



CPSC203: WEEK-1 LAB-1 PROBLEM SOLVING

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COURSE WEBSITE

[http://wiki.ucalgary.ca/page/
Courses/Computer_Science/
CPSC_203/CPSC_203_Template](http://wiki.ucalgary.ca/page/Courses/Computer_Science/CPSC_203/CPSC_203_Template)



PROBLEM SOLVING USING ALGORITHMS

- ALGORITHM:

An algorithm is a description of a procedure which terminates with a result. Simple algorithms can be implemented within a function.

For instance, the factorial of a number x is x multiplied by $x-1$ multiplied by $x-2$ and so on until it is multiplied by 1

- The popular way to implement an algorithm is to use a computer program.
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THE CONCEPT OF PROGRAMMING

- A programming language is an artificial language designed to express computations that can be performed by a machine, particularly a computer. Programming languages can be used to create programs that control the behavior of a machine, to express algorithms precisely, or as a mode of human communication.
- A programming language's surface form is known as its syntax. The syntax of a language describes the possible combinations of symbols that form a syntactically correct program.



THE CONCEPT OF PROGRAMMING

- Different types of Programming languages:
 - Procedural Programming language
 - Structured Programming Language
 - Object Oriented Programming Language
 - General Assembly Language
 - Assembly language for Microprocessor/Microcontrollers.



INTRODUCTION TO JES

- JES is a tool for teaching introductory programming, and we are going to use it to do some fun stuff with graphics.
- JES- Stands for Jython Environment for Students.
- Jython is an implementation of the python language written in the java programming language. So the real name of the programming language we are using is **python**.



INTRODUCTION TO JES

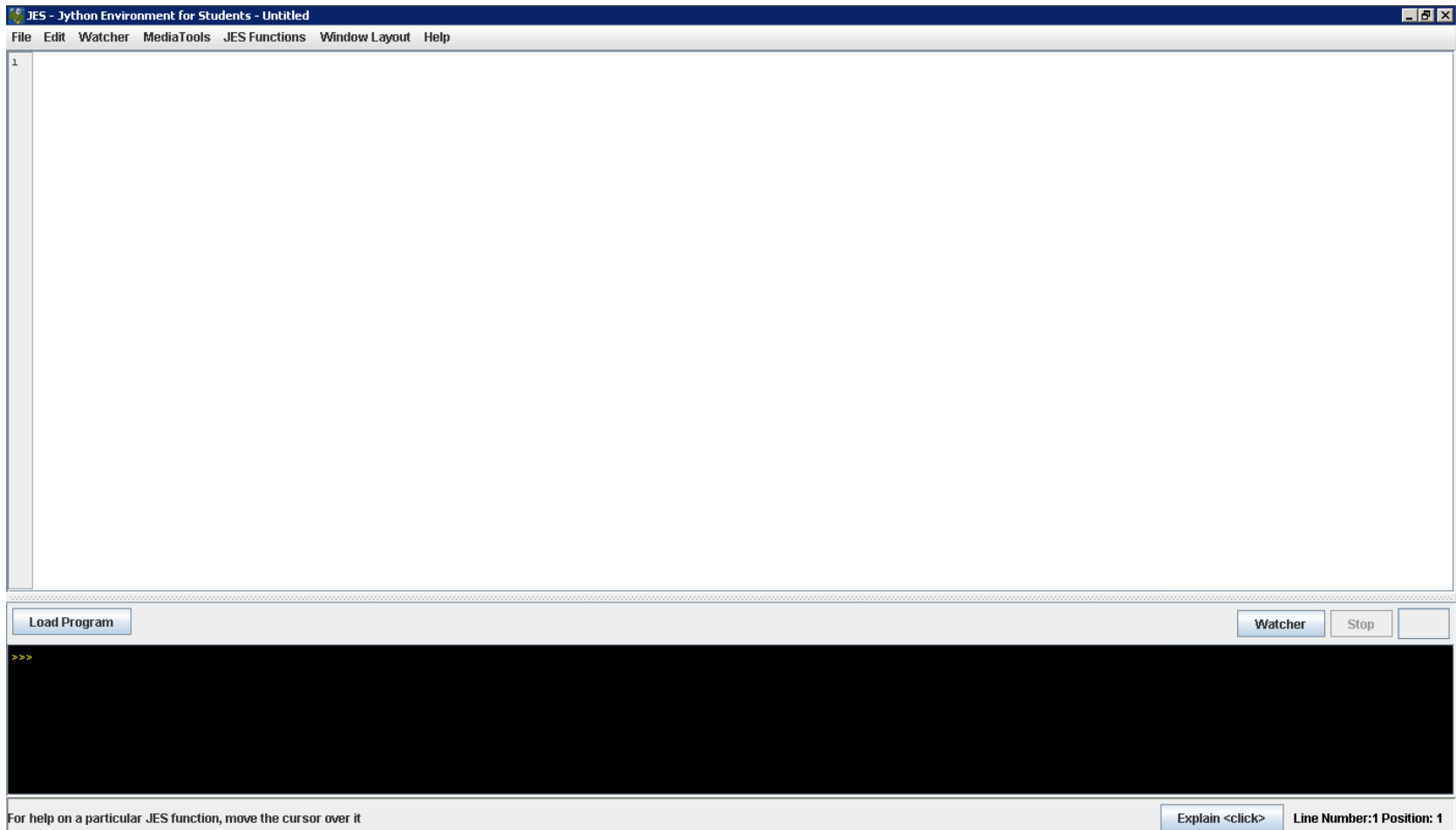
- Steps to install JES on windows:
- First install the latest version of Java SDK (<http://java.sun.com/javase/downloads/index.jsp>) . Right now the latest version is JDK 6 Update 16.
- Next download and install the JES tool from the following website:

(http://www.cc.gatech.edu/classes/AY2006/cs1315_summer/software.html)



USING THE JES APPLICATION

- First open the JES application it should look something like the figure below:



USING THE JES APPLICATION

- JES has two main ways of writing code (we call instructions for the computer “source code” or just “code” for short). If you are just trying stuff out, trying to see what things do, you can use the interactive window. The interactive window is the black box at the bottom of the JES window.
- If you are writing code that you want to keep, then you want to write it in the upper window

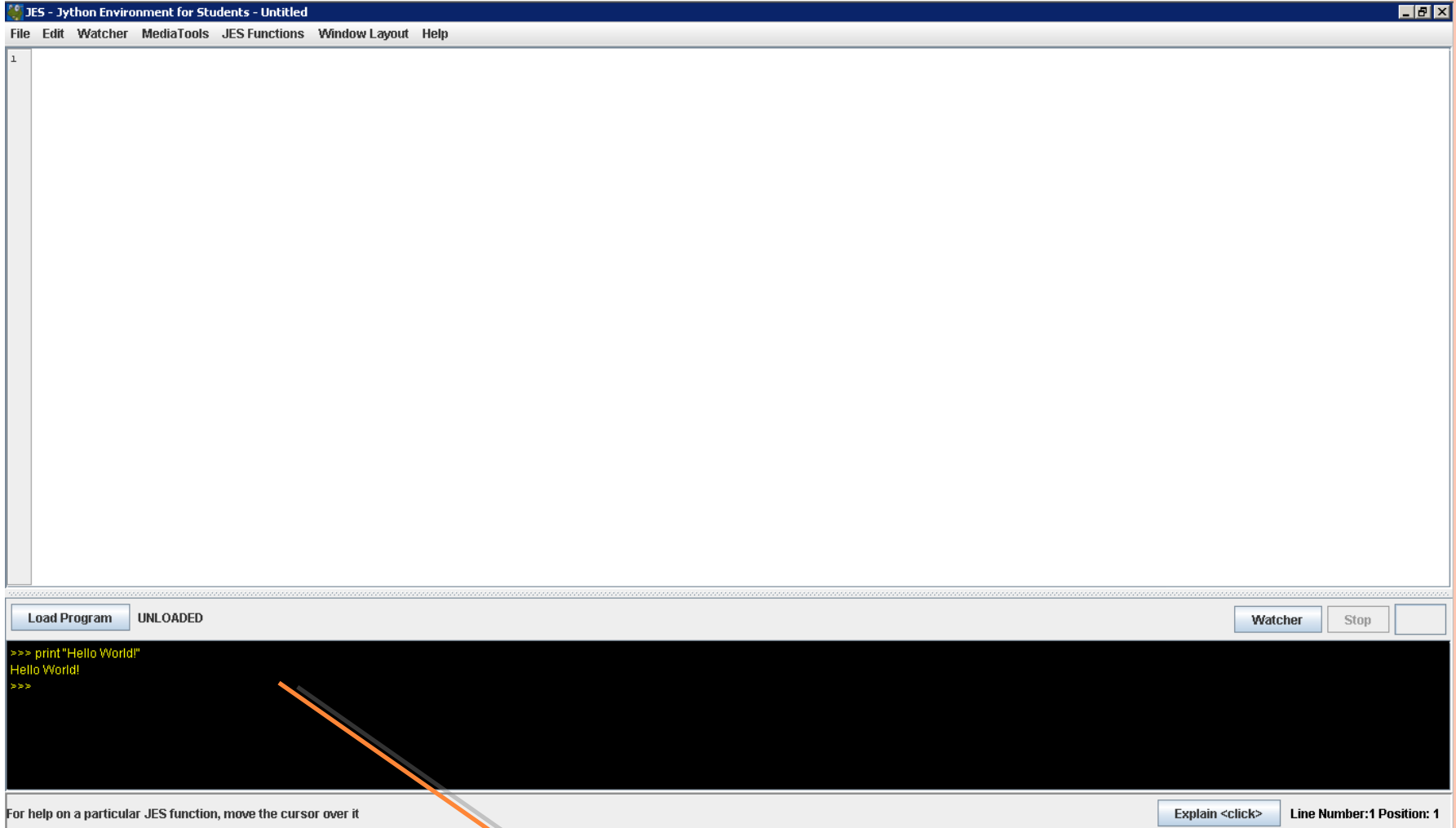


USING THE JES APPLICATION

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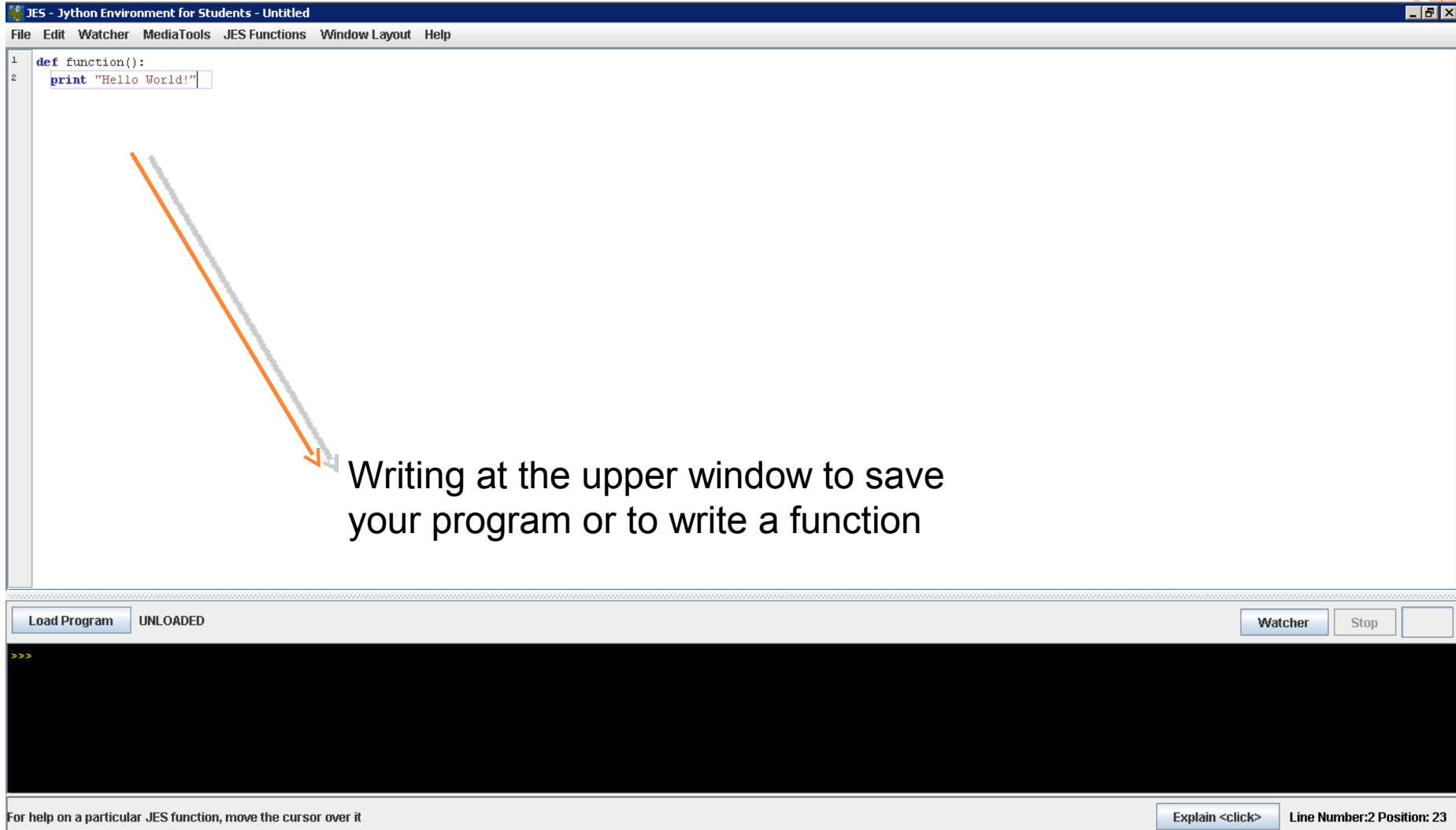
USING THE JES APPLICATION



The screenshot displays the JES application window titled "JES - Jython Environment for Students - Untitled". The menu bar includes "File", "Edit", "Watcher", "MediaTools", "JES Functions", "Window Layout", and "Help". The main area is a code editor with a single line of code: "1". Below the editor is a status bar with "Load Program" and "UNLOADED" buttons. To the right are "Watcher" and "Stop" buttons. The bottom section is a black interactive window containing the following text: ">>> print('Hello World!')", "Hello World!", and ">>>". An orange arrow points from the text "Writing at the interactive window" to the interactive window. At the bottom left, there is a help message: "For help on a particular JES function, move the cursor over it". At the bottom right, there is an "Explain <click>" button and a status indicator: "Line Number:1 Position: 1".

Writing at the interactive window

USING THE JES APPLICATION



The screenshot displays the JES application window titled "JES - Jython Environment for Students - Untitled". The menu bar includes "File", "Edit", "Watcher", "MediaTools", "JES Functions", "Window Layout", and "Help". The main workspace is divided into two sections. The upper section is a code editor containing the following Python code:

```
1 def function():  
2   print "Hello World!"
```

An orange arrow points from the end of the second line of code to the text: "Writing at the upper window to save your program or to write a function".

The lower section is a console window with a black background and a yellow prompt ">>>". Above the console, there are several buttons: "Load Program" (with "UNLOADED" text next to it), "Watcher", and "Stop".

At the bottom of the window, there is a status bar with the text "For help on a particular JES function, move the cursor over it" on the left, and "Explain <click>" and "Line Number:2 Position: 23" on the right.

USING THE JES APPLICATION

The upper window lets you store your code to a file, or load it from a file later on. A good rule of thumb is that if you are writing a function you should write it in this upper window. Otherwise, just use the interactive window. If you decide to save your code to a file, write your code in the upper window, and save it to a file. When you want to run that file, you need to click on "Load Program" first (at the bottom of the upper window), and then run your program



USING THE JES APPLICATION

The First Program:

Write the following in the interactive window and watch the output:

```
print “Hello World!”
```

(this is the syntax for printing any statement in python)

- Alright you just wrote your very first program in jython!



VARIABLES AND ARITHMETIC

- **Variables** are also used in programming to transfer information from one part of the program to another - for example to provide a place to lay out a document before printing it - as well as being a place to store status information that might be needed by all parts of that program.

- Examples-

- $X=2+5$

variable

- $Y=X*7$

- print Y



VARIABLES AND ARITHMETIC

We can print a combined line of text and numbers, like so:

- `X=7`
- `Y=8`
- `print "Sum is", X+Y`

JES supports several mathematical operations like addition, subtraction, multiplication, and division. Parentheses can also be used to indicate the order in which operations should be carried out.

Combining two strings in the output:

- `x="hello"+"world"`
- `print x`



SOME QUOTES ABOUT PROGRAMMING

- “Don’t worry if it doesn’t work right. If everything did, you’d be out of a job.” (Mosher’s Law of Software Engineering)
- “First, solve the problem. Then, write the code.”(John Johnson)
- “There are only two kinds of programming languages: those people always bitch about and those nobody uses.”(Bjarne Stroustrup)

