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Introduction to Python

Introduction

The purpose of this practical is to start using Python to develop programs. Don't forget that you are required to submit the indicated exercise through myLearn for assessment.

Python

Python is a high-level programming language and is typically a better choice for complicated programs than the bash scripting we have worked with so far. It is an interpreted language, meaning that the source code is covered to code understood by the computer as it is run through the Python interpreter.

There are two ways we can use the Python interpreter. The first is in interactive mode, where we type in our Python code one line at a time. The second is script mode, where we type all our code into a source file (or files) and then tell the interpreter to execute the script. We will examine both methods.

Exercises

Use material from this week's lectures to perform the following exercises:

1. Start the Python interpreter. On turing, enter the command `python3`. On other systems, it might be something more specific like `python3.8`
2. You should be presented with a Python prompt. Type in the following (make sure you understand what each statement is doing):
    - 1 + 2
    - type(1 + 2)
    - 1 + 2 ** 3
    - type (1 + 2 ** 3)
    - 15 / 2
    - type(15 / 2)
    - 15 // 2
    - type(15 // 2)
    - 15 % 2
    - type(15 % 2)
    - type("Hello, World!")
    - "Hello, World!"
    - print("Hello, World!")
    - print("Hello, " + "World!")
    - print("Hello, ", "World!")
3. Type `exit()` (or press Ctrl-D) to exit the interpreter. Create a file named *hello.py* with the following content, and then execute the program by running the command `python3 hello.py`

```
print("Hello, World!")
```

4. Make the file executable (i.e. use `chmod`) and try to run it: `./hello.py`
5. The system responds with an error. This is because it doesn't know how to interpret the program. Add the following as the first line of the file and then execute it again. This time the system knows which interpreter to use.

```
#!/usr/bin/env python3
```

6. Examine the following program, making sure you understand what it does. Then execute the program and verify it performs as you expected.

```
#!/usr/bin/env python3
name = input("Please enter your name: ")
print("Hello " + name + "!\n")

first = input("Please enter the first number: ")
first = int(first)

second = input("Please enter the second number: ")
second = int(second)

if first < second:
  print(first, "is less than", second)
elif second < first:
  print(first, "is greater than", second)
else:
  print(first, "is equal to", second)
  print("Did you do that on purpose?")

average = (first + second) / 2
print("The average of the two numbers is: " + str(average))
```

7. **[This exercise should be submitted through the Assessments section of myLearn for <u>Tutorial Exercise 2</u>]** Write a program that asks the user to enter their age (in years). If the user is 100 or older, tell them "You've already turned 100!". Otherwise, if they are less than 0, tell them "Try again after you are born!". If neither of these cases apply, calculate the number of years before they turn 100 and output the message "You will be 100 in x years!" (where x is replaced by the number of years before they turn 100). You must use an if...elif...else statement for this problem.

8. Write a Python program that implements the following pseudocode:

    - Display the message "How many hours did you work?"
    - Input hours
    - Display the message "How much do you get paid per hour?"
    - Input rate
    - Calculate the pay due as the number of hours worked multiplied by the pay rate
    - If the number of hours is less than 10, add a bonus equal to their pay rate for one hour
    - If the number of hours is greater than 100, add a bonus equal to their pay rate for five hours
    - Display the pay due to the user

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