Guess Who!

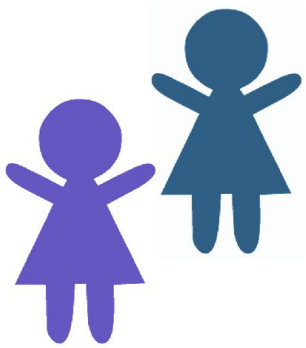
Welcome to the Labs

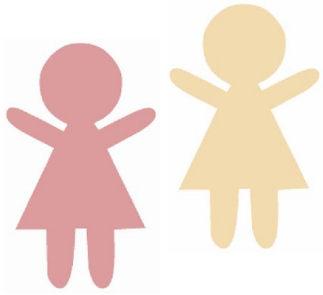
Who are the tutors?

Who are you?

Introduce your partner

1. Find a partner (someone you've never met before)
2. Find out:
   a. Their name
   b. What (school) year they are in
   c. A fun fact about them!
3. Introduce them to the rest of the group!





Log on

Jump on the GPN website

girlsprogramming.network/workshop

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!

Guess Who?

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!

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 6.2: 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**

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.

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.

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

★ BONUS 4.3: Do some extra!

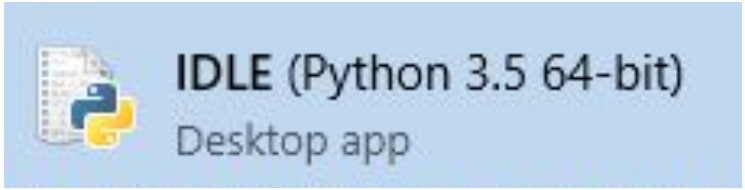
Something to try if you have spare time before the next lecture!

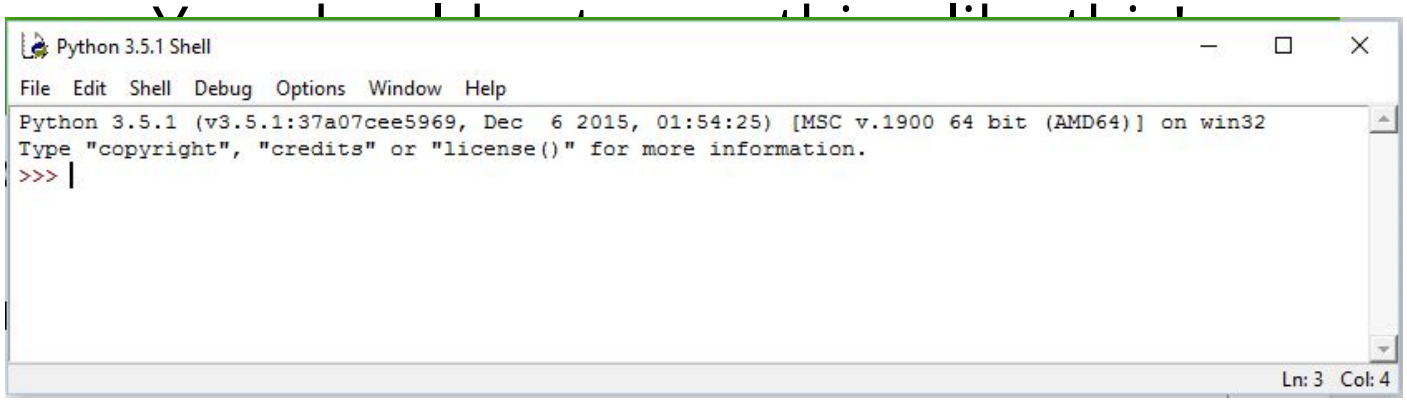
Intro to Python

Let’s get coding!

Where do we program? In IDLE

Click the start button and type IDLE!





Make a mistake!

Type by **button mashing** the keyboard!

Then press enter!

```
asdf asdjlkj;pa j;k4uroei
```

Did you get a big red error message?

Mistakes are great!

SyntaxError: Invalid Syntax

Good work you made an error!

ImportError: No module named humour

- Programmers make A LOT of errors!
- Errors give us hints to find mistakes
- Run your code often to get the hints!!
- Mistakes won't break computers!

KeyError: 'Hairy Potter'

```
AttributeError:
'NoneType' object
has no attribute
'foo'
```

```
TypeError: Can't
convert 'int' object
to str implicitly
```

Write some code!!

Type this into the window

Then press enter!

```
print('hello world')
```

Did it print:

```
hello world
```

Python the calculator!

Try writing some maths into python!

```
>>> 1 + 5

>>> 2 - 7

>>> 2 * 8

>>> 12/3
```

Python the calculator!

Try writing some maths into python!

```
>>> 1 + 5
6
>>> 2 - 7


>>> 2 * 8


>>> 12/3
```

Python the calculator!

Try writing some maths into python!

```
>>> 1 + 5
6
>>> 2 - 7
-5
>>> 2 * 8

>>> 12/3
```

Python the calculator!

Try writing some maths into python!

```
>>> 1 + 5
6
>>> 2 - 7
-5
>>> 2 * 8
16
>>> 12/3
```

Python the calculator!

Try writing some maths into python!

```
>>> 1 + 5
6
>>> 2 - 7
-5
>>> 2 * 8
16
>>> 12/3
4
```

A calculator for words!

What do you think these bits of code do?

Try them and see!

```
>>> "cat" + "dog"
```

```
>>> "tortoise" * 3
```

A calculator for words!

What do you think these bits of code do?
Try them and see!

```
>>> "cat" + "dog"
```

catdog

```
>>> "tortoise" * 3
```

A calculator for words!

What do you think these bits of code do?
Try them and see!

```
>>> "cat" + "dog"
```

catdog

```
>>> "tortoise" * 3
```

tortoisetortoisetortoise

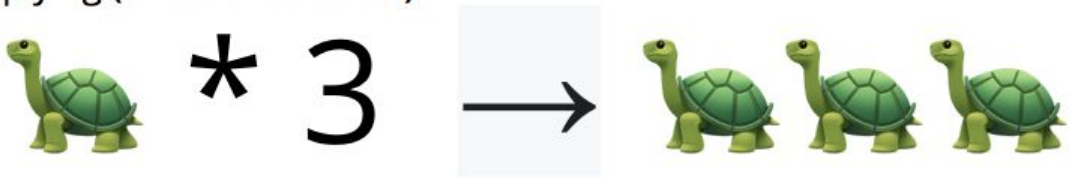
Strings!

Strings are things with `"quotes"`

To python they are essentially just a bunch of pictures!

Adding :

Multiplying (3 lots of tortoise!):



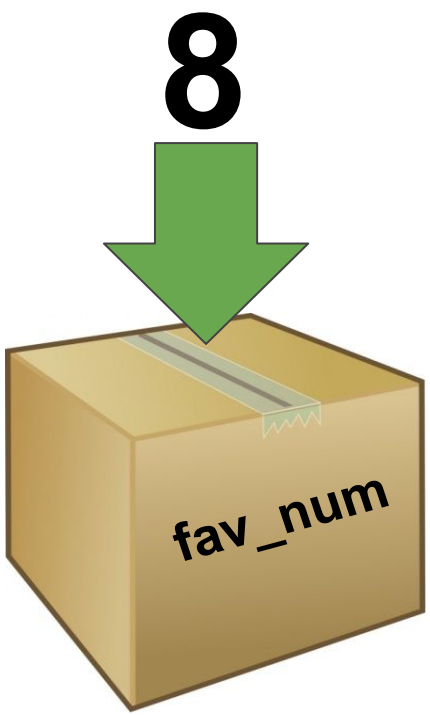
No Storing is Boring!

It's useful to be able to remember things for later!

Computers remember things in **"variables"**

Variables are like putting things into a **labeled cardboard box**.

Let's make our favourite number 8 today!



Variables

Instead of writing the number 8, we can write fav_num.


```
fav_num - 6
```

=> 2

```
fav_num + 21
```

=> 29

```
fav_num * 2
```

=> 16

```
fav_num / 2
```

=> 4

Variables

Instead of writing the number 8, we can write fav_num.


```
fav_num - 6
```

=> 2

```
fav_num + 21
```

=> 29

```
fav_num * 2
```

=> 16

2

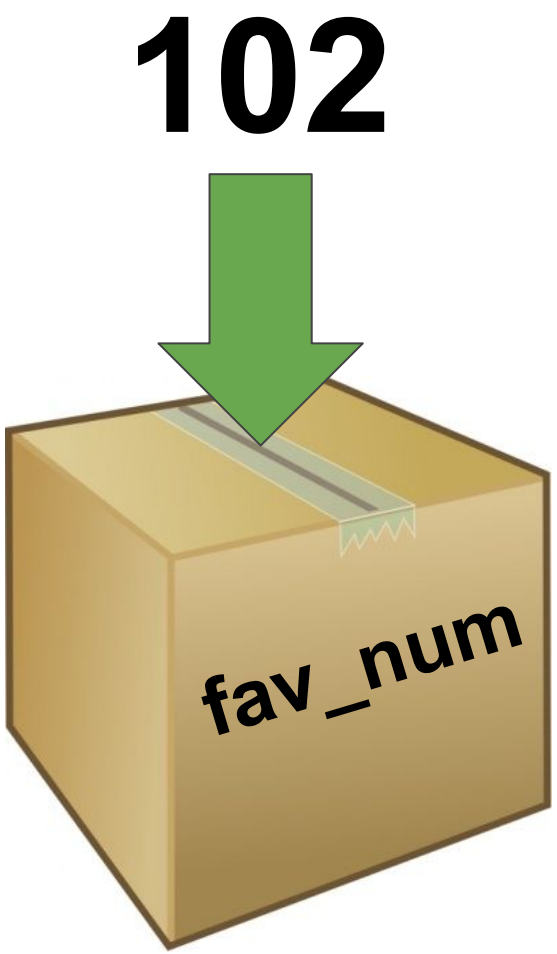
But writing 8 is much shorter than writing `fav_num`???

Variables

Variables are useful for storing things that change

(i.e. things that "vary" - hence the word "variable")

Try changing `fav_num` to **102**.



Variables

We're able to use our code for a new purpose, without rewriting everything:


```
fav_num - 6
```

=> 96

```
fav_num + 21
```

=> 123

```
fav_num * 2?
```

=> 204

```
fav_num / 2?
```

=> 51

No variables VS using variables

4
Changes

1
Change

8 - 6
8 * 2
8 + 21
8 / 2

102 - 6
102 * 2
102 + 21
102 / 2

int fav_num = **8**
fav_num - 6
fav_num * 2
fav_num + 21
fav_num / 2

int fav_num = **102**
fav_num - 6
fav_num * 2
fav_num + 21
fav_num / 2

Variables

Your turn!

Can you guess what each `print` will do?

Type the code into IDLE to check your guesses

```
>>> x = 3
>>> print(x)

>>> print(x + x)

>>> y = x
>>> print(y)

>>> y = y + 1
>>> print(y)
```

Variables

Your turn!

Can you guess what each `print` will do?

Type the code into IDLE to check your guesses

```
>>> x = 3
>>> print(x)
3
>>> print(x + x)
6
>>> y = x
>>> print(y)
3
>>> y = y + 1
>>> print(y)
4
```

Switcharoo - Making copies!

Set some variables!

```
>>> x = 3
>>> y = x
>>> x = 5
```

What do x and y contain now?

Let's find out together!

Switcharoo - Making copies!

Set some variables!

```
>>> x = 3
>>> y = x
>>> x = 5
```

What do x and y contain now?

```
>>> x
5
>>> y
3
```

y hasn't changed because it has a copy of x in it!

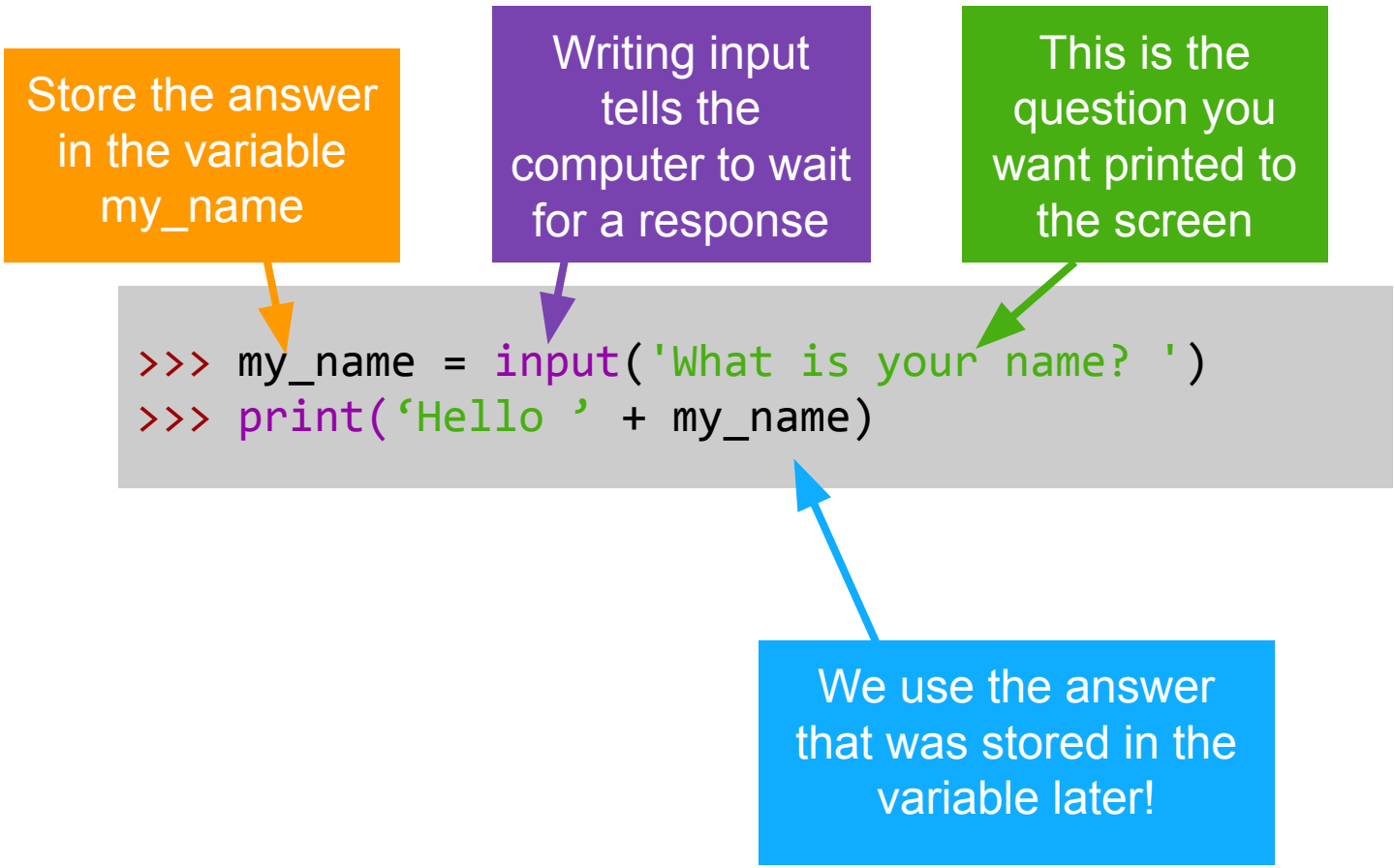
Asking a question!

It’s more fun when we get to interact with the computer!

Try out this code to get the computer to ask you a question!

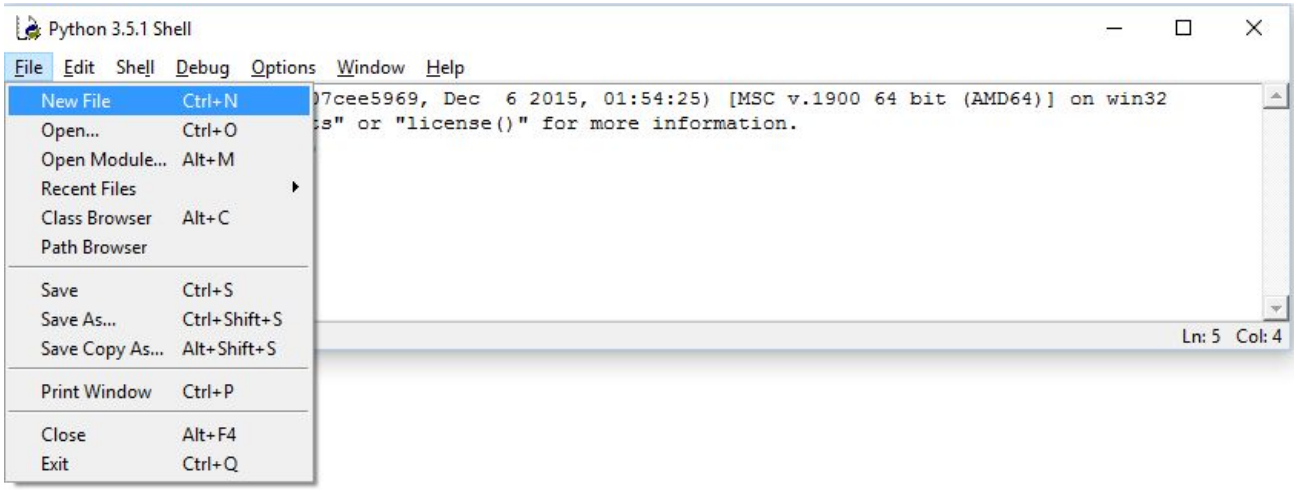
```
>>> my_name = input('What is your name? ')
>>> print(‘Hello ’ + my_name)
```

How input works!



Coding in a file!

Code in a file is code we can run multiple times! Make a reusable "hello world"!



1. Make a new file called hello.py, like the picture
2. Put your `print('hello world')` code in it
3. Run your file using the F5 key

Adding a comment!

Sometimes we want to write things in our file that the computer doesn't look at! **We can use "Comments" for that!**

Sometimes we want to write a note for a people to read

```
# This code was written by Vivian
```

And sometimes we want to not run some code (but don't want to delete it!)

```
# print("Goodbye world!")
```

Try it!

1. Add a comment to your hello.py file!
2. Run your code to make sure it doesn't do anything extra

Python `lists`

Girls' Programming Network
School of Information Technologies
University of Sydney

Storing groups of things in variables

- So we know how to store individual things, but what do we do when we have a group of things?
- We can try to do this with variables

```
>>> day1 = 'Monday'
>>> day2 = 'Tuesday'
>>> day3 = 'Wednesday'
>>> day4 = 'Thursday'
>>> day5 = 'Friday'
>>> day6 = 'Saturday'
>>> day7 = 'Sunday'
```

- But this can get long and hard to deal with *really* quickly...

Lists can store multiple things

- It's better to create a `list`. A `list` is a data type, like `int`eger and `str`ing, but cooler!

- A `list` is an ordered group of related items, all in the same variable

- So instead of using 7 variables to store the days, we can use 1:

```
>>> days = ['Monday', 'Tuesday', 'Wednesday',
'Thursday', 'Friday', 'Saturday', 'Sunday']
```

Creating lists

- A `list` is created using square brackets in Python
- An example

```
>>> words = ['This', 'is', 'a', 'sentence']
```

- Think of your four favourite things.....what are they?

- How could we store them in a list?




Your Favourite Things!

```
>>> faves = [‘books', ‘butterfly', ‘chocolate', 'skateboard']
```

You can put (almost) anything into a list

- You can have a list of integers

```
>>> primes = [1, 2, 3, 5, 11]
```

- You can have lists with mixed integers and strings

```
>>> mixture = [1, 'two', 3, 4, 'five']
```

- But this is almost never a good idea! You should be able to treat every element of the list the same way.

Try this!

1. Make a list of your favourite foods

```
>>> fave_foods = ['mango', 'pie', 'pizza']
```

2. Use `print` to print out your favourite foods list

3. Can you make it print on one line?

```
This is my fave food list ['mango', 'pie', 'pizza']
```

>> **Hint: use print with a comma!**

Accessing Lists!

- The favourites `list` holds four strings in order.
- We can count out the items using index numbers!

0	1	2	3
			

- **Indices start from zero!**

Accessing Lists

- We access the items in a `list` with an index such as `[0]`:

```
>>> faves[0]
'Books'
```

- What code do you need to access the third item in the list?

Going Negative

- Negative indices count backwards from the end of the `list`

```
>>> faves = [‘books', ‘butterfly', ‘chocolate', 'skateboard']
>>> faves[-1]
'skateboard'
```

- What would `faves[-3]` return?

Falling off the edge

- Python complains if you try to go past the end of a `list`

```
>>> faves = ['books', 'butterfly', 'chocolate',
'skateboard']
>>> faves[4]


Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
IndexError: list index out of range
```

Updating items!

- We can also update things in a list:

```
>>> faves = ['books', 'butterfly',
'chocolate', 'skateboard']
>>> faves[1]
'butterfly'
>>> faves[1] = 'new favourite'
>>> faves[1]
'new favourite'
```

Updating items

- What if we decided that we didn't like chocolate anymore, but loved lollypops?




- What does this list look like now?




Removing items!

- We can remove items from the list if they're no longer needed!
- What if we decided that we didn't like butterflies anymore?

```
>>> faves.remove('butterfly')
```

- What does this list look like now?

Try this!

1. Use your favourite foods list from before

```
>>> fave_foods = ['mango', 'pie', 'pizza']
```

2. Can you make it print on one line?

```
My favourite foods are mango, pie and pizza
```

Hint: use the indexes to get the foods out of the list

List of lists!

You really can put anything in a list, even more lists!

We could use a list of lists to store different sports teams!

```
tennis_pairs =[["Alex", "Emily"], ["Kass", "Annie"], ["Amara", "Viv"]]
```

Get the first pair in the list

```
>>> first_pair = tennis_pairs[0]
>>> ["Alex", "Emily"]
```

Now we have the first pair handy, we can get the first the first player of the first pair

```
>>> fist_player = first_pair[0]
>>> "Alex"
```

Project time!

Guess Who!

Let’s put what we learnt into our project

Try to do Part 0 - Part 3

The tutors will be around to help!

If Statements

Conditions!

Conditions let us make decision.

First we test if the condition is met!

Then maybe we'll do the thing

IF it's raining, **THEN** take an umbrella

Yep, it's raining!

➔ Take an umbrella

Booleans (True and False)

Computers store whether a condition is met in the form of

`True` and `False`

To figure out if something is `True` or `False` we do a comparison

Try typing these into IDLE! Are they `True` or `False`?	
`5 < 10`	`"Dog" == "dog"`
`3 + 2 == 5`	`"D" in "Dog"`
`5 != 5`	`"Hi" not in "Cat"`

Booleans (True and False)

Python has some special comparisons for checking if something is **`in`** something else. **Try these!**

```
>>> "A" in "AEIOU"
>>> "Z" in "AEIOU"
>>> "a" in "AEIOU"
```

```
>>> animals = ["cat", "dog", "goat"]
>>> "banana" in animals
>>> "cat" in animals
```

Conditions

So to know whether to do something, they find out if it's `True`!

```
fave_num = 5
if fave_num < 10:
    print("that's a small number")
```

Conditions

So to know whether to do something, they find out if it's `True`!

```
fave_num = 5
if fave_num < 10:
    print("that's a small number")
```

That's the condition!

Conditions

So to know whether to do something, they find out if it's `True`!

```
fave_num = 5
if fave_num < 10:
    print("that's a small number")
```

That's the condition!

Is it `True` that fave_num is less than 10?

- **Well, fave_num is 5**
- **And it's True that 5 is less than 10**
- **So it is `True`!**

Conditions

So to know whether to do something, they find out if it's `True`!

```
fave_num = 5
if True:
    print("that's a small number")
```

Put in the answer to the question

Is it `True` that fave_num is less than 10?

- **Well, fave_num is 5**
- **And it's `True` that 5 is less than 10**
- **So it is `True`!**

Conditions

So to know whether to do something, they find out if it's `True`!

```
fave_num = 5
if True:
    print("that's a small number")
```

What do you think happens?

Conditions

So to know whether to do something, they find out if it's `True`!

```
fave_num = 5
if True:
    print("that's a small number")
```

What do you think happens?

```
>>> that's a small number
```

Conditions

How about a different number???

```
fave_num = 9000
if fave_num < 10:
    print("that's a small number")
```

Conditions

It's `False`!

```
fave_num = 9000
if False          :
    print("that's a small number")
```

Put in the answer to the question

Conditions

It's `False`!

```
fave_num = 9000
if False:
    print("that's a small number")
```

What do you think happens?

```
>>>
```

Conditions

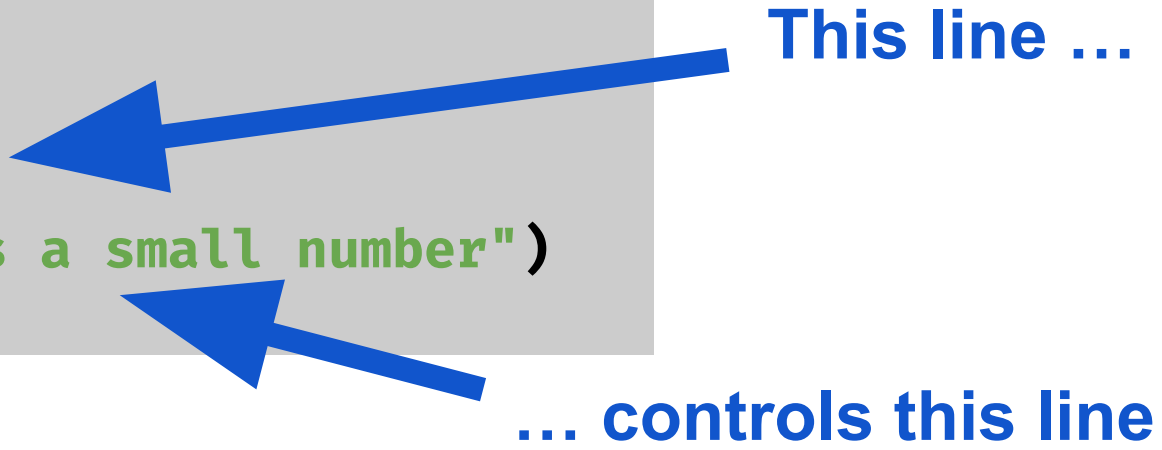
```
fave_num = 9000
if False:
    print("that's a small number")
```

What do you think happens?

```
>>>
```

If statements

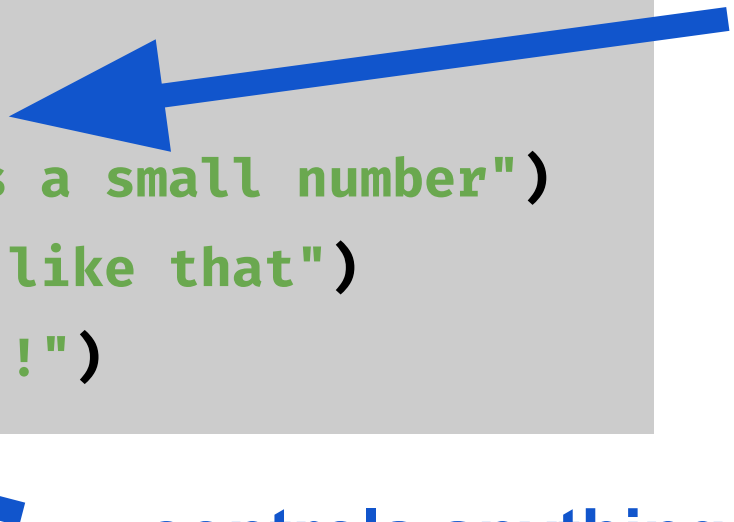
```
fave_num = 5
if fave_num < 10:
    print("that's a small number")
```



If statements

Actually .....

```
fave_num = 5
if fave_num < 10:
    print("that's a small number")
    print("and I like that")
    print("A LOT!!")
```



If statements

What do you think happens?

```
fave_num = 5
if fave_num < 10:
    print("that's a small number")
    print("and I like that")
    print("A LOT!!")
```

What do you think happens?

If statements

What do you think happens?

```
fave_num = 5
if fave_num < 10:
    print("that's a small number")
    print("and I like that")
    print("A LOT!!")
```

```
>>> that's a small number
>>> and I like that
>>> A LOT!!
```

If statements

```
word = "GPN"
if word == "GPN":
  print("GPN is awesome!")
```

```
What happens??
```

If statements

```
word = "GPN"
if word == "GPN":
  print("GPN is awesome!")
```

```
What happens??
>>> GPN is awesome!
```

Else statements

```
word = "GPN"
if word == "GPN":
  print("GPN is awesome!")
```

```
What happens??
>>> GPN is awesom
```

But what if we want something different to happen if the word isn't "GPN"

Else statements

else statements means something still happens if the **if** statement was **False**

```
word = "Chocolate"
if word == "GPN":
  print("GPN is awesome!")
else:
  print("The word isn't GPN :(")
```

What happens??

Else statements

else Statements means something still happens if the **if** statement was **False**

```
word = "Chocolate"
if word == "GPN":
  print("GPN is awesome!")
else:
  print("The word isn't GPN :(")
```

```
What happens??
>>> The word isn't GPN :(
```

Elif statements

elif
Means we can give specific instructions for other words

```
word = "Chocolate"
if word == "GPN":
  print("GPN is awesome!")
elif word == "Chocolate":
  print("YUMMM Chocolate!")
else:
  print("The word isn’t GPN :(")
```

```
What happens??
```

Practice Time!

1. Create a new file, call it weather.py
2. Copy this code into your file

```
weather = input("What is the weather? ")
if weather == "raining":
```

3. Add a third line to make it print a special message, but only if the user says "raining"
4. Run your code! Try typing in **raining**, try typing in **sunny**
5. BONUS! Add an else statement, to print a non-rainy message!

Practice Time!

1. Create a new file, call it weather.py

2. Copy this code into your file

```
weather = input("What is the weather? ")
if weather == "raining":
    print("Take an umbrella!")
```

3. Add a third line to make it print a special message, but only if the user says "raining"

4. Run your code! Try typing in **raining**, try typing in **sunny**

5. BONUS! Add an else statement, to print a non-rainy message!

Project Time!

You now know all about `if` and `else`!

See `if` you can do Part 4

The tutors will be around to help!

For Loops

Looping through lists!

What would we do if we wanted to print out this list, one word at a time?

```
words = ['This', 'is', 'a', 'sentence']


print(words[0])
print(words[1])
print(words[2])
print(words[3])
```

What if it had a 100 items??? That would be BORING!

For Loops

For loops allow you to do something for **each** item in a **group** of things

There are many real world examples, like:

For each page in this book:
Read

For each chip in this bag of chips:
Eat

Looping over a list of ints

We can loop through a list:

```
numbers = [1, 2, 3, 4]
for i in numbers:
    print(i)
```

```
What's going to happen?
```

Looping over a list of ints

We can loop through a list:

```
numbers = [1, 2, 3, 4]
for i in numbers:
    print(i)
```

```
What's going to happen?
>>> 1
>>> 2
>>> 3
>>> 4
```

- Each item of the list takes a turn at being the variable i
- Do the body once for each item
- We're done when we run out of items!

Practice Time!

1. Make a new file called yummy.py

2. Copy in this list

```
>>> fruits = ['apple', 'banana', 'mango']
```

3. Add **2 lines of code** that makes your program print out this.
   Use a for loop!

```
>>>Yummy apple
>>>Yummy banana
>>>Yummy mango
```

HINT!

```
numbers = [1, 2, 3, 4]
for i in numbers:
    print(i)
```

How does it work??

Somehow it knows how to get one fruit out at a time!!

It's like it knows english!

```
fruits = ['apple', 'banana', 'mango']
for fruit in fruits:
    print('yummy ' + fruit)
```

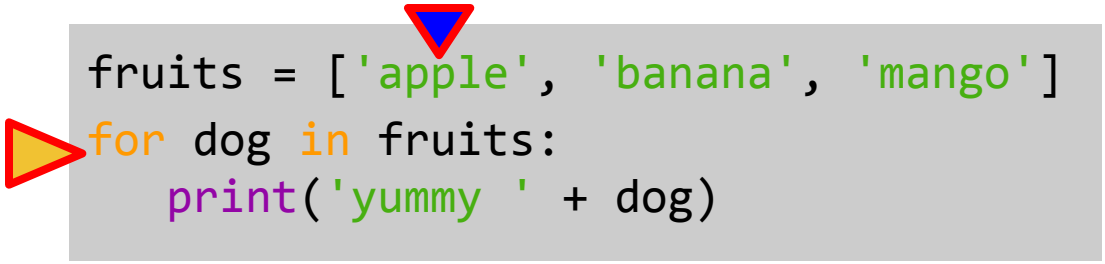
But fruit is just a variable! We could call it anything! Like dog!

```
fruits = ['apple', 'banana', 'mango']
for dog in fruits:
    print('yummy ' + dog)
```

```
>>>Yummy apple
>>>Yummy banana
>>>Yummy mango
```

How does it work??

Everything in the list gets to have a turn at being the dog variable



```
fruits = ['apple', 'banana', 'mango']
for dog in fruits:
    print('yummy ' + dog)
```

Let's set dog to to the first thing in the list!
dog is now 'apple'!

How does it work??

Everything in the list gets to have a turn at being the dog variable

```
fruits = ['apple', 'banana', 'mango']
for dog in fruits:
    print('yummy ' + dog)
```

```
>>>Yummy apple
```

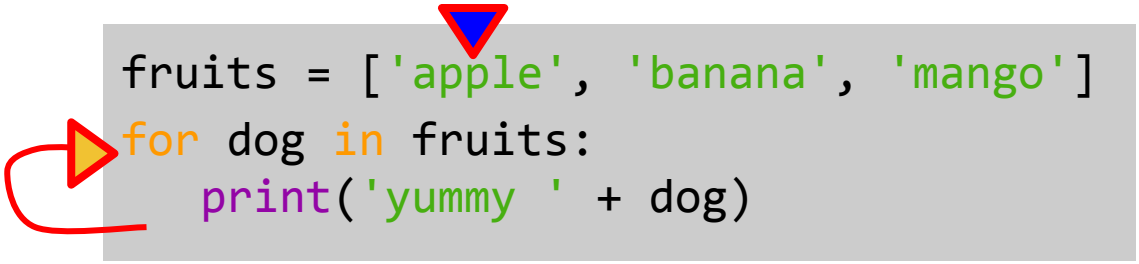
Let's set dog to to the first thing in the list!

dog is now 'apple'!

```
print('yummy ' + dog)
```

How does it work??

Everything in the list gets to have a turn at being the dog variable

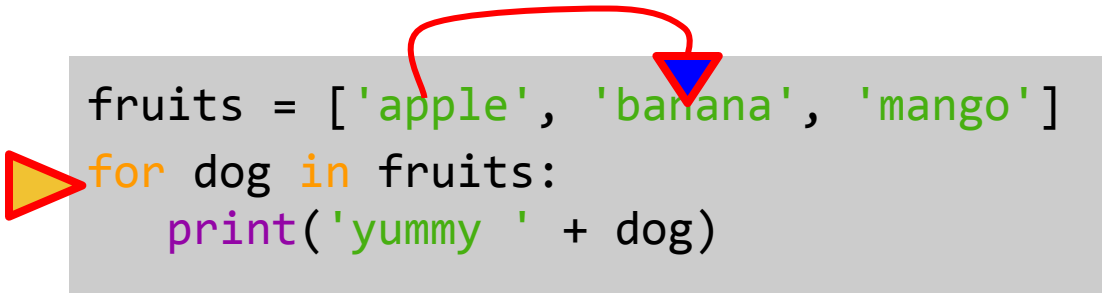



```
>>>Yummy apple
```

Let's set dog to to the first thing in the list!
dog is now 'apple'!
`print('yummy ' + dog)`
We're at the end of the loop body, back to the top!

How does it work??

Everything in the list gets to have a turn at being the dog variable



```
fruits = ['apple', 'banana', 'mango']
for dog in fruits:
    print('yummy ' + dog)
```

```
>>>Yummy apple
```

Let's set dog to to the first thing in the list!
dog is now 'apple'!
print('yummy ' + dog)
We're at the end of the loop body, back to the top!

Let's set dog to to the next thing in the list!
dog is now 'banana'!

How does it work??

Everything in the list gets to have a turn at being the dog variable

```
fruits = ['apple', 'banana', 'mango']
for dog in fruits:
    print('yummy ' + dog)
```

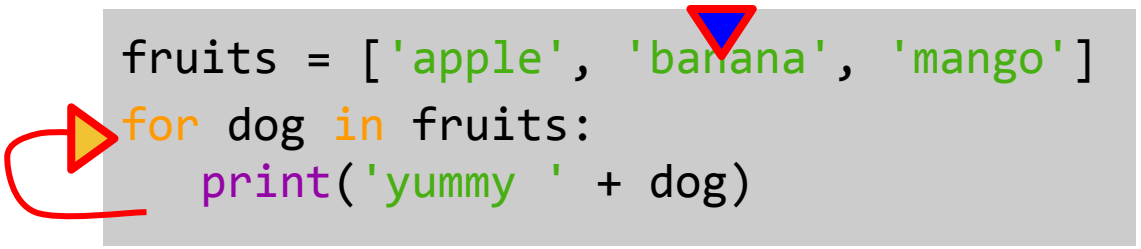
```
>>>Yummy apple
>>>Yummy banana
```

Let's set dog to to the first thing in the list!
dog is now 'apple'!
`print('yummy ' + dog)`
We're at the end of the loop body, back to the top!

Let's set dog to to the next thing in the list!
dog is now 'banana'!
`print('yummy ' + dog)`

How does it work??

Everything in the list gets to have a turn at being the dog variable



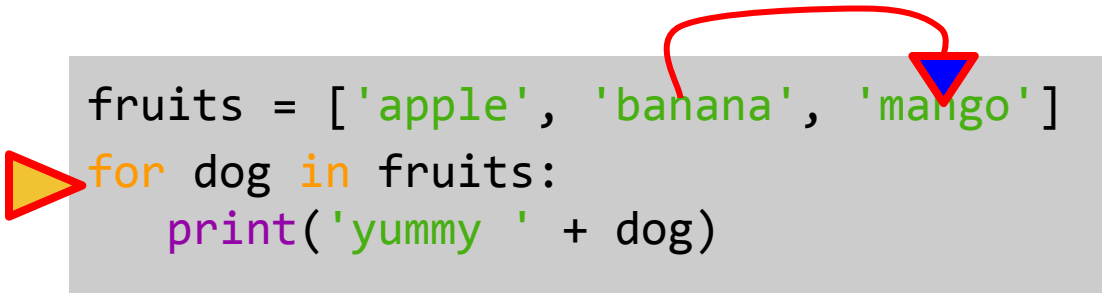

```
>>>Yummy apple
>>>Yummy banana
```

Let's set dog to to the first thing in the list!
dog is now 'apple'!
`print('yummy ' + dog)`
We're at the end of the loop body, back to the top!

Let's set dog to to the next thing in the list!
dog is now 'banana'!
`print('yummy ' + dog)`
Out of body, back to the top!

How does it work??

Everything in the list gets to have a turn at being the dog variable



```
fruits = ['apple', 'banana', 'mango']
for dog in fruits:
    print('yummy ' + dog)
```

```
>>>Yummy apple
>>>Yummy banana
```

Let's set dog to to the first thing in the list!
dog is now 'apple'!
print('yummy ' + dog)
We're at the end of the loop body, back to the top!

Let's set dog to to the next thing in the list!
dog is now 'banana'!
print('yummy ' + dog)
Out of body, back to the top!

Let's set dog to to the next thing in the list!
dog is now 'mango'!

How does it work??

Everything in the list gets to have a turn at being the dog variable

```
fruits = ['apple', 'banana', 'mango']
for dog in fruits:
    print('yummy ' + dog)
```

```
>>>Yummy apple
>>>Yummy banana
>>>Yummy mango
```

Let's set dog to to the first thing in the list!
dog is now 'apple'!
print('yummy ' + dog)
We're at the end of the loop body, back to the top!

Let's set dog to to the next thing in the list!
dog is now 'banana'!
print('yummy ' + dog)
Out of body, back to the top!

Let's set dog to to the next thing in the list!
dog is now 'mango'!
print('yummy ' + dog)

How does it work??

Everything in the list gets to have a turn at being the dog variable

```
fruits = ['apple', 'banana', 'mango']
for dog in fruits:
    print('yummy ' + dog)
```

```
>>>Yummy apple
>>>Yummy banana
>>>Yummy mango
```

Let's set dog to to the first thing in the list!
dog is now 'apple'!
print('yummy ' + dog)
We're at the end of the loop body, back to the top!

Let's set dog to to the next thing in the list!
dog is now 'banana'!
print('yummy ' + dog)
Out of body, back to the top!

Let's set dog to to the next thing in the list!
dog is now 'mango'!
print('yummy ' + dog)
Out of body, and out of list!!
We're done here!

Project Time!

Now you know how to use a for loop!

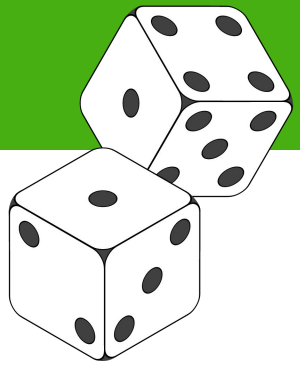
`Try to do Parts 5 and 6`

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

The tutors will be around to help!

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 IDLE**

```
>>> 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!

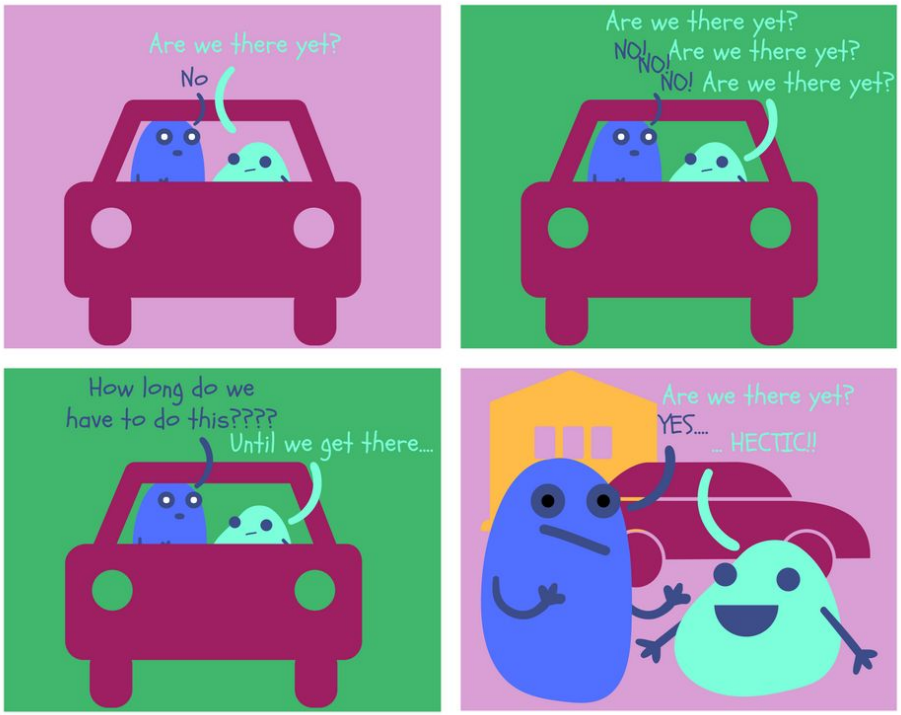
Raaaaaaaaaaandom! Can you handle that?

`Try to do Part 7!`

The tutors will be around to help!

While Loops

Loops



We know how to do things on repeat!

Sometimes we want to do some code on repeat!

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
>>>
```

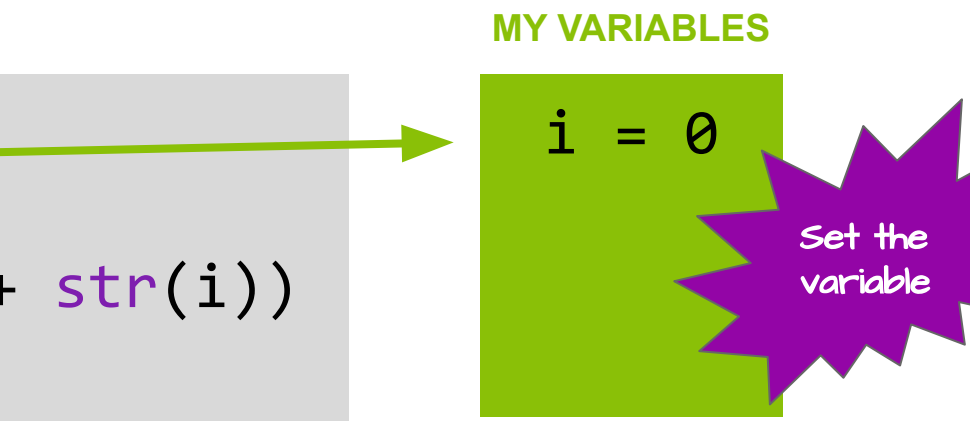
Introducing … `while` loops!

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
```



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
```

Introducing … `while` loops!

One step at a time!


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

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```
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```

```
i is 0
```

Introducing … `while` loops!

One step at a time!

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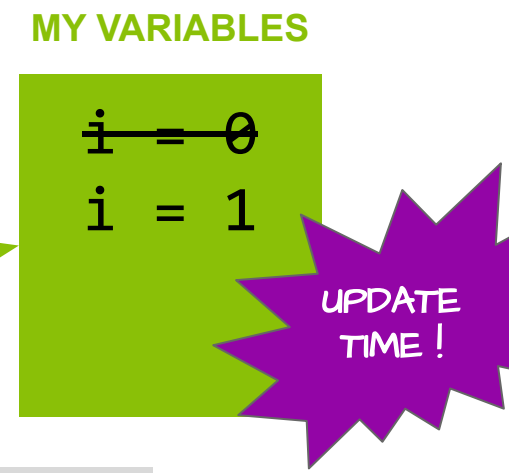


```
i is 0
```

Introducing … `while` loops!

One step at a time!


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

```
i is 0
```

MY VARIABLES

~~i = 0~~
i = 1

Introducing … `while` loops!

One step at a time!


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

MY VARIABLES

~~i = 0~~
i = 1

```
i is 0
```

Introducing … `while` loops!

One step at a time!


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

MY VARIABLES

~~i = 0~~

i = 1

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

Introducing ... `while` loops!

One step at a time!

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while i < 3:
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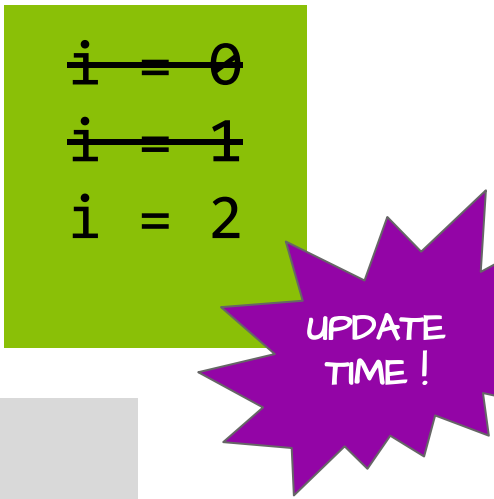


```
i is 0
i is 1
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Introducing … `while` loops!

One step at a time!


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i = 0
while i < 3:
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i is 1
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MY VARIABLES

~~i = 0~~

~~i = 1~~

i = 2

Introducing ... `while` loops!

One step at a time!


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i = 2

```
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i is 1
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Introducing … `while` loops!

One step at a time!


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while i < 3:
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MY VARIABLES

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Introducing ... `while` loops!

One step at a time!

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


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

MY VARIABLES

~~i = 0~~
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~~i = 2~~
i = 3

```
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i is 1
i is 2
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Introducing … `while` loops!

One step at a time!


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

MY VARIABLES

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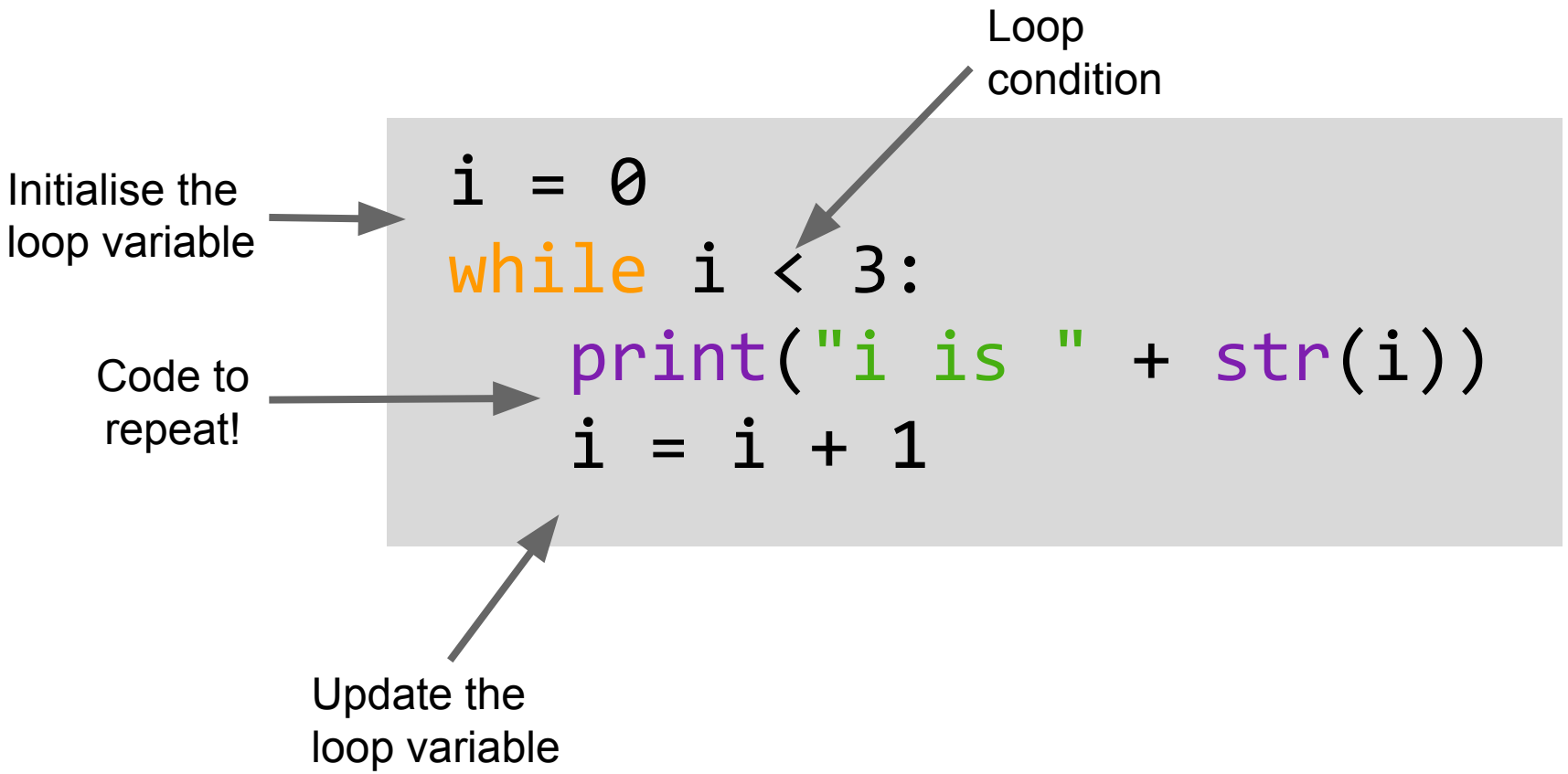
~~i = 1~~
~~i = 2~~
i = 3


```
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?

```
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
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 8!

And extension Part 9!

The tutors will be around to help!

Files

Girls' Programming Network
School of Information Technologies
University of Sydney

Filing it away!

What if we want to play Guess Who! But with different characters?

We'd have to change our code!!

It would be better if we could keep all our people in a file and just be able to pick and choose what file we wanted to play today!

people.txt

```
Aleisha,brown,black,hat
Brittany,blue,red,glasses
Charlie,green,brown,glasses
Dave,blue,red,glasses
Eve,green,brown,glasses
Frankie,hazel,black,hat
George,brown,black,glasses
Hannah,brown,black,glasses
Isla,brown,brown,none
Jackie,hazel,blonde,hat
Kevin,brown,black,hat
Luka,blue,brown,none
```

Opening files!

To get access to the stuff inside a file in python we need to **open** it!

That doesn't mean clicking on the little icon!

```
my_file = open("test.txt")
```

You'll now be able to read the things in `my_file`

If your file is in the same location as your code you can just use the name!

A missing file causes an error

Here we try to open a file that doesn't exist:

```
f = open('missing.txt')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
IOError: [Errno 2] No such file or
directory: 'missing.txt'
```

You can read a whole file into a string

```
>>> my_file = open('haiku.txt')
>>> my_string = f.read()
>>> my_stirng
'Wanna go outside.\nOh NO! Help! I
got outside!\nLet me back inside!

>>> print(my_stirng)
Wanna go outside.
Oh NO! Help! I got outside!
Let me back inside!
```

haiku.txt

```
Wanna go outside.
Oh NO! Help! I got outside!
Let me back inside!
```

You can also read in one line at a time

You can use a for loop to only get 1 line at a time!

```
my_file = open('haiku.txt')
for line in f:
    print(line)
```

```
Wanna go outside.

Oh NO! Help! I got outside!

Let me back inside!
```

Why is there an extra blank line each time?

Chomping off the newline

The newline character is represented by '\n':

```
print('Hello\nWorld')
Hello
World
```

We can remove it from the lines we read with .strip()

```
x = 'abc\n'
x.strip()
'abc'
```

x.strip() is safe as lines without newlines will be unaffected

Reading and stripping!

```
for line in open('haiku.txt'):
    line = line.strip()
    print(line)
```

```
Wanna go outside.
Oh NO! Help! I got outside!
Let me back inside!
```

No extra lines!

Using with!

This is a special trick for opening files!

```
with open(“words.txt”) as f:
  for line in f:
    print(line.strip())
```

It automatically closes your file for you!

It’s good when you are writing files in python!

Project Time!

while we're here:

Try to do extension Part 10!

The tutors will be around to help!

Tell us what you think!

Click on the

End of Day Form

and fill it in now!