CPSC 203
Problem Solving

Week 1 Lab2

Introduction

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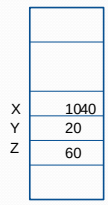
Motivation

- Introduce programming, using the Jython programming language
- Programs will be written using the Jython Environment for Students (JES)
- By the end of this tutorial, you should be familiar with
  - using variables
  - using constants

What are variables?

- Locations in memory reserved with a specific name
  - X=10
- The content of the location can be changed
  - X=40
- We are make operations using variable names
  - Y=20
  - Z=X+Y



Text variables

- Variables can contain text
  - myName="Dina"
  - myFatherName="Adel"
  - myFullName=myName+myFatherName ???
    - myFullName will equal DinaAdel
    - myFullName=myName+" " +myFatherName

Exercise

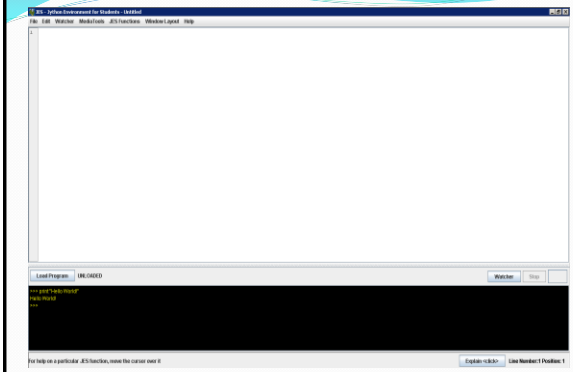
- Using a paper or MS Word:
  1. Define the radius of the circle (r) as 10.5
  2. Define pi as 3.14
  3. Define the area of the circle (A) as pi*r*r
  4. Define the perimeter of the circle (P) as 2*pi*r
- If this is a program, you can change r to several values and obtain A and P (This is the same way your calculator defines multiplication as a program of multiple additions)
- Also, you can change the accuracy of Pi

Data Types

- int : +ve or –ve natural number
  - X=10
- Float: +ve or –ve decimal number
  - X=10.5
- Text
  - X="Hello"

What is Jython?

- Jython is an implementation of the python language written in the java programming language
- Two ways of writing codes:
  - White box (for codes you want to save in files)
  - Black box (interactive window) for ad-hoc code



Exercise

- In the interactive window (black box), write:
  - print "Hello World!“
  - print "Hello” + “ python”
  - Print X → an error will be generated because you didn’t define X
  - X= 10
  - Print X
- Notes:
  - You must add a space before the second word
  - You can get the last typed statement by using upper arrow
  - You should use double quotes before and after texts

Functions

- Functions can be written only in white box

```
def funcName():
    print “Hello”
    x=10
    print 2*x
```

- To execute a function:
  1. Save it first with to a file
  2. Press load button
  3. In the black box write: funcName()

Exercise

- Write a function that
  1. Prints your name and your ID; e.g.
     1. Dina Said: 1300999
  2. Define x=10, y=20, print
     1. x+y
     2. x*y
     3. x/y
     4. x-y

Your output should look like

```
Dina Said: 1348989
30
200
0.5
-10
```

Note: x/y=0 because they are both integers. If you make x=10.0 or y=20.0, they would be floats and x/y=0.5

Comments

- Comments are very important for documentation
- They are not being executed. This is just for your understanding
- To write a comment:
  - Use # in the beginning of the statement
  - e.g.
    - #This program was created by Dina Said as an example for CPSC771, week1-lab1 of problem solving on March 4th, 2009

Exercise

- Add a comment to your previous program to explain who created it, when, and for which purpose

Exercise

- Make a function called myCircle() that:
  1. Define r as 10.5
  2. Define pi as 3.14
  3. Calculate the area of the circle (A) as pi*r*r
  4. Calculate the perimeter of the circle (P) as 2*pi*r
  5. Print the following message

     "For a circle with radius …, area=… and perimeter=…."

     You should replaced the dots before with the radius, calculated area, and calculated perimeter
  6. Change r to be 20.5 and re-execute the function