



# SKILLPILLS

## Skill Pill: Basic Programming with Python

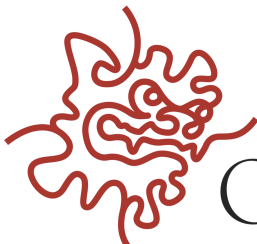
### Lecture 8: Programming practices with python

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## 1 Programming practices

- Comments
- Cleanliness

## 2 Other languages

## 3 Libraries

Here's the thing: Programming can be hard sometimes. Always comment your code and keep track of your progress, as if you were keeping a lab notebook. This helps in a number of ways:

- Writing helps you remember
- You are notoriously bad at remembering things.
- If you are ever writing code and you think, "Ah, I'll remember this in the future." Don't trust yourself. Leave a comment.
- You are your own audience!

What is this code doing (hint: remember last week!)?

---

```
a = 1243
b = 1456
q = 0; i = 0; j = 0
while i < a:
    i += 1; j = 0
    while j < b:
        j += 1; q += 1
```

---

What is this code doing (hint: remember last week!)?

---

```
# Finds area of square of size a, b
```

```
a = 1243
```

```
b = 1456
```

```
# q is a count of all the blocks,
```

```
# i, j are iterators
```

```
q = 0; i = 0; j = 0
```

```
# Outer loop through a
```

```
while i < a:
```

```
    i += 1; j = 0
```

```
    # Inner loop through b
```

```
    while j < b:
```

```
        j += 1; q += 1
```

---

Programming is like writing or art. Sometimes you need to learn from other people.

- Everyone has a different coding style, unless it affects performance, it doesn't matter
- Make your code super clean and sparkly, you never know who will want to use it!
- Don't become frustrated at other people. Don't pick up their bad habits.
- Ask questions / Google is your friend.

## Do not be ashamed of your code

- There are no eloquent programmers
- Ask for people to review your code
- Don't be offended if they say something is wrong!
- Learn from your mistakes and move on.
- The more you practice, the better you will be!

Programming will challenge you. Don't quit. Keep learning new numerical techniques!

The basics are not language dependent!

## Python:

---

```
# Prints out 0 -> 9
For i in range(10):
    print(i)
```

---

## Fortran:

---

```
!! Prints out 0 -> 9
program pline
    do i = 0,9
        write(*,*) i
    end do
end program
```

---

## C++:

---

```
// Prints out 0 -> 9
#include<iostream>

using namespace std;
int main(){
    for (int i=0; i<10; i++){
        cout << i << endl;
    }
}
```

---

## Julia:

---

```
# Prints out 0 -> 9
for i = 0:9
    println(i)
end
```

---



When it comes to programming, no one language rules them all.

Language	Advantages	Disadvantages
<b>Python</b>	Easy to use and write with	Poorly optimized / slow
<b>C++</b>	Blazingly fast if written well	Difficult to write well
<b>Fortran</b>	Blazingly fast	Incredibly old syntax
<b>Matlab</b>	Fast for arrays and matrix operations	Poor syntax / slow for anything else
<b>Julia</b>	Fast and friendly	New, some things are outdated within months
<b>R</b>	Great at bio stuff	Still slow

Python is known for being an incredibly easy language to use with plenty of library support. With the right libraries, you can use python to:

- Scientific computing (Scipy)
- Linear algebra (numpy)
- Plotting (matplotlib)
- 3-D videos (bpy)
- Web development (web.py) – made reddit.com
- etc..

Basically, people use python because it can be used for almost anything!

- Stack Overflow is a great cite to learn from good programmers
- docs.python.org is great for python
- RTFM ("Read the \*\*\*\*\* manual!") is a good thing. It means the solution exists
- Assume everyone is smarter than you unless proven otherwise
- When you see code online, try to figure out what it does (look at github.com)

- Python is a powerful programming language with support for almost anything. Unfortunately, it's slow.
- You have learned everything you need to get started with programming for your research
- Let us know if you have any questions!