Welcome to the Labs

Scissors Paper Rock!

Thank you to our Sponsors!

Platinum Sponsor:

ATLASSIAN

Who are the tutors?

Who are you?

Log on

Log on and jump on the GPN website

girlsprogramming.network/workshop

Click Content for your room. You can see:

- These **slides** (to take a look back or go on ahead).
- A digital copy of your **workbook**.
- Help bits of text you can **copy and paste**!

There's also links to places where you can do more programming!

Tell us you're here!

Click on the

Start of Day Survey

and fill it in now!

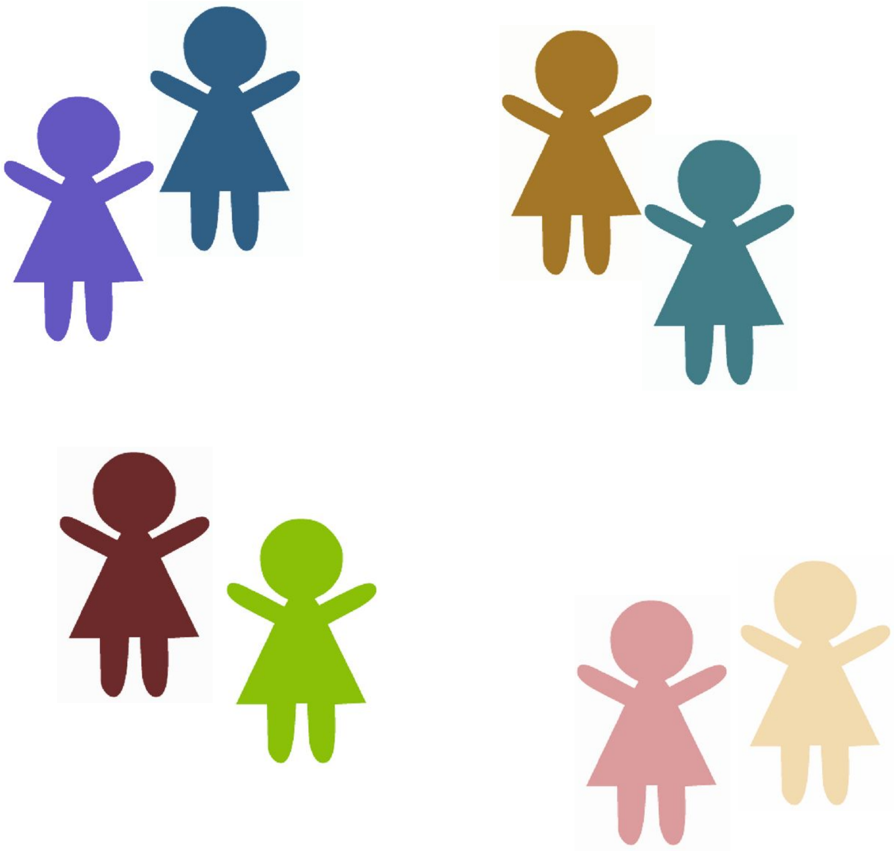
Today’s project!

Scissors Paper Rock

Ultimate Scissors Paper Rock

1. Start with a partner
2. play scissors paper rock!

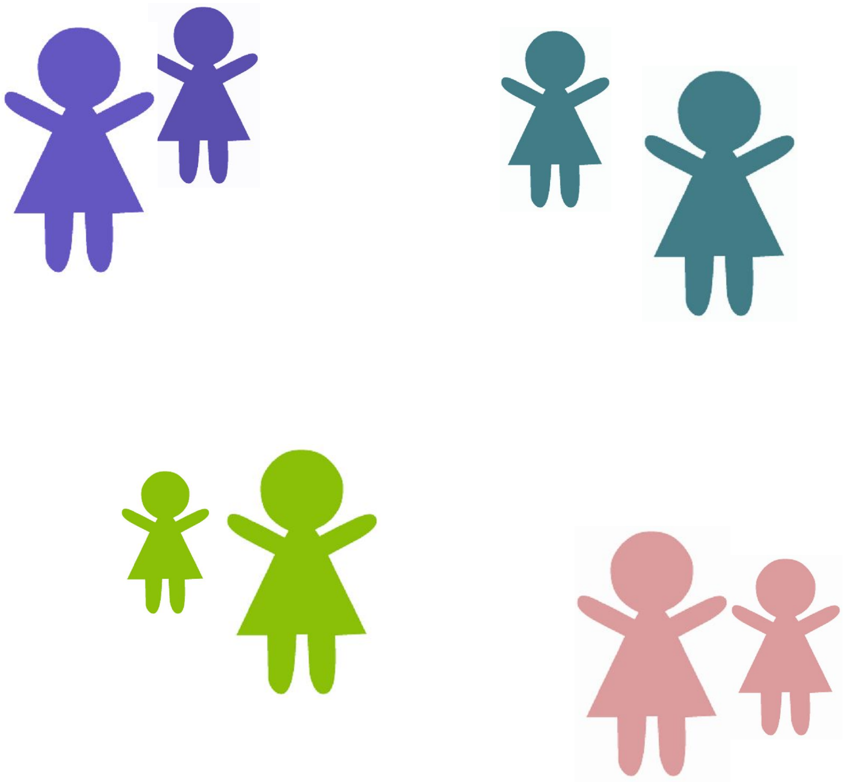
Who will be the champion?



Ultimate Scissors Paper Rock

1. Start with a partner
2. play scissors paper rock!
3. If you win they become your cheer squad!
   And their squad becomes your squad!
4. Find a new partner!
5. Keep playing until there is only one person left!

Who will be the champion?



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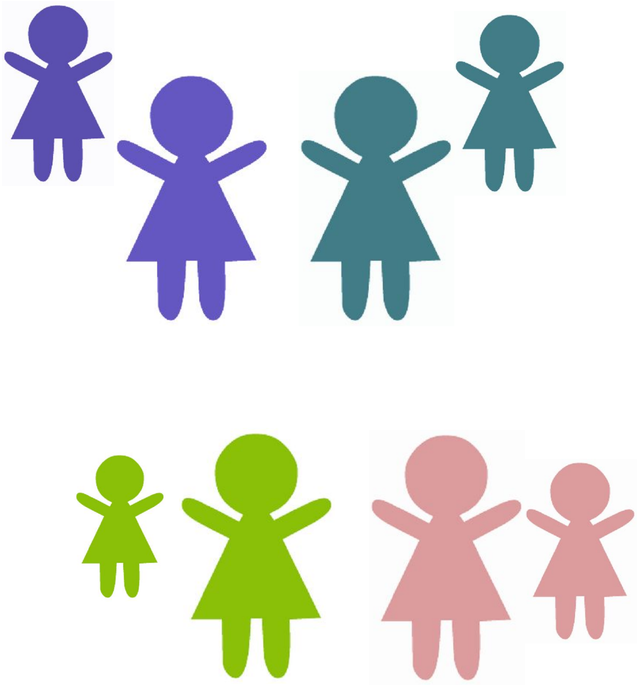

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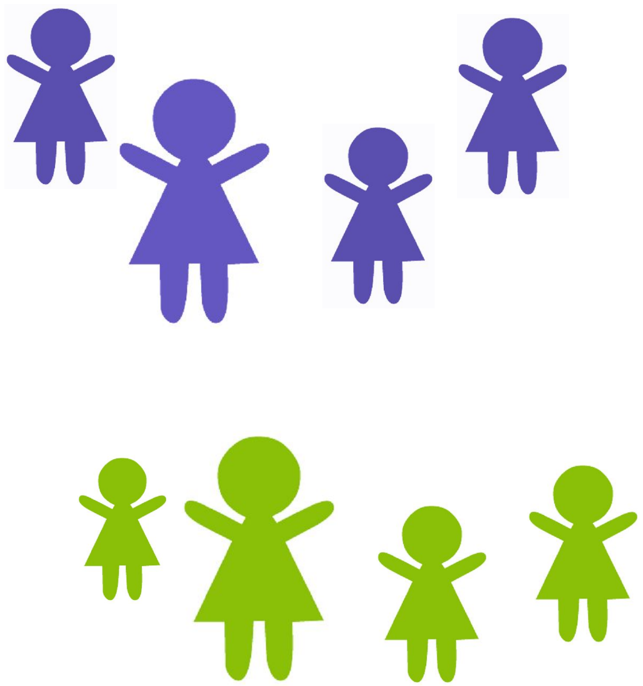

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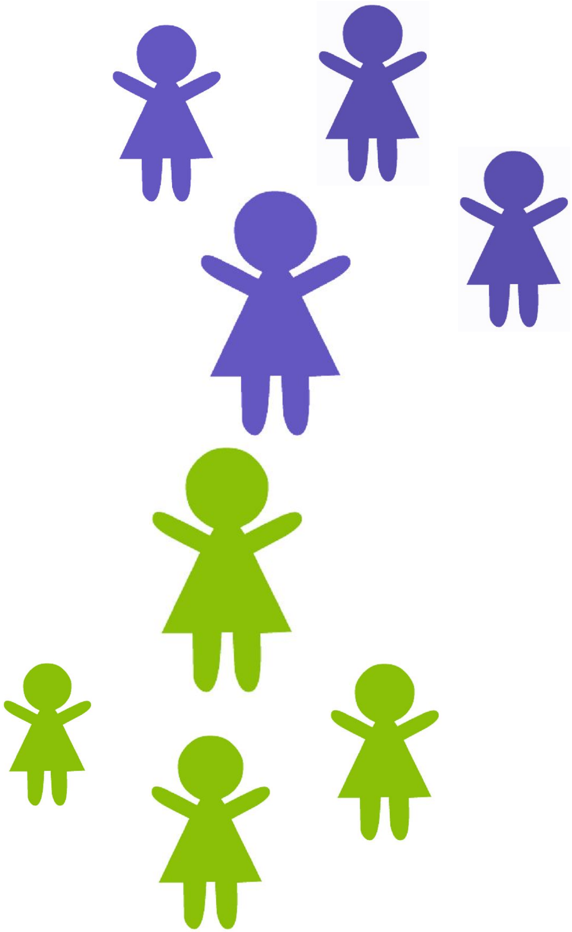

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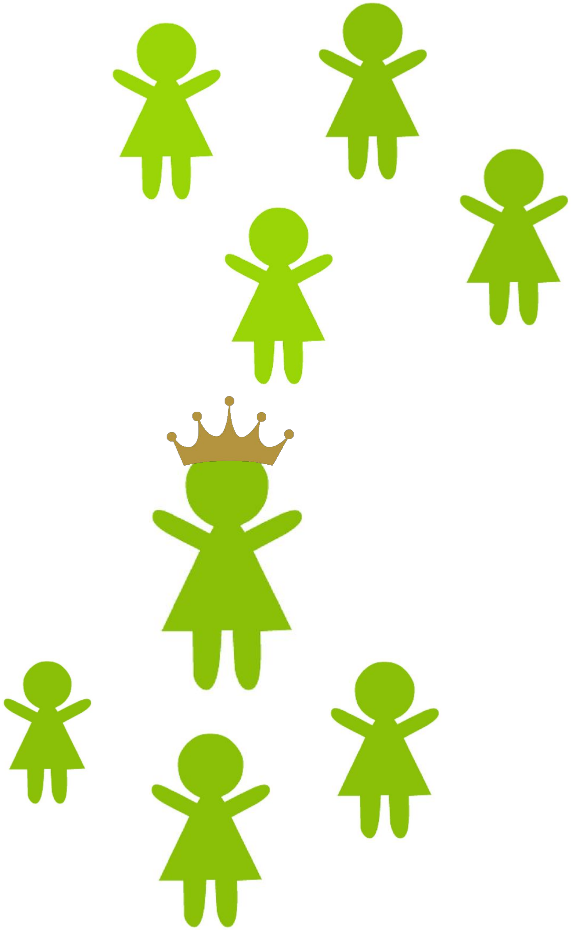


Scissors Paper Rock

How did you go? Did you win?

Some of the things that we need to do to play scissors paper rock include:

- We have to select a move (out of scissors, paper and rock)
- Our opponent has to select a move
- We need to know what combinations of moves result in win, lose or tie
- We need to compare our moves to see who won
- We have to congratulate the winner!

We'll be programming these actions today! Our opponent is going to be the computer.

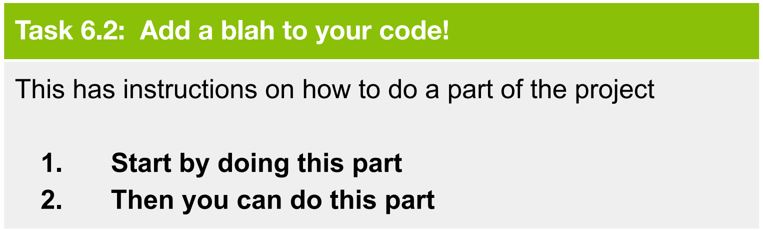
Using the workbook!

The workbooks will help you put your project together!

Each **Part** of the workbook is made of tasks!

Tasks - The parts of your project

Follow the tasks **in order** to make the project!



Task 6.2: Add a blah to your code!

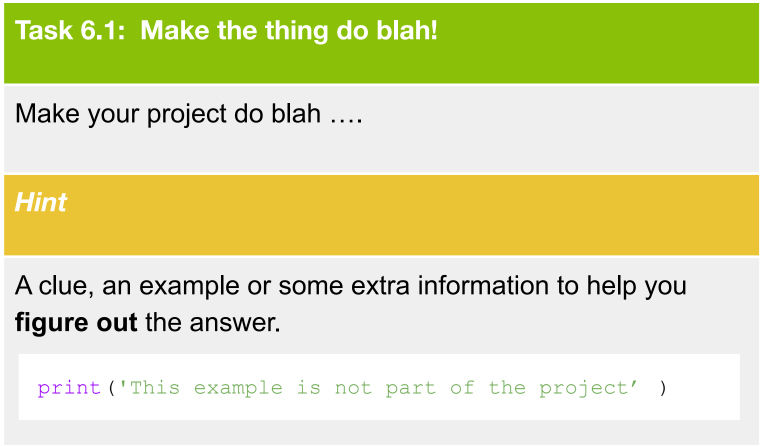
This has instructions on how to do a part of the project

1. **Start by doing this part**
2. **Then you can do this part**

Hints - Helpers for your tasks!

Stuck on a task, we might have given you a hint to help you **figure it out**!

The hints have **unrelated** examples, or tips. **Don't copy and paste** in the code, you'll end up with something **CRAZY**!



Task 6.1: Make the thing do blah!

Make your project do blah ....

Hint

A clue, an example or some extra information to help you **figure out** the answer.

```
print('This example is not part of the project' )
```

Using the workbook!

The workbooks will help you put your project together!

Check off before you move on from a **Part**! Do some bonuses while you wait!

Checklist - Am I done yet?

Make sure you can tick off every box in this section before you go to the next Part.

☑ **CHECKPOINT** ☑

If you can tick all of these off you're ready to move the next part!

☐ Your program does blah
☐ Your program does blob

Lecture Markers
This tells you you'll find out how to do things for this section during the names lecture.

Bonus Activities
Stuck waiting at a lecture marker?
Try a purple bonus. They add extra functionality to your project along the way.

★ **BONUS 4.3: Do some extra!**

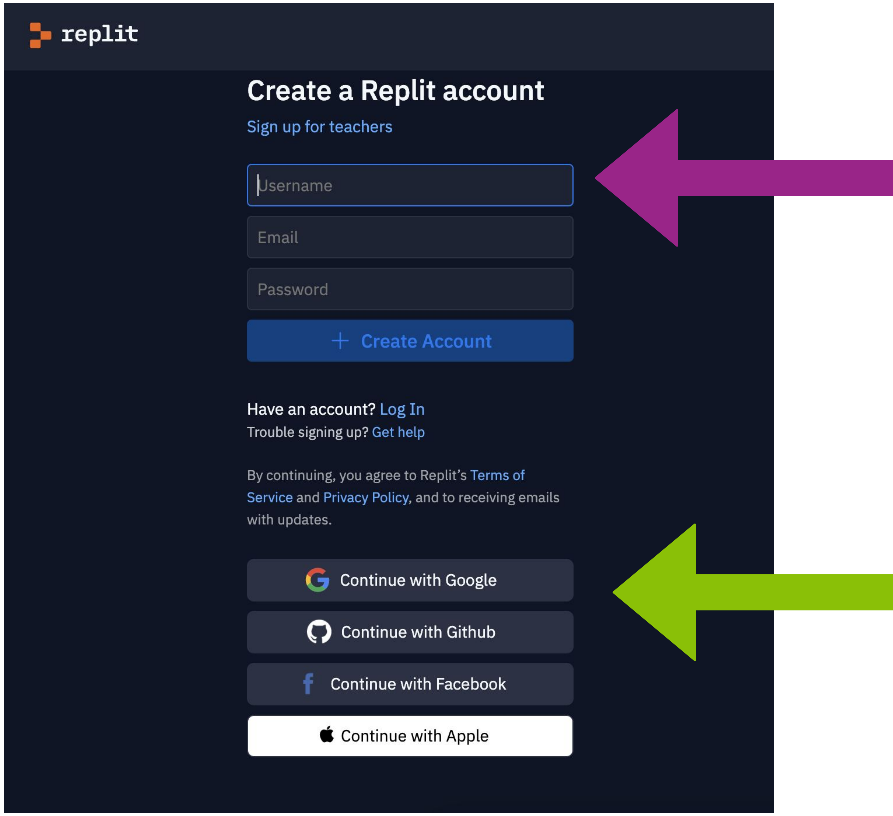
Something to try if you have spare time before the next lecture!

Where do we program? In Replit!

Go to replit.com

You need to sign up or sign in to start coding

- If you have a **Google** or **Apple account** it's easiest to use that.
- Or use an **email address** you are able to log into.
- If you don't have any of these, ask a tutor for one of our spare replit accounts to use today.



replit

Create a Replit account

Sign up for teachers

Username

Email

Password

+ Create Account

Have an account? Log In

Trouble signing up? Get help

By continuing, you agree to Replit's Terms of Service and Privacy Policy, and to receiving emails with updates.

Continue with Google

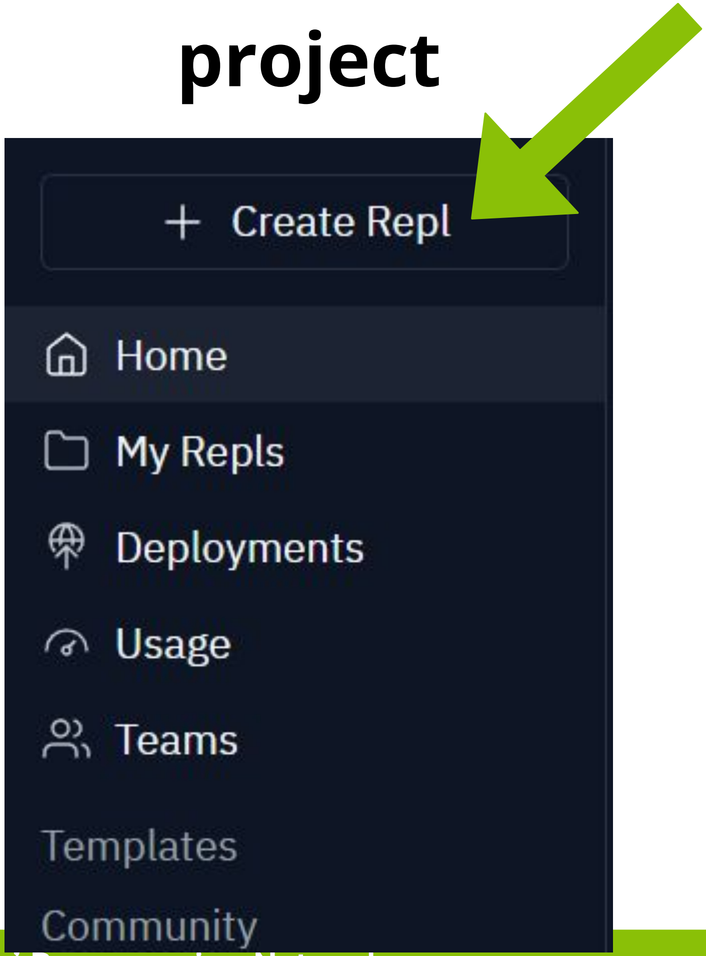
Continue with Github

Continue with Facebook

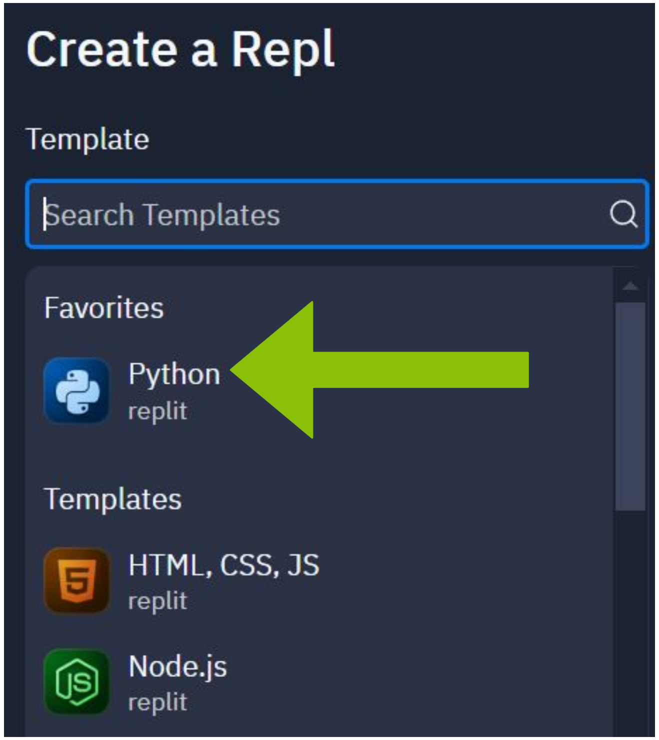
Continue with Apple

Creating our **Repl It Project**

Let's create a new project



Select Python for the project template

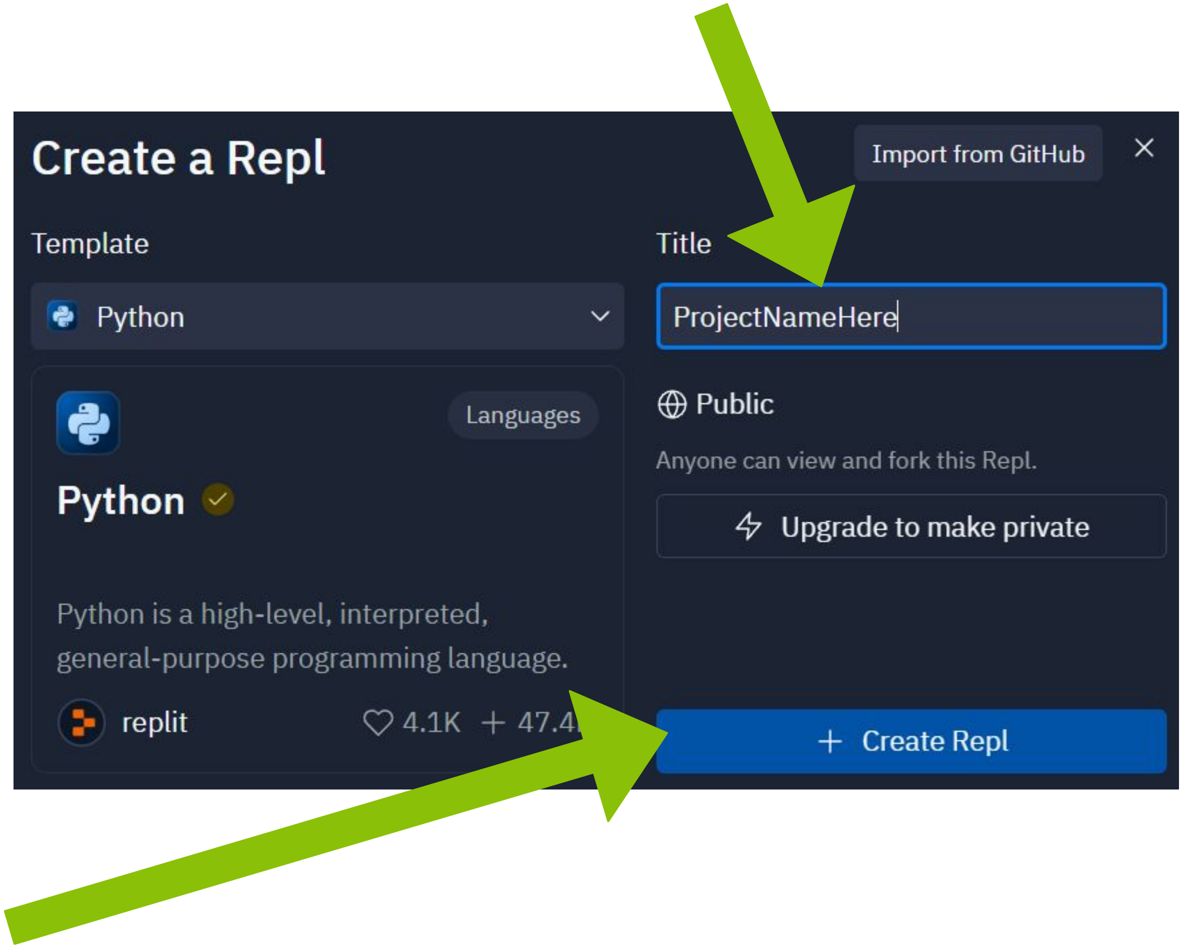


Creating our **Repl It Project**

Don't forget to give your project a name!

Name it after today's project!

Click Create Repl



Create a Repl

Template: Python

Title: ProjectNameHere

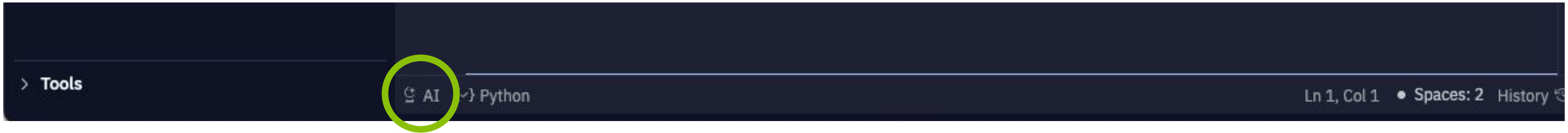
Public

Anyone can view and fork this Repl.

Setting our **Repl It Project**

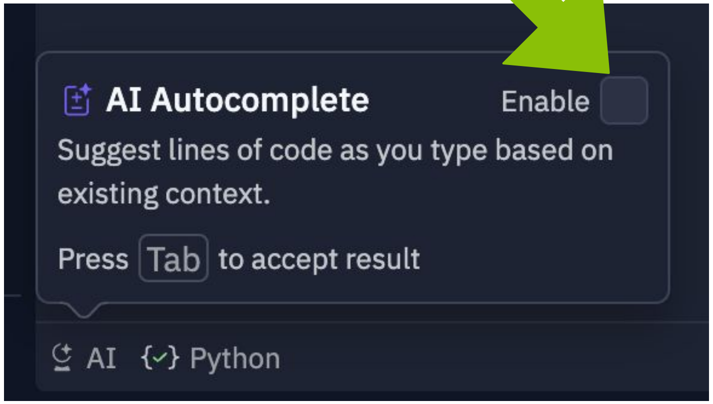
We can't learn if something else is doing all the work!

So we are going to disable AI Autocomplete for this project!



Click the small AI icon in the bottom left corner

Then sure there is no tick in this box



AI Autocomplete Enable □

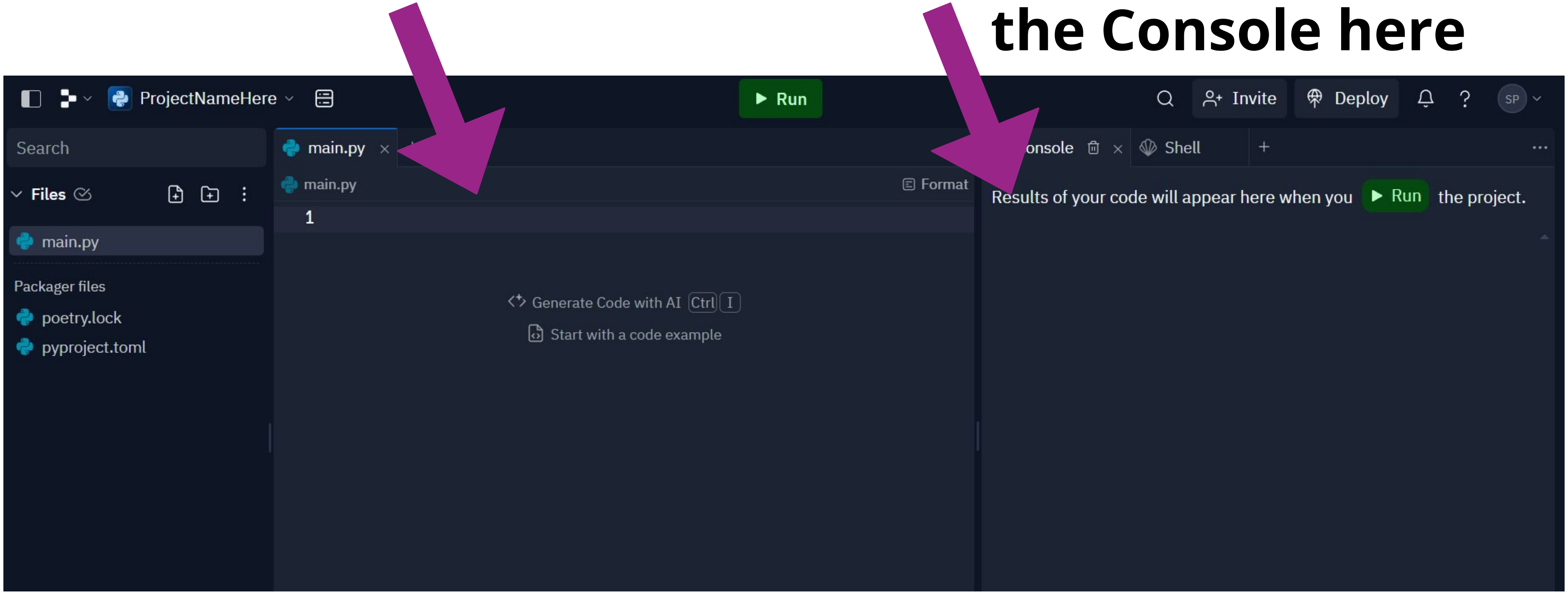
Suggest lines of code as you type based on existing context.

Press Tab to accept result

We’re ready to code!

We’ll write our project here in main.py

When you run your code, the results will display in the Console here



Results of your code will appear here when you ▶ Run the project.

Classes

What is an object?

What do you think an object is?

What is an object?

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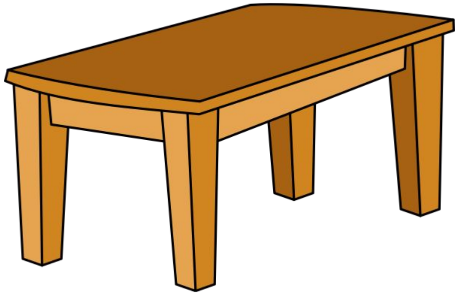
What is an object?

What do you think an object is?



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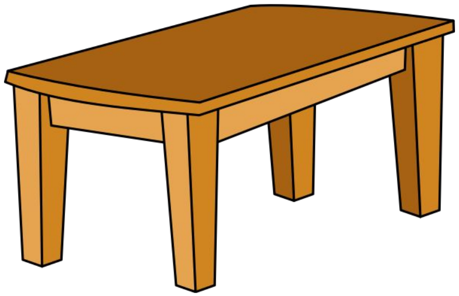

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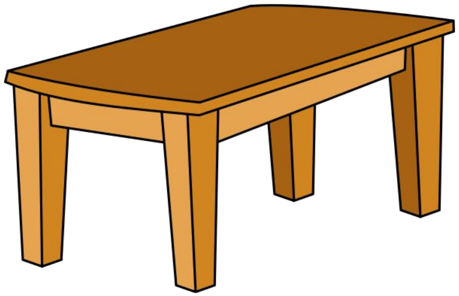

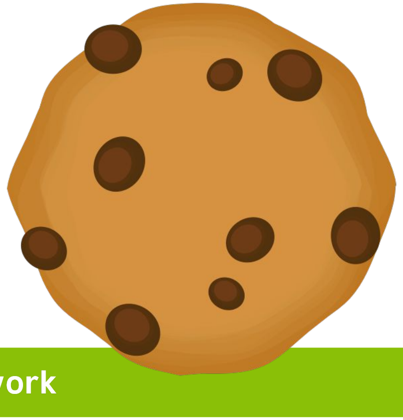

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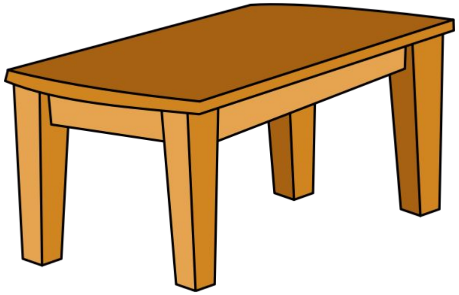

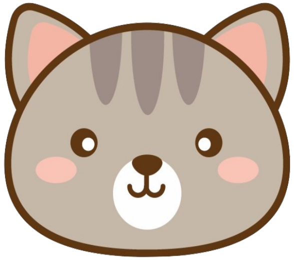

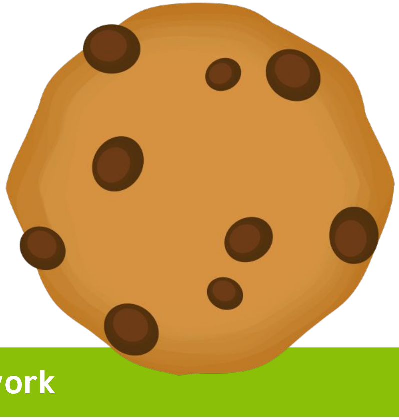

What is an object in code?

An object is something that we know information about and that can sometimes do things

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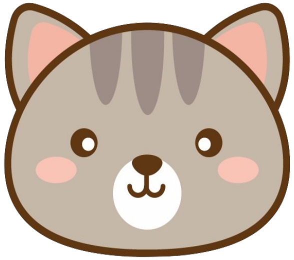
Like a cat!



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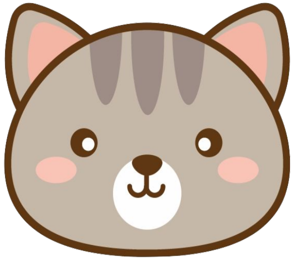

What information might we know about a cat?

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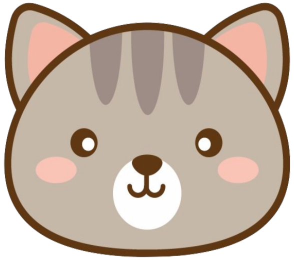

What information might we know about a cat?

Name

What is an object in code?

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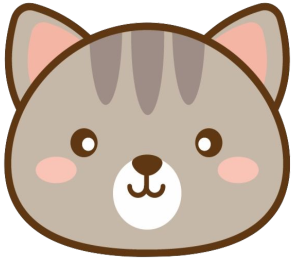

What information might we know about a cat?

Name

Age

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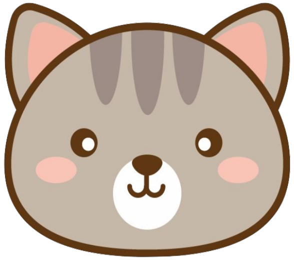

What information might we know about a cat?

Name

Age

Colour

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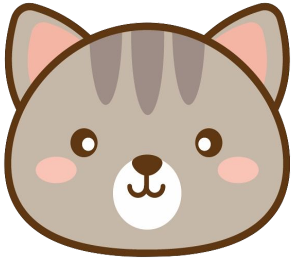

What information might we know about a cat?

Name

Age

Colour

Owner

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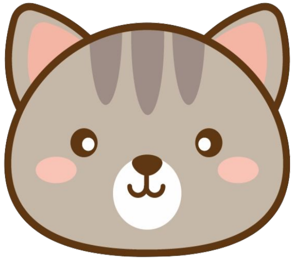

What information might we know about a cat?

Name
Age
Colour

Owner
Weight

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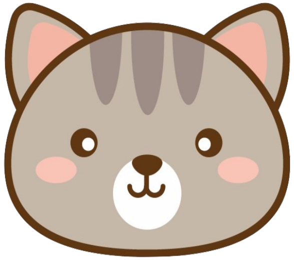

What information might we know about a cat?

Name

Owner

Age

Microchip #

Weight

Colour

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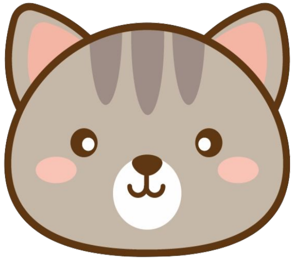

What things might a cat do?

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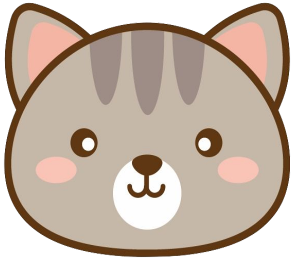

What things might a cat do?

Meow

What is an object in code?

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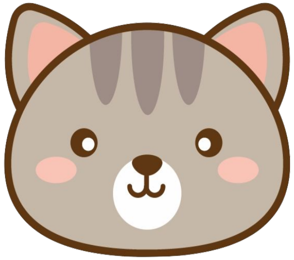

What things might a cat do?

Meow
Eat

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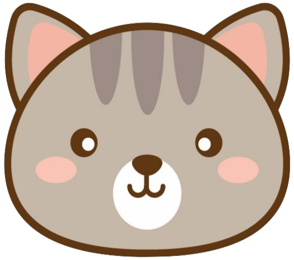

What things might a cat do?

Meow
Eat
Scratch

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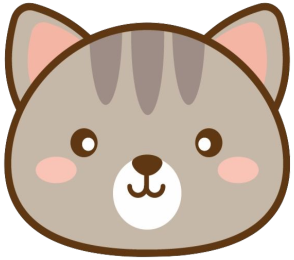

What things might a cat do?

Meow
Eat
Scratch

Sleep

What is an object in code?

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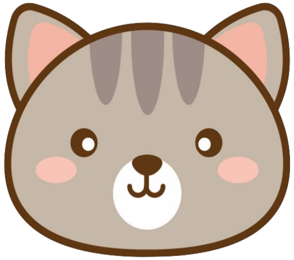

What things might a cat do?

Meow
Eat
Scratch

Sleep
Purr

What is an object in code?

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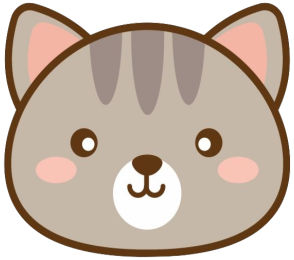


What things might a cat do?

Meow **Sleep**
Eat **Jump** **Purr**
Scratch

What does that look like in Python?

Let’s have a look at how we might make a Cat object in Python code!

What does that look like in Python?

Let’s have a look at how we might make a Cat object in Python code!

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour
```

Here we tell python that we are making a new type (or class) of object called Cat

What does that look like in Python?

Let’s have a look at how we might make a Cat object in Python code!

__init__ is how we tell Python how to make a new Cat

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour
```

What does that look like in Python?

Let’s have a look at how we might make a Cat object in Python code!

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour
```

Here we tell Python what information we need to know about the Cat

Note: self is special and we always need it

What does that look like in Python?

Let’s have a look at how we might make a Cat object in Python code!

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour
```

Here we save the information we got so we can use it again

What does that look like in Python?

How do we make a new Cat?

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour

emmy = Cat(“Emmy”, 3, “Dark brown”)
```

What does that look like in Python?

What does this print out?

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour

emmy = Cat(“Emmy”, 3, “Dark brown”)
print(emmy.name)
print(emmy.age)
print(emmy.colour)
```

What does that look like in Python?

What does this print out?

```python
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour

emmy = Cat(“Emmy”, 3, “Dark brown”)
print(emmy.name)
print(emmy.age)
print(emmy.colour)
```

```
Emmy
3
Dark Brown
```

What about doing things?

We said an object was something with information that could sometimes do things. Our Cat object doesn’t do anything right now - let’s add a way for it to meow!

What about doing things?

We said an object was something with information that could sometimes do things. Our Cat object doesn’t do anything right now - let’s add a way for it to meow!

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour

  def meow(self):
    print(“Meow”)
```

What about doing things?

What does this code do?

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour

  def meow(self):
    print(“Meow”)

emmy = Cat(“Emmy”, 3, “Dark brown”)
emmy.meow()
```

What about doing things?

What does this code do?

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour

  def meow(self):
    print(“Meow”)

emmy = Cat(“Emmy”, 3, “Dark brown”)
emmy.meow()
```

```
Meow
```

What else can it do?

Let’s have our cat have a Birthday that makes it get older by 1 year!

What else can it do?

Let’s have our cat have a Birthday that makes it get older by 1 year!

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour

  def meow(self):
    print(“Meow”)

  def birthday(self):
    self.age = self.age + 1
```

What else can it do?

What does this code do?

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour

  def meow(self):
    print(“Meow”)

  def birthday(self):
    self.age = self.age + 1

emmy = Cat(“Emmy”, 3, “Dark brown”)
emmy.birthday()
print(emmy.age)
```

What else can it do?

What does this code do?

```
class Cat():
  def __init__(self, name, age, colour):
    self.name = name
    self.age = age
    self.colour = colour

  def meow(self):
    print(“Meow”)

  def birthday(self):
    self.age = self.age + 1

emmy = Cat(“Emmy”, 3, “Dark brown”)
emmy.birthday()
print(emmy.age)
```

I have more than 1 cat!

Emmy has a little sister, Saphira! Let’s add her to our code too!

```
cat1 = Cat(“Emmy”, 3, “Dark brown”)
cat2 = Cat(“Saphira”, 1, “Grey”)
```

Cat Crime!

There has been a cat crime!

One of the cats has gotten on the kitchen counter and eaten some of my lunch!

They both look innocent but they left a hair behind at the scene of the crime! Let's write some code to work out who did it

Cat Crime

Who did it??

```
cat1 = Cat(“Emmy”, 3, “Dark brown”)
cat2 = Cat(“Saphira”, 1, “Grey”)

hair_colour = “Grey”

if hair_colour == cat1.colour:
  print(“That hair belongs to”, cat1.name)
elif hair_colour == cat2.colour:
  print(“That hair belongs to”, cat2.name)
```

Cat Crime

Who did it??

```
cat1 = Cat(“Emmy”, 3, “Dark brown”)
cat2 = Cat(“Saphira”, 1, “Grey”)

hair_colour = “Grey”

if hair_colour == cat1.colour:
  print(“That hair belongs to”, cat1.name)
elif hair_colour == cat2.colour:
  print(“That hair belongs to”, cat2.name)
```

```
That hair belongs to Saphira
```

Project time!

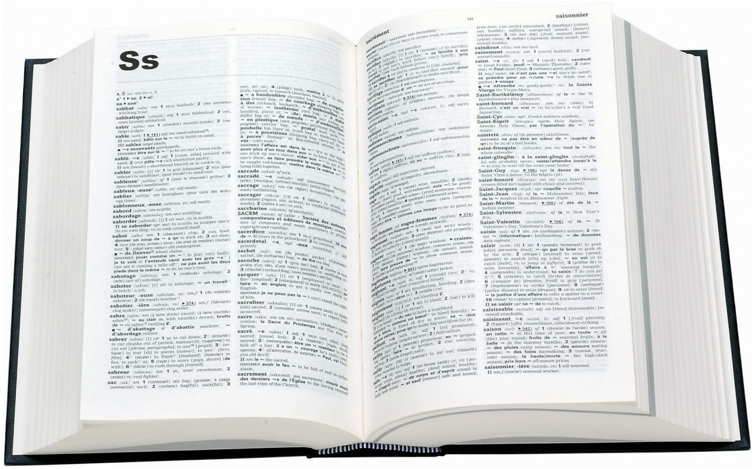
You now know all about **classes**!

Let's put what we learnt into our project

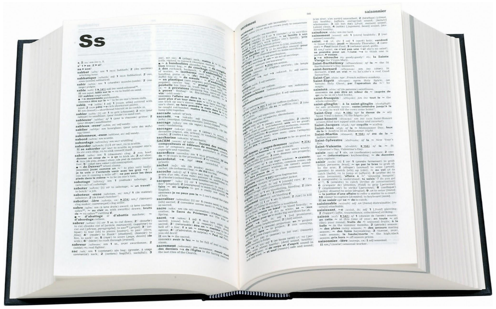
Try to do Parts 0-2

The tutors will be around to help!

Dictionaries



Dictionaries!

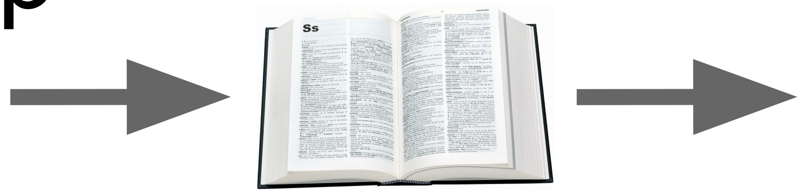


You know dictionaries!

They’re great at looking up thing by a word, not a position in a list!

Look up

Hello



Get back

A greeting (salutation) said when meeting someone or acknowledging someone’s arrival or presence.

Looking it up!

There are lots of times we want to look something up!

Competition registration

Team Name → List of team members

Phone Book

Name → Phone number

Vending Machine

Treat Name → Price

Looking it up!

Phone Book

Name → Phone number

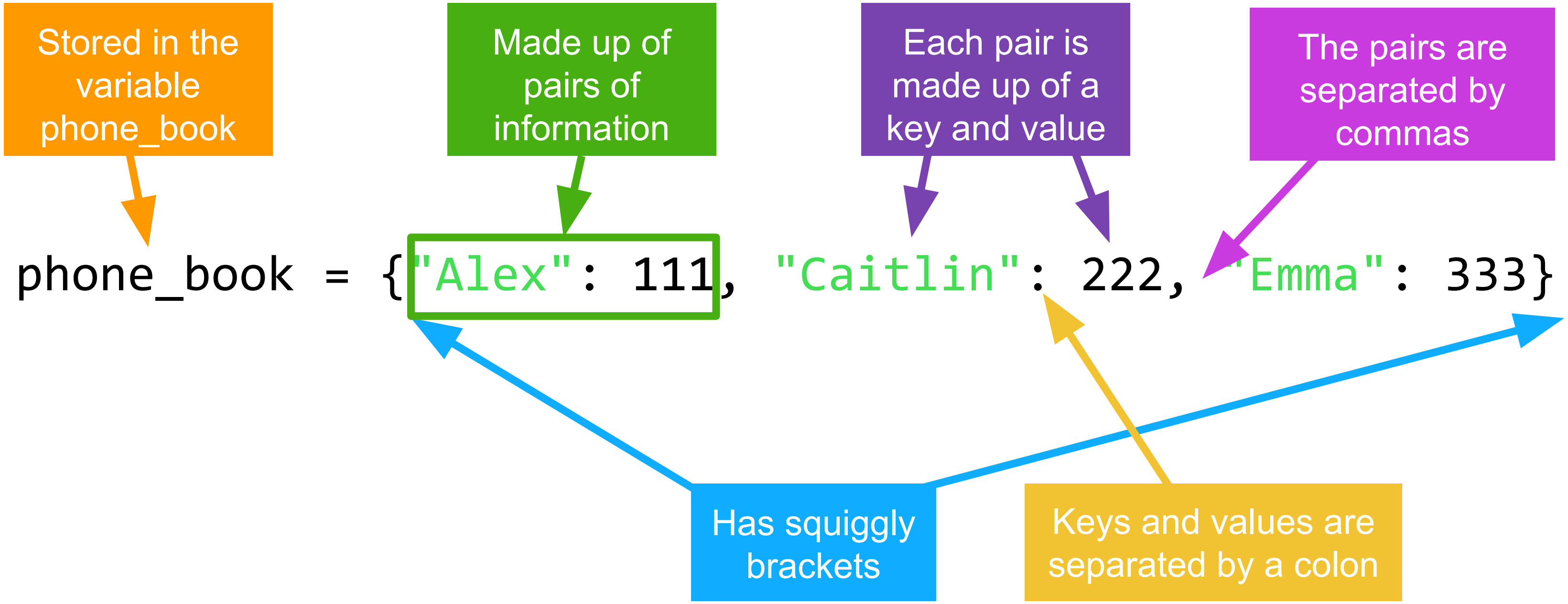
Key

Value

We can use a dictionary for anything with a <u>key → value</u> pattern!

Dictionaries anatomy!

This is a python dictionary!



Stored in the variable phone_book

Made up of pairs of information

Each pair is made up of a key and value

The pairs are separated by commas

```
phone_book = {"Alex": 111, "Caitlin": 222, "Emma": 333}
```

Has squiggly brackets

Keys and values are separated by a colon

This dictionary has Alex, Caitlin and Emma’s phone numbers

Playing with dictionaries!

Let’s try using the phone book

1. Copy in the dictionary! Add your own made up phone number!

```
phone_book = {"Alex": 111, "Caitlin": 222, "Emma": 333}
```

2. Try this: `phone_book[“Alex"]`

3. How would you look up Emma’s phone number?

4. Look up the name of someone who is not in the phone book? What happens?

Save it for later!

Sometimes we don't need the info right now.

Let's store it in a variable and use it later!

1. **Look up Alex's phone number and store it in a variable**

```
alexs_number = phone_book["Alex"]
```

2. **Print out a message using alexs_number**

```
print("Alexs number is: ", alexs_number)
```

3. **Repeat task 1 and 2 for another person in the phone book!**

Tuples!

Some data sticks together!

Tuples are like lists that you can't edit or add too!

It's a:

- **list of items**
- **in round brackets**
- **separated by commas**

Tuples are a way of grouping data!

```
("January", "1st")
("December", "25th")
("April", "25th")
```

Tuples in dictionaries!

We can use tuples as the key to a dictionary

1. Copy in the dictionary! Add your own made up phone number!

```
phone_book = {("January", "1st"): "New Years",
              ("December", "25th"): "Christmas Day",
              ("April", "25th"): "ANZAC Day"}
```

2. Try this: `phone_book[("January", "1st")]`

3. How would you look up what happens on the 25th of April

4. What happens if you we do: `phone_book[("25th", "December")]`

Project time!

You now know all about dictionaries!

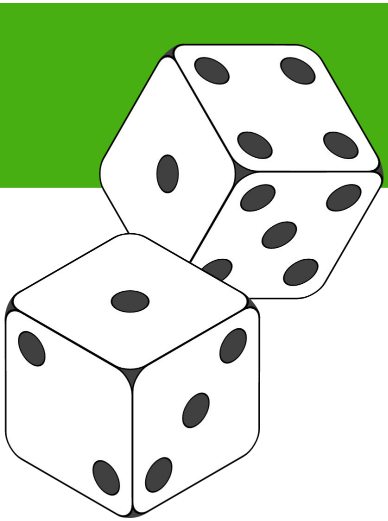
Let’s put what we learnt into our project

Try to do Part 3

The tutors will be around to help!

Random!

That’s so random!



There’s lots of things in life that are up to chance or random!

We want the computer to be random sometimes!

Python lets us **import** common bits of code people use! We’re going to use the **random** module!

Using the random module

Let's choose something randomly from a list!

This is like drawing something out of a hat in a raffle!

Try this!

1. **Import the random module!**

```
>>> import random
```

2. **Copy the shopping list into your script**

```
>>> shopping_list = ["eggs", "bread", "apples", "milk"]
```

3. **Choose randomly! Try it a few times!**

```
>>> random.choice(shopping_list)
```

Using the random module

You can also assign your random choice to a variable

```
>>> import random
>>> shopping_list = ["eggs", "bread", "apples", "milk"]
>>> random_food = random.choice(shopping_list)
>>> print(random_food)
```

Project Time!

Raaaaaaaaaaandom! Can you handle that?

Let’s try use it in our project!

Try to do Part 4

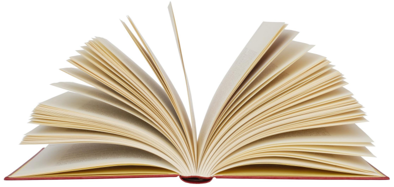
The tutors will be around to

For Loops

For Loops

For loops allow you to do something **for a number of times or for each item in a group**

There are many real world examples, like:



```
For each page in this book:
  Read
```

```
For each chip in this bag of chips:

  Eat
```

For Loops

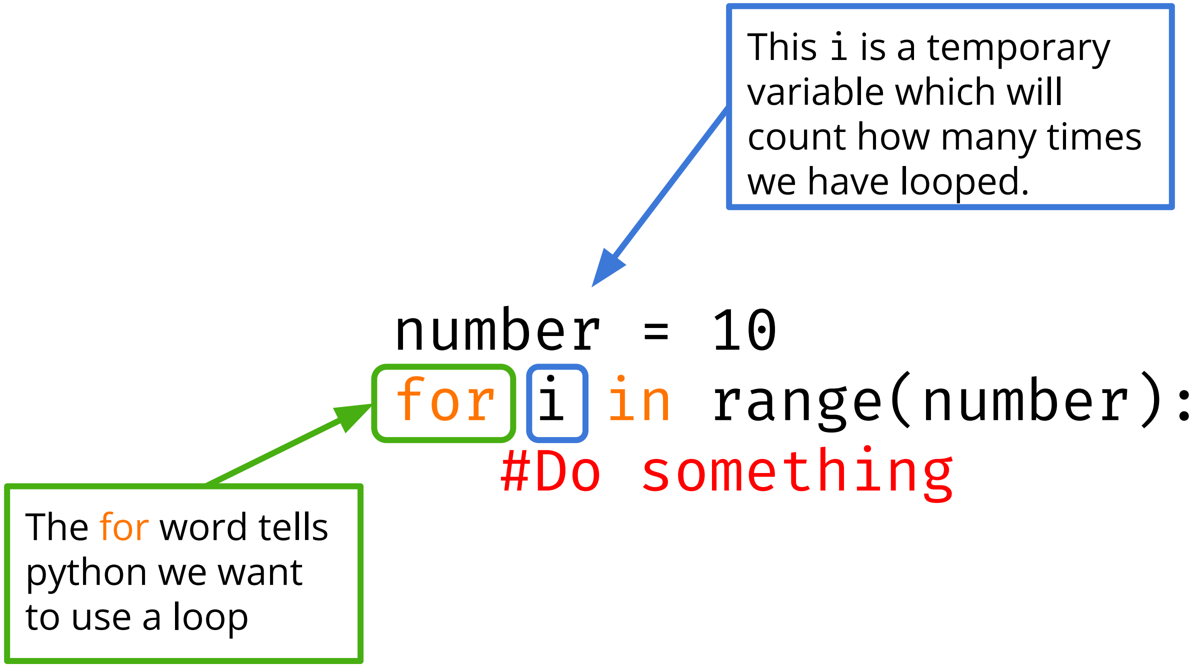
```
number = 10
for i in range(number):
   #Do something
```

For Loops

```
number = 10
for i in range(number):
    #Do something
```

The for word tells python we want to use a loop

For Loops

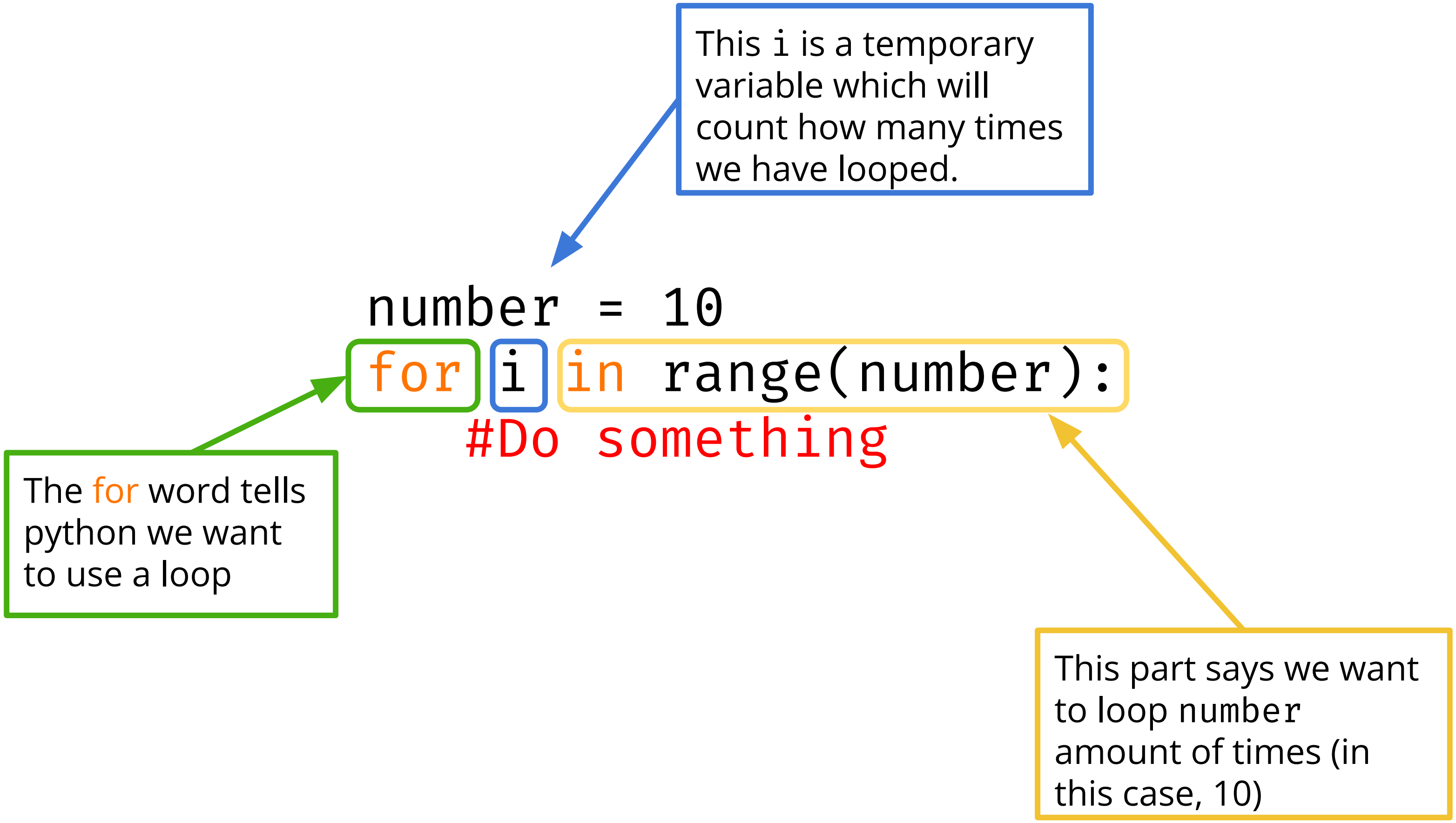


```
number = 10
for i in range(number):
    #Do something
```

This i is a temporary variable which will count how many times we have looped.

The for word tells python we want to use a loop

For Loops



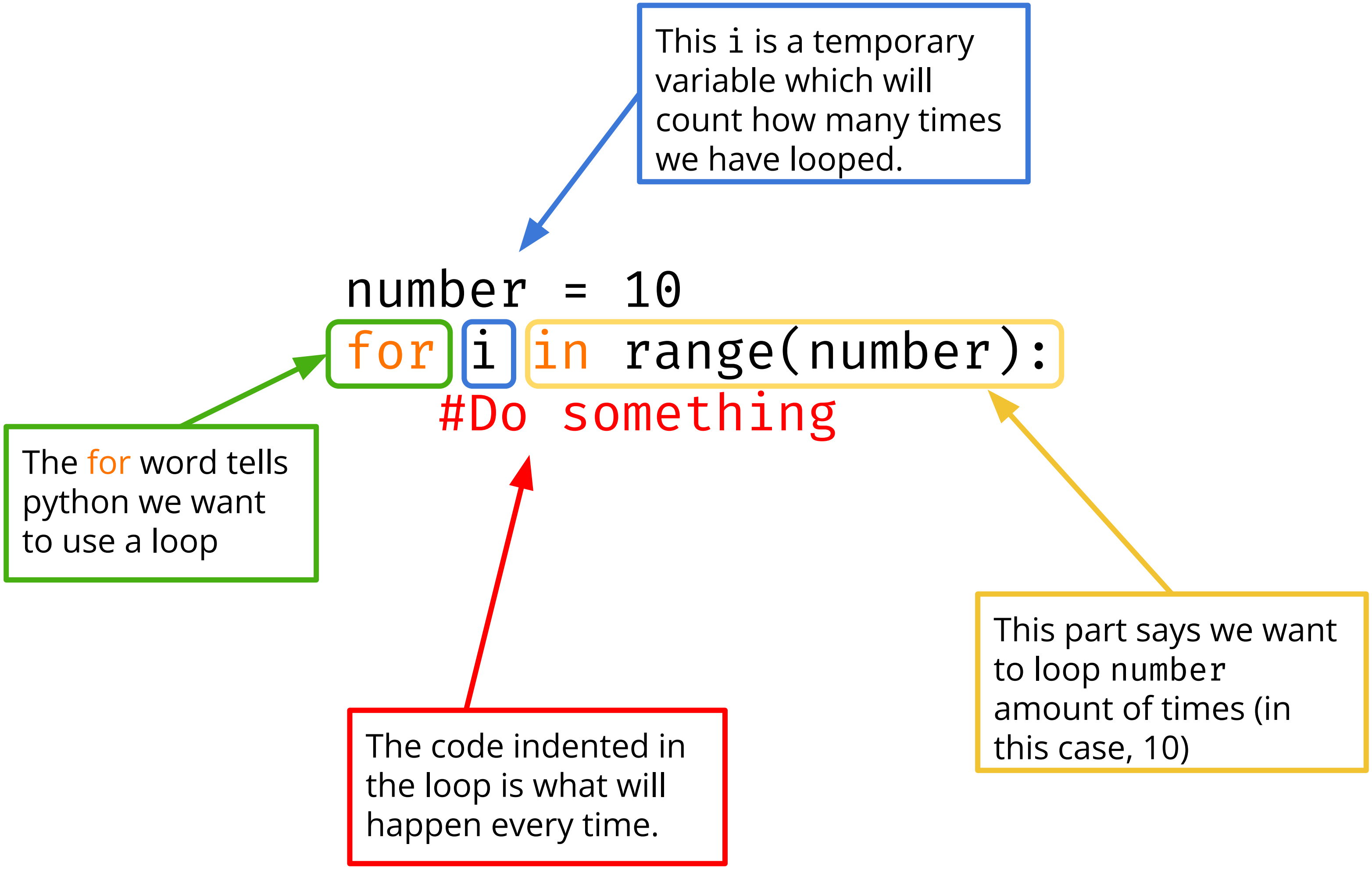
This i is a temporary variable which will count how many times we have looped.

```
number = 10
for i in range(number):
   #Do something
```

The for word tells python we want to use a loop

This part says we want to loop number amount of times (in this case, 10)

For Loops



```
number = 10
for i in range(number):
    #Do something
```

This i is a temporary variable which will count how many times we have looped.

The for word tells python we want to use a loop

The code indented in the loop is what will happen every time.

This part says we want to loop number amount of times (in this case, 10)

Looping how many times?

We can loop through a list:

```
friends = 4
for i in range(friends):
    print(“Hello friend!”)
```

What’s going to happen?

Looping how many times?

We can loop through a list:

```
friends = 4
for i in range(friends):
   print(“Hello friend!”)
```

What’s going to happen?

We do what’s in the for loop as many times as what is in the “range”

Looping how many times?

We can loop through a list:

```
friends = 4
for i in range(friends):
    print(“Hello friend!”)
```

We do what’s in the for loop as many times as what is in the “range”

What’s going to happen?

```
>>> Hello friend!
>>> Hello friend!
>>> Hello friend!
>>> Hello friend!
```

Asking a question with a number answer!

It’s common to ask the user to enter a number

Input always gives us a string of text

We need to turn the **string** into a number before we can use it as a range in a for loop

We do this by using **int()**

```
no_of_turns = int(input("How many times: “   ”))
```

```
for i in range(no_of_turns)
    Do something
```

Project Time!

Now you know how to use a for loop!

`Try to do Parts 5 and 6`

`...if you are up for it!`

The tutors will be around to help!

While Loops

Introducing … while loops!

What do you think this does?

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

Introducing … while loops!

What do you think this does?

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

```
i is 0
i is 1
i is 2
>>>
```

Introducing … `while` loops!

Stepping through a while loop…

Introducing … while loops!

One step at a time!

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

MY VARIABLES

```
i = 0
```

Set the variable

Introducing ... while loops!

One step at a time!

0 is less than 3 !

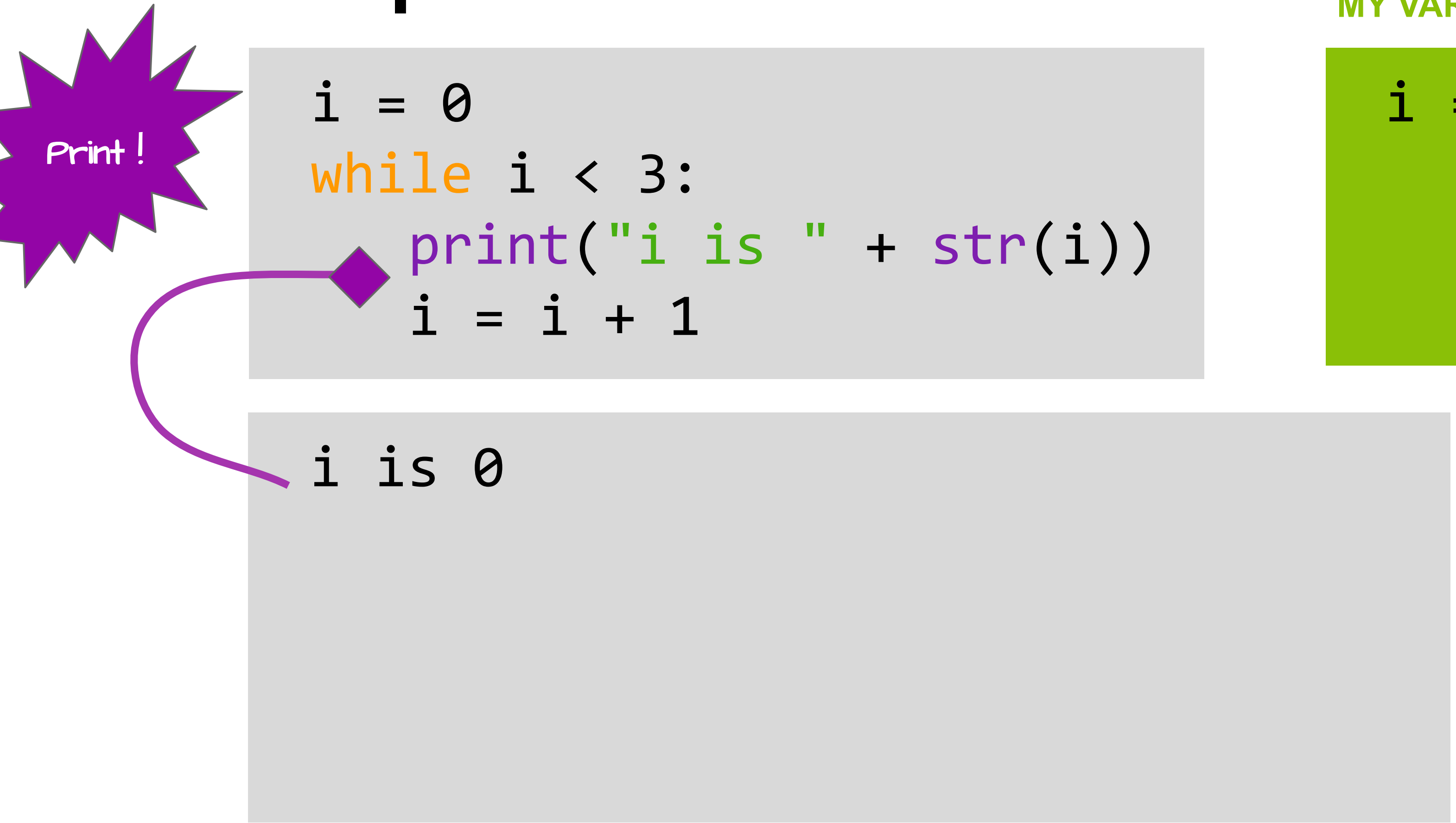
```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

MY VARIABLES

```
i = 0
```

Introducing ... `while` loops!

One step at a time!



```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

MY VARIABLES

```
i = 0
```

```
i is 0
```

Introducing ... while loops!

One step at a time!

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

MY VARIABLES

~~i = 0~~

i = 1

UPDATE TIME !

```
i is 0
```

Introducing ... `while` loops!

One step at a time!

Take it from the top!

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

```
i is 0
```

MY VARIABLES

~~i = 0~~

i = 1

Introducing ... while loops!

One step at a time!

I is less than 3!

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

MY VARIABLES

~~i = 0~~

i = 1

```
i is 0
```

Introducing ... while loops!

One step at a time!

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

```
i is 0

i is 1
```

MY VARIABLES

~~i = 0~~

i = 1

Introducing ... while loops!

One step at a time!

```
i = 0
while i < 3:
    print("i is " + str(i))
◆   i = i + 1
```

MY VARIABLES

~~i = 0~~

~~i = 1~~

i = 2

UPDATE TIME !

```
i is 0

i is 1
```

Introducing ... while loops!

One step at a time!

Take it from the top!

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

```
i is 0

i is 1
```

MY VARIABLES

~~i = 0~~

~~i = 1~~

i = 2

Introducing ... while loops!

One step at a time!

2 is less than 3 !

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

MY VARIABLES

~~i = 0~~

~~i = 1~~

i = 2

```
i is 0

i is 1
```

Introducing ... while loops!

One step at a time!

Print !

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

MY VARIABLES

~~i = 0~~

~~i = 1~~

i = 2

```
i is 0

i is 1

i is 2
```

Introducing … while loops!

One step at a time!

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

MY VARIABLES

~~i = 0~~

~~i = 1~~

~~i = 2~~

i = 3

UPDATE TIME !

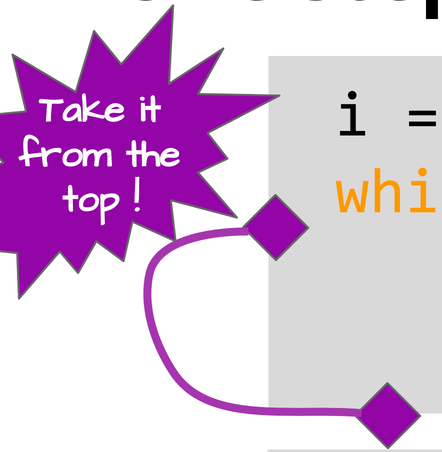
```
i is 0

i is 1

i is 2
```

Introducing … while loops!

One step at a time!



Take it from the top!

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

MY VARIABLES

~~i = 0~~

~~i = 1~~

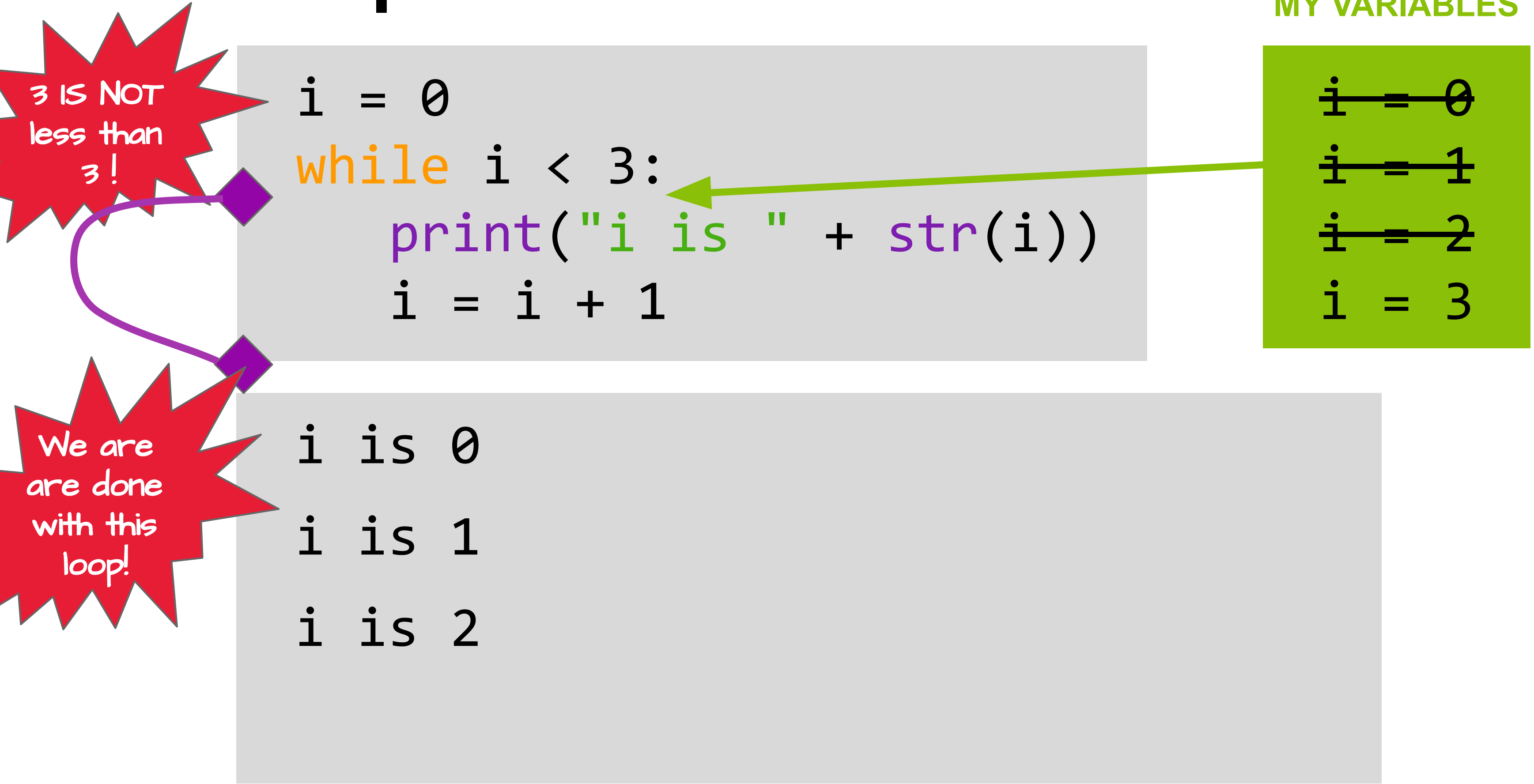
~~i = 2~~

i = 3

```
i is 0
i is 1
i is 2
```

Introducing ... while loops!

One step at a time!



3 IS NOT less than 3 !

```
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

MY VARIABLES

~~i = 0~~

~~i = 1~~

~~i = 2~~

i = 3

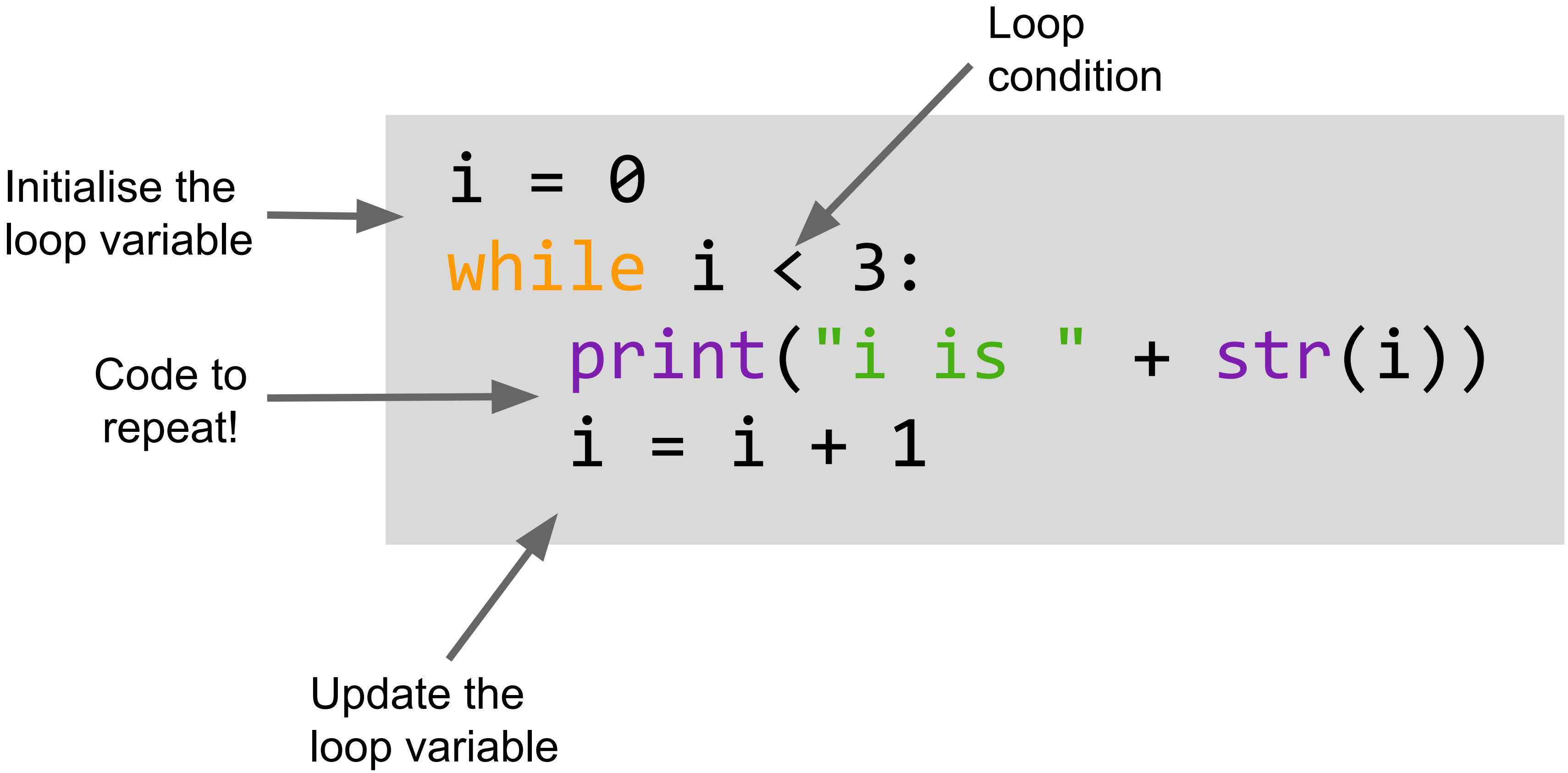
We are are done with this loop!

```
i is 0

i is 1

i is 2
```

Introducing … `while` loops!



```python
i = 0
while i < 3:
    print("i is " + str(i))
    i = i + 1
```

Loop condition

Initialise the loop variable

Code to repeat!

Update the loop variable

What happens when.....

What happens if we forget to update the loop variable?

```
i = 0
while i < 3:
    print("i is " + str(i))
```

What happens when…..

What happens if we forget to update the loop variable?

```
i = 0
while i < 3:
   print("i is " + str(i))
i is 0
i is 0
i is 0
i is 0
i is 0
i is 0
i is 0
i is 0
i is 0
i is 0
i is 0
i is 0
i is 0
i is 0
```

Infinite loop!

Sometimes we want our loop to go forever!

So we set a condition that is always True!

We can even just write True!

```
while True:
    print("Are we there yet?")
```

Project Time!

while we're here:

Try to do Part 7!

And the extensions

The tutors will be around to help!

Tell us what you think!

Click on the

End of Day Form

and fill it in now!