Welcome to the Labs

Scissors Paper Rock!

Thank you to our Sponsors!

Platinum Sponsor:

Who are the tutors?

Who are you?

Log on

Log on and jump on the GPN website

girlsprogramming.network/adelaide-workshop

Click Content for your room. You can see:

- These **slides** (to take a look back or go on ahead).
- A link to our **workbook** in EdStem.
- A **cheatsheet** of python shortcuts!

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!

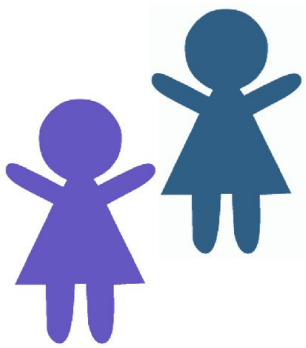
Today’s project!

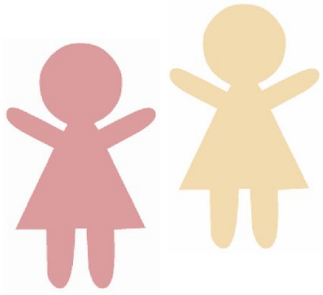
Scissors Paper Rock

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!
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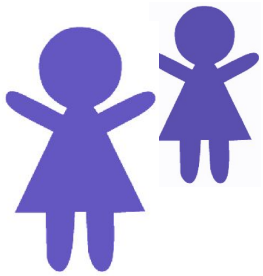

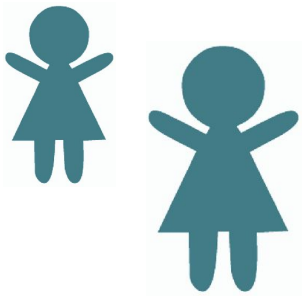

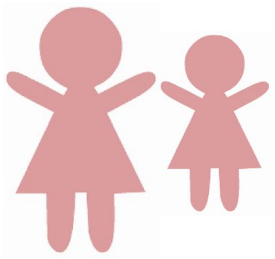

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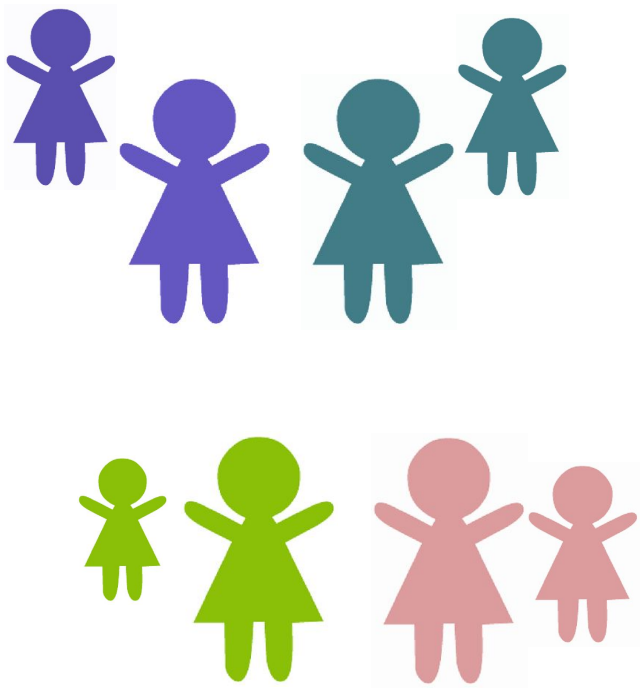

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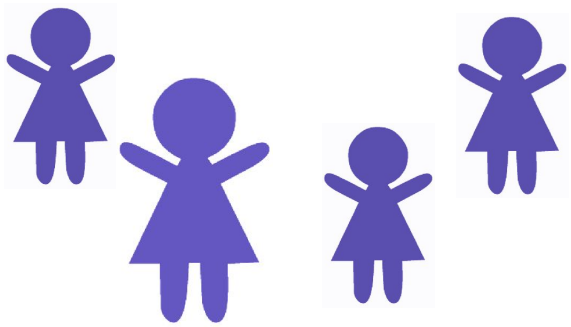

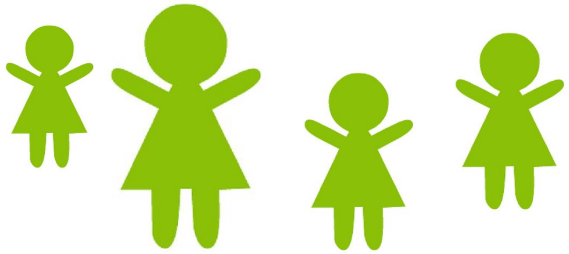

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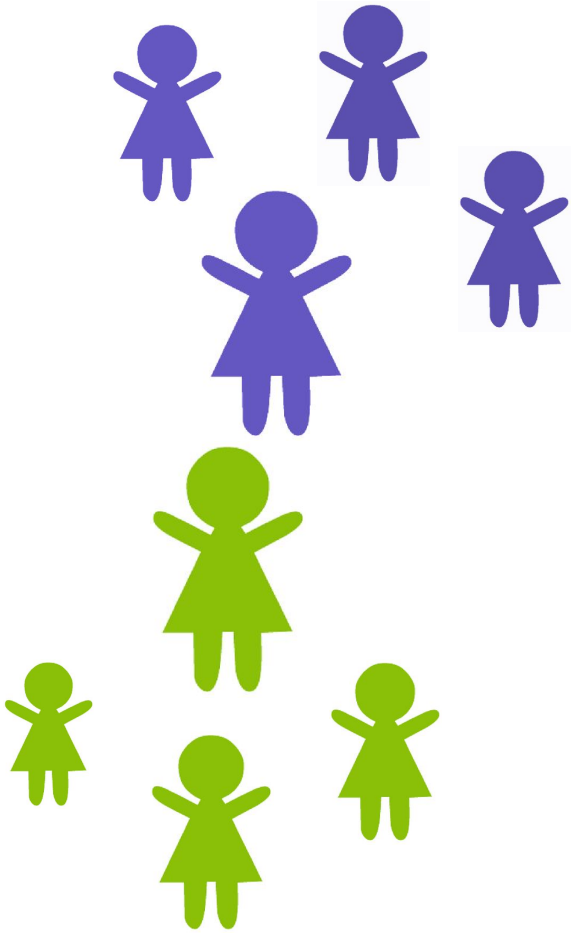

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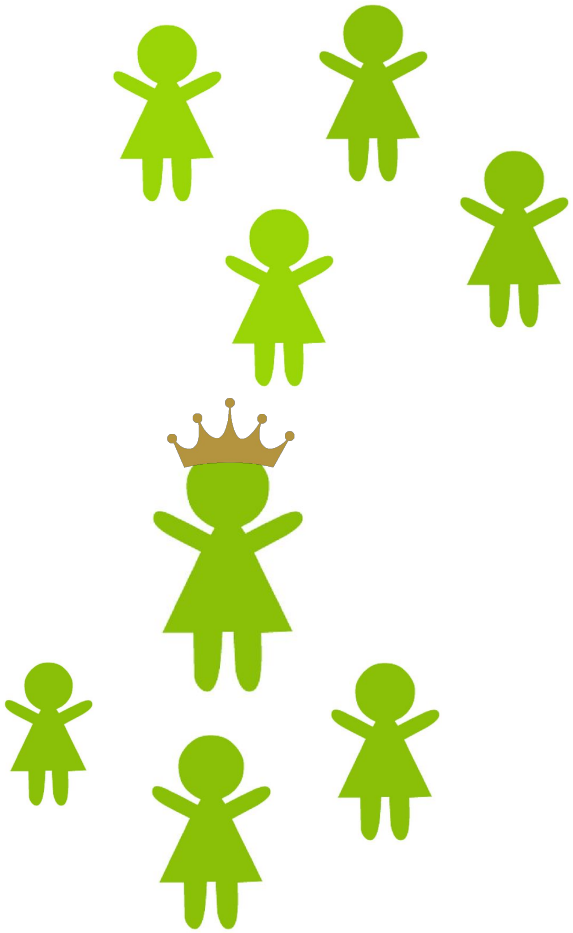


Scissors Paper Rock

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.

Signing up to Edstem

We are shifting all our courses to a new website called “Edstem” so here’s an overview of how to sign up and how to use it.

First let’s go through how to create an account.

1. Follow this link: https://edstem.org/au/join/TZCN8s
2. Type in your name and your personal email address
3. Click Create Account
4. Go to your email to verify your account
5. Create a password
6. It should then take you to the courses home page.

If you don’t have access to your email account, ask a tutor for a GPN edStem login

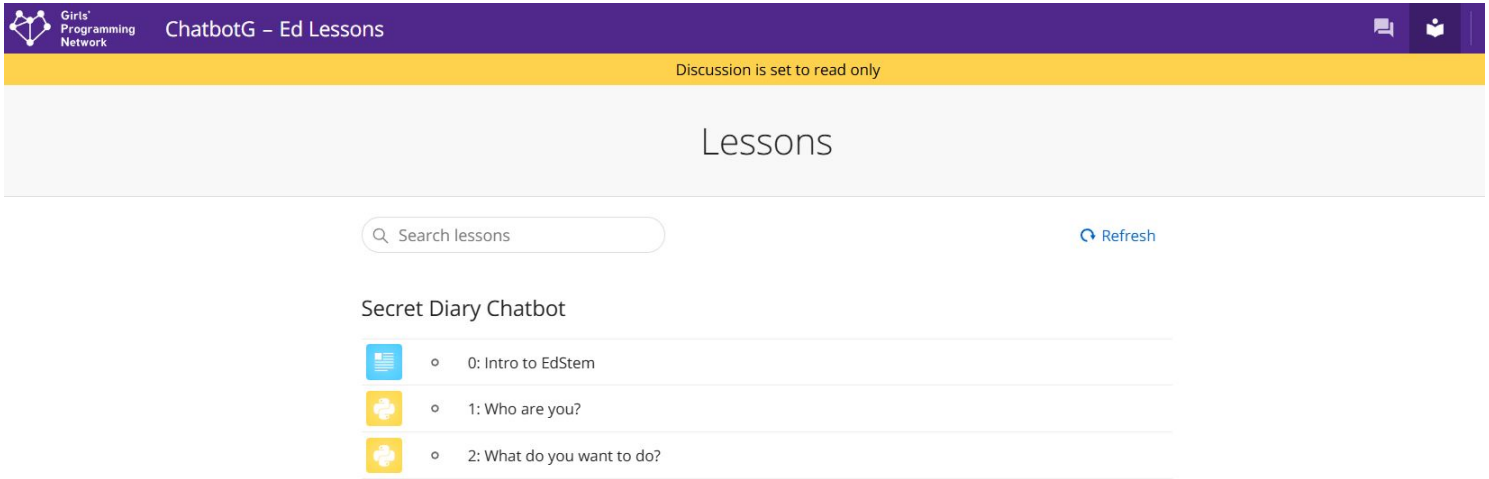
Getting to the lessons

1. Once you are in the course, you'll be taken to a discussion page.
2. Click the button for the lessons page (top right - looks like a book)

The Anatomy of the workbook

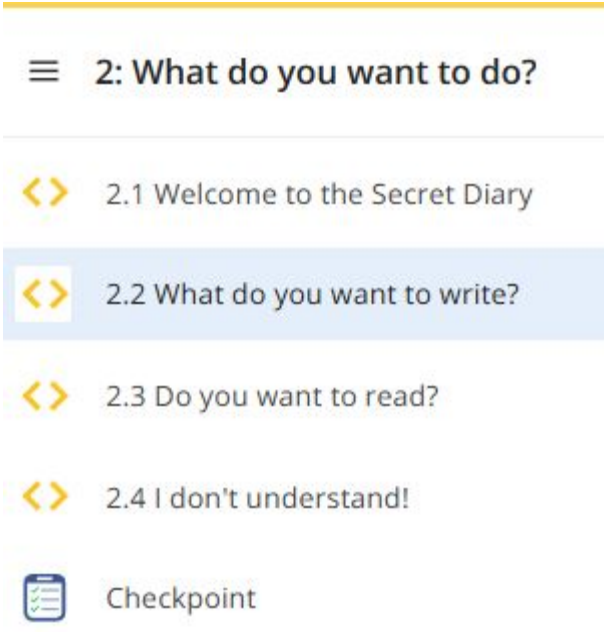
The main page:

- Heading at the top that tells you the project (SPR)
- List of “Chapters” - they have icons that looks like this:
- To complete your project, work through the chapters one at a time



Inside a Chapter

Inside a chapter there are two main types of pages:



1. **Lessons** - where you will do your coding.

   They have this icon: 

2. **Checkpoints**  Checkpoint

   Each chapter has a checkpoint to complete to move to the next chapter. Make sure you scroll down to see all the questions in a checkpoint.

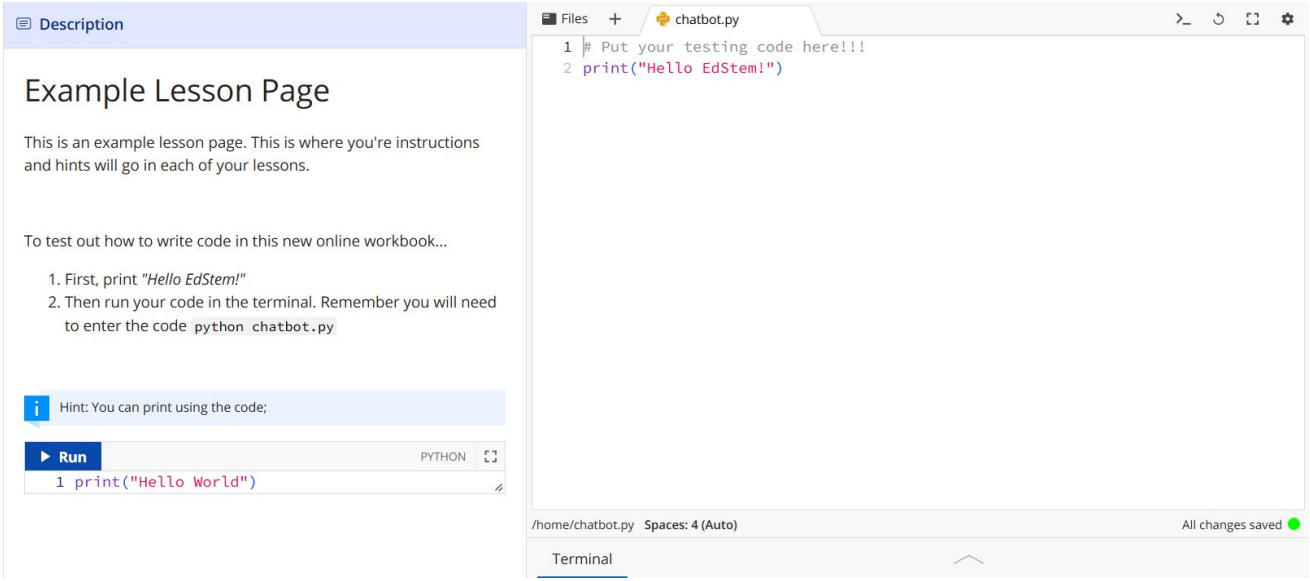
How to do the work

In each lesson there is:

- A section on left with instructions
- A section on right for your code

You will need to **copy your code from the last lesson**, then follow the instructions to change your code

There are also Hints and Code Blocks to help you



Some shortcuts...

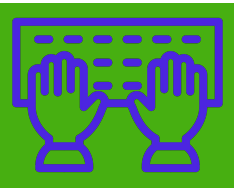
There are a couple things you can do to make copying your code from one page to another easier.

1) **Ctrl + A** Pressing these keys together will select all the text on a page

2) **Ctrl + C** Pressing these keys together will copy anything that's selected

3) **Ctrl + V** Pressing these keys together will paste anything you've copied

Need help with EdStem?



There is a section at the top of your workbook that explains how to use EdStem if you get stuck and need a reminder!

It's called 0: Intro to EdStem

Go to Part 0 and have a look!

Classes

What is an object?

What do you think an object is?

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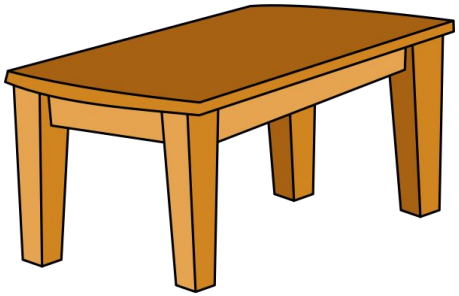

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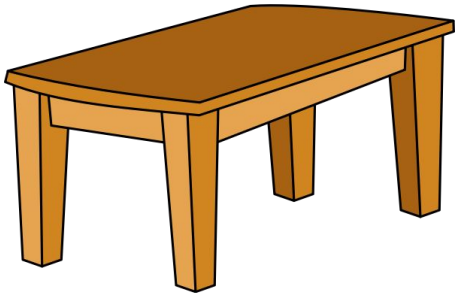

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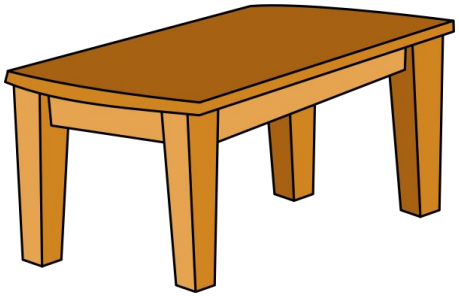

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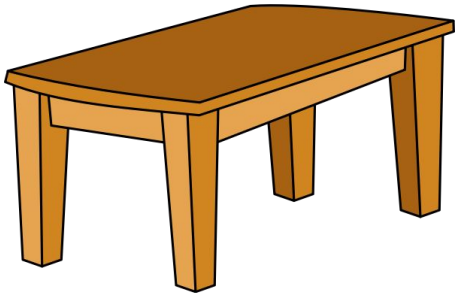

What is an object in code?

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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Like a cat!

What information might we know about a cat?

What is an object in code?

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Like a cat!

What information might we know about a cat?

Name

What is an object in code?

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

Like a cat!

What information might we know about a cat?

Name

Age

What is an object in code?

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

Like a cat!

What information might we know about a cat?

Name

Age

Colour

What is an object in code?

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Like a cat!

What information might we know about a cat?

Name

Owner

Age

Colour

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Like a cat!

What information might we know about a cat?

Name
Age
Colour
Owner
Weight

What is an object in code?

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

Like a cat!

What information might we know about a cat?

Name
Owner
Age
Microchip #
Weight
Colour

What is an object in code?

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Like a cat!

What things might a cat do?

What is an object in code?

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Like a cat!

What things might a cat do?

Meow

What is an object in code?

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Like a cat!

What things might a cat do?

Meow
Eat

What is an object in code?

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Like a cat!

What things might a cat do?

Meow
Eat
Scratch

What is an object in code?

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What things might a cat do?

Meow
Eat
Scratch
Sleep

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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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Like a cat!

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!

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```
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

```
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```

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)
```

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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!

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```
class Cat():
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    self.age = age
    self.colour = colour

  def meow(self):
    print("Meow")
```

What about doing things?

What does this code do?

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

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Meow

What else can it do?

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

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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?

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

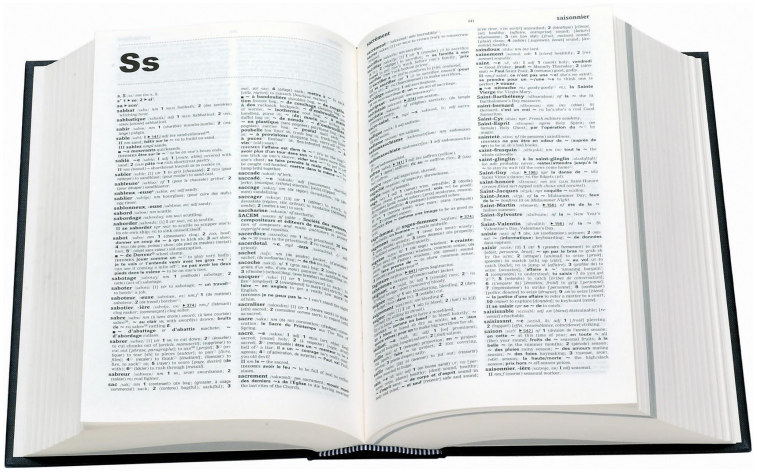
You now know all about **classes**!

Let's put what we learnt into our project

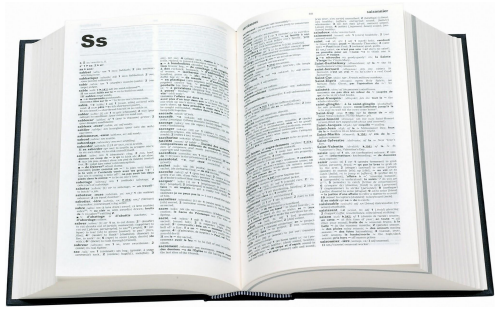
Try to do Parts 0-2

The tutors will be around to help!

Dictionaries



Dictionaries!

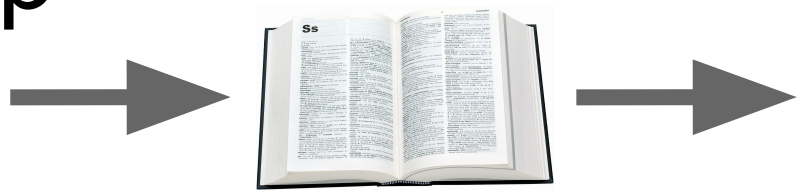


You know dictionaries!

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

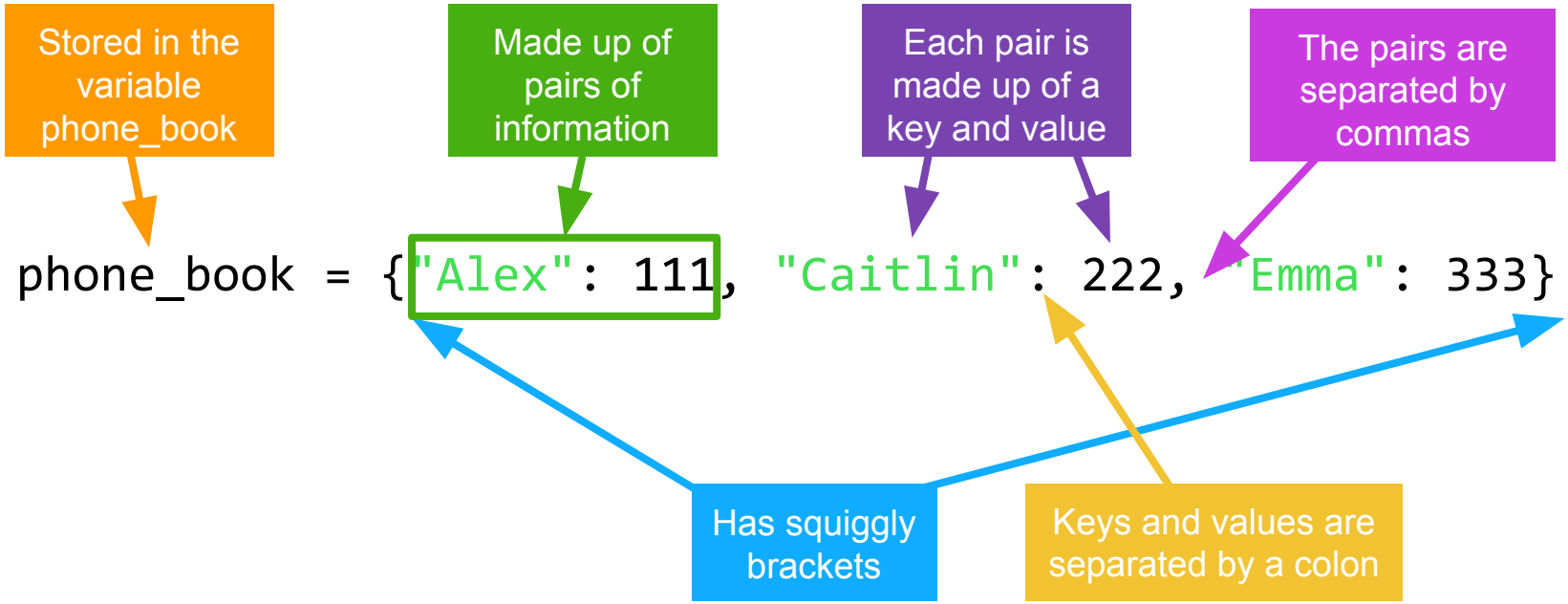
Key

Value

We can use a dictionary for anything with a key → value pattern!

Dictionaries anatomy!

This is a python dictionary!



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!

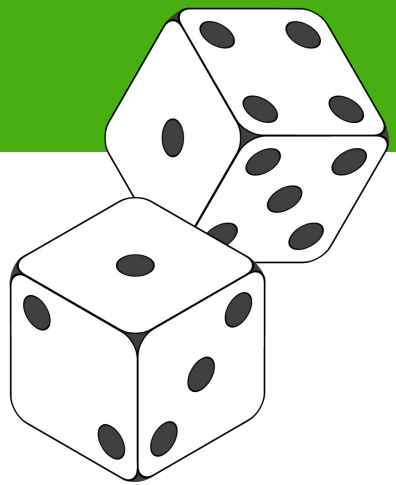
Let's put what we learnt into our project

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!

Raaaaaaaaaandom! Can you handle that?

Let’s try use it in our project!

Try to do Part 4

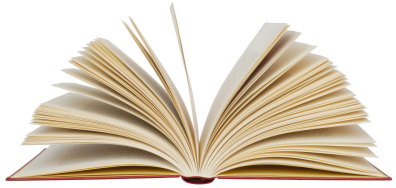
The tutors will be around to

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

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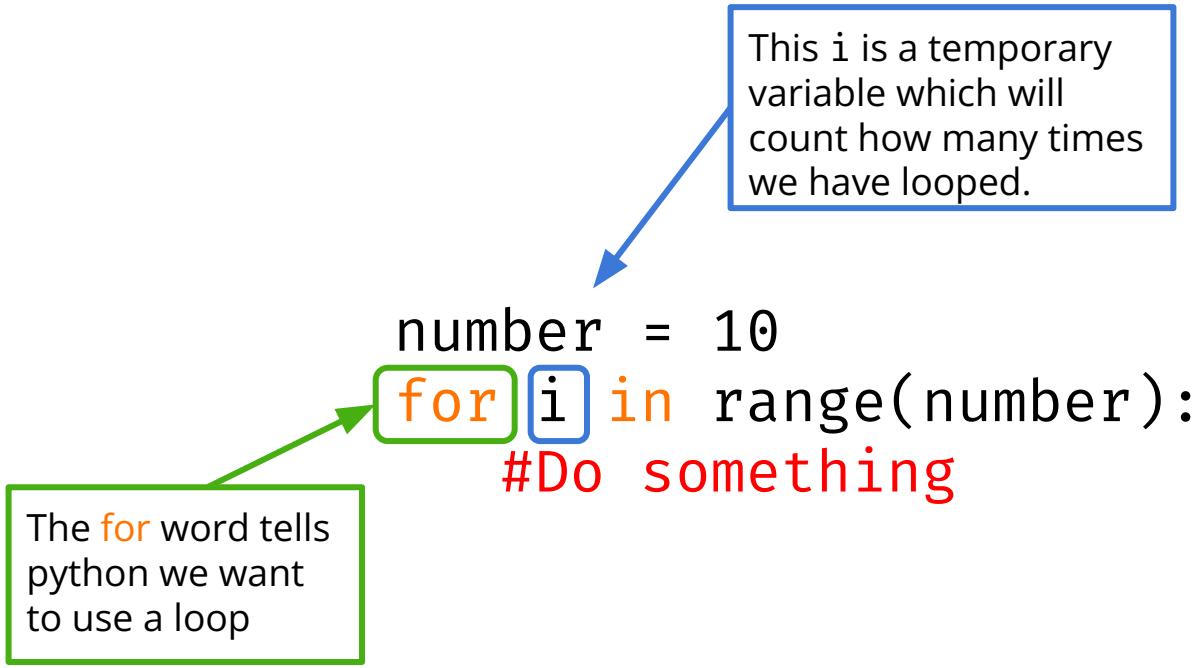
The for word tells python we want to use a loop

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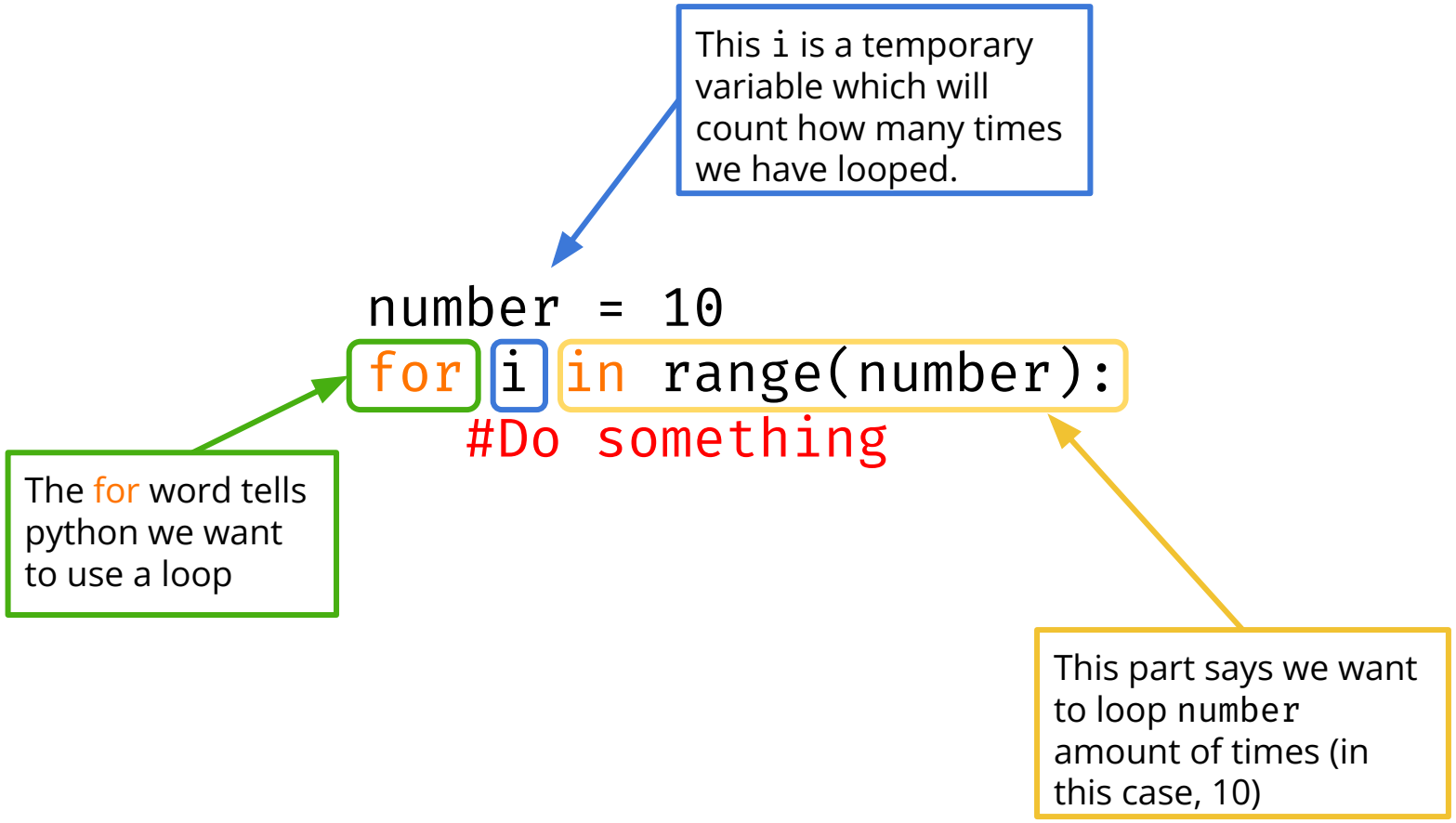
For Loops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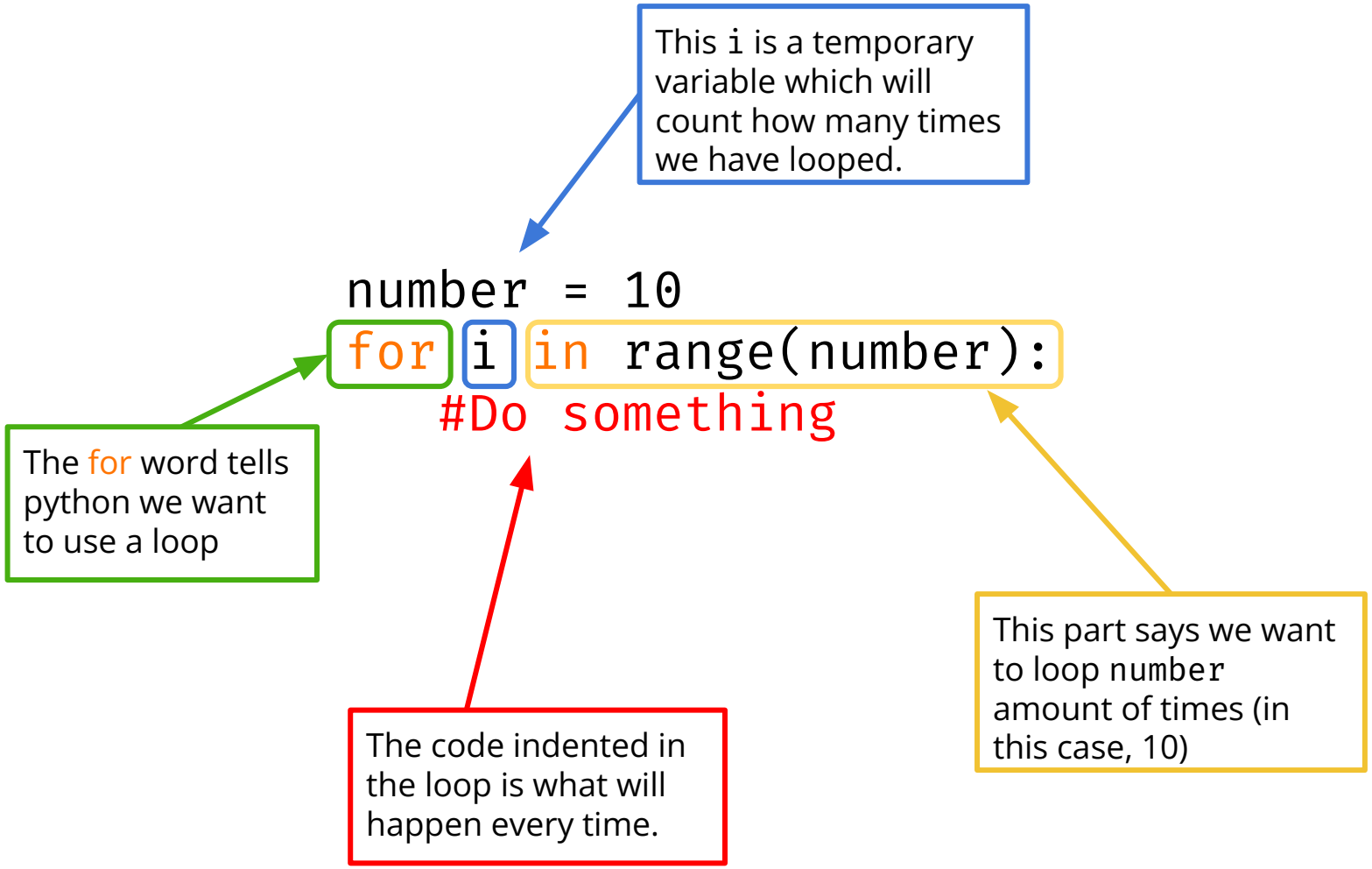
This part says we want to loop number amount of times (in this case, 10)

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
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?

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

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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
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```
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!

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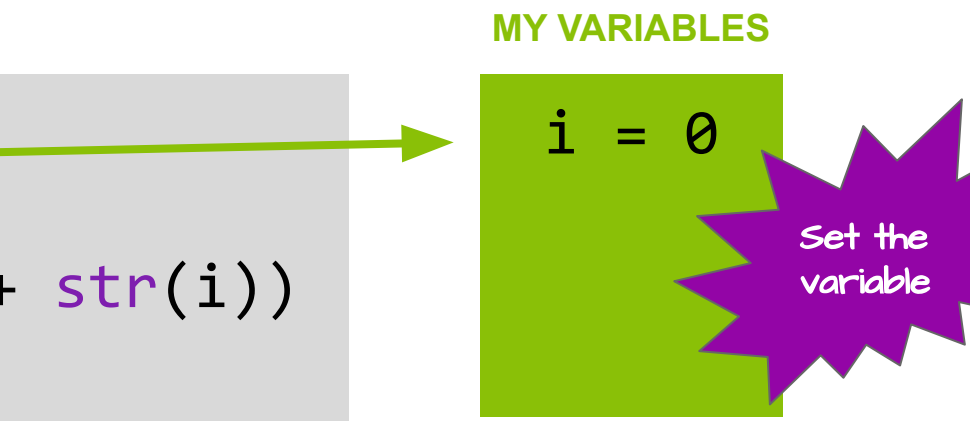

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UPDATE TIME !

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```
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One step at a time!

3 IS NOT less than 3!

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

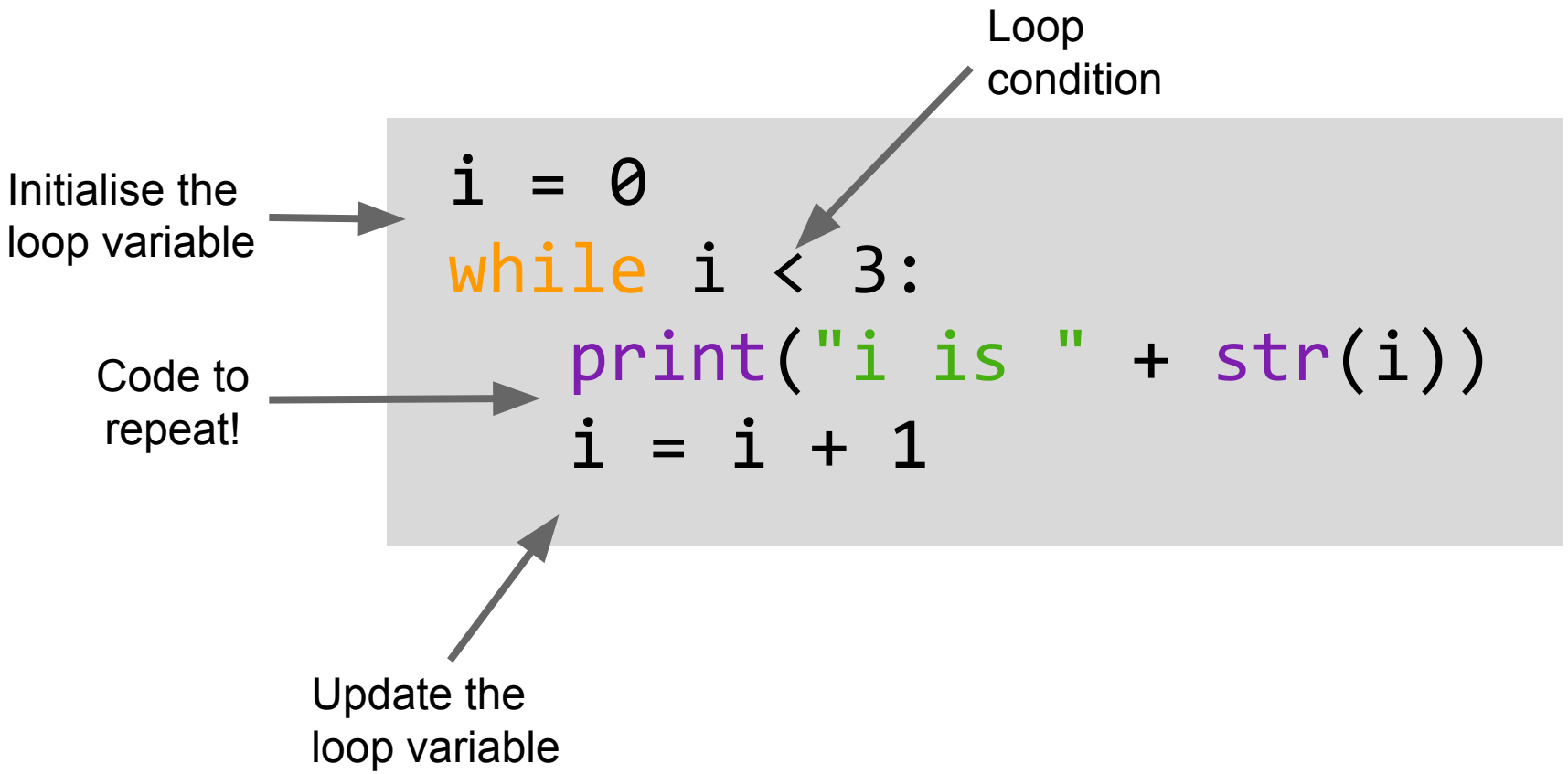
MY VARIABLES

~~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!



What happens when.....

What happens if we forget to update the loop variable?

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i is 0
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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!