UNIVERSITY OF CALGARY

CPSC203 – Introduction to Problem Solving and Using Application Software

Fall 2009

Tutorial 25, Mehrdad Nurolahzade

Introduction

- Problem Solving with Algorithms
- Introduction to JES
- Jython Programming Basics

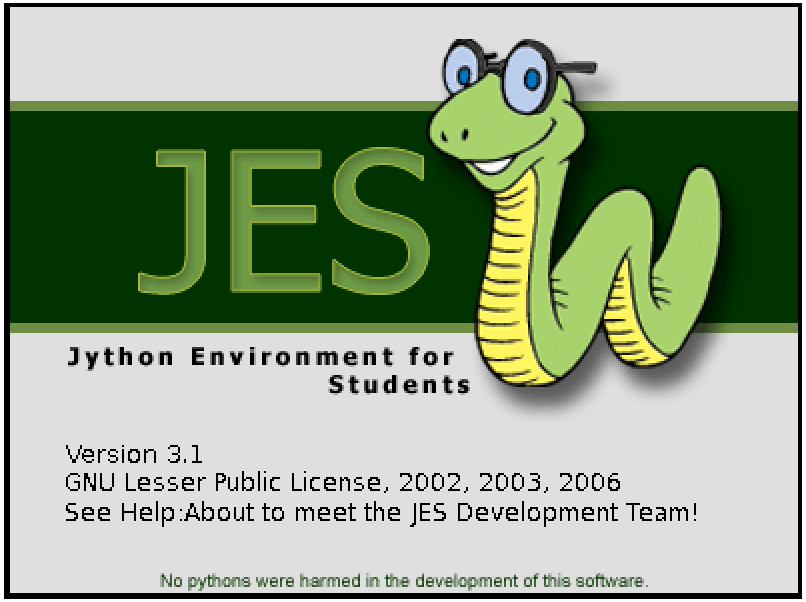
Problem Solving with Algorithms

- An algorithm is a step by step procedure for accomplishing some particular problem.

- Computers are often used to solve problems.
  - a person with knowledge of the problem must analyze the problem
  - develop the instructions for solving the problem
  - have the computer carry out those instructions

Introduction to JES

- JES = Jython Environment for Students
- We are using version 3.2 or 4.2



Jython Environment for Students

Version 3.1
GNU Lesser Public License, 2002, 2003, 2006
See Help:About to meet the JES Development Team!

No pythons were harmed in the development of this software.

- Download page: http://coweb.cc.gatech.edu/mediaComp-teach/26

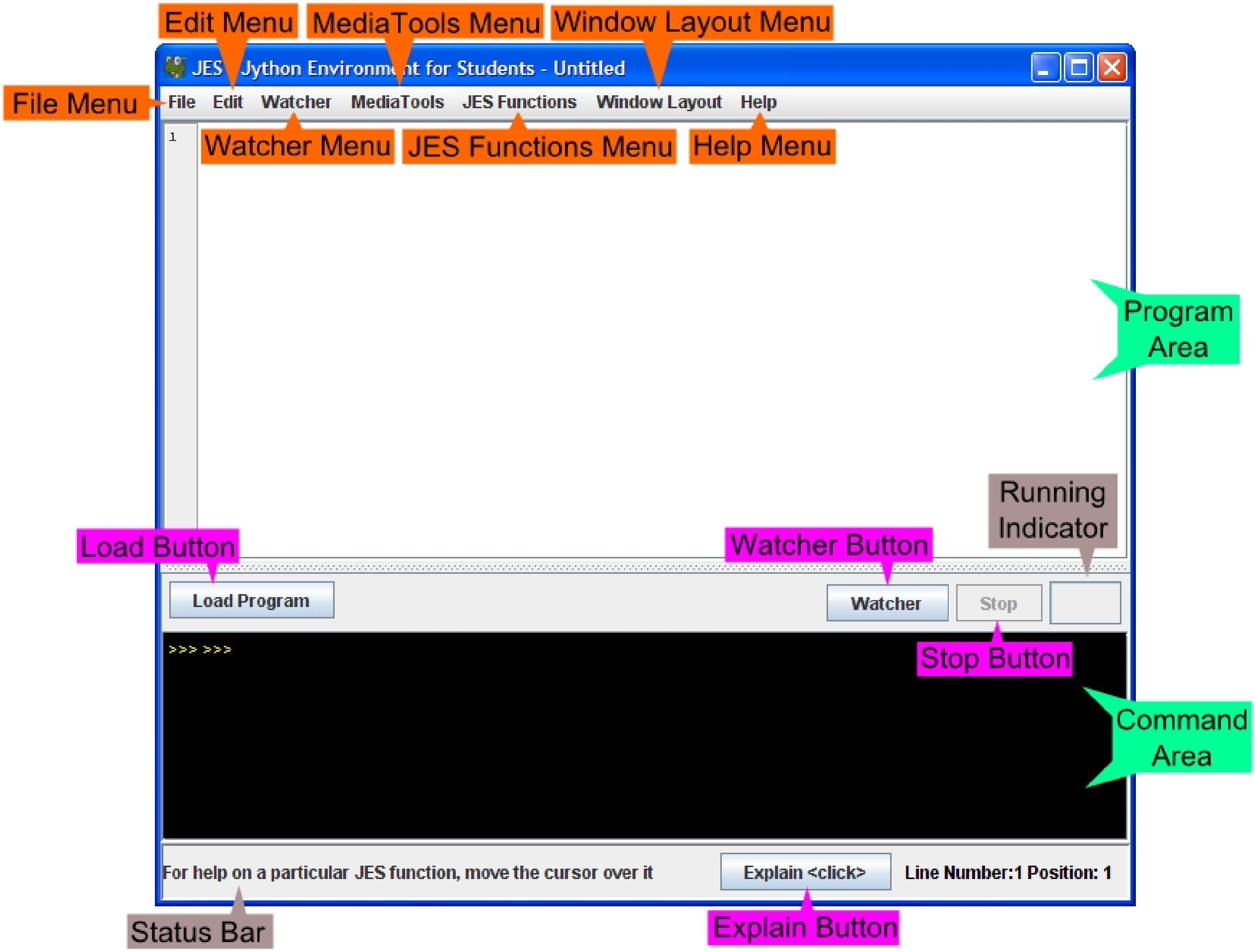
Jython & Python

- Jython, successor of JPython, is an implementation of the Python programming language written in Java.
- Python is a general-purpose high-level programming language.
- Non-Programmer's Tutorial for Python: http://en.wikibooks.org/wiki/Non-Programmer%27s_Tutorial_for_Python

Python: 1991

Jython: 1997

JES Interface



```
>>> >>>
```

For help on a particular JES function, move the cursor over it

Line Number:1 Position: 1

JES Help

- Important sections:
  - Setting Up JES
  - Getting Started with JES
  - Programming in Jython

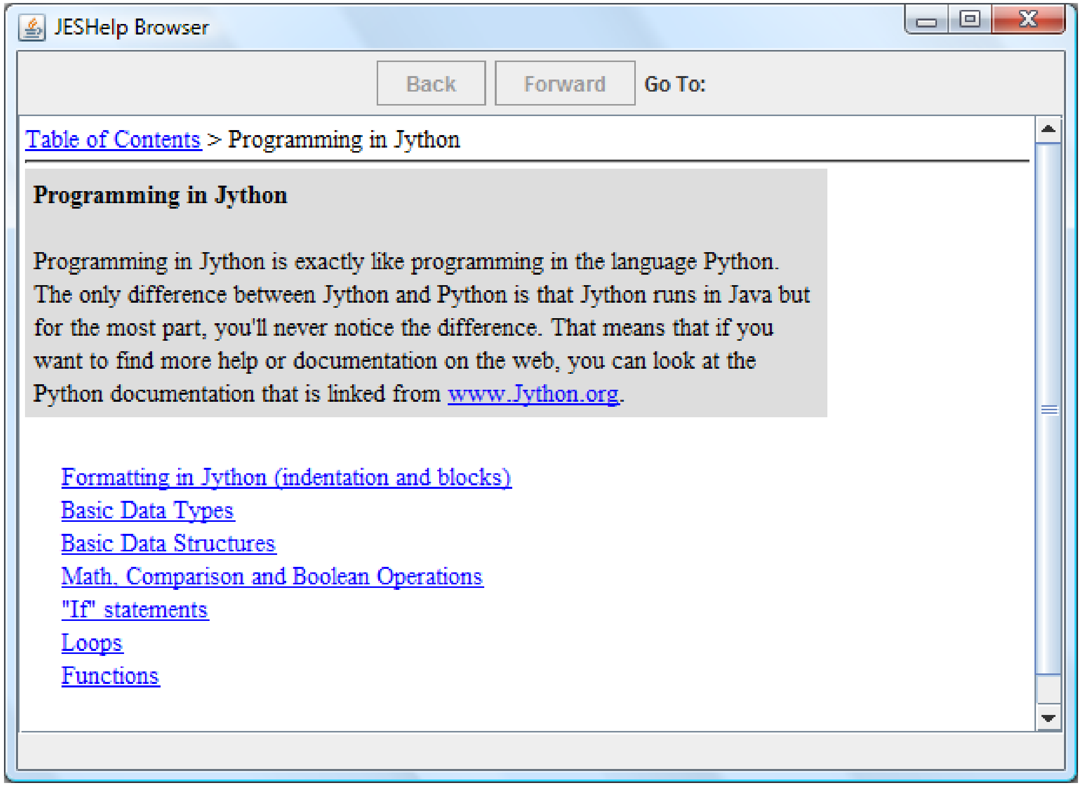


Table of Contents > Programming in Jython

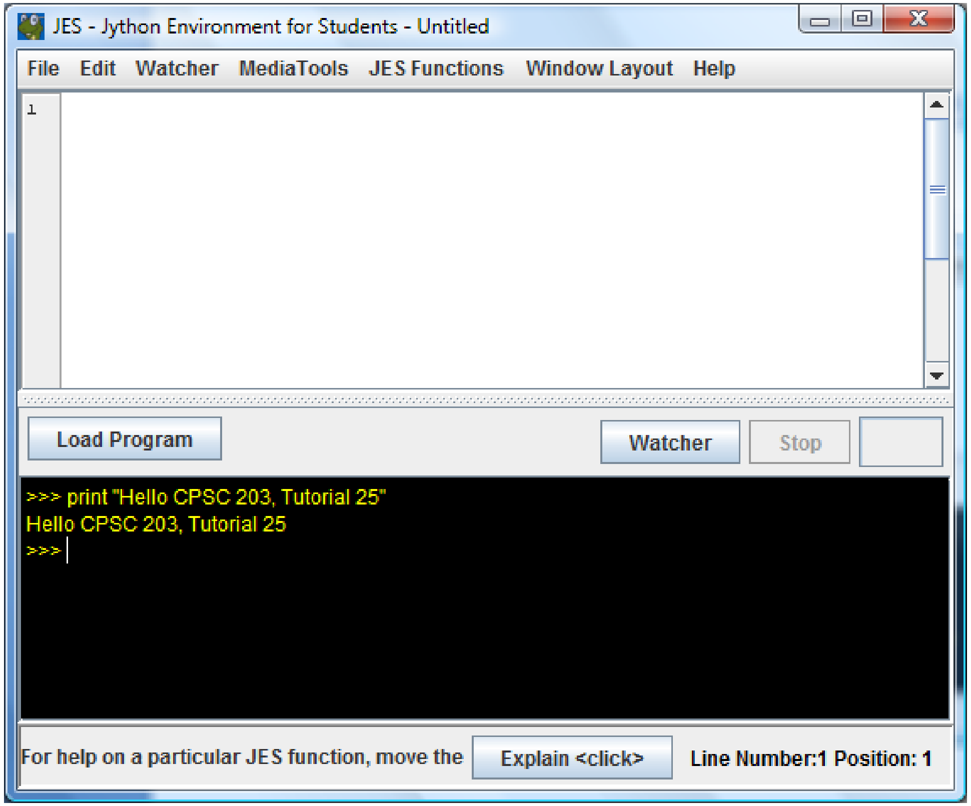
Programming in Jython

Programming in Jython is exactly like programming in the language Python. The only difference between Jython and Python is that Jython runs in Java but for the most part, you'll never notice the difference. That means that if you want to find more help or documentation on the web, you can look at the Python documentation that is linked from www.Jython.org.

- Formatting in Jython (indentation and blocks)
- Basic Data Types
- Basic Data Structures
- Math, Comparison and Boolean Operations
- "If" statements
- Loops
- Functions

Using Command Area

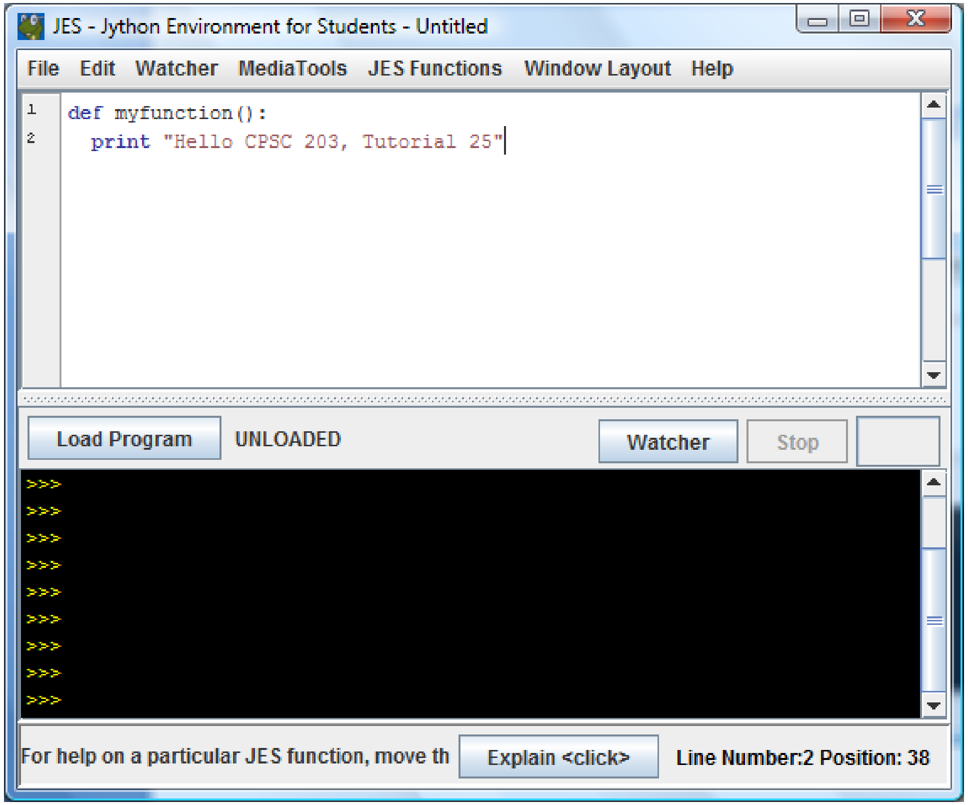
- Select command area (click)
- Type in:
  `print “Hello World”`
- Press Enter
- You will get:
  `Hello World`


JES - Jython Environment for Students - Untitled
File
Edit
Watcher
MediaTools
JES Functions
Window Layout
Help
Load Program
Watcher
Stop
For help on a particular JES function, move the
Explain <click>
Line Number:1 Position: 1

```
>>> print "Hello CPSC 203, Tutorial 25"
Hello CPSC 203, Tutorial 25
>>>
```

Using Program Area

- Select program area (click)
- Type in:
  `def function()`
- Press Enter
- Press Tab
- Type in:
  `print “Hello World”`



```
def myfunction():
  print "Hello CPSC 203, Tutorial 25"
```

UNLOADED

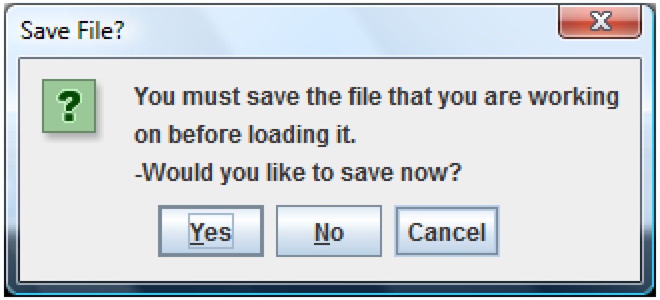
```
>>>
>>>
>>>
>>>
>>>
>>>
>>>
>>>
>>>
```

For help on a particular JES function, move th

Line Number:2 Position: 38

Running a Program (1)

- Click on Load button
- You will get the Save File dialog box



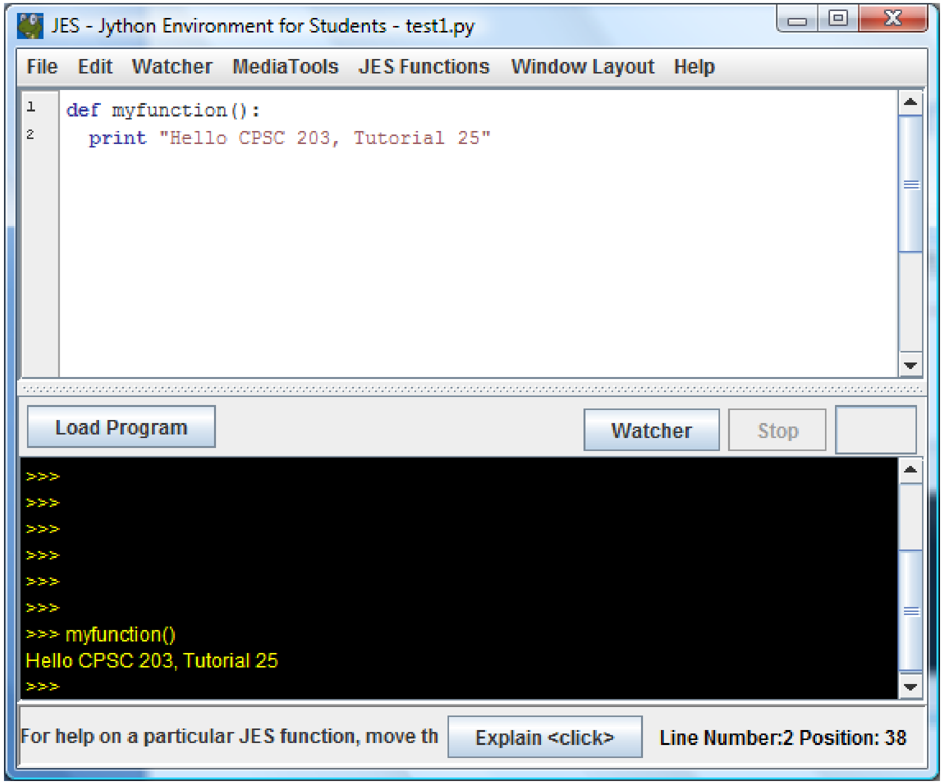
Save File?

You must save the file that you are working on before loading it.
-Would you like to save now?

- Click OK
- Give your program file a name and save it

Running a Program (2)

- Select command area
- Type in the function name followed by ()
- Press Enter



```
def myfunction():
  print "Hello CPSC 203, Tutorial 25"
```

```
>>>
>>>
>>>
>>>
>>>
>>>
>>> myfunction()
Hello CPSC 203, Tutorial 25
>>>
```

For help on a particular JES function, move th

Line Number:2 Position: 38

Arithmetic Expressions (1)

- JES supports several mathematical operations like addition, subtraction, multiplication, and division.

```
print 5 * 10
print 3 / 2
print 3.0 / 2
print 10 + 5
print 32 % 3
print 5 % 2
print 3 - 1
```

Arithmetic Expressions (2)

- Parentheses can also be used to indicated the order in which operations should be carried out.

```
print 5+3/2+7*2
print ((5+3)/2)+(7*2)
print 5+(3/2)+(7*2)
print (5+3)/((2+7)*2)
```

Strings

- In Jython a bit of text in (single or double) quotes is called a String.
- You can add two strings together (concatenation) using the “+” sign.

```
print ‘Hello’
print "Hello"+"World"
print "Mr."+" "+"Michael"+" "+"Reed"
```

Variables

- Variables are locations in memory where a computer program stores values.

```
x=10
y=5
z=x+y
str=“Hello World”
a=“Hello”
b=“Wolrd”
c=a+b
print str
print str, z
```

Variable Naming Convention

- Name of a Jython variable can consist of letters, numbers, and underline.
- A Jython variable name should always start with a letter.

```
cost=100
tax2=0.02
monthly_salary=5280
```

Basic Data Types

- Variables have data types.
- The type of a variable is determined by the value it stores.
- There are four basic data types:
  - Integer
  - Float
  - String
  - Boolean

Functions (1)

- Jython program statements must be grouped together into a function.
- A Jython program must consist of at least one function.

```
def function-name(zero or more arguments):
    first statement
    second statement
    etc …
```

Functions (2)

- “:” signifies the end of function header and the start of function body.
- All statements inside a function body must be indented.
- Once a function is called (=invoked), the statements in its body start being executed sequentially. When the last statement is executed the function returns (=exits).

Comments

- In-line comments can be used to document (explain) your code.
- For example, comments can be used to explain the logic of the program.

```
# author: Jalal Kawash
# date: April 2009
# This is just an example of the use of comments
```

Keyboard Input

- To collect input from user (by typing something on the keyboard) the built-in function:

```
raw_input(‘type in some message here’)
```

```
x=raw_input(‘Enter some value for x’)
print x
```

Type Conversion

- Function raw_input() always returns string values. To convert user input to type Integer or Float use functions **int()** or **float()** respectively.

```
str1=‘123’
str2=‘10.38’
x=int(str1)
y=float(str2)
a=int(raw_input(‘How old are you?’))
b=float(raw_input(‘What is the tax rate?’))
```