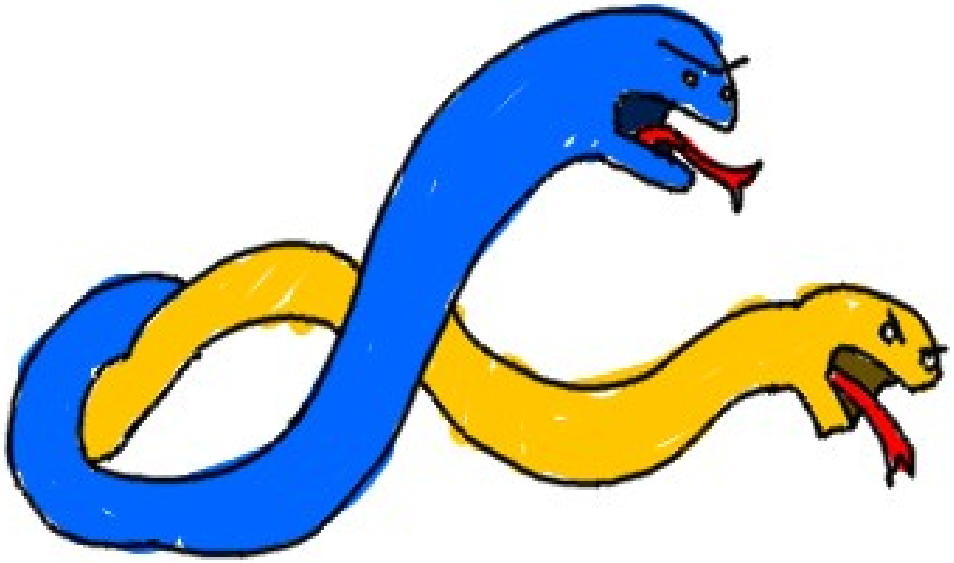
Python vs. C++



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Classes

Terms:

- Instantiation: When you declare a new variable whose data-type is a class object.
- Members: The variables and functions encapsulated within a class.

Classes

- Classes are a way to define your own **data types** and **data structures** with attributes (variables) and functionality (functions).
- C++ and Python both have Classes, though they look a little different.

Classes

A sample of a Python class vs. a C++ class

Python
(Functions not defined)

```
class NPC:


   def Move( self ):
   def GetDialog( self ):


   # m_x, m_y
   # m_dialog
```

C++

```
class NPC
{
   public:
   void Move();
   string GetDialog();

   private;
   int m_x, m_y;
   string m_dialog;
};
```

Classes

- C++ class definitions are surrounded in curly braces { } and the closing brace must end with a semicolon!
- C++ classes can have functions and variables, with three different keywords: **public:, protected:,** or **private:**

```
class MyClass
{
   public:
   protected:
   private:
};
```

Classes

- C++ Members can be:
  - **Public:** The function or member can be called anywhere in the program, if there is an instance of the class.
  - **Protected:** The function or member cannot be called outside of the class itself. It can be accessed by the classes' children (inheritance, later).
  - **Private:** The function or member cannot be called outside of the class itself.

Classes

- Members and functions in Python classes are all **public** by default – this means that anything **outside** of the class itself can access those member variables.

```
class MyClass:
    def SelfDestruct( self ):
        # ...
```

```
myVar = 2 + 4

myClass = MyClass()
myClass.SelfDestruct()
```

Classes

- In C++, you can set the accessibility of member functions and variables so that they're *public* to anywhere in the program, or *private* and available only to that class itself.

```
class BankAccount
{
    public:
    void DepositMoney();
    void WithdrawMoney();

    private:
    float m_balance;
};
```

```
int main()
{
    BankAccount myAcct;
    myAcct.m_balance = 10000;

    return 0;
}
```

Classes

- With m_balance being **private** in the `BankAccount` class, **`m_balance`** can only be changed from within the `DepositMoney()` and `WithdrawMoney()` functions.
- Nobody can change **`m_balance`** directly but the **`BankAccount`** class!

```
class BankAccount
{
    public:
    void DepositMoney();
    void WithdrawMoney();

    private:
    float m_balance;
};
```

WON'T

WORK!

```
int main()
{
    BankAccount myAcct;
    myAcct.m_balance = 10000;

    return 0;
}
```

Classes

- By default, all members and variables within a class are **private**. You can change this by adding the "**public:**" keyword before a list of variables and/or functions.
- This is different from Python, where all members are **public** by default.

Classes

Additional Reading

- http://www.cplusplus.com/doc/tutorial/classes/
- http://www.learncpp.com/cpp-tutorial/81-welcome-to-object-oriented-programming/