ICT@LWA

ScRATcH

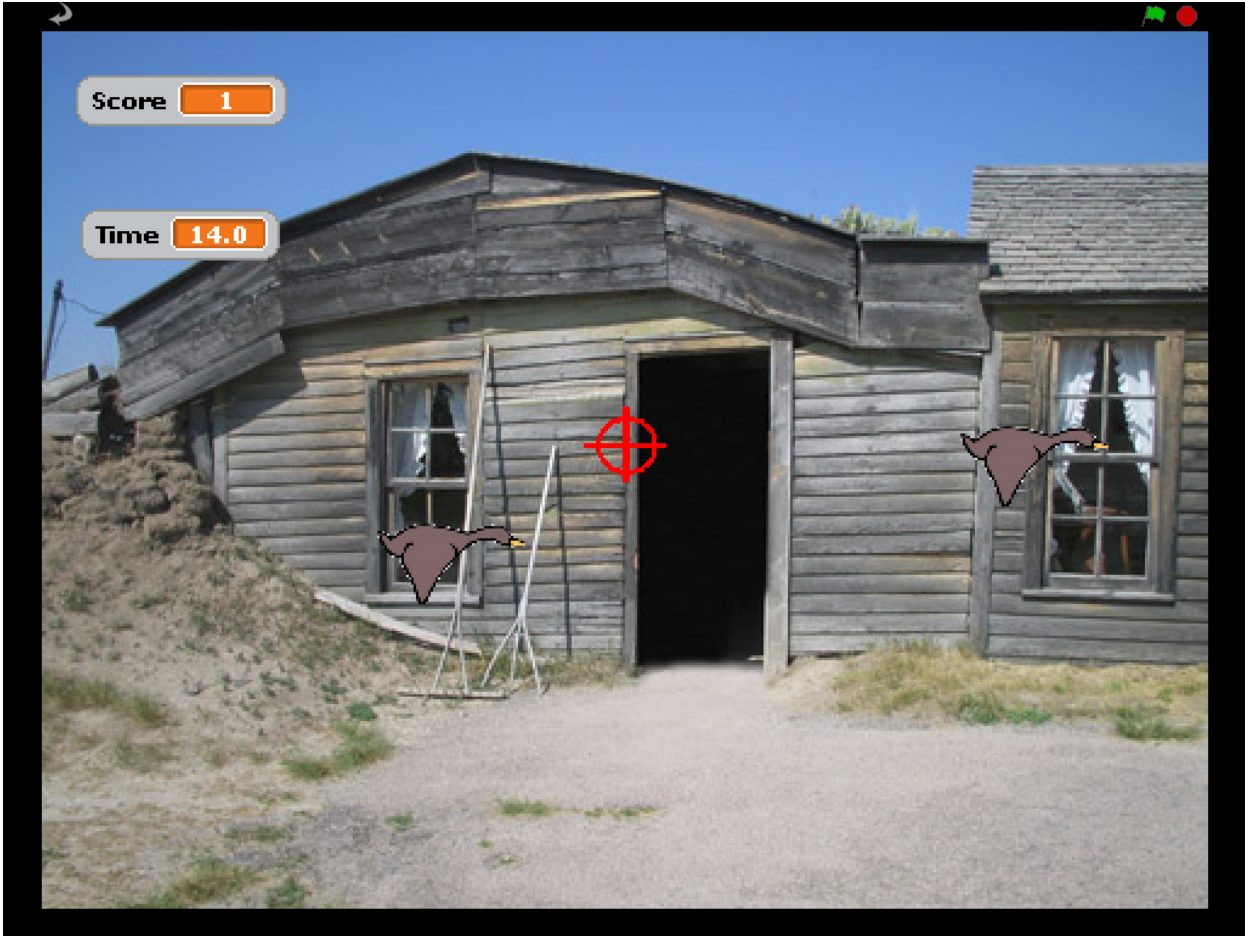## Duck Shooter Game Intermediate

Duck Shoot

In this exercise you are going to create a game to shoot flying ducks. The screen is shown below. The ducks will enter from the left of the screen and you need to position the cross hairs to shoot the duck. Your score will be recorded.
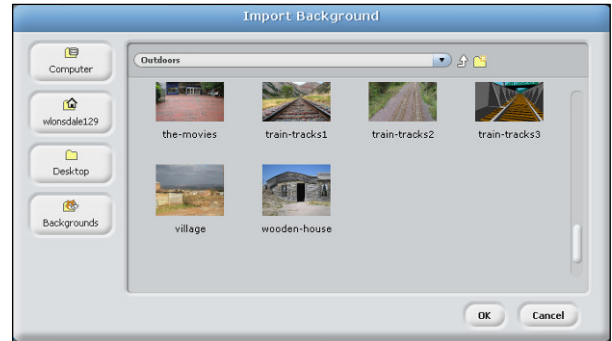
Duck Shoot

Setting the Stage

Double click on the stage to select it and then click the **Backgrounds** tab. Click Import and, from the outdoors folder, select wooden-house.

Delete Background1 so that you only have one background.

Creating the Cross Hairs

We will now create sprite to act as the sight on a gun. Click on the Paint new sprite button. Use the circle tool and the line tool to create a small circle with a vertical and a horizontal line.
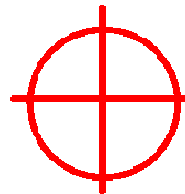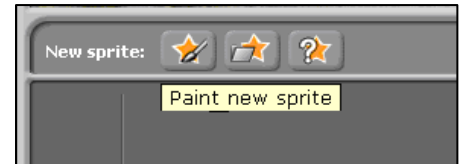
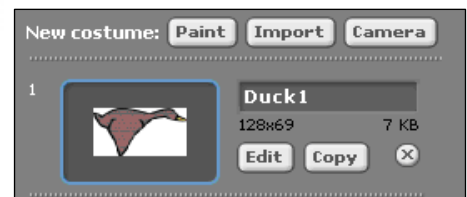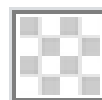Right click on the Cat sprite and delete it.

We will now import the Duck sprite. Navigate to your Scratch folder and import Duck 1.
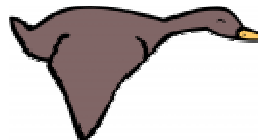
Unfortunately, there is white space around the duck. Click the Edit button and choose the Fill tool. Select the Transparent colour and fill all the white space with transparent.

We will also reduce the size of the duck by clicking on the Shrink button. Click this button four times.

To make the duck fly, we need to have another costume for this duck with the wings in a different position. From the New Costume menu choose Import and import Duck 2. Edit this costume also to remove the white space and to resize it. Rename the Duck sprite to Duck1 and the duck costumes to Ducka and Duckb.
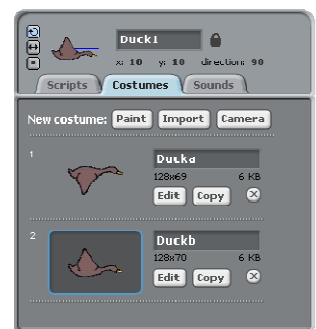
Flying Ducks

Scripts are the programs that enable actions to take place. We need to create scripts to make the duck fly. We will begin by making the ducks wings flap. Begin by positioning the duck in the centre of the stage.

To make the duck fly we continually change the duck's costume from Ducka to Duckb, making sure we leave a short time delay so that we can see the costumes change.

Click on the scripts tab and then choose the Control block. Since we want the duck to start flying when the game starts, we select the **when** 🏳 **is clicked** command and drag it to the scripts area..

Now, from the Looks block, drag **switch to costume Duckb** to the scripts area. If we join this to the **when clicked** command the duck will change to costume Duckb.

Join the two commands as shown and then click the green flag. You will see the costume change.

We now need to change the costume back to costume Ducka. Drag **switch to costume Duckb** to the scripts area, but use the combo box to change the command to **switch to costume Ducka**. If you join the commands, and click the green flag you will see the costume change. However the change only occurs once, we need to repeat this action.

From the Control block drag the forever loop command. Drag the Switch costume commands into the loop as shown.

Click the green flag to see what happens. The duck changes costume, but it happens so quickly that you do not notice it. We must slow the process down.
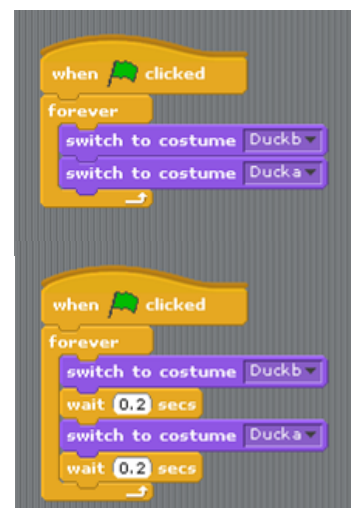
From the Control block, drag the **wait 1 secs** command to the scripts area. And place it below switch to costume Duckb. Place a second copy of the **wait 1 secs** command below the **switch to costume Ducka** command. Change the wait time from 1 secs to 0.2 secs and then press the green flag.

We now need to make the duck move across the screen. To do this we need to change the x position of the duck. We begin with the duck at the left of the screen and move it to the right.

Begin as before with the w**hen is clicked** command. Again we will use the forever command. However we need to set the start position of the duck. Since this is at the left of the screen the x position is -240. We will also start the duck half way up the screen this is at y position 0.

Use the Motion block to create the following script.

This will set the start position of the duck, but will not move it across the screen, to do this we need to use a loop to increase the x position.

We will begin by using the change x by 10 command from the Motion block and the wait 1 secs from the Control block. Change the wait time to 0.1 secs.
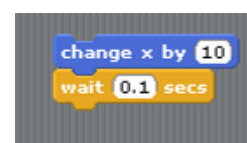
We now need to repeat this command until the duck's x position is 240 and then start over again. Select the **repeat until** loop from the Control block and drag it across to the scripts area and place the change x by 10 and wait 0.1 secs inside this loop.


We will repeat this loop until the x position of the duck is 240, ie the right hand side of the screen. We need to create a rule that will repeat the actions until the x position is greater that 240. To do this we will use the x position statement from the Motion block and the > operator from the Operators block. Drag the x position statement in to the left hand box on the comparison control and type the number 240 into the right hand box. This creates the statement as shown.
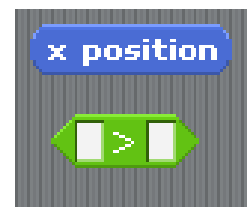
No place this statement into the repeat loop and place this loop inside the forever loop to create nested loops as shown.


Click the green flag and watch the duck fly across the screen. You can change the speed by altering the wait time.
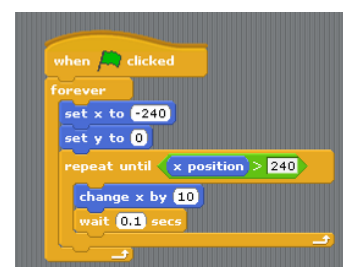
Shooting the Duck

We need to add scripts to the cross hairs so that we can fire the gun. We will allow the gun to move up and down and left and right.

We will begin by setting the start position of the cross hairs. This will be the centre of the screen with the x position at 0 and the y position at 0. Create the script as shown.
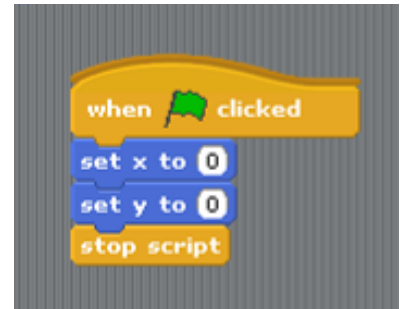
We will use the up arrow to mode the cross hairs up 10 places. Begin by clicking on the cross hair sprite. From the Control block, drag the when space key pressed command and use the combo box to choose up arrow as shown.
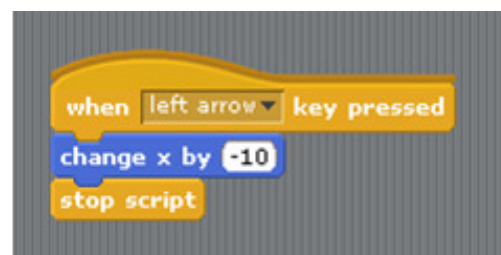
From the Motion block, choose change y by 10 and from the control block, choose stop script. Connect these commands together to produce the complete script as shown.
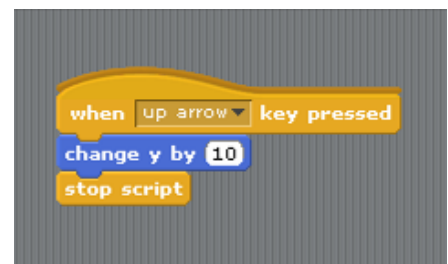
Create the script to move the cross hairs down, notice that the button used is the down arrow and y is changed by -10.
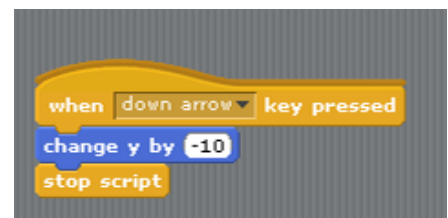
Create the following scripts to move the cross hairs left and right.

Use the arrow keys to move the cross hairs to check your scripts work.

We now need to be able to fire the gun to hit a duck. We will fire the gun by pressing the space key. This will create a fire sound and if the duck is hit a sound will play.

We begin by importing the shotgun sound. From the sounds tab, click Sounds and then Import. Navigate to your Scratch folder and import the sound file shotgun.

We will now create the script to fire the gun. From the Control block, drag the **when space is pressed** command onto the scripts area and drag the **play sound shotgun** from the Sound block. Include the **stop script** command from the Control block and create the following script. Press the space bar to check that the script works.

We now need to check if the duck has been hit. To do this we will use an IF statement to check if the duck has been hit. If the duck is hit we will broadcast a message and the duck will fall from the screen.
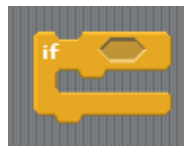
We begin by dragging the **if loop** from the Control block. We will use this loop if the duck has been hit. From the Sensing block drag the touching Duck 1? command onto the scripts area and place it in the If control.

Drag the broadcast command from the Control block and click the combo box. Click on the word new and type the word hit. This message will be broadcast when the cross hairs touch the duck. It will not appear as a message on the screen.
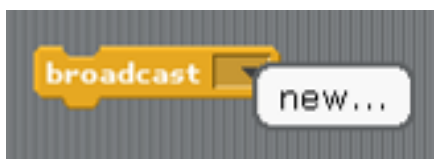
Now complete the script as shown.

Falling Ducks

When we shoot a duck we will make it fall down the screen. We can do this when we receive the hit message. We then need to put the duck back to its start position so that it appears as a new flying duck.
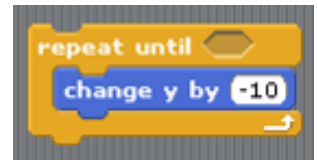
Select the command **when I receive Hit** from the Control block.

To make the duck fall from the screen we need to reduce its y position unit it is at the bottom of the screen. We do this using a repeat command. Drag the repeat until command onto the scripts area.
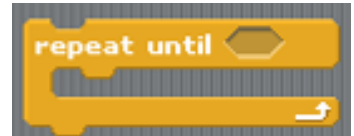

Place the command change y by 10 inside the repeat loop and change the value to -10.

Since we will repeat this action until the y position reaches -170 we must include the statement y position < -170 in the loop condition. Use the y position statement from the Motion block and the less than (<) operator from the Operator block to create the statement as shown.

Finally we need to return the duck to its start position. Remember this was the y position 0 and the x position -240. Create these two commands from the Motion block.
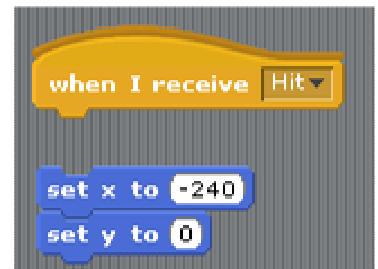
Finally put all the commands together to create the following script.
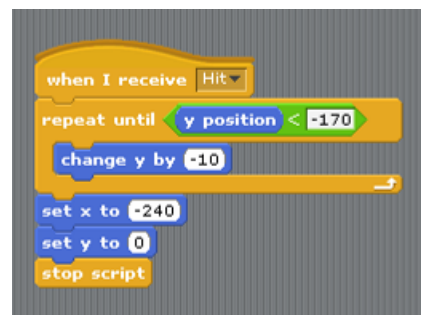
Keeping Score

We now need some method of keeping the score of the number of ducks shot. As we shoot a duck we must increase this score. We begin by setting the score to 0.

Click on the stage and the scripts tab. Click on the Variables block and the option make variable. A variable is the name given to a container for a value which can change, much in the same way we use the word time. The time is a number which changes. When we ask someone the time we want to know what its current value is. In this case we will use the word Score to keep a record of the score. Type in the details as shown and a score will now appear at the top of the screen.

We need to reset the score to 0 at the start of the game. Use the set Score to 0 command to create the following script.

We need to increase the score each time a duck is hit. We need to change the script which runs when the duck is hit. This script is shown. We now need to include a command to increase the score when the IF command is run.

Double click the crosshairs sprite to open this script. Drag the command change Score by 1 from the variables block and place in the loop to create the script.
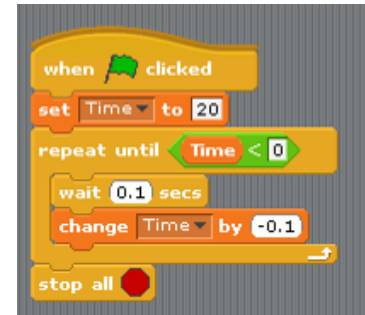
Now run the game and shoot the duck!

Timing, Timing, Timing!

Most games have some form of time included so that the game doesn't last for ever. We can include a timer to stop the game after a set time interval.

We will begin by creating a new variable called Time. Double click on the Stage to open the scripts.

Make a new variable called Time and then create the script as shown. We include a **stop all** at the end of this script so that the game stops.

Try running the game to see how it works.

Unfortunately, you may notice that the gun will still fire and shoot ducks even after the game has finished. Moreover, the duck appears at the left edge of the screen and doesn't fly – a case of shooting stationary ducks. We need to make sure that we cannot fire after the time has run out.

Double click on the cross hairs to open the script. We need to change the script so that the gun will only fire if the Time variable is greater than (>) 0.
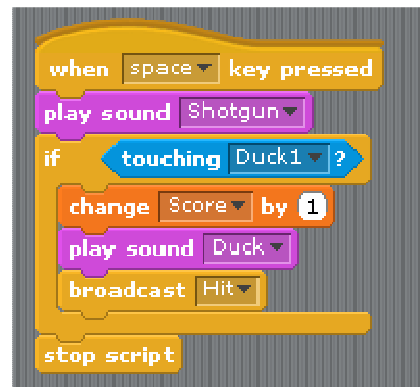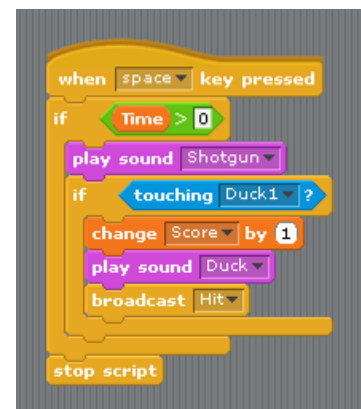
Use the Control block to drag the If loop onto the scripts area. We now need to use the greater than (>) operator to check that the Time is greater than 0. Drag the operator and the variable Time on to the stage and create the script shown.

Now place this code inside the IF loop and finish off the script as shown.

Now play the game!

More Ducks

To make the game more interesting we will now introduce a second duck. Right click on Duck1 and select duplicate. This will create a second duck with all the scripts. Change the name of this Duck to Duck2 and the costume names to Duck2a and Duck2b. You will need to change the scripts for Duck2 to reflect the changes of name.
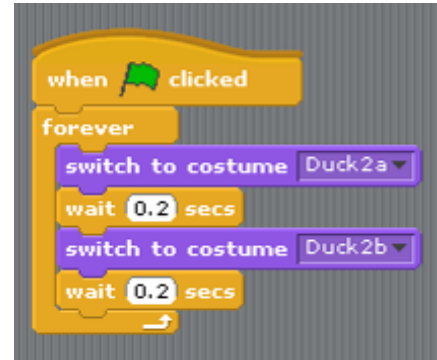
We also need to change the start position of the ducks so that they don't enter the screen at the same place. We will also add some interest to the game by having the ducks enter at random positions. We will use the pick random command to do this.

From the Operators block choose the command **pick random 1 to 10**. Place the command into the set y position and change this to **pick random -10 to -50**. Place the command into the hit script also.
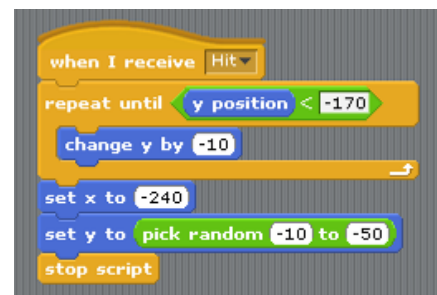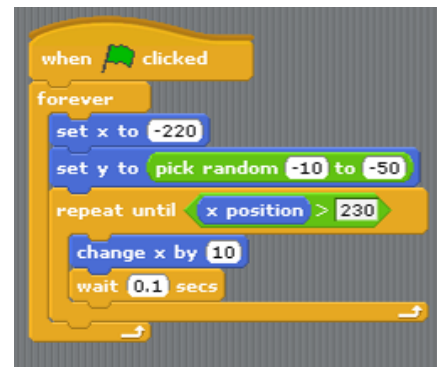
Change the scripts for Duck 1 so that it enters at a random height of between 10 and 50.

Now run the game and shoot as many ducks as you can! Experiment with changing the wait times, adding more ducks, having smaller ducks with higher scores, etc.