

University of Surrey Widening Participation and  
Outreach Coding Hub

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Ready for the next challenge? Perfect! Now that we have a Paddle on our screen we need a ball to play with! And how we are going to do it? Exactly the same way we put a Paddle on the screen. This time, we will not tell you exactly what code do you have to write. We will give you some tips but it's you who has to figure out what and where to code.

## Step 1: Draw a ball

Drawing a Ball is as easy as drawing a Paddle. First we need to define what a Ball is. Let's make a class Ball, just next to the class Paddle. What characteristics should our ball have? We need to define its size and appearance. What parameters do we need to make it round? How do we define its position on the screen? And its movement across the screen? How fast will it move? In which directions should it move? Think about it and fill in the code.

```
1 # Class that defines the attributes of the ball
2 class Ball:
3     def __init__(self, ?, ?):
4         ?
5         ?
6         ?
```

We have just defined our Ball. Now we have to give it all the characteristics it needs. Try to do it just like you did it for a Paddle: define the colours, the position of the Ball and then create the Ball using the function you have just created. Look for the code that is giving the necessary values to the Paddle and try to write analogical code for the Ball.

Does the Ball have the colour, size, initial position and speed? Ok, let's try to print it on the screen. Just where you print your Paddle on the screen, at the end of your code, print also your Ball putting appropriate variables from your code to the following command.

```
1 pygame.draw.circle(screen, COLOUR_OF_YOUR_BALL, (POSITION_X_OF_YOUR_BALL,
    POSITION_Y_OF_YOUR_BALL), RADIUS_OF_YOUR_BALL, 0)
```

Time to run our code and see if the Ball is there!

## Step 2: Move the Ball

Great, we see the Ball, but why it does not move? Well, because we never told it to move! Let's write a `moveBall()` function. This function will update the position of our Ball in every frame. Complete the following code and put it just after definition of the class Ball. Remember, we have to define all the functions and objects before the actual game starts!

```
1 # Move the ball
2 def moveBall():
3     ? = ? + ? # update position X of the ball according to its speed
4     ? = ? + ? # update position Y of the ball according to its speed
```

Does it work? Check it by calling the function just before updating the screen and drawing the Ball on the new position.

## Step 3: Bounce off the walls and Paddle

It's really nice that the Ball falls off the screen but that is not what the game is about, right? We now need to bounce it off the walls and the Paddle.