

Numerical Methods in Materials Science and Engineering

Syntax Day (3)

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Syntax

Statements and
Expressions

Boolean

Whitespace
if-then-else

Arrays!

Homework

Syntax Day!

- ▶ Statement vs. Expression
- ▶ True False and the Boolean
- ▶ Flow control
- ▶ Whitespace
 - ▶ if: elif: else:
 - ▶ for x in y:
 - ▶ while z:
- ▶ Conventions, Naming, Code Etiquette

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Homework

Statements vs Expressions

Expressions Have a Value. Statements do Not.

If you can pass it as the argument of a function, then it is an expression.

If you can't, it is a statement.

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Homework

Many **expressions** result in a boolean result (True or False)
These are objects too!

- ▶ “True” and “False”
- ▶ $x == y$, $x != y$
- ▶ $x < y$, $x > y$
- ▶ $x <= y$, $x >= y$
- ▶ “and”, “or”, “not”
- ▶ x **is** y
- ▶ x **in** y
- ▶ (many object methods)

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Homework

Python uses whitespace (non-printing characters)
to control the flow of program execution.
(This is unusual)

Following a **statement** that ends in a “:”

- ▶ There **must** be a block of indented code
- ▶ The preceding statement decides if/when/how many times the block of code is executed.

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Homework

“if” begins a statement
(that may contain expressions) that
end with a “:”
The (indented) block of code that follows
the “:” is run conditionally.
(Example)

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Homework

while

“while” begin a statement (that may contain expressions) that end with a “:”, which is repeated many times while the condition is met

(Example)

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Homework

for

“for” begins a statement (that may contain expressions) that end with a “:” that will run a block of code, replacing a variable with a different value each time.

(Example)

Syntax

- Statements and Expressions
- Boolean
- Whitespace
- if-then-else

Arrays!

Homework

Beginning Arrays

arrays are probably the single most powerful object we will use in this class

- ▶ Creating an array:
 - ▶ `array()`
 - ▶ `arange()`
 - ▶ `linspace()`
- ▶ Broadcasting

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Arrays!

Homework

Homework for Monday

- ▶ Finish reading sections 1-4 at (<http://docs.python.org/tutorial/>)
- ▶ Read the numpy/scipy array primer found here: (http://www.scipy.org/Tentative_NumPy_Tutorial)
- ▶ Download the homework found at (<http://www.u.arizona.edu/~mgoodman/>)
- ▶ Follow the instructions there in and e-mail the completed .py to Dr. Erdmann (erdmann@arizona.edu) before the start of class Monday.