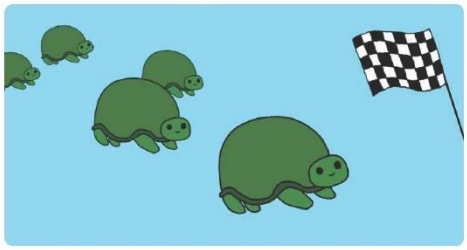
Turtle Race!

Race turtles against each other!



Python

Adaptation from Turtle Race by Raspberry Pi Foundation:
https://projects.raspberrypi.org/en/projects/turtle-race

Step 1 Introduction

Use loops to draw a race track and create a racing turtle game.

What you will make

This project introduces `for` loops through a fun turtle race game. Loops are used to draw the race track and to make the turtles move a random number of steps each turn. If you have a group of people to play the game. Each person pick a turtle and the one that gets the furthest is the winner.

What you will learn

By making your turtle race game. You will learn how to:

- Write `for` loops in Python
- Use random numbers in Python
- Draw lines in different colours with Python Turtle

Step 2 Racetrack

You're going to create a game with racing turtles. First they'll need a race track.

```
from turtle import *
forward(100)
```

Run your code **[F5]**

Did you notice the line starts in the middle. Let's move it to the left a bit to give more room.

```
from turtle import *
penup()
goto(-140, 140)

pendown()
forward(100)
```

Run your code **[F5]**

- Now let's use the turtle to draw some track markings for the race.

The turtle **`write`** function writes text to the screen.

Try it:

```
from turtle import *
penup()
goto(-140, 140)

pendown()
write(0)
forward(100)
write(5)
```

Run your code **[F5]**

- Now you need to fill in the numbers in between to create markings:

```
from turtle import *
penup()
goto(-140, 140)

pendown()
write(0)
forward(20)
write(1)
forward(20)
write(2)
forward(20)
write(3)
forward(20)
write(4)
forward(20)
write(5)
```

Run your code **[F5]**

- Did you notice that your code is very repetitive? The only thing that changes is the number to write.

  There's a better way of doing this in Python. You can use a **`for`** loop and make the track longer and at the same time draw the lines going down.

  Update your code to use a **`for`** loop:

```
from turtle import *
penup()
goto(-140, 140)

pendown()
for step in range(15):
  write(step, align='center')
  right(90)
  for num in range(8):
    penup()
    forward(10)
    pendown()
    forward(10)
  penup()
  backward(160)
  left(90)
  forward(20)
```

  Run your code **[F5]**

  Try changing some of the numbers and see what happens?
  Which section of code draws the lines going down?

Step 3 Add the Turtles

- Now let's bring in the Turtles and add a variable called **`racespeed`** so we can change how fast the races are as well as import **`randint`** which allows is to create random integer numbers: This is a long bit of code but it repeats a fair bit so maybe try using copy/paste to make it faster to input.

```
from turtle import *
from random import randint

speed(0)
penup()
goto(-140, 140)

racespeed = 10

for step in range(15):
  write(step, align='center')
  right(90)
  for num in range(8):
```

```
    penup()
    forward(10)
    pendown()
    forward(10)
  penup()
  backward(160)
  left(90)
  forward(20)

ada = Turtle()
ada.color('red')
ada.shape('turtle')

ada.penup()
ada.goto(-160, 100)
ada.pendown()

for turn in range(10):
  ada.right(36)

bob = Turtle()
bob.color('blue')
bob.shape('turtle')

bob.penup()
bob.goto(-160, 70)
bob.pendown()

for turn in range(72):
  bob.left(5)

ivy = Turtle()
ivy.shape('turtle')
ivy.color('green')

ivy.penup()
ivy.goto(-160, 40)
ivy.pendown()

for turn in range(60):
  ivy.right(6)

jim = Turtle()
jim.shape('turtle')
jim.color('orange')

jim.penup()
jim.goto(-160, 10)
jim.pendown()

for turn in range(30):
  jim.left(12)
```

Run your code **[F5]**

Step 4 Finish the Race

With this we now have 4 turtles called ada, bob, ivy and jim.
We also did a bit of animation of the turtles.
Try changing the numbers to see how it affects the turtles.

- The final piece of code is to add a **`Winner`** variable to tell who's won
  Use **`if`** statements to know which turtle crossed the line first
  Then display the colour of the winner. :

This looks like a really long bit of code again, but you've entered most of it already. Only the section in grey is new.

```
from turtle import *
from random import randint

speed(0)
penup()
goto(-140, 140)

racespeed = 10

for step in range(15):
  write(step, align='center')
  right(90)
  for num in range(8):
    penup()
    forward(10)
    pendown()
    forward(10)
  penup()
  backward(160)
  left(90)
  forward(20)

ada = Turtle()
ada.color('red')
ada.shape('turtle')

ada.penup()
ada.goto(-160, 100)
ada.pendown()

for turn in range(10):
  ada.right(36)

bob = Turtle()
bob.color('blue')
bob.shape('turtle')
```

```
bob.penup()
bob.goto(-160, 70)
bob.pendown()

for turn in range(72):
  bob.left(5)

ivy = Turtle()
ivy.shape('turtle')
ivy.color('green')

ivy.penup()
ivy.goto(-160, 40)
ivy.pendown()

for turn in range(60):
  ivy.right(6)

jim = Turtle()
jim.shape('turtle')
jim.color('orange')

jim.penup()
jim.goto(-160, 10)
jim.pendown()

for turn in range(30):
  jim.left(12)

Winner = "None"

while (Winner == "None"):
  ada.forward(randint(1,racespeed))
  bob.forward(randint(1,racespeed))
  ivy.forward(randint(1,racespeed))
  jim.forward(randint(1,racespeed))

  if ada.xcor() >140:
    Winner = "Red"
  elif bob.xcor() >140:
    Winner = "Blue"
  elif ivy.xcor() >140:
    Winner = "Green"
  elif jim.xcor() >140:
    Winner = "Yellow"

finish = Turtle()
finish.shape()
finish.penup()
finish.goto(-100,-50)
finish.write("And the Winner is " + Winner)
```