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**CMP 321 - Programming languages Laboratory**

**Lab 1 – Introduction to Python**

**Objectives**

* Get familiar with Python scripts and IDLE
* Define variables of different types
* Employ conditional and loop statements
* Use character strings and slicing

**Please explore and make use of Python features where possible. Code that does not follow this note will be penalized.**

**Exercise 1**

Write a Python script that:

* Defines variables a, b, and c which are the coefficients of the equation ax2 + bx + c, with values 5, 6, and 1, respectively.
* Calculates the discriminant: d = b2 – 4ac.
* Prints the two solutions of the above equation: and.

**Exercise 2**

Write a Python script that:

* Prints the sum of odd and even numbers between 1 and 1000 using a single ‘for’ loop (and ‘if/else’ statement).
* Prints the same using two separate loops, one for odd numbers and one for even numbers (so that no conditional statement is needed).

**Exercise 3**

Write a Python script that:

* Defines a list containing student grades: 40, 86.5 , 67.8, 55, 43.7, 85.
* Adds to the list the following two grades: 96 and 71.
* Sorts the list and prints it.
* Extract all fail grades (59 and below) from the list and insert them into a new list.
* Prints the fail grades list, one grade per line.

**Exercise 4**

Write a Python script that defines a list of numbers (50, 12, 27, 33, 61, 49, 28), applies Bubble Sort to it, and prints the result. To do so, you must convert the following C++ code to *proper* Python code, using the language’s features as much as possible. (For instance, note that there is no need for the temp variable in Python!)

#include <iostream>

using namespace std;

int main()

{

int values[] = {50, 12, 27, 33, 61, 49, 28};

int size=7;

int temp;

for (int i=1; i<size; ++i)

{

for (int j=0; j<size-i; ++j)

if (values[j] > values[j+1])

{

temp = values[j];

values[j] = values[j+1];

values[j+1] = temp;

}

}

cout << "Array after bubble sort:";

for (int i=0; i<size; ++i)

cout << " " << values[i];

}

**Exercise 5**

Write a Python script that defines the string s = "Welcome to Python" and performs the following, where each operation must consist of one line of Python code using *slices* only:

* Prints all characters from the 6th to the 10th character.
* Prints all characters after the 4th character.
* Prints the last five characters (without assuming the size).
* Prints all characters at even indices
* Prints the string in reverse.
* Checks and prints whether a given string s is a palindrome.