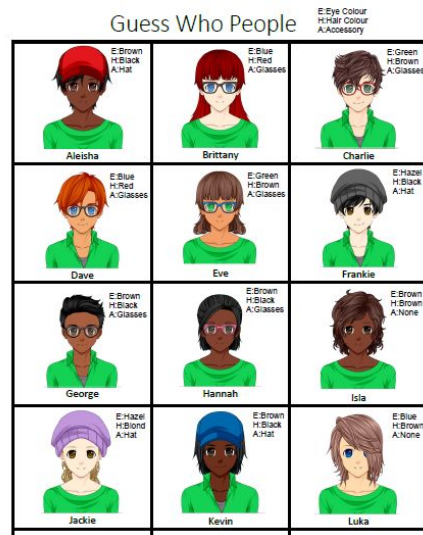


Guess Who!

Welcome to the labs!



Thank you to our Sponsors!

Platinum Sponsor:



Who are the tutors?

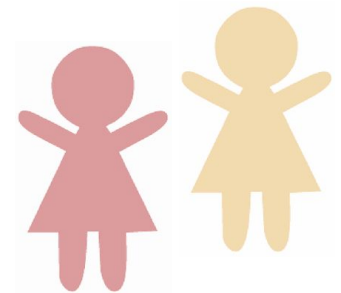
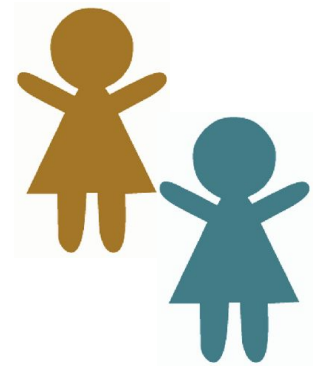


Who are you?



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 Programming



What is programming?



Programming is not a bunch of crazy numbers!

It's giving computers a set of instructions!



A Special Language

A language to talk
to dogs!



Programming is a
language to talk to
computers



People are smart! Computers are dumb!

SALAD INSTRUCTIONS

Programming is like a recipe!

Computers do EXACTLY what you say, every time.

Which is great if you give them a good recipe!

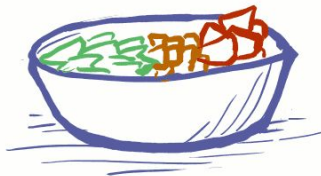
1) GET A LETTUCE HEAD, A CARROT, A TOMATO, A KNIFE, AND A BOWL



2) USE THE KNIFE TO CUT UP THE LETTUCE HEAD, CARROT, AND TOMATO



3) PUT THE LETTUCE, CARROT AND TOMATO IN THE BOWL



4) MIX THE CONTENTS OF THE BOWL



People are smart! Computers are dumb!

But if you get it
out of order....

A computer
wouldn't know
this recipe was
wrong!

SALAD INSTRUCTIONS

1) GET A LETTUCE HEAD,
A CARROT, A TOMATO, A
KNIFE, AND A BOWL



3) PUT THE LETTUCE,
CARROT AND TOMATO
IN THE BOWL



2) USE THE KNIFE TO CUT
UP THE LETTUCE HEAD,
CARROT, AND TOMATO



4) MIX THE CONTENTS
OF THE BOWL



People are smart! Computers are dumb!

Computers are bad at filling in the gaps!

A computer wouldn't know something was missing, it would just freak out!

SALAD INSTRUCTIONS



Everyone/thing has strengths!



- Understand instructions despite:
 - Spelling mistakes
 - Typos
 - Confusing parts
- Solve problems
- Tell computers what to do
- Get smarter every day



- Does exactly what you tell it
- Does it the same every time
- Doesn't need to sleep!
- Will work for hours on end!
- Get smarter when you tell them how

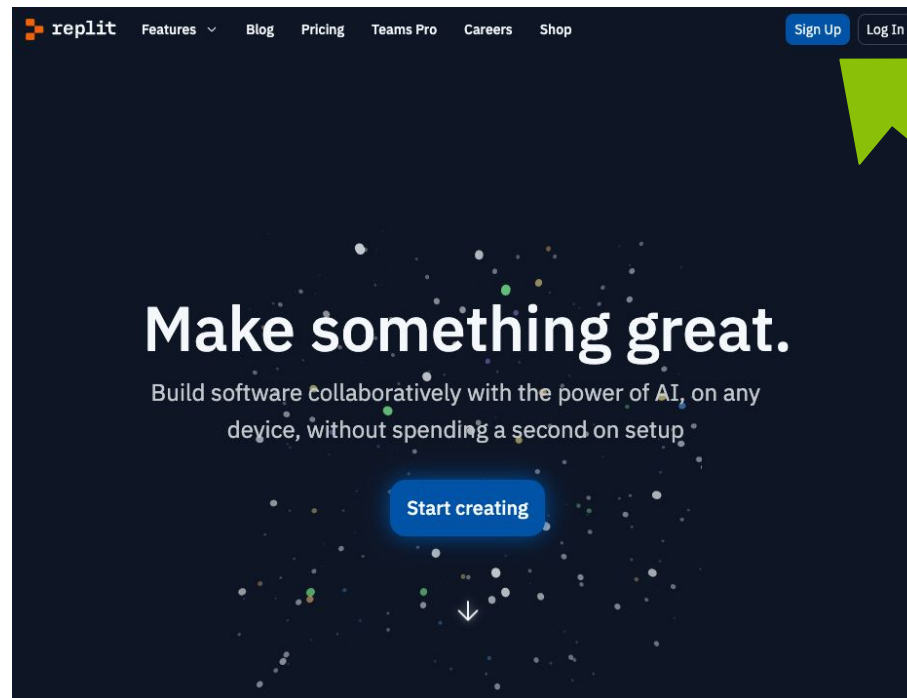
Intro to Python

Let's get coding!



Where do we program?

We'll use **Repl It** to make a Python project!



Go to replit.com in Google Chrome

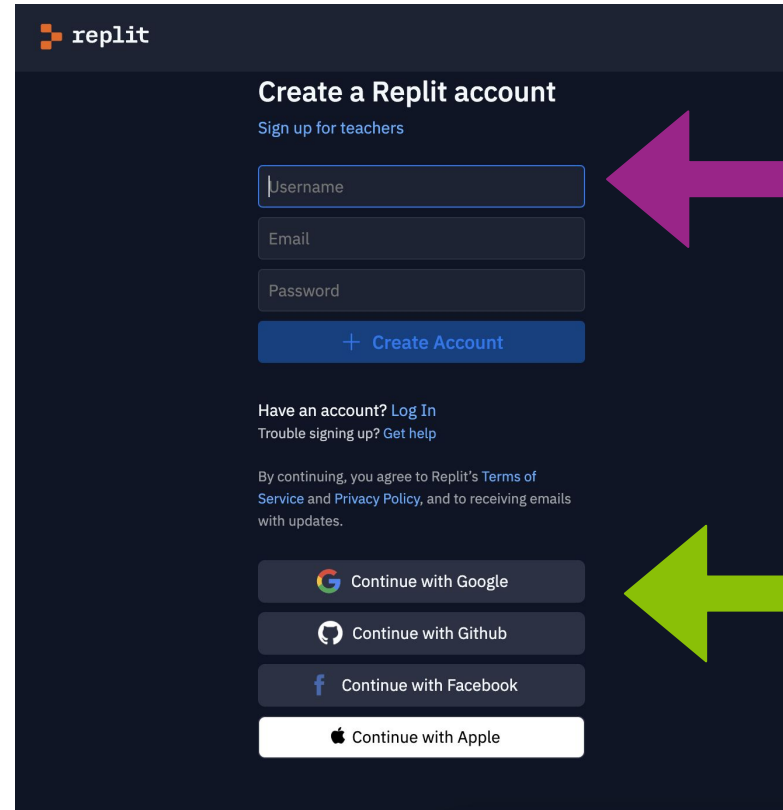


Where do we program?

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.

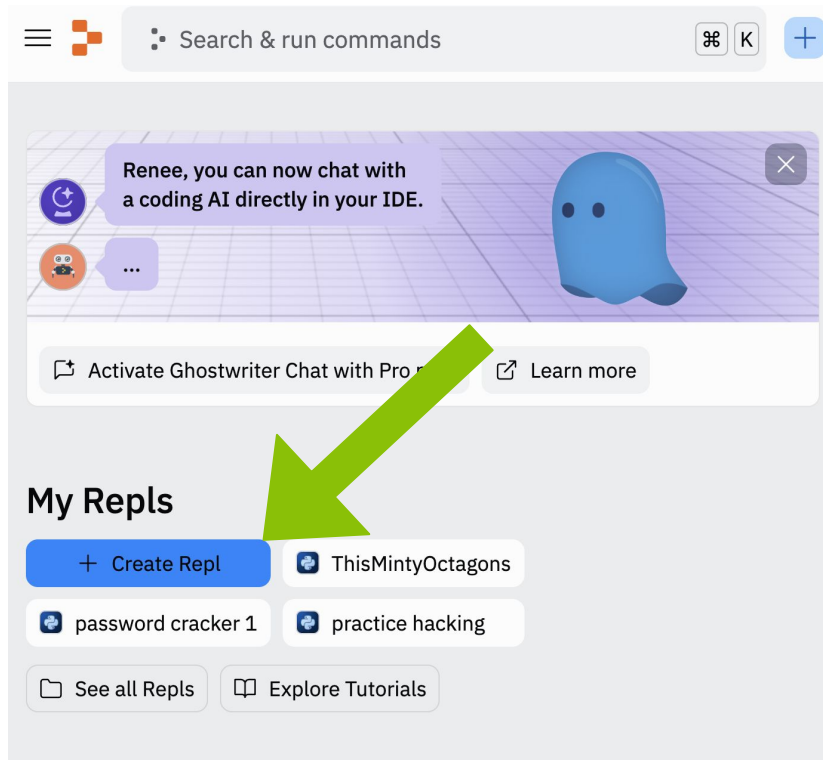


The screenshot shows the Replit website's account creation interface. At the top left is the Replit logo. The main heading is "Create a Replit account", followed by a link "Sign up for teachers". Below these are three input fields: "Username", "Email", and "Password". A blue button with a plus icon and the text "+ Create Account" is positioned below the input fields. A purple arrow points from the right edge of the image to the "Username" input field. Below the "Create Account" button, there is a link "Have an account? Log In" and a smaller link "Trouble signing up? Get help". Further down, a paragraph states: "By continuing, you agree to Replit's Terms of Service and Privacy Policy, and to receiving emails with updates." Below this paragraph are four social login buttons: "Continue with Google" (with the Google logo), "Continue with Github" (with the Github logo), "Continue with Facebook" (with the Facebook logo), and "Continue with Apple" (with the Apple logo). A green arrow points from the right edge of the image to the "Continue with Google" button.

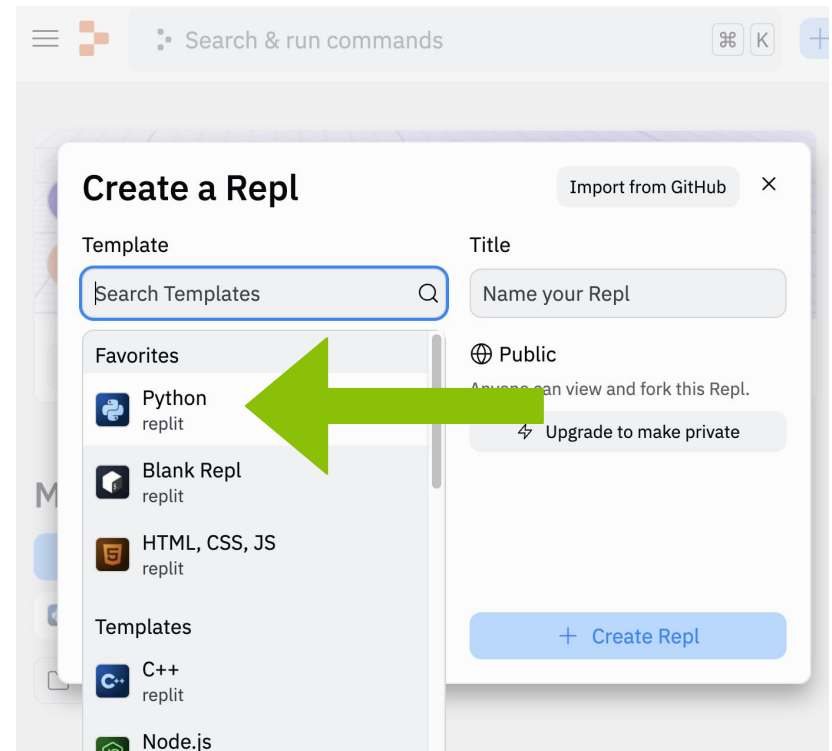


Creating our Repl It Project

Let's create a new project



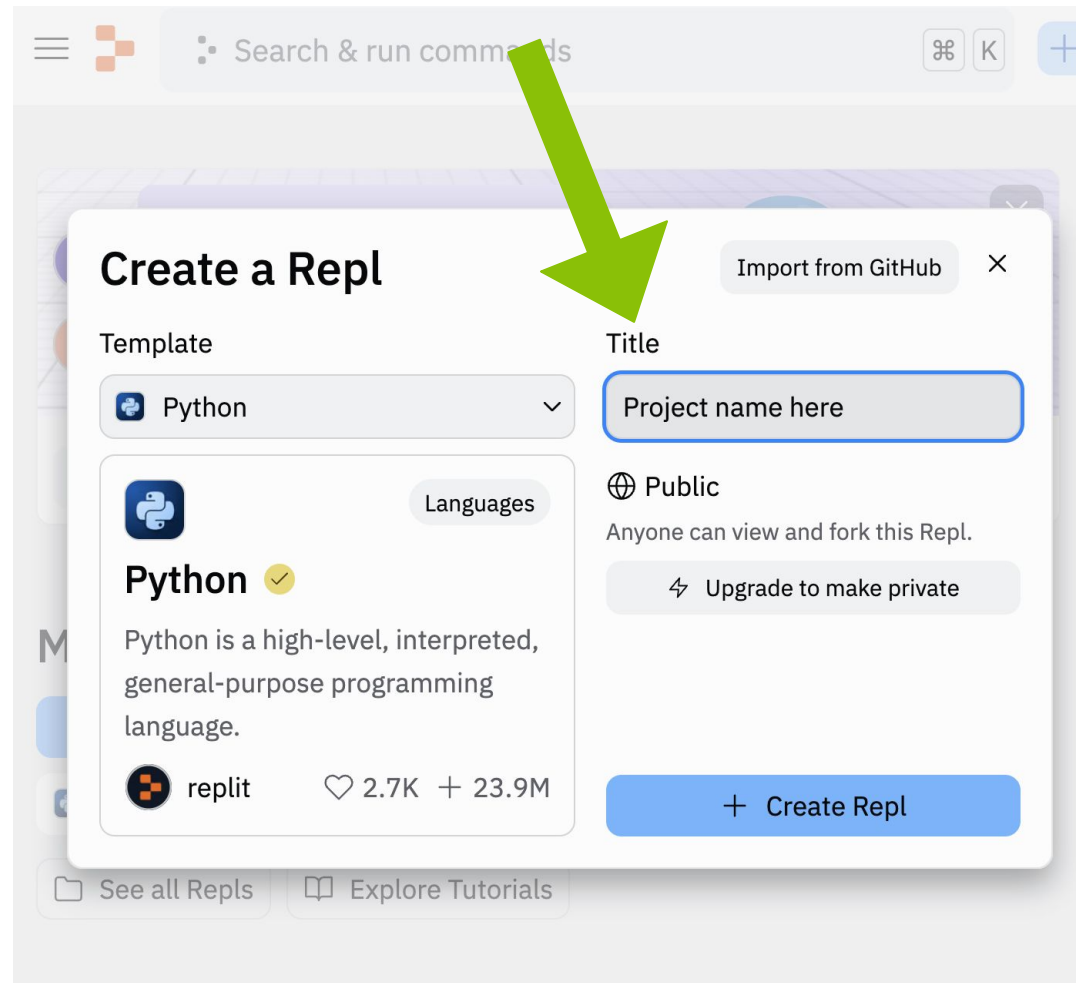
Select Python for the project template



Creating our Repl It Project

**Don't forget to
give your
project a name!**

Name it after
today's project!



The screenshot shows the 'Create a Repl' dialog box in the Replit interface. A green arrow points to the 'Title' field, which contains the placeholder text 'Project name here'. The dialog box also shows the 'Template' dropdown set to 'Python', the 'Public' visibility setting, and a 'Create Repl' button at the bottom right.

Search & run commands

⌘ K

Create a Repl

Import from GitHub

Template

Python

Python

Python is a high-level, interpreted, general-purpose programming language.

replit 2.7K + 23.9M

Title

Project name here

Public

Anyone can view and fork this Repl.

Upgrade to make private

+ Create Repl

See all Repls

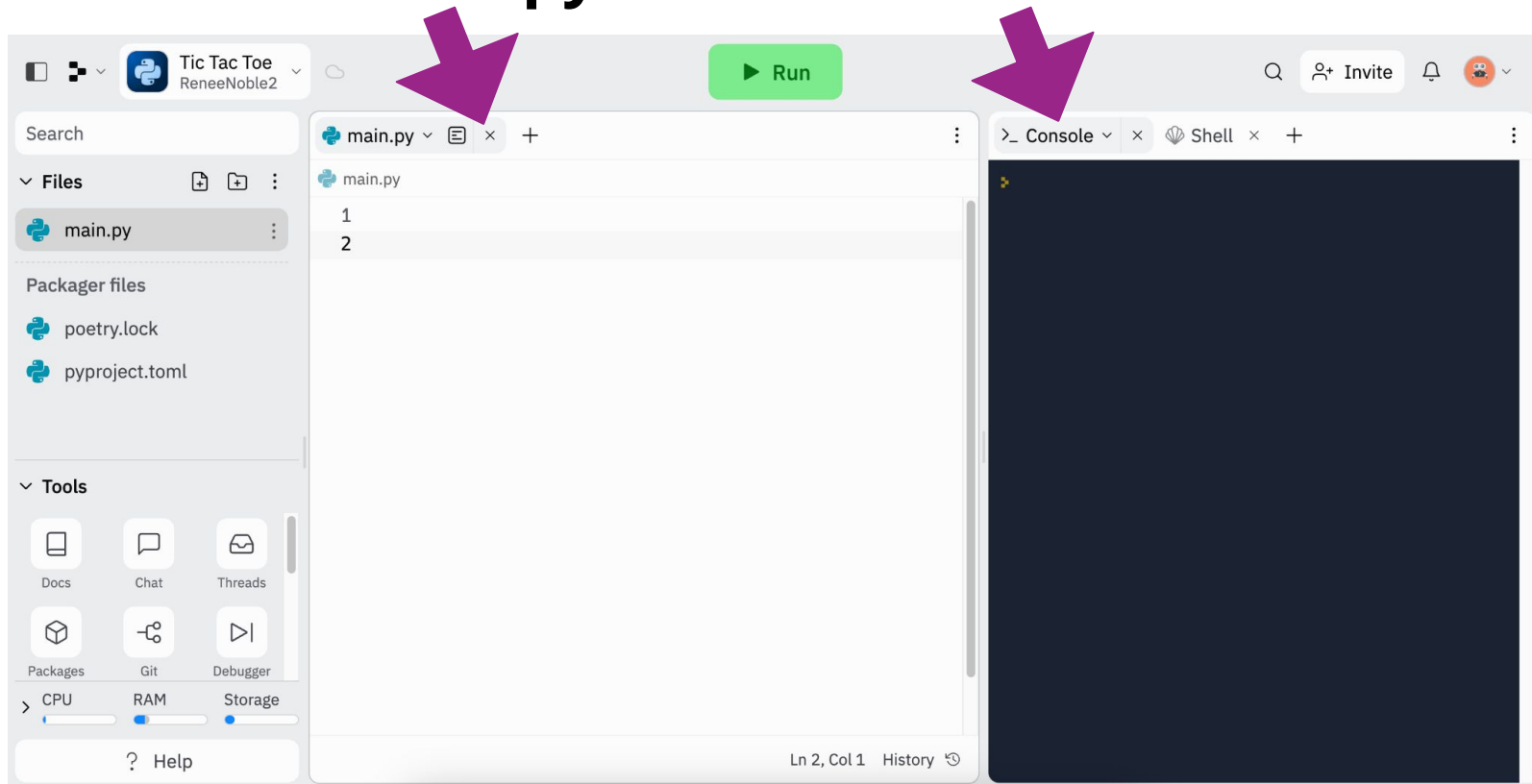
Explore Tutorials



We're ready to code!

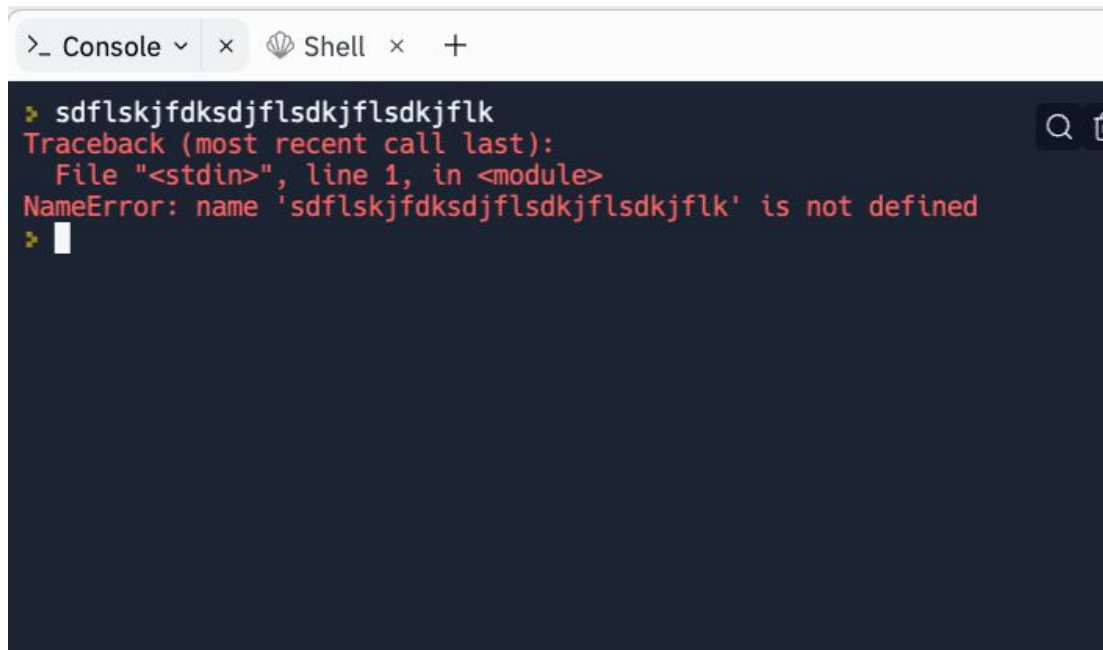
**We'll write our project
here in main.py**

**You can test out Python
code in the console**



Test the **console**! Make a mistake!

Type by **button mashing** the keyboard!
Then press enter!

A screenshot of a web-based console window. The window has a title bar with tabs for 'Console' and 'Shell'. The console area is dark blue with white text. It shows a command prompt prompt '>' followed by the text 'sdflskjfdksdjflsdkjflsdkjflk'. Below this, a red error message is displayed: 'Traceback (most recent call last):', 'File "<stdin>", line 1, in <module>', and 'NameError: name 'sdflskjfdksdjflsdkjflsdkjflk' is not defined'. A cursor is visible on the line following the error message.

```
>_ Console x Shell x +
> sdflskjfdksdjflsdkjflsdkjflk
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'sdflskjfdksdjflsdkjflsdkjflk' is not defined
> 
```

Did you get a big red error message?



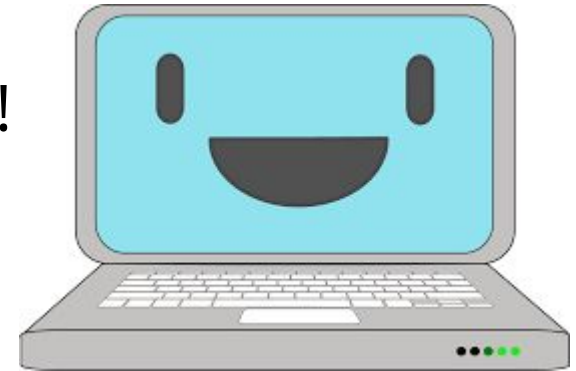
Mistakes are great!

*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!



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

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

*KeyError:
'Hairy Potter'*



We can learn from our mistakes!

Error messages help us fix our mistakes!
We read error messages from bottom to top

Traceback (most recent call last):

File "C:/Users/Madeleine/Desktop/tmp.py", line 9, in <module>
 print("I have " + 5 + " apples")

TypeError: can only concatenate str (not "int") to str

1. What went wrong

2. What code didn't work

3. Where that code is



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!")
```



Write some code!!

Watch a Tutor type this into the window
Then press enter!

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

Did it print:

hello world

???



Tell me more!

We can `print` things in lots of different ways in python!

```
>>> print("Hello world!")
```

```
>>> print("Hello", "world!")
```

```
>>> print("Hello", "world", end="!")
```



Tell me more!

We can `print` things in lots of different ways in python!

```
>>> print("Hello world!")
```

```
Hello world!
```

```
>>> print("Hello", "world!")
```

```
>>> print("Hello", "world", end="!")
```



Tell me more!

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>>> print("Hello world!")
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```
Hello world!
```

```
>>> print("Hello", "world!")
```

```
Hello world!
```

```
>>> print("Hello", "world", end="!")
```



Tell me more!

We can `print` things in lots of different ways in python!

```
>>> print("Hello world!")
```

```
Hello world!
```

```
>>> print("Hello", "world!")
```

```
Hello world!
```

```
>>> print("Hello", "world", end="!")
```

```
Hello world!
```

Note that this last one will not have a new line after it!

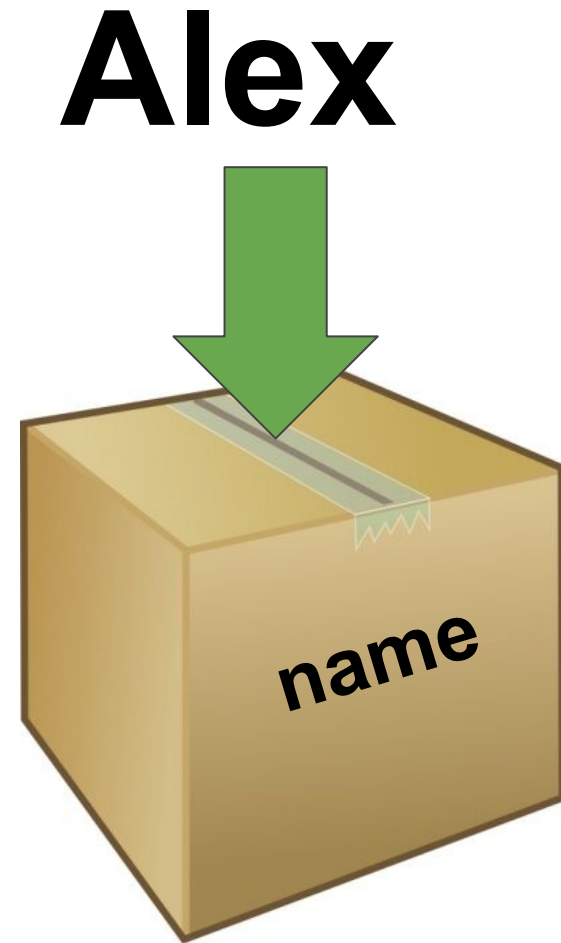


Variables

**Variables are useful
for storing things
that change**

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

You can think of it like
putting information in a
box and giving it a name

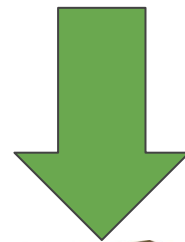


Variables

Instead of writing a name, we can use the name that is inside our variable! Here, we get the name out of the box.

```
print(name)
```

Alex



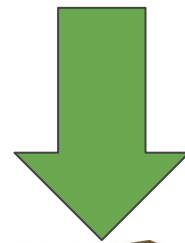
Variables

Instead of writing a name, we can use the name that is inside our variable! Here, we get the name out of the box.

```
print(name)
```

Alex

Alex



Reusing variables

We can replace values in variables:

```
animal = "dog"
print("My favourite animal is a " + animal)
animal = "cat"
print("My favourite animal is a " + animal)
animal = animal + "dog"
print("My favourite animal is a " + animal)
```

What will this output?



Reusing variables

We can replace values in variables:

```
animal = "dog"
print("My favourite animal is a " + animal)
animal = "cat"
print("My favourite animal is a " + animal)
animal = animal + "dog"
print("My favourite animal is a " + animal)
```

What will this output? `My favourite animal is a dog`
`My favourite animal is a cat`
`My favourite animal is a catdog`



Asking a question!

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

Let's get the computer to ask us a question!

```
my_name = input('What is your name? ')\nprint('Hello ' + my_name)
```

What do you think happens?



Asking a question!

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

Let's get the computer to ask us a question!

```
my_name = input('What is your name? ')\nprint('Hello ' + my_name)
```

What do you think happens?

What is your name? Maddie

Hello Maddie



Asking a question!

Store the answer
in the variable
my_name

Writing input tells
the computer to
wait for a response

This is the question
you want printed to
the screen

```
my_name = input('What is your name? ')\nprint('Hello ' + my_name)
```

What do you think happens?

What is your name? Maddie

Hello Maddie

We can use the answer
the user wrote that we
then stored later!



Project time!

You now know all about printing, variables
and input!

Let's put what we learnt into our project
Try to do Part 0 - Part 1

The tutors will be around to help!



Lists



Storing groups of things in variables

- We know how to store individual things, but if 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 `integer` and `string`, 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 one:

```
>>> 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!

```
1 >>> favourites = ['books', 'butterfly',  
                    'chocolate', 'skateboard']
```



You can put anything into a list

- You can have a list of **integers**

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

- You can have a **lists** of **strings**

```
>>> colours = ['red', 'blue', 'green']
```



Accessing Lists!

- The favourites **list** holds four strings in order.

```
favourites = ['books', 'butterfly',  
             'chocolate', 'skateboard']
```

- 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]:

```
>>> favourites[0]  
'Books'
```
- What code do you need to access the third item in the list?



Falling off the edge

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

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

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



List of lists!

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

We could use a list of lists to store tennis partners.!

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



Project time!

Now you know all about lists!

Let's put what we learnt into our project
Try to do Part 2

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 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

`5 < 10`

`3 + 2 == 5`

`5 != 5`

`"Dog" == "dog"`

`"D" in "Dog"`

`"Q" not in "Cat"`



Booleans (True and False)

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True and **False**

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

<code>5 < 10</code>	True	<code>"Dog" == "dog"</code>
<code>3 + 2 == 5</code>		<code>"D" in "Dog"</code>
<code>5 != 5</code>		<code>"Q" not in "Cat"</code>



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

`5 < 10` **True**

`3 + 2 == 5` **True**

`5 != 5`

`"Dog" == "dog"`

`"D" in "Dog"`

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<code>3 + 2 == 5</code>	<code>True</code>	<code>"D" in "Dog"</code>	
<code>5 != 5</code>	<code>False</code>	<code>"Q" not in "Cat"</code>	



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

5 < 10	True	"Dog" == "dog"	False
3 + 2 == 5	True	"D" in "Dog"	True
5 != 5	False	"Q" not in "Cat"	



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

5 < 10	True	"Dog" == "dog"	False
3 + 2 == 5	True	"D" in "Dog"	True
5 != 5	False	"Q" not in "Cat"	True



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

Find out if it's **True**!

```
fave_num = 9000  
if False:  
    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 9000
- And it's not **True** that 9000 is less than 10
- So it is **False**!



Conditions

How about a different number???

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



What do you think happens?

```
>>>
```

Conditions

How about a different number???

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



What do you think happens?

```
>>>
```



Nothing!



If statements

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

This line ...

... controls this line



If statements

Actually

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

This line ...

... controls anything below it
that is indented like this!



If statements

```
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

```
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

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?

Project Time!

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

Let's put what we learnt into our project
Try to do Parts 3 and 4

The tutors will be around to help!

Random!

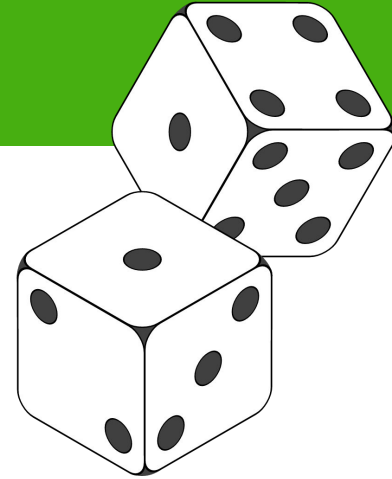


That's so random!

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



We're going to use the
random module!



**We want the
computer to be
random sometimes!**



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!

Raaaaaaaaaandom! Can you handle that?

Let's put what we learnt into our project
Try to do Part 5

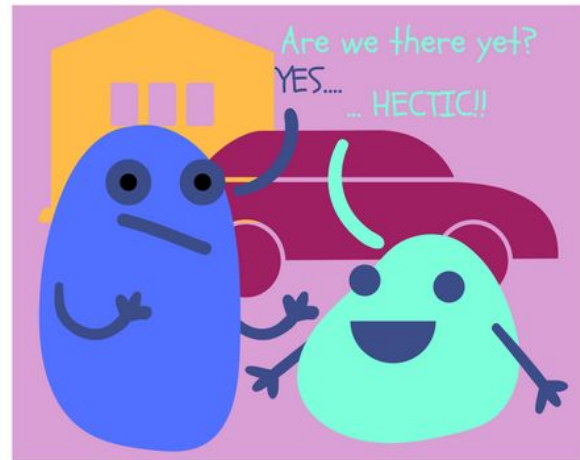
The tutors will be around to help!



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
```

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!

Print !

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

i is 0

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 = 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!

1 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!

Print!

```
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
```

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

MY VARIABLES


```
i = 0
i = 1
i = 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
```

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

MY VARIABLES

```
i = 0
i = 1
i = 2
i = 3
```



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!

Initialise the loop variable

Loop condition

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

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
ing Netw	i	s
i	.	.

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?")
```



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?")
```

```
Are we there yet?  
Are we there yet?  
Are we there yet?  
Are we there yet?  
Are we there yet?  
Are we there yet?
```



Project Time!

while we're here:

Let's put what we learnt into our project

Try to do Part 6!

Then try Extension Parts 7 - 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!