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Web Programming and Python (AI104)

Assignment – 1

1. Create the following lists using a for loop.
   (a) A list consisting of the integers 0 through 49
   (b) A list containing the squares of the integers 1 through 50.
   (c) The list ['a','bb','ccc','dddd', ...] that ends with 26 copies of the letter z.

2. Write a program that generates 100 random integers that are either 0 or 1. Then find the longest run of zeros, the largest number of zeros in a row. For instance, the longest run of zeros in [1,0,1,1,0,0,0,0,1,0,0] is 4.

3. Write a program that asks the user to enter a length in feet. The program should then give the user the option to convert from feet into inches, yards, miles, millimeters, centimeters, meters, or kilometers. Say if the user enters a 1, then the program converts to inches, if they enter a 2, then the program converts to yards, etc. While this can be done with if statements, it is much shorter with lists and it is also easier to add new conversions if you use lists.

4. Take numbers from 1 to 10000. Create equivalence classes for modulo 5 on this set of numbers. Check the validity of your equivalence classes. [Hint: the union of all equivalence classes should be the original set/list.]

5. You are a student in a class of 10. Your class teacher assigns you a task of entering the names of all the students in the class. You finally want to display the names given the condition that the maximum allowed characters in a name is 15. As a fun task, reverse the names and display them. [Hint: Slicing works when you are selecting maximum characters]

6. Consider a 3-D co-ordinate space. Input 10 3-D points. Find the nearest neighbour for each of the points in your 3-D space and store them in a list. The final output is a list with each consisting of a point and its nearest neighbour. [Hint: Use distance between two points formula]