

## Week 3: Python Programming

Last week you used functions to make programs shorter and to allow you use re-use code. This week we will leave turtles for a week and look at user input and selection (using if). The demonstration will cover the use of the Python shell and assigning values to variables.

**Task 1:** In pairs, look at the program below and write out what you think might happen when it runs

```
# starter program week 3

def questions():
    print("What is the capital of France?")
    answer = input()
    if answer == "Paris":
        print("Correct!")
    else:
        print("No, that's not correct")

    # what is the difference with the question below?
    answer = input("What is the capital of Norway? ")
    if answer == "Oslo":
        print("Correct!")
    else:
        print("No, that's not correct")
```

What would you expect the computer to do? Write it out exactly.

**Task 2:** Download and run the program and see if it does what you think it might do. You will find it at <http://teachinglondoncomputing/ks3-week-3>

Did the program run as you predicted? \_\_\_\_\_

**Task 3:** There are a few new concepts in this program. In pairs, work out the answers to the following questions by examining the code and running it a few times. (These are good questions to ask your students!!)

1. Name a variable being defined in this program \_\_\_\_\_

2. What would happen if you typed Print() instead of print() \_\_\_\_\_

3. What would happen if you wrote that London was the capital of France?

4. Why do you need a colon : at the end of the if statement and the word else

5. What is the difference between = and == ? Both are used in this program.

6. What happens when you run `answer = input()`

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7. What is the difference between

`answer = input()` and `answer = input("What is the capital of...")`?

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Now add comments (beginning with `#`) to the program to make sure everything you understand is included in your program for future reference. When you think you understand how this program works then go on to the exercises.

Once you write programs that have if statements you must test both options!!

#### Task 4: Exercises

In pairs, try these challenges:

1. Add two more questions and answers about capitals. If you get any syntax errors along the way be sure to write them down for later reference!
2. Now extend your program to give a more personalised answer with name. In a `print()` or `input()` statement you can use a "+" to join up a variable and some text inside "".

```
>>> questions()
What is your name?
Sue
What is the capital of France?
Paris
Well done Sue, that is Correct!
```

3. Now ask a question with a numeric answer , for example "*How many cities are there in England?*" Use `int(input(...))` to do this. The extra `int()` wrapped around the input will convert what you typed in into a whole number.

```
How many cities are there in England?
51
Correct!
```

Note that if you don't use `int(input())` and try to enter a number you will get an error. You could try to generate this error to make a note of it.

4. Now extend your program to include a multiple-choice question. "a. ..."

What is the capital of Hungary?. Select a, b or c

- a. Bucharest
- b. Budapest
- c. Vilnius

a

No, that's not correct

### Extension exercise

Go back to the turtle program you wrote last week and add some user input. Ask the user if they want a large square or a small square, and draw the square appropriately. For an additional challenge, you could also do this with the colour of the square.

Make a note of any errors that you come across in the notebook and how you fix them.

### Key concepts from this sheet:

Term	What it means	How to do it in Python
Variable	Something you can give a value to and then change it at other times in the program	<pre>name = "Rhiannon" # name is a variable number = 56      # number is a variable</pre>
Selection	Where there is a choice point in the program design and an if statement is used to create more than one possible pathway.	<pre>if answer == "Paris":     print("Correct") else:     print("Not correct")</pre>
Input/Output	Getting input from the keyboard or outputting something to the screen.	<pre>name = input("What is your name?") print(name)</pre>
Assignment	Where a variable is given a value	<pre>number = 56 # number is assigned the value 56 name = "Rhiannon" # name is assigned the value Rhiannon</pre>
Condition	What we test for inside an if statement.	<pre>answer == "Paris" # to test equality number == 100 # test equality number &gt; 100 # test greater than number &lt; 100 # test less than number &gt;= 100 # test greater than or equal to number &lt;= 100 # test greater than or equal to number != 100 # test if not equal to</pre>

Testing	Testing is essential to make sure that each pathway works correctly	Run the program as many times as there are options or combinations of options to ensure each pathway works. You can plan this using a <i>test plan</i> which is a table to record the results. A test plan makes sure your testing is systematic.
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**Key points to remember in Python** (and to remind your students!)

1. The colon : is used to announce that a new block of code is coming and all the lines in the block MUST be indented the same amount of spaces. At the end of the block, you can stop indenting. Anything that happens if a condition is true after an if statement is also a block of code.
2. Python is case sensitive so Triangle and triangle will be treated as completely different things.
3. 'Name error' is an error you get if the variable name or function name you have used in Python is not recognised. Sometimes it's caused by a lower case/upper case mis-typing or a spelling error.