ICS 31, Summer Session 10-wk, 2016

Lab 1

Do the following exercises. Save all of your work in a file called `lab1.py`. In your Python file, be sure to include a comment of the form **`# Problem ?`** at the beginning of the solution to each problem, where the ? is replaced with the problem number.

Problem 1 Write Python expressions that correspond to each of the following statements:

a. The sum of the five even integers from 2 to 10.
b. The average of this group of test scores: 75%, 83.5%, 61%, 43%
c. 2 to the 10th power
d. A moving anteater has a mass of 50 kg and a velocity (speed) of 15 meters per second. Compute its kinetic energy using this formula: 1/2 times the mass times the velocity squared.

Problem 2 We're designing a game where players can create castle defenses against invaders. Each side of the castle consists of a sequence of wall parts and cannons: We represent a six-segment side with no cannons as `'wwwwww'`; a five-segment side with one cannon in the middle would be `'wwcww'`.

Define these two variables:

```
wall = 'w'
cannon = 'c'
```

Using the variables `wall` and `cannon`, the string operators + and *, and parentheses, write string expressions that evaluate to:

a. `'wc'`
b. `'wcw'`
c. `'wwwcwww'`
d. `'wccwccwccwcc'`
e. `'wwwcwwwcwwwcwwwcw'`
f. `'wwwwcwwwwcwwwwcwwwwcwwww'`

Problem 3 Scores on a quiz range from 0 to 5. In the Python Shell, evaluate the following assignment statement (which represents the quiz scores of all the students in a class):

```
>>> test_scores = '4325220523455023'
```

Using the variable `test_scores` and the indexing operators, write four separate expressions whose values are each of the following: quiz score for the 1st student, the 5th student, the 10th student, and the 16th student. Remember zero-based indexing.

Problem 4 Evaluate the following assignment statement:

```
>>> s = 'anteater'
```

For each of the following, write a boolean expression that represents the English statement:

a. The first character of string s is `'a'`
b. The last character of string s is `'r'`
c. The fourth character of string s is `'x'`
d. The first three characters of string s match the string `'zot'`

Problem 5 Write Python assignment statements that correspond to each of the following:

a. Assign 3.14159 to variable `pi`
b. Assign the values `'Toyota'`, `'Camry'`, and `2014` to the variables `make`, `model`, and `year`
c. Assign a list containing strings `'Computer Science'`, `'Informatics'`, and `'Computer Game Science'` to the variable `ICS_majors`
d. Assign the variable `a` to be the average of the odd numbers from 3 to 9.

Problem 6 Write boolean expressions corresponding to each of the following statements:

a. 20 plus 35 is greater than 2 to the power of 4
b. The string `'hello'` is not equivalent to the string `'goodbye'`
c. The remainder when 10 is divided by 3 is less or equal to 1.
d. The list `['apple', 'orange', 'banana', 'mango']` contains 5 elements.
e. The number 63 is an even number.

Problem 7 Execute the following assignment statement:

```
>>> s = 'abcdefghijklmnopqrstuvwxyz'
```

Using only string concatenation and the indexing operator on the string `s`, write Python expressions that result in the following:

a. `'dog'`
b. `'tv'`
c. `'ics'`
d. `'uci'`

Problem 8 Given two points represented as x1,y1,x2,y2 write Python code to print the distance between them. You may find the math.sqrt function useful. Be sure to define x1, y1, x2, and y2 as positive integers at the beginning of your code.

Problem 9 Given two points represented as x1,y1,x2,y2 write Python code to print the slope of the line between them. Be sure to define x1, y1, x2, and y2 as positive integers at the beginning of your code.