DEBUGGING HELP SHEET

This document will introduce you to the basics of debugging and is intended to support the 'Introduction to data types and variables' video:

Breakpoints

You can add and remove breakpoints by clicking in the left side of the code area. Set the breakpoint to where you want the code to stop. In this video we are breaking the code (or halting its execution) at TheGame.java file's setupBeginning method, where mBallX value is assigned.

To remove a breakpoint click on it again.

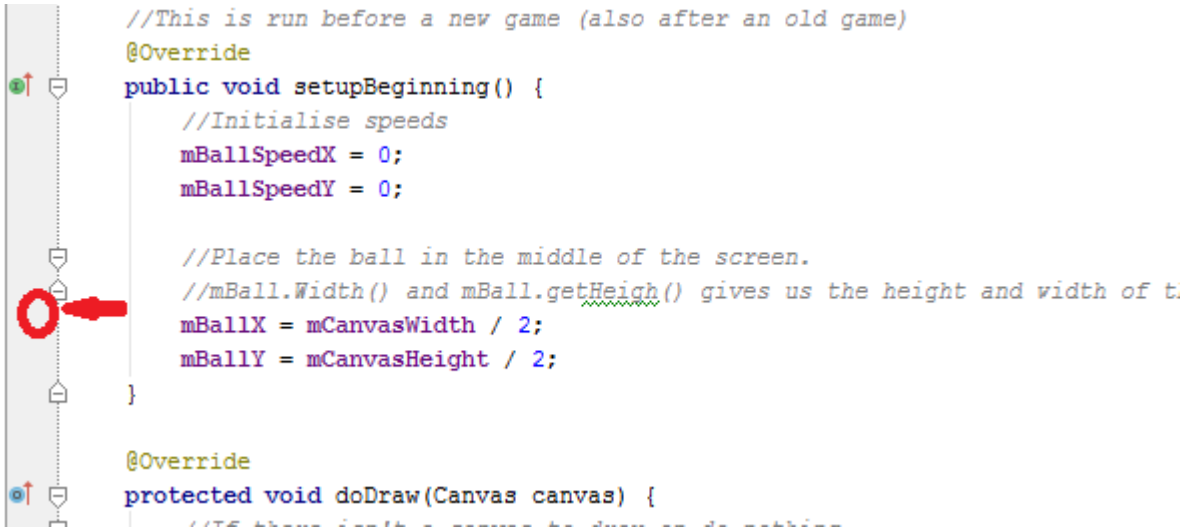

Figure 1: Click to set up a breakpoint

After setting up the breakpoint it will look similar to Figure 2.

```
@Override
public void setupBeginning() {
    //Initialise speeds
    mBallSpeedX = 0;
    mBallSpeedY = 0;

    //Place the ball in the middle of the screen.
    //mBall.Width() and mBall.getHeigh() gives us the height and width of the
    mBallX = mCanvasWidth / 2;
    mBallY = mCanvasHeight / 2;
}
```

Figure 2: A breakpoint is setup

Have the emulator started and fully loaded up.

Debug app

Instead of running the program using **Run 'app'** (the green triangle), start debugging by pressing the little green bug (**Debug 'app'**) shown in Figure 3.

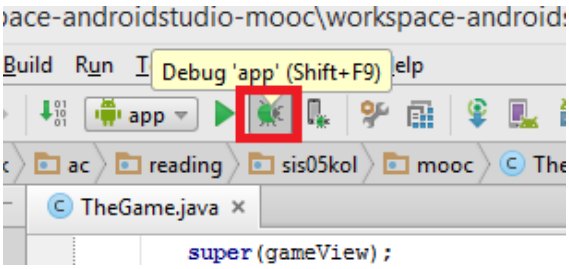

Figure 3: Debug 'app'

Starting the code takes a little longer, and the code runs a bit slower than normal.

It will prompt a dialog asking to select a device. Select your emulator from the list (At this point it also allows you to launch a different emulator if you wish) and click 'OK'.

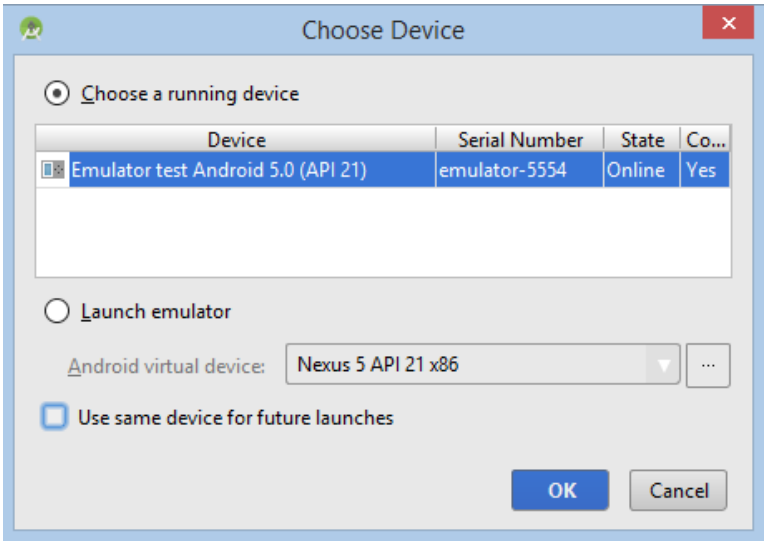

Figure 4: Choose Device dialog

Next you will see the emulator displaying a message similar to Figure 5.

Once the game is loaded it will show a screen similar to Figure 6 on your emulator.

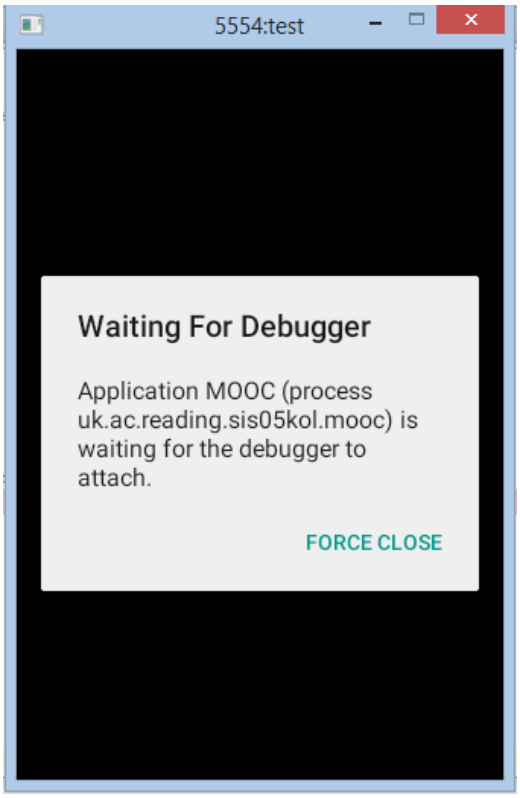

Figure 5: Waiting for Debugger message

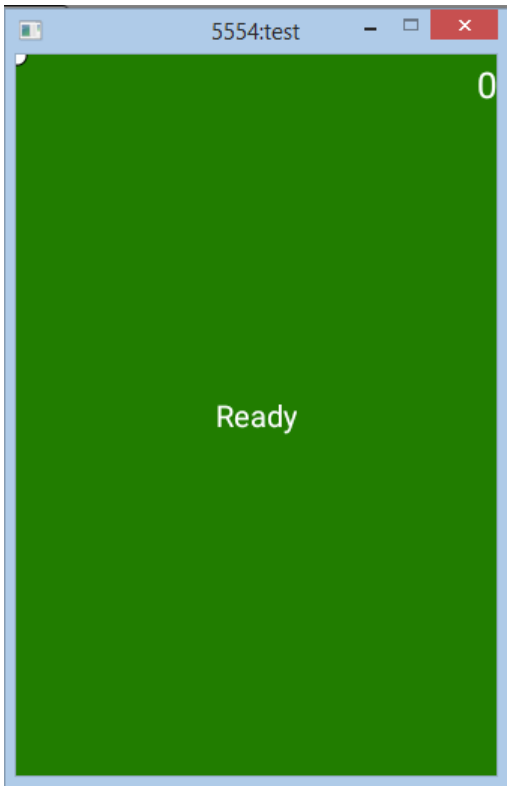

Figure 6: Emulator after loading the game

Now click on the emulator screen. It will now execute the 'setupBeginning' method and it will halt the

execution of the code at the break point we have set in the 'setupBeginning' method (Figure 7).

```
@Override
public void setupBeginning() {
    //Initialise speeds
    mBallSpeedX = 0;
    mBallSpeedY = 0;

    //Place the ball in the middle of the screen.
    //mBall.Width() and mBall.getHeigh() gives us the height and width of the image
    mBallX = mCanvasWidth / 2;
    mBallY = mCanvasHeight / 2;
}

@Override
```

Viewing variable values

All the variables that are available at present are shown in the Variables tab located bottom half of the screen. But it only shows a few in the default view. Clicking on the arrow near 'this' in the variables tab will show all variable values. For the moment let us concentrate on the variables mBallX and mBallY.

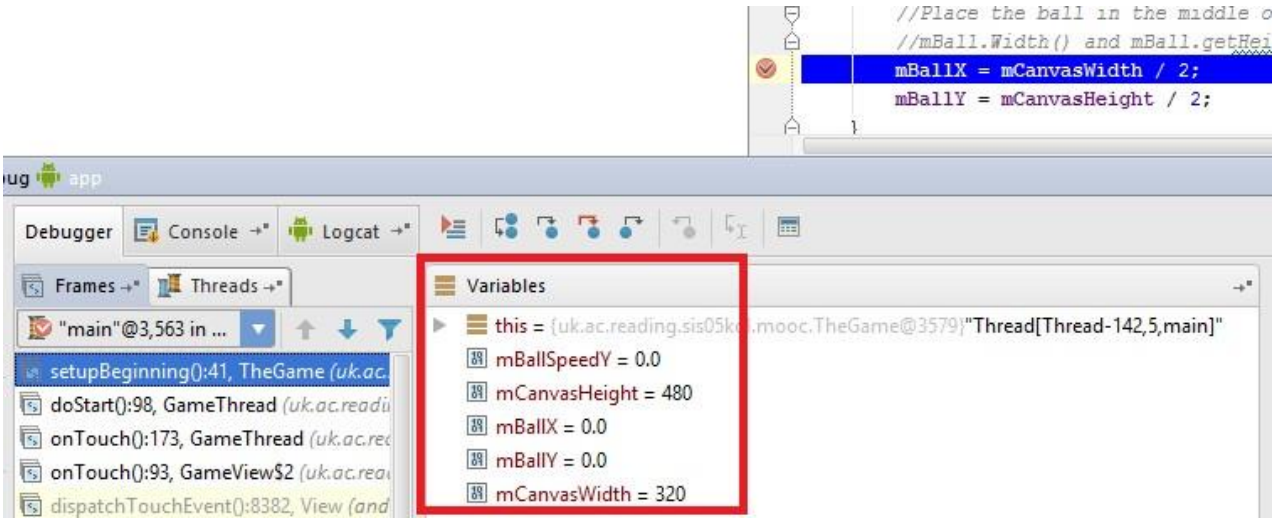

Figure 8: Variables and their values

Now click on the emulator screen. It will now execute the 'setupBeginning' method and it will halt the execution of the code at the break point we have set in the 'setupBeginning' method.

Note: the values of mCanvasWidth and mCanvasHeight can vary on the emulator you have selected.

Execute code line by line

With this setup (mCanvasWidth being 320) I expect my mBallX will be 160 once the statement

```
mBallX = mCanvasWidth / 2;
```

gets executed. After the breakpoint we can run the code line by line in the debugger to view the value changes. The debug commands for these can be found in the menu under Run (Figure 9).

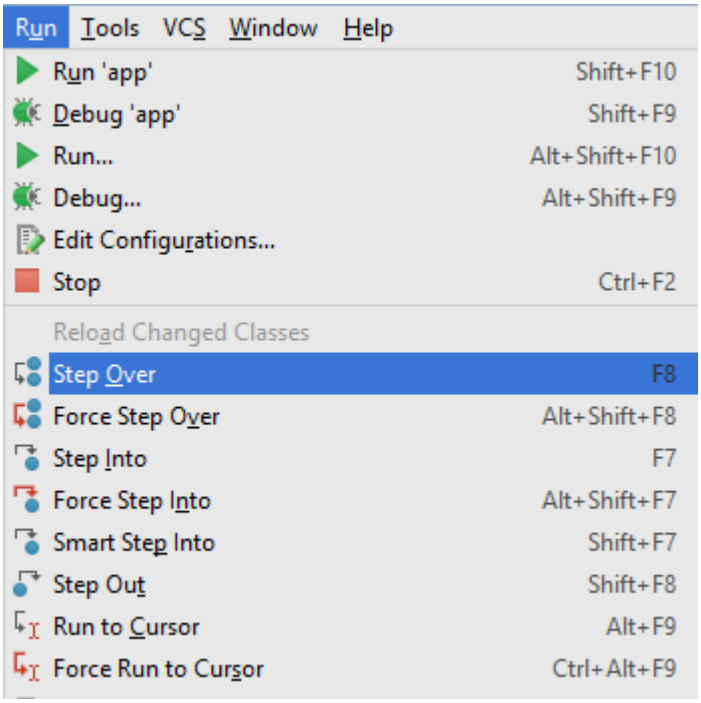

Figure 9: Debug Commands

Press **F8 (Step Over)** to execute the next line of code. This will execute the line

```
mBallX = mCanvasWidth / 2;
```

Now view the variable value of mBallX.

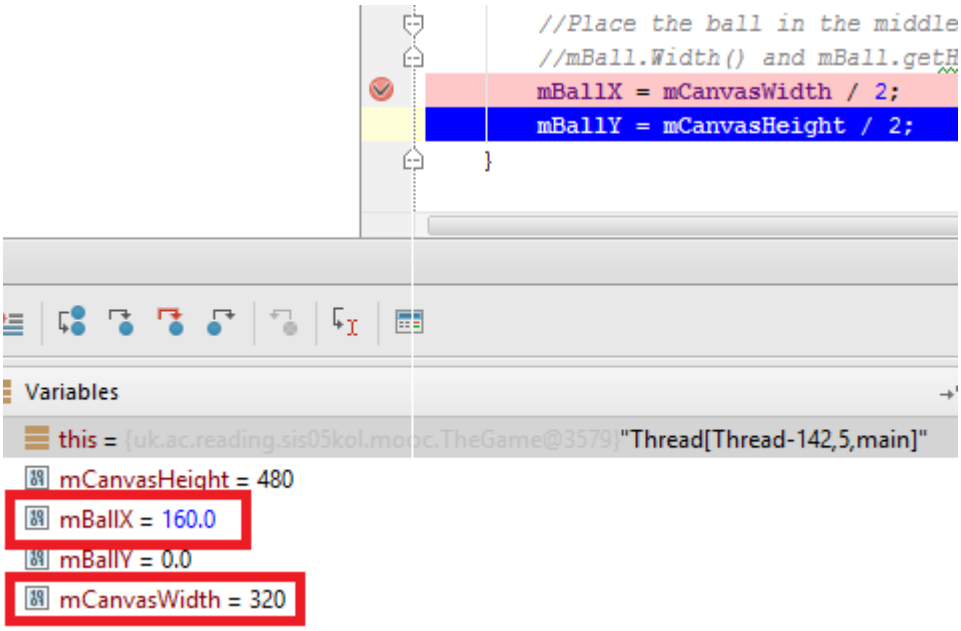

Figure 10: mBallX is assigned

You will see that mBallX is assigned with half of the mCanvasWidth value as expected. You can use F8 again and again to execute the program statement by statement.

#

On the side of the Debugger tab you will see controls that allow you to control your application while debugging (Figure 11). Hover over the controls and you will be shown what they are.

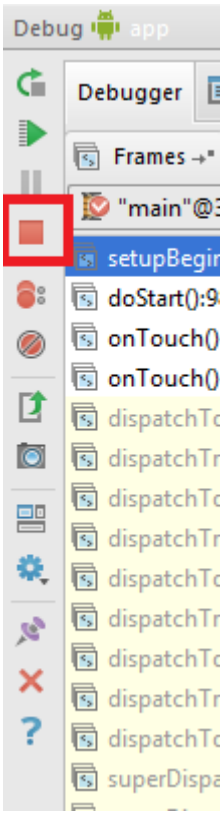

Figure 11: Controls – highlighted is stop

Useful to know: (0,0) location of a Bitmap is the top left corner.