Introduction to Programming (CS102) 2006/2007 — Practical 1

The main purpose of this first practical is to explore the programming environment, which allows you to develop and run Python programs. You will receive detailed instructions during the practical.

Work through the following sections. Seek assistance whenever needed. At http://schmidt.nuigalway.ie/cs102/python files with Python programs can be downloaded. Present your results, so that a record of your achievements can be kept.

1. True or False?

1. Computer Science is the study of computers.
2. The CPU is the "brain" of the computer.
3. Secondary memory is also known as RAM.
4. The syntax of a language is its meaning, and the semantics is its form.
5. A function definition is a sequence of statements that defines a new command.
6. A programming environment is a place where programmers work.
7. A variable is used to give a name to a value so it can be referred to in other places.
8. A loop is used to skip over a section of a program.

2. Multiple Choice.

1. What is the fundamental question of computer science?
   (a) How fast can a computer compute?
   (b) What can be computed?
   (c) What is the most efficent programming language?
   (d) How much money can a programmer make?
2. An algorithm is like a
   (a) newspaper, (b) venus flytrap, (c) drum, (d) recipe.
3. A computer language designed to be used and understood by human readers is called a
   (a) natural language,
   (b) high-level language,
   (c) machine language,
   (d) fetch-execute language.
4. A statement is
   (a) a translation of machine language,
   (b) a complete computer command,
   (c) a precise description of a problem,
   (d) a section of an algorithm.

5. One difference between a compiler and an interpreter is
   (a) a compiler is a program,
   (b) a compiler translates high-level language into machine language,
   (c) a compiler is no longer neede after a program is translated,
   (d) a compiler processes source code.
6. Which of the following is not true of comments?
   (a) They make a program more efficient.
   (b) They are intended for human readers.
   (c) They are ignored by Python.
   (d) In Python, they begin with a hash symbol (#).

3. Programming Exercises.

1. Start up an interactive Python session and carefully type in each of the following commands. Write down the results you see.
   (a) `print "Hello, world!"`
   (b) `print "Hello", "world!"`
   (c) `print 3`
   (d) `print 3.0`
   (e) `print 2 + 3`
   (f) `print 2.0 + 3.0`
   (g) `print "2" + "3"`
   (h) `print "2 + 3", 2 + 3`
   (i) `print 2 * 3`
   (j) `print 2 ** 3`
   (k) `print 2 / 3`
   (l) `print 2.0 / 3.0`
2. Enter and run the Chaos program from the file `chaos.py`. Try it out with various values of output to see that it works as described.

For each of the following exercises start with a fresh copy of `chaos.py`.

3. Modify the Chaos program so that it uses 2.0 instead of 3.9 as the multiplier in the logistic function. (The concerned line of code should then look like

   ```
   x = 2.0 * x * (1 - x)
   ```

   after the modification.) Run the program for various input values and compare the results to those obtained from the original program. Write a short paragraph describing any differences that you notice in the behavior of the two versions.
4. Modify the Chaos program so that it prints out 20 values instead of 10.
5. Modify the Chaos program so that the number of values to print is determined by the user. You will have to add a line like

   ```
   n = input("How many numbers should be printed? ")
   ```

   near the top of the program, in order to get another value from the user.