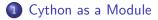
Introduction to Cython - Week 3

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Outline







Exercise

 $sum_nums.pyx$



Exercise

sum_nums.pyx

```
1 cdef unsigned long long sum_nums(unsigned long n):
2    cdef unsigned long long s = 0
3    cdef unsigned long i
4    for i in range(1, n+1):
5        s += i
6    return s
```





```
1 import sum_nums as sn
2
3 print(sn.sum_nums(10))
```



```
1 import sum_nums as sn
2
3 print(sn.sum_nums(10))
```

python setup.py build_ext -inplace
python run_sum_nums.py



import sum_nums as sn

```
print(sn.sum_nums(10))

python setup.py build_ext -inplace
python run_sum_nums.py
>> AttributeError: 'module' object has no attribute 'sum_nums'
```



The Fix

$sum_nums.pyx$

```
def sum_nums_wrapper(n):
    return sum_nums(int(n))
```



The Fix

```
sum_nums.pyx

def sum_nums_wrapper(n):
    return sum_nums(int(n))

run_sum_nums.py

import sum_nums as sn

print(sn. sum_nums_wrapper (10))
```



Testing The Fix

python setup.py build_ext -inplace
python rum_sum_nums.py



Testing The Fix

python setup.py build_ext -inplace python rum_sum_nums.py >> 55



The Sugar

sum_nums.pyx

```
cpdef unsigned long long sum_nums(unsigned long n):

cdef unsigned long long s = 0

cdef unsigned long i

for i in range(1, n+1):

s += i

return s
```



Using The Sugar

```
run_sum_nums.py
import sum_nums as sn
print(sn.sum_nums(10))
```



Using The Sugar

run_sum_nums.py

import sum_nums as sn

```
print(sn.sum_nums(10))

python setup.py build_ext -inplace
python run_sum_nums.py
```



Using The Sugar

run_sum_nums.py

import sum_nums as sn

```
print(sn.sum_nums(10))

python setup.py build_ext -inplace
python run_sum_nums.py
>> 55
```



Exercise

 $sum_logs.pyx$



Exercise

```
sum_logs.pyx

import math

cpdef double log_loop(double n, unsigned long iters):

cdef unsigned long i

cdef double s = 0

for i in range(iters):

s += math.log(n)

return s
```



Running sum_logs.pyx

```
setup.py

from distutils.core import setup
from Cython.Build import cythonize

setup(
    ext_modules=cythonize('*.pyx'),
)
```



Running sum_logs.pyx

```
setup.py

from distutils.core import setup
from Cython.Build import cythonize

setup(
    ext_modules=cythonize('*.pyx'),

python setup.py build_ext -inplace
python run_sum_logs.py
```



Log Loops

```
clog.pyx

cdef extern from "math.h":
   float log(float n)

cpdef double log_loop(double n, unsigned long iters):
   cdef unsigned long i
   cdef double s = 0
   for i in range(iters):
        s += log(n)

return s
```



Speed Test

3

```
run_log_loops.py (Summarized)
import clog
print(clog.log_loop(100,000,000, 10,000,000))
import pylog
print(pylog.log_loop(100,000,000, 10,000,000))
```



Speed Test

```
run_log_loops.py (Summarized)

1  import clog
2  print(clog.log_loop(100,000,000, 10,000,000))
3  
4  import pylog
5  print(pylog.log_loop(100,000,000, 10,000,000))
```

clog: 184,206,807.418 pylog: 184,206,807.418

clog took: 0.77s pylog took: 8.05s