



# Girls' Programming Network

*Flappy Bird!*

Extensions

**FOR TUTOR EYES ONLY**

**This project was created by GPN Australia for GPN sites all around Australia!**

**This workbook and related materials were created by tutors at:**

**Sydney, Canberra and Perth**



**Girls' Programming Network**

***If you see any of the following tutors don't forget to thank them!!***

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# Extension: Gravity

The original Flappy Bird game had the bird go down on its own with gravity and you had to keep it up by flapping the wings

## Task 1.1: Fall Bird!

Just like how we make the pipes move from right to left by adding to their pipe\_x we are going to do the same thing but we're going to add to the bird\_y

Add 1 to bird\_y after you update all the pipe\_x variables

## Task 1.2: Different planets!

Different planets have different amounts of gravity! Try changing how much you are adding to the bird\_y variable and see how that changes the game

## ✓ CHECKPOINT ✓

**If you can tick these off you have finished the extension!**

- ☐ Your bird falls down if you don't press any buttons
- ☐ Your bird still goes up when you press the up button
- ☐ You have played with different numbers for gravity

## TUTOR TIPS

**The code should look like this:**

```
from pygame import *
from random import *

init()

print("The game is about to start!")

screen = display.set_mode((800, 600))

background_image = image.load("bg.png")
bird_image = image.load("bird.png")
pipe_image = image.load("pipe.png")
```

```

flipped_pipe_image = transform.flip(pipe_image, False, True)

bird_x = 10
bird_y = 250

pipe_x = 200
pipe_y = 250
pipe_flipped = False
pipe2_x = 450
pipe2_y = 100
pipe2_flipped = False
pipe3_x = 700
pipe3_y = 400
pipe3_flipped = True

while True:

    new_event = event.poll()
    if new_event.type == KEYDOWN and new_event.key == K_UP:
        bird_y = bird_y - 50
    if new_event.type == KEYDOWN and new_event.key == K_DOWN:
        bird_y = bird_y + 50

    pipe_x = pipe_x - 2
    pipe2_x = pipe2_x - 2
    pipe3_x = pipe3_x - 2

    #Added gravity to pull the bird down
    bird_y = bird_y + 1

    background = screen.blit(background_image, (0, 0))
    bird = screen.blit(bird_image, (bird_x, bird_y))

    if pipe_flipped:
        pipe = screen.blit(flipped_pipe_image, (pipe_x, -pipe_y))
    else:
        pipe = screen.blit(pipe_image, (pipe_x, pipe_y))
    if pipe2_flipped:
        pipe2 = screen.blit(flipped_pipe_image, (pipe2_x,
-pipe2_y))
    else:
        pipe2 = screen.blit(pipe_image, (pipe2_x, pipe2_y))
    if pipe3_flipped:
        pipe3 = screen.blit(flipped_pipe_image, (pipe3_x,
-pipe3_y))
    else:
        pipe3 = screen.blit(pipe_image, (pipe3_x, pipe3_y))

    display.update()

```

```
if bird.colliderect(pipe):
    print("Game Over!")
    quit()
    break

if bird.colliderect(pipe2):
    print("Game Over!")
    quit()
    break

if bird.colliderect(pipe3):
    print("Game Over!")
    quit()
    break

if pipe_x < -70:
    pipe_x = 800
    pipe_y = randint(100, 500)
    pipe_flipped = choice([True, False])

if pipe2_x < -70:
    pipe2_x = 800
    pipe2_y = randint(100, 500)
    pipe2_flipped = choice([True, False])

if pipe3_x < -70:
    pipe3_x = 800
    pipe3_y = randint(100, 500)
    pipe3_flipped = choice([True, False])
```

# Extension: Flappy Wings

The game is called Flappy Bird but there isn't much flapping going on! Let's animate the wings so that they flap!

## Task 1.1: Download the images

First we need to download the images that we need. We have 2 images to download, one with the wings up and one with the wings down.

Once you've downloaded the images load them into pygame and call them `bird_wings_up_image` and `bird_wings_down_image`

### Hint

Make sure you save the images to the same place as your code

## Task 1.2: Keeping track

So that we can know what our wings are doing let's make a variable before the while loop called `wings_position` and set it to "up"

## Task 1.3: Lift the wings

Now where we blit our bird image we are going to replace it with an if statement.

If the wings are up then we should blit the `bird_wings_up_image` and update the `wings_position` to be "down"

## Task 1.4: Lower the wings

Now we need to put the wings down by adding an elif statement right after the first.

If the wings are down then we should blit the `bird_wings_down_image` and update the `wings_position` to be "up"

### Hint

Make sure you use an elif for the second statement otherwise the wings will always be up

## Task 1.5: Too fast!

Those little wings are flapping so fast we can hardly see them! Let's count to 10 before we change the position so that our bird doesn't run out of puff!

Make a variable called count before the while loop and set it to 0. Now every time we blit the bird (for both positions) we add one to the count and check if the count is greater than 10. If it is then we can update the wing\_position and set the count back to 0

## ✓ CHECKPOINT ✓

**If you can tick these off you have finished the extension!**

- ☐ The bird flaps its wings as the game runs
- ☐ Try running your code!

## TUTOR TIPS

**The code should look like this:**

```
from pygame import *
from random import *

init()

print("The game is about to start!")

screen = display.set_mode((800, 600))

background_image = image.load("bg.png")

#Added the new bird images
bird_wings_up_image = image.load("bird_wingsup.png")
bird_wings_mid_image = image.load("bird_wingsmid.png")
bird_wings_down_image = image.load("bird_wingsdown.png")

pipe_image = image.load("pipe.png")
flipped_pipe_image = transform.flip(pipe_image, False, True)

bird_x = 10
bird_y = 250

pipe_x = 200
pipe_y = 250
pipe_flipped = False
pipe2_x = 450
pipe2_y = 100
pipe2_flipped = False
pipe3_x = 700
pipe3_y = 400
pipe3_flipped = True
```

```

#Added new wing position and counter
wing_position = "up"
count = 0

while True:

    new_event = event.poll()
    if new_event.type == KEYDOWN and new_event.key == K_UP:
        bird_y = bird_y - 50
    if new_event.type == KEYDOWN and new_event.key == K_DOWN:
        bird_y = bird_y + 50

    pipe_x = pipe_x - 2
    pipe2_x = pipe2_x - 2
    pipe3_x = pipe3_x - 2

    background = screen.blit(background_image, (0, 0))

    #Added if statements that check what image to show
    if wing_position == "up":
        bird = screen.blit(bird_wings_up_image, (bird_x, bird_y))
        count += 1
        if count > 10:
            wing_position = "down"
            count = 0
    elif wing_position == "down":
        bird = screen.blit(bird_wings_down_image, (bird_x, bird_y))
        count += 1
        if count > 10:
            wing_position = "up"
            count = 0

    if pipe_flipped:
        pipe = screen.blit(flipped_pipe_image, (pipe_x, -pipe_y))
    else:
        pipe = screen.blit(pipe_image, (pipe_x, pipe_y))
    if pipe2_flipped:
        pipe2 = screen.blit(flipped_pipe_image, (pipe2_x, -pipe2_y))
    else:
        pipe2 = screen.blit(pipe_image, (pipe2_x, pipe2_y))
    if pipe3_flipped:
        pipe3 = screen.blit(flipped_pipe_image, (pipe3_x, -pipe3_y))
    else:
        pipe3 = screen.blit(pipe_image, (pipe3_x, pipe3_y))

    display.update()

    if bird.colliderect(pipe):
        print("Game Over!")
        quit()
        break

    if bird.colliderect(pipe2):
        print("Game Over!")
        quit()
        break

```



```
if bird.colliderect(pipe3):  
    print("Game Over!")  
    quit()  
    break  
  
if pipe_x < -50:  
    pipe_x = 800  
    pipe_y = randint(100, 500)  
    pipe_flipped = choice([True, False])  
  
if pipe2_x < -50:  
    pipe2_x = 800  
    pipe2_y = randint(100, 500)  
    pipe2_flipped = choice([True, False])  
  
if pipe3_x < -50:  
    pipe3_x = 800  
    pipe3_y = randint(100, 500)  
    pipe3_flipped = choice([True, False])
```

## Extension: Faster and faster!

In case the game isn't tricky enough, let's make it get faster as it goes.

### Task 1.1: Set the speed

To keep track of the speed let's make a variable before the while loop called speed and set it to 2 because that's the speed that the pipes are currently moving.

Where we minus 2 from the pipe\_x instead minus speed. Make sure you do this for all 3 pipes.

### Task 1.2: Faster faster faster!

Now that we have a variable we can make the speed change!

After we set the new pipe\_x position we can add one to the speed which will make our pipes move faster and faster

### Task 1.3: Too fast!

Wow! That's really fast! Our speed is getting too big too quickly so we need to add a number that is smaller than one.

Try adding 1/800 to the speed instead of adding one. You can play around with this number to find what you like best

## ✓ CHECKPOINT ✓

**If you can tick these off you have finished the extension!**

- ☐ The pipes start of at a slower speed and slowly get faster
- ☐ Run your code!

### TUTOR TIPS

**The code should look like this:**

```
from pygame import *  
from random import *
```

```

init()

print("The game is about to start!")

screen = display.set_mode((800, 600))

background_image = image.load("bg.png")
bird_image = image.load("bird.png")
pipe_image = image.load("pipe.png")
flipped_pipe_image = transform.flip(pipe_image, False, True)

bird_x = 10
bird_y = 250

pipe_x = 200
pipe_y = 250
pipe_flipped = False
pipe2_x = 450
pipe2_y = 100
pipe2_flipped = False
pipe3_x = 700
pipe3_y = 400
pipe3_flipped = True

#Added speed
speed = 2

while True:
    new_event = event.poll()
    if new_event.type == KEYDOWN and new_event.key == K_UP:
        bird_y = bird_y - 50
    if new_event.type == KEYDOWN and new_event.key == K_DOWN:
        bird_y = bird_y + 50

    #Use speed instead of number
    pipe_x = pipe_x - speed
    pipe2_x = pipe2_x - speed
    pipe3_x = pipe3_x - speed

    #Update speed each loop
    speed += 1/800

    background = screen.blit(background_image, (0, 0))
    bird = screen.blit(bird_image, (bird_x, bird_y))

    if pipe_flipped:
        pipe = screen.blit(flipped_pipe_image, (pipe_x, -pipe_y))
    else:
        pipe = screen.blit(pipe_image, (pipe_x, pipe_y))

```

```

if pipe2_flipped:
    pipe2 = screen.blit(flipped_pipe_image, (pipe2_x, -pipe2_y))
else:
    pipe2 = screen.blit(pipe_image, (pipe2_x, pipe2_y))
if pipe3_flipped:
    pipe3 = screen.blit(flipped_pipe_image, (pipe3_x, -pipe3_y))
else:
    pipe3 = screen.blit(pipe_image, (pipe3_x, pipe3_y))

display.update()

if bird.colliderect(pipe):
    print("Game Over!")
    quit()
    break

if bird.colliderect(pipe2):
    print("Game Over!")
    quit()
    break

if bird.colliderect(pipe3):
    print("Game Over!")
    quit()
    break

if pipe_x < -50:
    pipe_x = 800
    pipe_y = randint(100, 500)
    pipe_flipped = choice([True, False])

if pipe2_x < -50:
    pipe2_x = 800
    pipe2_y = randint(100, 500)
    pipe2_flipped = choice([True, False])

if pipe3_x < -50:
    pipe3_x = 800
    pipe3_y = randint(100, 500)
    pipe3_flipped = choice([True, False])

```

# Extension: Score!

Our flappy bird game is pretty good but there's no way to keep score and see how well you're doing.

## Part 1: Keeping time

### Task 1.1: What's the time?

Pygame can tell us how long it's been since the game started! Let's use that as our score. The longer you play the game the higher your score is.

In our if statements where we check if the bird has collided with a pipe and end the game let's add a score that is the time the game has been running divided by 1000. It should look like this when you're done:

```
Game Over!  
You lasted: 3 seconds!
```

### Hint

To get the number of milliseconds from pygame you can use this code:

```
time_in_milliseconds = time.get_ticks()
```

### ✓ CHECKPOINT ✓

**If you can tick these off you can move on to Part 2!**

- ☐ Your game prints how many seconds you lasted when the game ends.
- ☐ Run your code!

### TUTOR TIPS

**The code should look like this:**

```
from pygame import *  
from random import *  
  
init()  
  
print("The game is about to start!")
```

```

screen = display.set_mode((800, 600))

background_image = image.load("bg.png")
bird_image = image.load("bird.png")
pipe_image = image.load("pipe.png")
flipped_pipe_image = transform.flip(pipe_image, False, True)

bird_x = 10
bird_y = 250

pipe_x = 200
pipe_y = 250
pipe_flipped = False
pipe2_x = 450
pipe2_y = 100
pipe2_flipped = False
pipe3_x = 700
pipe3_y = 400
pipe3_flipped = True

while True:

    new_event = event.poll()
    if new_event.type == KEYDOWN and new_event.key == K_UP:
        bird_y = bird_y - 50
    if new_event.type == KEYDOWN and new_event.key == K_DOWN:
        bird_y = bird_y + 50

    pipe_x = pipe_x - 2
    pipe2_x = pipe2_x - 2
    pipe3_x = pipe3_x - 2

    background = screen.blit(background_image, (0, 0))
    bird = screen.blit(bird_image, (bird_x, bird_y))

    if pipe_flipped:
        pipe = screen.blit(flipped_pipe_image, (pipe_x, -pipe_y))
    else:
        pipe = screen.blit(pipe_image, (pipe_x, pipe_y))
    if pipe2_flipped:
        pipe2 = screen.blit(flipped_pipe_image, (pipe2_x, -pipe2_y))
    else:
        pipe2 = screen.blit(pipe_image, (pipe2_x, pipe2_y))
    if pipe3_flipped:
        pipe3 = screen.blit(flipped_pipe_image, (pipe3_x, -pipe3_y))
    else:
        pipe3 = screen.blit(pipe_image, (pipe3_x, pipe3_y))

    display.update()

```

```

if bird.colliderect(pipe):
    print("Game Over!")
    #Added this line to print out time game lasted
    print("You lasted:", time.get_ticks()//1000, "seconds!")
    quit()
    break

if bird.colliderect(pipe2):
    print("Game Over!")
    #Added this line to print out time game lasted
    print("You lasted:", time.get_ticks()//1000, "seconds!")
    quit()
    break

if bird.colliderect(pipe3):
    print("Game Over!")
    #Added this line to print out time game lasted
    print("You lasted:", time.get_ticks()//1000, "seconds!")
    quit()
    break

if pipe_x < -70:
    pipe_x = 800
    pipe_y = randint(100, 500)
    pipe_flipped = choice([True, False])

if pipe2_x < -70:
    pipe2_x = 800
    pipe2_y = randint(100, 500)
    pipe2_flipped = choice([True, False])

if pipe3_x < -70:
    pipe3_x = 800
    pipe3_y = randint(100, 500)
    pipe3_flipped = choice([True, False])

```

## Part 2: Play again

### Task 2.1: Waiting

If we want to keep track of our scores over multiple plays it might be good to be able to play again right away without having to rerun our code!

Let's make a "waiting" variable to keep track of whether or not we are waiting to play again. Before the while loop make a variable called waiting and set it to False. Then in the code where we print "Game Over" set waiting to True (make sure to do this for all your pipes)

## Task 2.2: No really, we're waiting!

The game isn't really waiting yet so let's fix that.

If we are meant to be waiting let's show a waiting screen. You can download the image here: <URL>

Where we load all our images, load the new waiting screen and call it `waiting_image`. Then add an if statement right at the beginning of the loop (before we check for new events) that checks if we should be waiting. If we are meant to be waiting then blit the waiting image onto the screen at position 0,0 and update the display.

We don't want the rest of our code to run while we're waiting so add a `continue`.

### Hint

Remember to save all your images in the same place as your code

## Task 2.3: I don't want to wait forever!

Now we need to check if the player wants to play again or quit.

After we update the display inside our new if statement but before we `continue`, check for a new event. Then add an if statement to see if the player has pressed the q key, if they have we should `quit()` the game and `break`

Add an if statement to check if the player has pressed the enter key. If they have then we should set `waiting` back to `False`. We also need to reset the game by setting all the bird and pipe variables back to their original values (e.g. `bird_y` should equal 250 etc.)

### Hint

The enter key is `K_RETURN`

## Task 2.3: Those scores aren't right!

Remember how we get the score? We are just seeing how long it's been since the game started, and we can't reset that every time we start a new game.

Let's keep track of what time the game started so that we can work out how long the game is taking. Think of it like if you look at the clock before you run a lap and the time is 12:03 and then if you look at the clock again when you finish your lap and the time is 12:05 you know that it took you 2 minutes to run the lap.

Make a `start_time` variable before the while loop and make it equal the current pygame time. Then when we work out the score we should get the current time and minus the start time and then divide it by 1000



We also need to update the start time every time we start a new game (so the clock resets). In the if statement that lets us play again where we reset all the variables we should also reset the start\_time to be the new current time.

### Hint

Remember you can get the current pygame time using this code:

```
current_time = time.get_ticks()
```

To work out how long it's been in seconds since we started it could look like this:

```
score = (time.get_ticks() - start_time)//1000
```

## ✓ CHECKPOINT ✓

### If you can tick these off you can move on to Part 3!

- ☐ When the game ends you get a screen asking you to play again
- ☐ If you press q on the waiting screen the game quits
- ☐ If you press enter on the waiting screen the game starts again and everything is in its starting position
- ☐ When you play multiple games the scores are right every time
- ☐ Run your code!

## TUTOR TIPS

### The code should look like this:

```
from pygame import *
from random import *

init()

print("The game is about to start!")

screen = display.set_mode((800, 600))

background_image = image.load("bg.png")
#Added waiting image
waiting_image = image.load("play_again.png")
bird_image = image.load("bird.png")
pipe_image = image.load("pipe.png")
flipped_pipe_image = transform.flip(pipe_image, False, True)

bird_x = 10
bird_y = 250
```

```

pipe_x = 200
pipe_y = 250
pipe_flipped = False
pipe2_x = 450
pipe2_y = 100
pipe2_flipped = False
pipe3_x = 700
pipe3_y = 400
pipe3_flipped = True

#Added waiting & start time variables
waiting = False
start_time = time.get_ticks()

while True:

    #Added waiting state
    if waiting:
        screen.blit(waiting_image, (0, 0))
        display.update()
        new_event = event.poll()
        #Added way to quit from waiting
        if new_event.type == KEYDOWN and new_event.key == K_q:
            quit()
            break
        #Added way to restart game from waiting
        if new_event.type == KEYDOWN and new_event.key == K_RETURN:
            bird_x = 10
            bird_y = 250
            pipe_x = 250
            pipe_y = 250
            pipe_flipped = False
            pipe2_x = 500
            pipe2_y = 100
            pipe2_flipped = False
            pipe3_x = 750
            pipe3_y = 400
            pipe3_flipped = True
            #Here we set waiting and start time again
            waiting = False
            start_time = time.get_ticks()
            continue

    new_event = event.poll()
    if new_event.type == KEYDOWN and new_event.key == K_UP:
        bird_y = bird_y - 50
    if new_event.type == KEYDOWN and new_event.key == K_DOWN:
        bird_y = bird_y + 50

```

```

pipe_x = pipe_x - 2
pipe2_x = pipe2_x - 2
pipe3_x = pipe3_x - 2

background = screen.blit(background_image, (0, 0))
bird = screen.blit(bird_image, (bird_x, bird_y))

if pipe_flipped:
    pipe = screen.blit(flipped_pipe_image, (pipe_x, -pipe_y))
else:
    pipe = screen.blit(pipe_image, (pipe_x, pipe_y))
if pipe2_flipped:
    pipe2 = screen.blit(flipped_pipe_image, (pipe2_x, -pipe2_y))
else:
    pipe2 = screen.blit(pipe_image, (pipe2_x, pipe2_y))
if pipe3_flipped:
    pipe3 = screen.blit(flipped_pipe_image, (pipe3_x, -pipe3_y))
else:
    pipe3 = screen.blit(pipe_image, (pipe3_x, pipe3_y))

display.update()

if bird.colliderect(pipe) or bird.colliderect(pipe2) or
bird.colliderect(pipe3):
    print("Game Over!")
    #Made the score be based on the start time
    score = (time.get_ticks() - start_time ) //1000
    print("You lasted:", score, "seconds!")
    #Set waiting at the end of each game
    waiting = True

if pipe_x < -70:
    pipe_x = 800
    pipe_y = randint(100, 500)
    pipe_flipped = choice([True, False])

if pipe2_x < -70:
    pipe2_x = 800
    pipe2_y = randint(100, 500)
    pipe2_flipped = choice([True, False])

if pipe3_x < -70:
    pipe3_x = 800
    pipe3_y = randint(100, 500)
    pipe3_flipped = choice([True, False])

```

## Part 3: High Score

### Task 3.1: Who's winning?

Now that we can play over and over again we can keep a high score of all of the games we play!

Make a variable called `high_score` before the while loop and set it to 0. Then whenever we get someone's score add an if statement that checks if the score is greater than the high score and if it is print out that we have a new high score and what it is. Then update the `high_score` to be equal to the score that we just got.

### ✓ CHECKPOINT ✓

**If you can tick these off you can move on to Part 4!**

- ☐ Every time you set a new high score the game prints it out
- ☐ Run your code!

### TUTOR TIPS

**The code should look like this:**

```
from pygame import *
from random import *

init()

print("The game is about to start!")

screen = display.set_mode((800, 600))

background_image = image.load("bg.png")
play_again_image = image.load("play_again.png")
bird_image = image.load("bird.png")
pipe_image = image.load("pipe.png")
flipped_pipe_image = transform.flip(pipe_image, False, True)

bird_x = 10
bird_y = 250

pipe_x = 200
pipe_y = 250
pipe_flipped = False
pipe2_x = 450
```

```

pipe2_y = 100
pipe2_flipped = False
pipe3_x = 700
pipe3_y = 400
pipe3_flipped = True

waiting = False
start_time = time.get_ticks()

#Added high score
high_score = 0

while True:
    if waiting:
        screen.blit(play_again_image, (0, 0))
        display.update()
        new_event = event.poll()
        if new_event.type == KEYDOWN and new_event.key == K_q:
            quit()
            break
        if new_event.type == KEYDOWN and new_event.key == K_RETURN:
            bird_x = 10
            bird_y = 250
            pipe_x = 250
            pipe_y = 250
            pipe_flipped = False
            pipe2_x = 500
            pipe2_y = 100
            pipe2_flipped = False
            pipe3_x = 750
            pipe3_y = 400
            pipe3_flipped = True

            waiting = False
            start_time = time.get_ticks()
            continue

    new_event = event.poll()
    if new_event.type == KEYDOWN and new_event.key == K_UP:
        bird_y = bird_y - 50
    if new_event.type == KEYDOWN and new_event.key == K_DOWN:
        bird_y = bird_y + 50

    pipe_x = pipe_x - 2
    pipe2_x = pipe2_x - 2
    pipe3_x = pipe3_x - 2

    background = screen.blit(background_image, (0, 0))
    bird = screen.blit(bird_image, (bird_x, bird_y))

```

```

if pipe_flipped:
    pipe = screen.blit(flipped_pipe_image, (pipe_x, -pipe_y))
else:
    pipe = screen.blit(pipe_image, (pipe_x, pipe_y))
if pipe2_flipped:
    pipe2 = screen.blit(flipped_pipe_image, (pipe2_x, -pipe2_y))
else:
    pipe2 = screen.blit(pipe_image, (pipe2_x, pipe2_y))
if pipe3_flipped:
    pipe3 = screen.blit(flipped_pipe_image, (pipe3_x, -pipe3_y))
else:
    pipe3 = screen.blit(pipe_image, (pipe3_x, pipe3_y))

display.update()

if bird.colliderect(pipe) or bird.colliderect(pipe2) or
bird.colliderect(pipe3):
    print("Game Over!")
    score = (time.get_ticks() - start_time)//1000
    print("You lasted:", score, "seconds!")
    #Added a way to check and update the high score
    if score > high_score:
        high_score = score
        print("You've got a new high score!")
    waiting = True

if pipe_x < -70:
    pipe_x = 800
    pipe_y = randint(100, 500)
    pipe_flipped = choice([True, False])

if pipe2_x < -70:
    pipe2_x = 800
    pipe2_y = randint(100, 500)
    pipe2_flipped = choice([True, False])

if pipe3_x < -70:
    pipe3_x = 800
    pipe3_y = randint(100, 500)
    pipe3_flipped = choice([True, False])

```

## Part 4: High Score Store

### Task 4.1: Long term storage

Right now our high score is only kept until we quit the game and then it's gone. Let's store the score in a file so we can keep it every time we play.

Download the highscore.txt file and save it in the same place you've saved your program

### Task 4.2: A bit of light reading

Let's read our high score from the file instead of setting it to 0 at the beginning.

Open the file, then set `high_score` to equal what is read from the file (don't forget to convert it to a number!), then print what the current high score is.

#### Hint

You can read from a file using code like this:

```
with open("age.txt") as file:
    age = int(file.read())
```

### Task 4.3: Write it down

Now we need to make sure we store our high score back in the file for next time.

After the while loop, open the file again in write mode and write the `high_score` into the file.

#### Hint

You can write to a file using code like this:

```
with open("age.txt", "w") as file:
    file.write(str(age))
```

## ✓ CHECKPOINT ✓

**If you can tick these off you have finished the extension!**

☐ If you play multiple games, quit and then run your code again it will remember your high score

### TUTOR TIPS

**The code should look like this:**

```
from pygame import *
from random import *

init()
```

```

print("The game is about to start!")

screen = display.set_mode((800, 600))

background_image = image.load("bg.png")
play_again_image = image.load("play_again.png")
bird_image = image.load("bird.png")
pipe_image = image.load("pipe.png")
flipped_pipe_image = transform.flip(pipe_image, False, True)

bird_x = 10
bird_y = 250

pipe_x = 200
pipe_y = 250
pipe_flipped = False
pipe2_x = 450
pipe2_y = 100
pipe2_flipped = False
pipe3_x = 700
pipe3_y = 400
pipe3_flipped = True

waiting = False

#Opening the file and getting the high score from there
with open("highscore.txt") as file:
    high_score = int(file.read())
    print("The current high score is", high_score)

start_time = time.get_ticks()

while True:

    if waiting:
        screen.blit(play_again_image, (0, 0))
        display.update()
        new_event = event.poll()
        if new_event.type == KEYDOWN and new_event.key == K_q:
            quit()
            break
        if new_event.type == KEYDOWN and new_event.key == K_RETURN:
            bird_x = 10
            bird_y = 250
            pipe_x = 250
            pipe_y = 250
            pipe_flipped = False
            pipe2_x = 500
            pipe2_y = 100
            pipe2_flipped = False

```



```

        pipe3_x = 750
        pipe3_y = 400
        pipe3_flipped = True
        waiting = False
        start_time = time.get_ticks()
    continue

new_event = event.poll()
if new_event.type == KEYDOWN and new_event.key == K_UP:
    bird_y = bird_y - 50
if new_event.type == KEYDOWN and new_event.key == K_DOWN:
    bird_y = bird_y + 50

pipe_x = pipe_x - 2
pipe2_x = pipe2_x - 2
pipe3_x = pipe3_x - 2

background = screen.blit(background_image, (0, 0))
bird = screen.blit(bird_image, (bird_x, bird_y))

if pipe_flipped:
    pipe = screen.blit(flipped_pipe_image, (pipe_x, -pipe_y))
else:
    pipe = screen.blit(pipe_image, (pipe_x, pipe_y))
if pipe2_flipped:
    pipe2 = screen.blit(flipped_pipe_image, (pipe2_x, -pipe2_y))
else:
    pipe2 = screen.blit(pipe_image, (pipe2_x, pipe2_y))
if pipe3_flipped:
    pipe3 = screen.blit(flipped_pipe_image, (pipe3_x, -pipe3_y))
else:
    pipe3 = screen.blit(pipe_image, (pipe3_x, pipe3_y))

display.update()

if bird.colliderect(pipe) or bird.colliderect(pipe2) or
bird.colliderect(pipe3):
    print("Game Over!")
    score = (time.get_ticks() - start_time)//1000
    print("You lasted:", score, "seconds!")
    if score > high_score:
        high_score = score
        print("You've got a new high score!")
    waiting = True

if pipe_x < -70:
    pipe_x = 800
    pipe_y = randint(100, 500)

```

```
    pipe_flipped = choice([True, False])

    if pipe2_x < -70:
        pipe2_x = 800
        pipe2_y = randint(100, 500)
        pipe2_flipped = choice([True, False])

    if pipe3_x < -70:
        pipe3_x = 800
        pipe3_y = randint(100, 500)
        pipe3_flipped = choice([True, False])

#Saving the high score back into the file
with open("highscore.txt", 'w') as file:
    file.write(str(high_score))
```