

CPSC 231 Tutorial #15

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Reminders

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TODAY

Quiz 8

THURSDAY

Quiz 8 Review

FRIDAY

Assignment 4 Paired Component

Last Time...

- `std::draw` tips
- Spirograph exercise
- Remapping function

Modules and Clients

MODULE

Contains functions available for use by other programs

CLIENT

A program that makes use of a function in a module

Creating and Using a Module

1. Create two files, `<module>.py` and a `<client>.py`
2. In the module file: define **only** functions
3. Place the module file in the same directory as the client
4. In the client file: import the module file

Never put arbitrary global code in a module file!

Testing a Module

```
---
```

```
...
```

```
def main():  
    # Test suite goes here  
  
if __name__ == '__main__':  
    main()
```

`__name__` is a special variable that holds the name of the module. “`__main__`” refers to top-level scope.

Why modules?

- Programs of reasonable size
- Debugging
- Code reuse
- Maintenance

Private functions

These are functions not intended for a client to use.

Naming convention: underscore prefix

```
e.g. def _phi(x):  
      # ...
```

... But Python has no way of actually enforcing this convention.

Libraries

Libraries are collections of related modules.

You've used these before:

- Numpy
- Pygame
- Karel

Hyperbolic Trigonometric Functions

Create a module, `hyperbolic.py`, that implements the following:

$$\sinh x = \frac{e^x - e^{-x}}{2}$$

$$\coth x = \frac{\cosh x}{\sinh x}$$

$$\cosh x = \frac{e^x + e^{-x}}{2}$$

$$\operatorname{sech} x = \frac{1}{\cosh x}$$

$$\tanh x = \frac{\sinh x}{\cosh x}$$

$$\operatorname{csch} x = \frac{1}{\sinh x}$$

where $e = 2.71828$

Do not import math.

Then, write a separate client file to use these functions.