



Touch in iOS:

It's just a tap to the left and then a swipe to the right.

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Agenda

1. Designing for Touch
3. Touch in iOS
 - a. Simple Touch
 - b. Gesture Recognizers
 - c. Custom Gestures



Designing for Touch

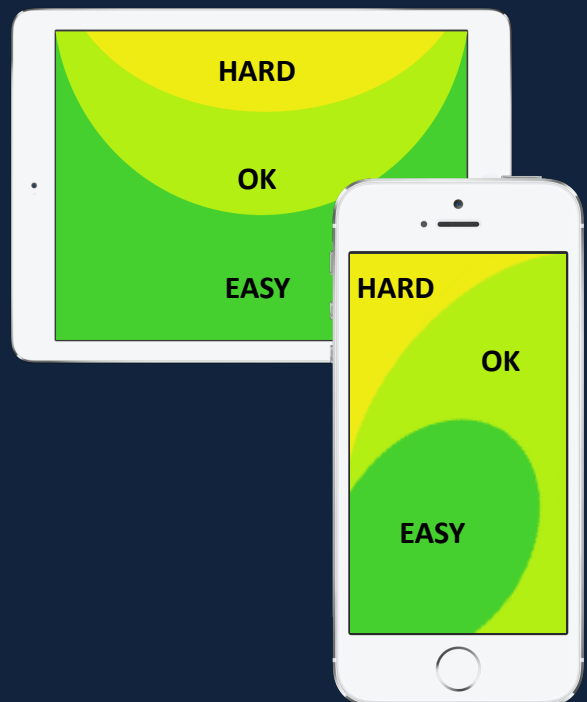
- to put your hand, fingers, etc., on someone or something

<http://www.merriam-webster.com/dictionary/touch>

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Design for Human Touch

- Think about interaction scenarios
- Are UI widgets too small?
- What is obscured by hands?
- How much movement is required?



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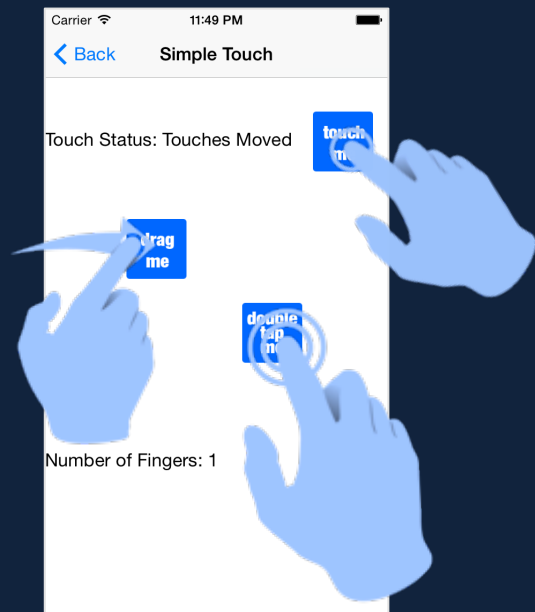
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Simple Touch

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Simple Touch

- Motion Event Action
- Event Timing
- Location

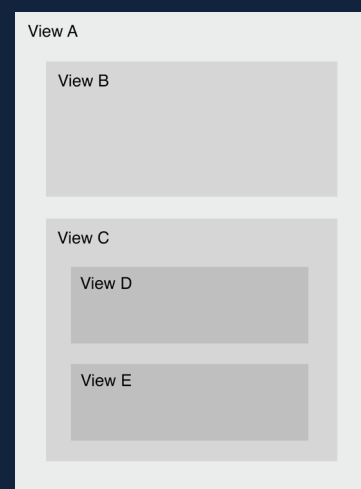


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Enabling Touch-Event Handling

```
View.UserInteractionEnabled = true;
```

```
View.MultipleTouchEnabled = true;
```



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Implementing the Touch-Event Handling Methods

```
public override void TouchesBegan(NSSet touches, UIEvent evt){  
    base.TouchesBegan(touches, evt);  
}
```

```
public override void TouchesMoved(NSSet touches, UIEvent evt){  
    base.TouchesMoved(touches, evt);  
}
```

(NSSet touches, UIEvent evt)

```
public override void TouchesEnded(NSSet touches, UIEvent evt){  
    base.TouchesEnded(touches, evt);  
}
```

```
public override void TouchesCancelled(NSSet touches, UIEvent evt){  
    base.TouchesCancelled(touches, evt);  
}
```

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You tapped, sir?

```
public override void TouchesBegan(NSSet touches, UIEvent evt){  
    base.TouchesBegan(touches, evt);  
  
    var touch = touches.AnyObject as UITouch;  
  
    if (touch.TapCount == 2){  
        ...  
    }  
  
    ...  
}
```

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Where was that tap?

```
public override void TouchesBegan(NSSet touches, UIEvent evt){
    base.TouchesBegan(touches, evt);

    ...

    if (imgDragMe.Frame.Contains(touch.LocationInView(View))){
        touchStartedInside = true;
    }

    ...
}
```

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That is far enough!

```
public override void TouchesCancelled(NSSet touches, UIEvent evt){
    base.TouchesCancelled(touches, evt);

    // reset our tracking flags
    touchStartedInside = false;
}

public override void TouchesEnded(NSSet touches, UIEvent evt){
    base.TouchesEnded(touches, evt);

    var touch = touches.AnyObject as UITouch;

    if (touch == null) return;

    // reset our tracking flags
    touchStartedInside = false;
}
```

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That is far enough!

```
public override void TouchesCancelled(NSSet touches, UIEvent evt){  
    base.TouchesCancelled(touches, evt);  
  
    // reset our tracking flags  
    touchStartedInside = false;  
}  
  
public override void TouchesEnded(NSSet touches, UIEvent evt){  
    base.TouchesEnded(touches, evt);  
  
    var touch = touches.AnyObject as UITouch;  
  
    if (touch == null) return;  
  
    // reset our tracking flags  
    touchStartedInside = false;  
}
```

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Demo

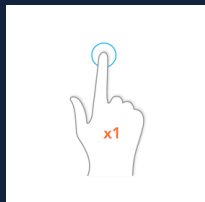
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Gestures

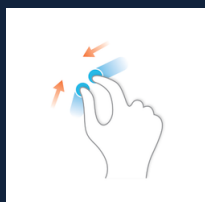
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Gesture Recognizers

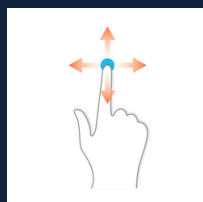
Detection for Gestures



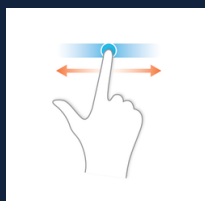
Tap



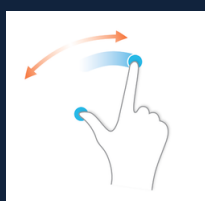
Pinch



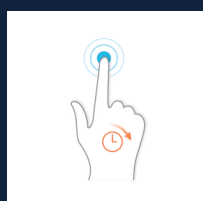
Pan



Swipe



Rotation



Long Press

Images from Wikipedia - http://en.wikipedia.org/wiki/Multi-touch#Multi-touch_gestures

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Implementing UITapGestureRecognizer

Tap, Tap ... who's there?

```
var tapGestureRecognizer = new UITapGestureRecognizer();
tapGestureRecognizer.AddTarget(
    (tg) => {
        var currTapGesture = (tg as UITapGestureRecognizer);
        if (currTapGesture == null) return;

        lblGestureStatus.Text = string.Format("Tap Location: @{ 0}",
            currTapGesture.LocationOfTouch(touchIndex, imgTapMe));
    } );

tapGestureRecognizer.NumberOfTapsRequired = 2;
imgTapMe.AddGestureRecognizer(tapGestureRecognizer);
```

Index of touch in gesture

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Implementing UITapGestureRecognizer

Tap, Tap ... who's there?

```
var tapGestureRecognizer = new UITapGestureRecognizer();
tapGestureRecognizer.AddTarget(
    (tg) => {
        var currTapGesture = (tg as UITapGestureRecognizer);
        if (currTapGesture == null) return;

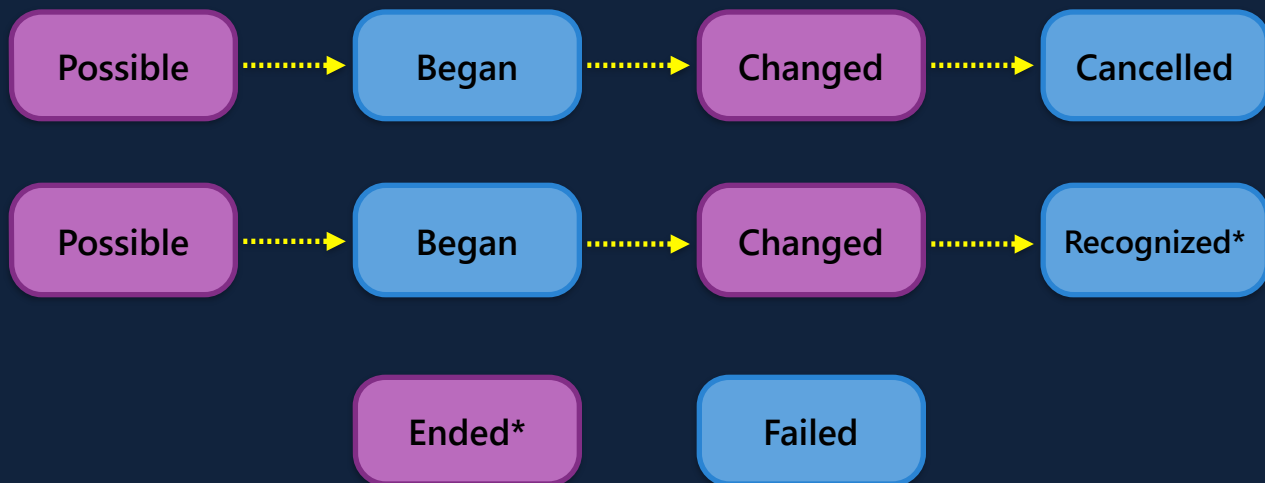
        lblGestureStatus.Text = string.Format("Tap Location: @{ 0}",
            currTapGesture.LocationOfTouch(0, imgTapMe));
    } );

tapGestureRecognizer.NumberOfTapsRequired = 2;
imgTapMe.AddGestureRecognizer(tapGestureRecognizer);
```

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Gesture Recognizer States

What, where? ... oh!



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Implementing UITapGestureRecognizer

See? Glide. It's all in the Don't I look pretty?*

```
imgDragMe.AddGestureRecognizer(new UIPanGestureRecognizer(HandleDrag));  
private void HandleDrag(UIPanGestureRecognizer recognizer) {  
    switch (recognizer.State) {  
        case UIGestureRecognizerState.Began:  
            // if it's just began, cache the location of the image  
            originalImageFrame = imgDragMe.Frame;  
            break;  
        case UIGestureRecognizerState.Possible:  
        case UIGestureRecognizerState.Cancelled:  
        case UIGestureRecognizerState.Failed:  
            return;  
    }  
    ...  
}
```

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* Victor "Vic" Melling - Miss Congeniality

Demo

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Custom Gestures

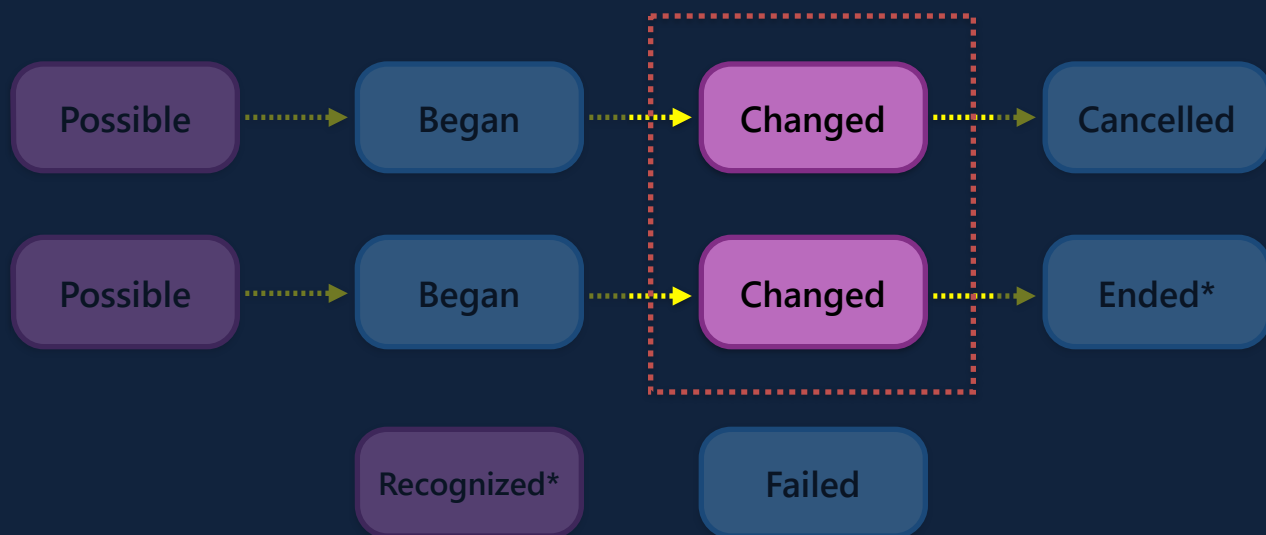
- Custom Create Recognizer
- Fully customizable
- Detect multiple motion events



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Gesture Recognizer States

What, where? ... oh, OH!



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Let's Build IT ... Ourselves!



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Wait ... we can build it ourselves !

```
public class CheckmarkGestureRecognizer : UIGestureRecognizer {  
    public override void Reset() {  
        base.Reset();  
        ...  
    }  
  
    public override void TouchesBegan(NSSet touches, UIEvent evt) {  
        base.TouchesBegan(touches, evt);  
  
        // we want one and only one finger  
        if (touches.Count != 1)  
            State = UIGestureRecognizerState.Failed;  
    }  
  
    ... Continue ...  
}
```

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Wait ... we can build it ourselves !

```
public class CheckmarkGestureRecognizer : UIGestureRecognizer {  
    public override void Reset() {  
        base.Reset();  
        ...  
    }  
  
    public override void TouchesBegan(NSSet touches, UIEvent evt) {  
        base.TouchesBegan(touches, evt);  
  
        // we want one and only one finger  
        if (touches.Count != 1)  
            State = UIGestureRecognizerState.Failed;  
    }  
  
    ... Continue ...  
}
```

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Wait ... we can build it ourselves !

```
public class CheckmarkGestureRecognizer : UIGestureRecognizer {  
    ... Continued ...  
  
    public override void TouchesCancelled(NSSet touches, UIEvent evt) {  
        base.TouchesCancelled(touches, evt);  
  
        // we fail the recognizer so that there isn't unexpected behavior  
        // if the application comes back into view  
        State = UIGestureRecognizerState.Failed;  
    }  
  
    ... Continue ...  
}
```

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Wait ... we can build it ourselves !

```
public class CheckmarkGestureRecognizer : UIGestureRecognizer {  
    ... Continued ...  
  
    public override void TouchesMoved(NSSet touches, UIEvent evt) {  
        base.TouchesMoved(touches, evt);  
  
        // if we haven't already failed  
        if (State != UIGestureRecognizerState.Failed) {  
            ...  
            strokeUp = true;  
        }  
  
        ...  
    }  
}
```

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Wait ... we can build it ourselves !

```
public class CheckmarkGestureRecognizer : UIGestureRecognizer {  
    ... Continued ...  
  
    public override void TouchesEnded(NSSet touches, UIEvent evt) {  
        base.TouchesEnded(touches, evt);  
  
        //If we are able to detect our gesture and we are on the up stroke  
        //we know that our gesture was successful  
        if (State == UIGestureRecognizerState.Possible && strokeUp) {  
            State = UIGestureRecognizerState.Recognized;  
        }  
        ...  
    }  
  
    ... Continue ...  
}
```

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Demo

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Summary

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