayout
xmlns:android="http://schemas.android.com/apk/res/android"
  xmlns:tools="http://schemas.android.com/tools"
  android:layout_width="match_parent"
  android:layout_height="match_parent"
  tools:context=".MainActivity"
  android:splitMotionEvents="true"
  android:id="@+id/layout1"
  >
  <Button
    android:id="@+id/button1"
    ....."/>
  <Button
  ...../>
</RelativeLayout>
```

# Multi-touch

## Finger counter

Handler h;

Global

h=new Handler();

OnCreate

```
private Runnable updater=new Runnable()
{@Override
    public void run() {

t1.setText(String.valueOf(fingerCount));
    }
};
```

# Multi-touch

## Finger counter

### Override OnCreate

```
@Override  
public boolean onTouchEvent(MotionEvent event) {  
  
    fingerCount=event.getPointerCount();  
  
        h.post(updater);  
        return super.onTouchEvent(event);  
  
}
```

Thank you 😊