DEVOXX™ 4KIDS Connecticut

Introduction to Python – Level 1

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Getting Started

What do you need to get started?

1. Anaconda for the Python version 3.6
   https://www.continuum.io/downloads

2. A web browser, preferably Google Chrome

(Make sure you download these before the class and you have right version for your platform, Windows or Mac)

- Class time: 1 hrs. and 45 minutes
  (Two 45 minute sessions with one 15 minute break!)

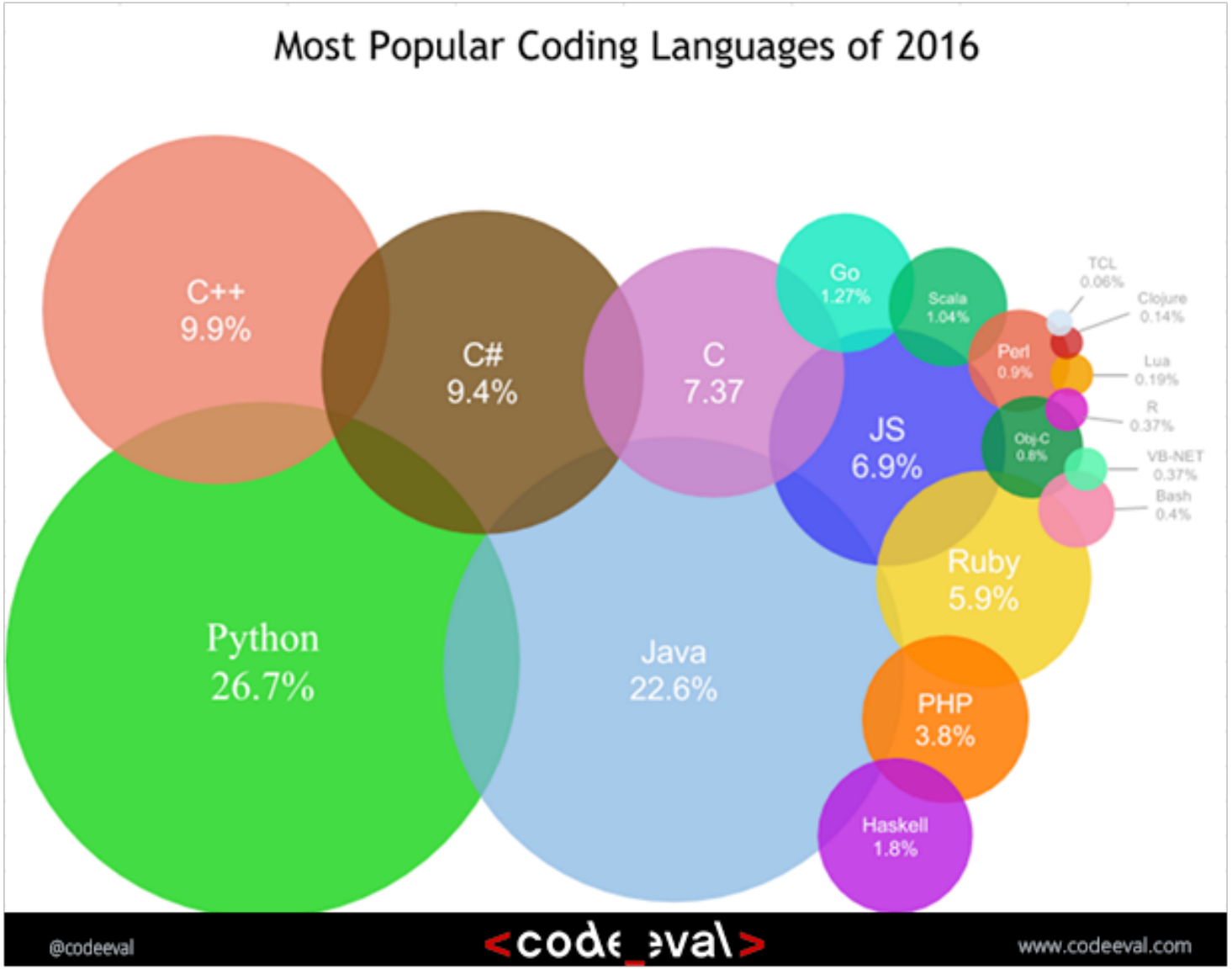
What are we going to do today ?

1. What is Python ?
2. Installation and How to Run Python
3. Basics of Python Programming Language
4. Input and output statements
5. All About data ‘types’
6. Conditional Execution
7. Practice Examples!
8. Q&A / Showcase

What is Python ?

- Great language for both beginner programmers and experts
- Easy to learn, easy to read
- Fun to write
- Open Source
- Very versatile, extendable
- Compatible on UNIX, Windows, and Macintosh
- **Used in various "hot" fields like Game Development, Artificial Intelligence, Robotics, Big Data, Automation, Medical Research**
- **Famous websites like Google, Instagram, YouTube, Pinterest, NASA, Spotify and Reddit run on Python**

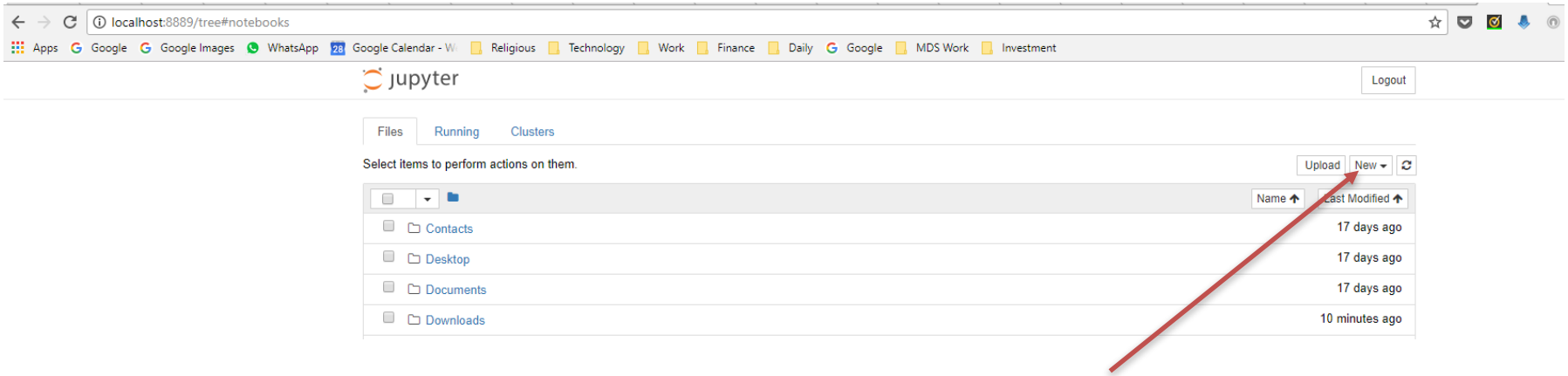
Quiz : Why is this language named Python ?


Most Popular Coding Languages of 2016
C++
9.9%
C#
9.4%
C
7.37
Go
1.27%
Scala
1.04%
TCL
0.06%
Clojure
0.14%
Perl
0.9%
Lua
0.19%
R
0.37%
Obj-C
0.8%
VB-NET
0.37%
Bash
0.4%
JS
6.9%
Ruby
5.9%
Python
26.7%
Java
22.6%
PHP
3.8%
Haskell
1.8%
@codeeval
<code_eval>
www.codeeval.com

Python Setup

1. Launch Jupyter Notebook from Anaconda Navigator

2. Create a new Python 3 notebook



3. Rename the notebook to “Python Intro – 1”

Python Basics

- Numerical operators + - * / % ** //
- String operator + (concatenation)
- Assignment operator =
- Comparison operators == != > < >= ??
- Logical operators and , or , not
- Print command print()
- Input command input()
- Comment # this is a comment

Basic Python Data Types

- **Integer (default for numbers)**

  z = 5 // 2

  # Answer is ? (integer division.)

- **Float (decimal numbers)**

  x = 5.00 / 2

  # Answer is ? (decimal division.)

- **String**

  Can use “” or ‘’ to specify a string.

  “abc” or ‘abc’ (Both are same)

Python Basics Examples

```
In [*]: print("Hello World")
```

```
In [ ]: 15 % 9
```

Quiz : Print the following strings together in a single sentence :

String1 = 'Python is'
String2 = ' Awesome.'

```
In [ ]: 8 <= 6
```

Quiz : Evaluate the following expression in Python :

The remainder of (8 cubed plus 10 squared plus 9 squared minus 1) divided by 50

```
In [ ]: hi = 9
        hi * hi
```

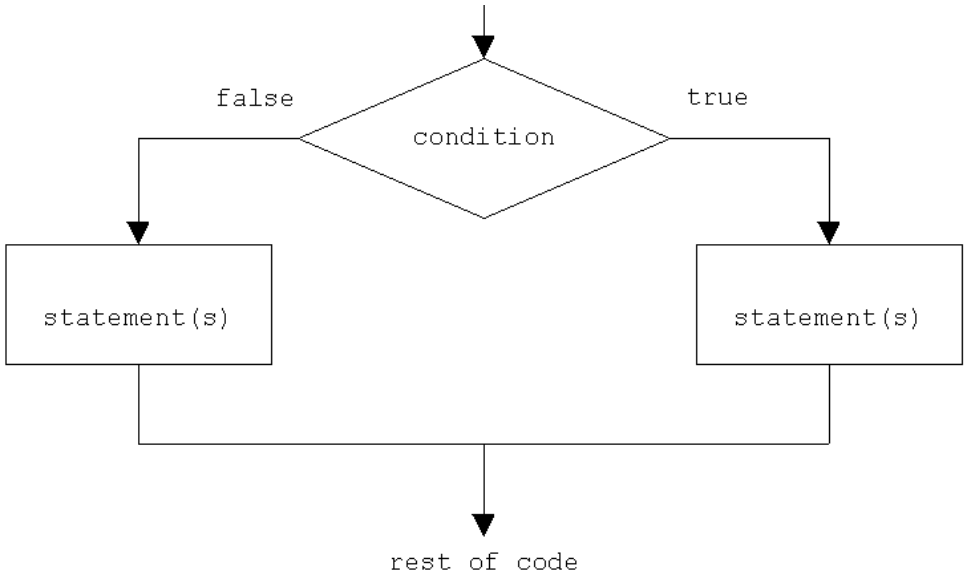
```
In [ ]: False and True
```

```
In [ ]: hi ** hi
```

```
In [ ]: False and False
```

Conditional Execution

if.....elif.....else



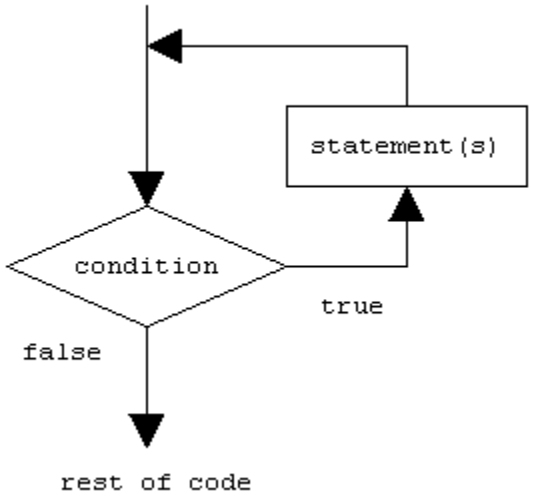

```
marks = 72

if marks >= 90:
    print("Congrats you got A grade")
elif marks > 79:
    print("Congrats you got B grade")
else:
    print("Study hard!!")
```

```
Study hard!!
```

What is the answer if marks = 79 ?

Conditional Execution

while.....




```
count = 0
while (count < 9):
    print ('The count is:', count)
    count = count + 1
print ("Good bye!")
```

```
The count is: 0
The count is: 1
The count is: 2
The count is: 3
The count is: 4
The count is: 5
The count is: 6
The count is: 7
The count is: 8
Good bye!
```

What happens if “count = count +1 “ is made into “count = count -1” ?

Conditional Execution

for.....

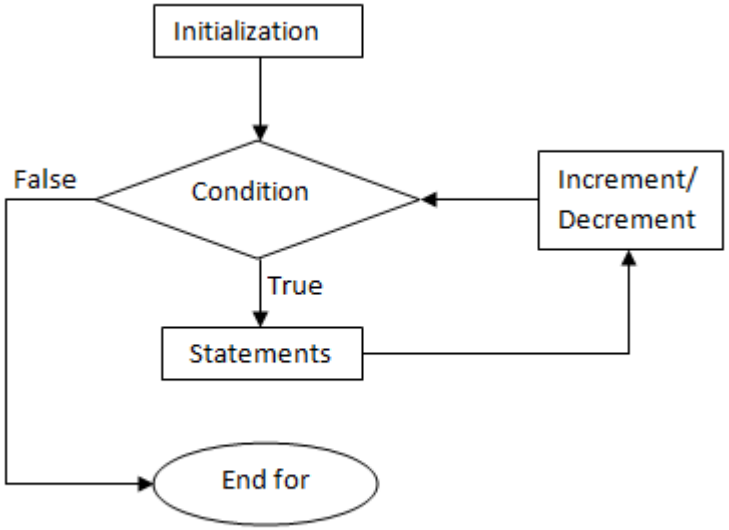


fig: Flowchart for for loop

```
primes = [2, 3, 5, 7]
for prime in primes:
    print(prime)
```

```
2
3
5
7
```

How do you print the square of each prime number instead of the number itself ?

More examples

Write a Python Block to capture temperature as input
and display the following :

If temperature is over 70, then display “wear T-Shirt”
If temperature is over 40 but below 70, then display “wear Sweat Shirt”
If temperature is less than 40, then display “wear Jacket”

```
temperature = float(input('What is the temperature? '))
```

```
if temperature > 70:
    print('Wear T-Shirt.')
elif temperature > 40:
    print('Wear Sweat Shirt.')
else:
    print('Wear Jacket.')
```

Advanced Python Data Types

- **List** – Items separated by commas and enclosed within square brackets []. List items can be changed.
  - **list1 = [‘abc’, 23, 4.34, 23]**
- **Tuple** - Items separated by commas and enclosed within parantheses (). Tuple items can **not** be changed.
  - **tuple1 = (23, ‘abc’, 4.56, ‘def’)**
- **Dictionary** – Pairs of Items separated by colons and commas and enclosed within braces {}. Dictionary items can be changed.
  - **dictionary1 = {‘user’:‘Alice’, ‘pswd’:1121, “Hint’:”birthday”}**

Lists - Examples

In [38]:
```
listA = ['Devoxx' , 4 , 'Kids','CT' ]
listB = [6, 'Montieth Drive', 'Farmington' , '06032']

print(listA)
print (listB)

print(listA[0])
print(listA[1])
print(listA[-1])
#print(listA[7])

print(listB[0:2])
print(listB[1:2])
print(listB[:3])

listA.append('USA')

print (listA+listB)
```

```
['Devoxx', 4, 'Kids', 'CT']
[6, 'Montieth Drive', 'Farmington', '06032']
Devoxx
4
CT
[6, 'Montieth Drive']
['Montieth Drive']
[6, 'Montieth Drive', 'Farmington']
['Devoxx', 4, 'Kids', 'CT', 'USA', 6, 'Montieth Drive', 'Farmington', '0
6032']
```

How do you print 'Devoxx Farmington' ?

Tuples - Examples

In [39]:
```
tupleA = ('Devoxx' , 4 , 'Kids','CT' )
tupleB = (6, 'Montieth Drive', 'Farmington' , '06032')

print(tupleA)
print (tupleB)

print(tupleA[0])
print(tupleA[1])
print(tupleA[-1])
#print(tupleA[7])

print(tupleB[0:2])
print(tupleB[1:2])
print(tupleB[:3])

tupleA.append('USA')

print (tupleA+tupleB)
```

What are the 2 ways to print '06032' from tupleB ?

```
('Devoxx', 4, 'Kids', 'CT')
(6, 'Montieth Drive', 'Farmington', '06032')
Devoxx
4
CT
(6, 'Montieth Drive')
('Montieth Drive',)
(6, 'Montieth Drive', 'Farmington')
---------------------------------------------------------------------------
---
AttributeError                            Traceback (most recent call la
st)
<ipython-input-39-22aafd0816bb> in <module>()
     14 print(tupleB[:3])
     15
---> 16 tupleA.append('USA')
     17
     18 print (tupleA+tupleB)

AttributeError: 'tuple' object has no attribute 'append'
```

Dictionaries - Examples

```
dictionary1 = {'username':'Alice', 'pswd':1121, 'hint':'birthday'}
print(dictionary1)
dictionary1['username'] = 'Rabbit'
print(dictionary1)
dictionary1['userid'] = 45
print(dictionary1)

print(dictionary1.keys())
print(dictionary1.values())
print(dictionary1.items())
```

How do I add an expiry date of 12/31/2017 to this dictionary ?

```
{'hint': 'birthday', 'pswd': 1121, 'username': 'Alice'}
{'hint': 'birthday', 'pswd': 1121, 'username': 'Rabbit'}
{'userid': 45, 'hint': 'birthday', 'pswd': 1121, 'username': 'Rabbit'}
dict_keys(['userid', 'hint', 'pswd', 'username'])
dict_values([45, 'birthday', 1121, 'Rabbit'])
dict_items([('userid', 45), ('hint', 'birthday'), ('pswd', 1121), ('user
name', 'Rabbit')])
```

Temp Converter

Fahrenheit to Celsius: (°F - 32) x 5/9 = °C or in plain English, First subtract 32, then multiply by 5, then divide by 9.

Celsius to Fahrenheit: (°C × 9/5) + 32 = °F or in plain English, Multiply by 9, then divide by 5, then add 32.

```
temp = int(input('Insert a temp to convert: '))
type = input('Is the above in Celcius(c) or Farenheit(f)?')

if(type == 'f'):
    cel = round((5/9)*(temp-32),2)
    print('Farenheit', temp, 'is equal to', cel, 'celsius')
elif(type == 'c'):
    far = ((9/5)*temp)+32
    print('Celsius', temp, 'is equal to', far, 'farenheit')
else:
    print('Unknown Data Input! Try again')
```

Coin Toss

Toss a coin 100 times and calculate how many times heads comes up and how many times tails comes up.

Coin Toss = Generate a Random Number between 1 and 2 (Either 1 or 2)

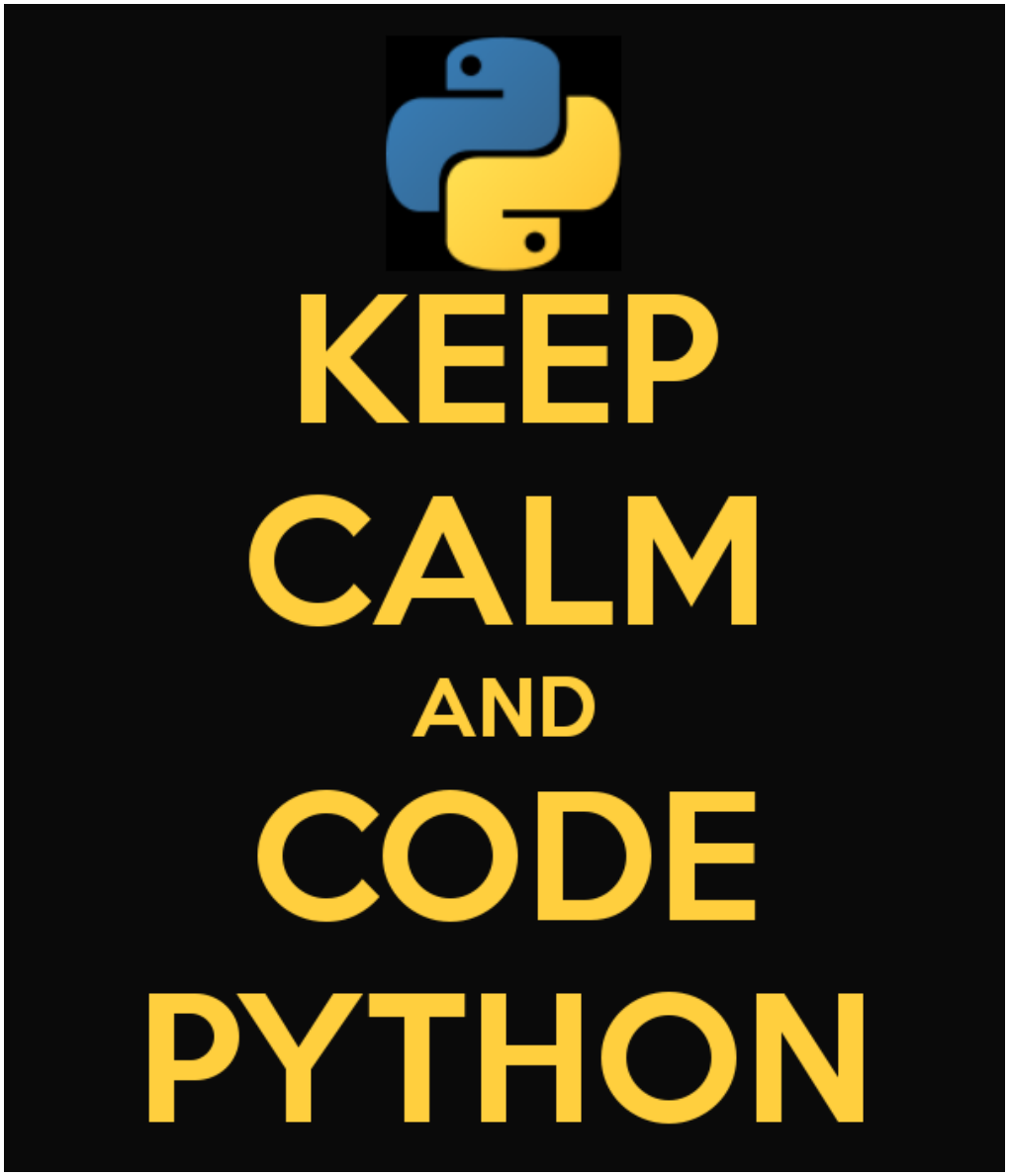
Heads = 1
Tails = 2

```
import random

heads = 0
tails = 0

for i in range(0, 100):
    result = random.randint(1,2)
    #print(result)
    if (result == 1):
        heads +=1
    else:
        tails +=1

print('Head came up:', heads, 'times')
print('Tail came up:', tails, 'times')
```

Turtle Graphics

```
# turtle honeycomb
# Lasse Kosiol
# 1.9.2012
# python workshop opentechschool berlin

import turtle
from random import randint

size = 20
circles = 20
turtle.speed(100)

turtle.colormode(255)

def move(length, angle):
                turtle.right(angle)
                turtle.forward(length)

def hex():
        turtle.pendown()
        turtle.color( randint(0,255),randint(0,255),randint(0,255) )
        turtle.begin_fill()
        for i in range(6):
                move(size,-60)
        turtle.end_fill()
        turtle.penup()
```

```
# start
turtle.penup()

for circle in range (circles):
        if circle == 0:
                hex()
                move(size,-60)
                move(size,-60)
                move(size,-60)
                move(0,180)
        for i in range (6):
                move(0,60)
                for j in range (circle+1):
                        hex()
                        move(size,-60)
                        move(size,60)
                move(-size,0)
        move(-size,60)
        move(size,-120)
        move(0,60)

turtle.exitonclick()
```


KEEP
CALM
AND
CODE
PYTHON