if conditions

This document helps you understand `if` conditions through many different examples and exercises.

To run the examples, ***type the code yourself***. Do *not* copy and paste.

For each exercise, you can use the "Python Tutor" online visualiser (https://pythontutor.com/visualize.html#mode=edit) to run the code step by step. This is very important because visualising the code execution helps you understand how Python really works.

Ex01

Open the Python REPL and type all of these:

```
>>> 3 > 0
>>> 5 > 2
>>> 4 > 3
>>> 1 > 0
```

Ex02

Open the Python REPL and type all of these:

```
>>> 3 < 0
>>> 15 < 10
>>> 100 < 1
>>> 1 < 0
```

You can use the symbols `>` and `<` to ask Python to compare numbers.
When Python does the comparisons, you get the values
`True` or `False` back, depending on whether the comparison is correct or not.

Ex03

Open the Python REPL and type all of these (careful with the double equals sign `==`, it's not a single equals sign `=`):

```
>>> 3 == 3
>>> 5 == 5
>>> 101 == 101
>>> 1 == 1

>>> 3 == 4
>>> 4 == 3
>>> 100 == 1
>>> 1 == 0
```

Ex04

What is the operator `==` used for? What does it do?

Ex05

Open the Python REPL and type all of these:

```
>>> 6 != 5
>>> 6 != 7
>>> 5 != 10
>>> 5 != 999

>>> 6 != 6
>>> 5 != 5
>>> 3 != 3
>>> 0 != 0
```

Ex06

What is the operator `!=` used for? What does it do?

Ex07

Open the Python REPL and type all of these:

```
>>> 6 >= 5
>>> 6 >= 6
>>> 6 >= 7

>>> 4 >= 3
>>> 4 >= 4
>>> 4 >= 5
```

Ex08

What is the operator `>=` used for? What does it do?

Ex09

Open the Python REPL and type all of these:

```
>>> 16 <= 18
>>> 16 <= 16
>>> 16 <= 0

>>> 3 <= 5
>>> 3 <= 3
>>> 3 <= 1
```

Ex10

What is the operator `<=` used for? What does it do?

Ex11

Look at the code below. If you run the code, what will the terminal show?

Type the code in the file `ex11.py` and run it to check if you were right.

```
print("Hi!")
if 1 > 0:
    print("Bye!")
```

Ex12

Look at the code below. If you run the code, what will the terminal show?

Type the code in the file `ex12.py` and run it to check if you were right.

```
print("Hi!")
if 0 > 1:
    print("Bye!")
```

Ex13

Look at the code below. If you run the code, what will the terminal show?

Type the code in the file `ex13.py` and run it to check if you were right.

```
print("Hi.")
if True:
    print("How are you doing today?")
```

Ex14

Look at the code below. If you run the code, what will the terminal show?

Type the code in the file `ex14.py` and run it to check if you were right.

```
print("Hi.")
if False:
    print("How are you doing today?")
```

Ex15

Look at the code below. If you run the code, what will the terminal show?

Type the code in the file `ex15.py` and run it to check if you were right.

```
should_run = True
if should_run:
    print("How do you do?")
```

Ex16

Look at the code below. If you run the code, what will the terminal show?

Type the code in the file `ex16.py` and run it to check if you were right.

```
should_run = False
if should_run:
    print("How do you do?")
```

Ex17

Look at the code below. If you run the code, what will the terminal show?

Type the code in the file `ex17.py` and run it to check if you were right.

```
if True:
    print("Hey, let me tell you a joke.")
if False:
    print("===")
if False:
```

```
    print("Oh yeah, please tell me a joke!")
if True:
    print("Do you know what's brown and sticky..?")
if True:
    print("Nope, what's brown and sticky?")
if False:
    print("A car!")
if True:
    print("A stick!")
```

Ex18

Look at the code below. If you run the code, what will the terminal show?

Type the code in the file `ex18.py` and run it to check if you were right.

```
if 5 != 5:
    print("You are boring.")
if 5 > 0:
    print("Hey, let me tell you a joke.")
if 5 >= 167:
    print("===")
if 4 != 4:
    print("Oh yeah, please tell me a joke!")
if 4 != 5:
    print("What's a dog's favourite super hero?")
if 0 < 34:
    print("What?")
if 0 > 34:
    print("I don't know, what?")
if 3 == 3:
    print("A Labra-Thor!")
if 2 == 3:
    print("Superman!")
```

Ex19

Type the code below in the file `ex19.py`. Complete the `if` statement (by replacing the `???` with the correct code) so that the code runs correctly.

```
age = 23

if ???:
    print("You are legally an adult.")
```

Expected output:

```
You are legally an adult.
```

Ex20

Type the code below in the file `ex20.py`. Complete the `if` statement (by replacing the `???` with the correct code) so that the code runs correctly.

```
cars_owned = 0

if ???:
    print("If you don't have a car, do you have a motorbike?")
```

Ex21

Type the code below in the file `ex21.py` and run it. It does not run correctly. Fix the code and run it again.

```
x = 6
y = 5
if :
    print("X and Y are different.")
```

Expected output:

```
X and Y are different
```

Ex22

Create an empty file `ex22.py`. Write a small program that has a variable called `favourite_number` and set it to a number. The code should print "7 is my favourite number, too!" **only** when the variable `favourite_number` has the value 7.

Ex23

Look at the code below. Type the code in the file `ex23.py`, run the code, type a number in the terminal, and press `Enter`.

What does the code do?

Run the code and type many different numbers like `0`, `1`, `7`, `999`, etc.

```
fav_number = int(input("What's your favourite number?"))

if fav_number == 7:
    print("My favourite number is also 7!")
if fav_number != 7:
    print("You should rethink your favourite number!")
```

Ex24

In the file `ex24.py` write code that asks the user for their favourite number.

If the user types `8` the program should show the message "8 is such a good number!".
If the user types anything else, the program should show the message "That is a decent number.".

You can use **Ex23** as inspiration.

Run your code and type different numbers like `0`, `1`, `8`, `73`, etc. Make sure the code works as intended.

Ex25

In the file `ex25.py` write code that asks the user for their age.

If the user types a number below `21` the program should show the message “You are still quite young!”. If the user types a number above `20` the program should show the message “How is adulthood?”.

You can use **Ex23** as inspiration.

Run your code and type different numbers like `1`, `5`, `18`, `20`, `21`, `22`, `65`, etc. Make sure the code works as intended.