CMPT 120

Topic: Python Modules
Last Few Lectures

• Functions
Learning outcomes

At the end of this course, a student is expected to:

• Create (design) small to medium size programs using Python:
  • Use the core features of Python to design programs to solve problems: variables, expressions, terminal input and output, type conversion, conditionals, iteration, functions, standard library modules
  • Identify and use built-in objects (from predefined classes), and objects defined in modules
Today’s Menu

• Modules
  • What are they
  • Where to find them
  • How to use them
  • Demo: Turtle module
Remember our Guessing Game

- **Problem Statement:** Write a guessing game using Python
  - We pick a number and the user tries to guess our number
  - Our program displays an appropriate message:
    "Wow! You got it!"
    OR
    "Sorry! You missed! The number was <#>."

```python
# List all modules used in this program import random
# Get a number from 1 to 10 for the user to guess
color = random.randint(1,10)
# For debugging purposes:
print("number to guess is: ", number)
```
What is a module?

- Python comes with a huge library of pre-written code (functions) that we can use in our Python program

- This pre-written code is organised into *modules*

- Each module has a theme
  - For example: *random, math, calendar* and *turtle*

- This makes it easy to search for functionality (i.e., functions) throughout all Python modules
Python modules

Question: How do we learn about all the Python modules?
Answer: The same way we learn about all the Python built-in functions and methods -> we look them up on web sites

• Here is one web site describing Python modules:
  https://docs.python.org/3/py-modindex.html

Question: How do we know which function to use from a particular module (for example, from the random module)?
Answer: We search the web site describing the desired module

For example, here is the link to the random module web site:
  https://docs.python.org/3/library/random.html

By the way, here is a super useful web site
  https://docs.python.org/3/library/
How do we use a module?

• To use the functions of a Python module in our program, we must first import the module
  • Syntax: import <moduleName>
  • Example: import random

• Important: We can use the functions of a module as soon as we have imported the module, therefore, we place the import statement at the top of our Python program so that its functions can be called at any point in our program

• To use a particular function of a Python module in our Python program, we use the following dot notation syntax:
  • Syntax: <moduleName>.<functionName>( )
  • Example: aRandomInt = random.randint(1,10)
How do we use a module?

Other syntax:

- **Syntax:** `import <moduleName> as <shortNameForModule>`
- **Example:**
  ```python
  import turtle as t
  import turtle as t2
  t.pencolor("red") t2.pencolor("blue")
  ```
  **Advantage of this syntax:** you can create > 1 turtle

- **Syntax:** `from <moduleName> import <functionName>`
- **Example:**
  ```python
  from math import sqrt, pi
  circleArea = pi * sqrt(radius)
  ```
  **Advantage of this syntax:** you only import what you need out of the module
Module Demo

• Let’s illustrate how to use a module by looking at the Turtle module
Summary

• Modules
  • What are they
  • Where to find them
  • How to use them
  • Demo: Turtle module
Next Lecture

- Case study: creating a program with functions