1. 12 marks
   1. What is the difference between onSingleTapUp and onSingleTapConfirmed callbacks?

Unlike onSingleTapConfirmed, which is notified when the detector is confident that the user’s first tap is not followed by a second tap leading to a double-tap gesture, onSingleTapUp is notified when a tap occurs with the up MotionEvent that triggered it.

* 1. What is the difference between onDoubleTap and onDoubleTapEvent callbacks?

The onDoubleTap is notified when a double-tap occurs (triggered on the down event of second tap). Whereas onDoubleTapEvent is notified when an event within a double-tap gesture occurs, such as the down, move and up events.

1. Compare onFling and onScroll (20 marks)
   1. Parameters

onFling has 4 parameters which are the first and second MotionEvents and the horizontal and vertical velocity when the gesture goes from the first MotionEvent to the second MotionEvent. onScroll also has 4 parameters, 2 of them are the same to the onFling callback (first and second MotionEvents). But onScroll only cares about the horizontal and vertical distance between two MotionEvents (between a MotionEvent and a MotionEvent before it).

* 1. Number of times the callback is called per gesture

onFling is only called once at the end of the gesture, while the onScroll will be called multiple times as you move your finger on the screen.

* 1. What the end-user has to do to invoke the callback?

onFling needs some velocity in the movement, whereas onScroll is invoked when you move your finger with normal speed.

1. 8 marks
   1. What is a Convenience class?

A convenience class is used to simplify a complex class, so it could be implemented more conveniently. It implements all the method headers but the methods are empty and do nothing.

* 1. What problem does it solve?

It does not require the programmers to fully implement every methods in the complex class but still have access to the interface/structure of the complex class. The programmer can override those methods in convenience class when extending it to modify and create functional methods.

* 1. What’s special about a Convenience class for a listener interface?

When implement a convenience class of a listener, the programmer does not have to create functional methods in order to get them to listen to the gestures. In fact, the methods could be empty and do nothing (return false).

* 1. Why is it special?

For unnecessary methods, the programmers could leave them returning false (notifying that the event is not handled). For useful methods, the programmers can override and return true, notifying the event is handled. In short, the programmers can selectively override the methods that they need instead of having to code all unnecessary and necessary methods.