**Lab Manual for**

**AI – 2002 Artificial Intelligence Lab**

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Lab # 01

Semester: Spring 2024

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Description automatically generated

Department of AI & DS

National University of Computer and Emerging Sciences

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Carefully read the following instructions

1. Make a Jupyter Notebook file (.ipynb) with the convention “ROLLNO\_NAME\_SECTION\_LABNO” (E.g., **22I-1234\_XYZ\_BAI-A\_01**)
2. Write a code for each of the following tasks one after the other, in the same order.
3. At the end, when you are done with your lab tasks, make your submission on Google Classroom.

(python basic, Lists, Tuples, Dictionaries, Sets, NumPy)

**Task 1 (a):**

Write a program to find circumference of a circle. The program should take radius input from user and display the circumference = 2πr (where PI is a constant value of 3.1415 and r is radius)

**Note: Declare PI as constant**

**Task 1 (b):**

A university does not allow its student to sit in the exam if his/her attendance is less than 85% in any course/lab.

Write a python program to ask a student about total number of classes scheduled by instructor during the whole semester and total number of classes he/she attended during the whole semester.

Pass both values to a function named isAllowed() which should calculate and display the percentage of his/her attendance.

Task 2:

Create a list of areas that contains the areas of the bedroom, hallway, bathroom, kitchen, and living room of a house with the following values respectfuly.

**112.0, 113.5, 189.5, 789.0 , 230.2.**

Make a clone of the areas list and name it as float\_area now remove all values except for float values in the float\_area list. Do the same for string values as well and name it as str\_area. Now you will have three lists.

**Areas**

**Float\_area**

**Str\_area**

1. Print all elements of lists using slicing
2. Print the area of bedroom along its name from Areas list using slicing

Task 3:

Consider that you have won a lottery and you want to extend your house. Add

another list of the pool\_area with the area allotted as ‘112.7, 177.9’. Along with this add a list garage with an area of 112.0. The final list will look something like this

**[‘bed’, 112.0 , ‘hall’, 113.5, ‘bath’, 189.5, ‘kit’,789.0, ‘liv’, 230.0 , [‘pool’,112.7,117.9],[‘grg’,112.0]].**

Write a Python program to deep flattens the above list.Following is an example.

Original list elements:

[1, [2], [[3], [4], 5], 6]

Deep flatten the said list:

[1, 2, 3, 4, 5, 6]

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[[[1, 2, 3], [4, 5]], 6]

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Task 4:

Write a Python program to extract values from a given dictionaries and create a list of lists from those values.

**Original Dictionary**:

[{'student\_id': 1, 'name': 'Jean Castro', 'class': 'V'}, {'student\_id': 2, 'name': 'Lula Powell', 'class': 'V'}, {'student\_id': 3, 'name': 'Brian Howell', 'class': 'VI'}, {'student\_id': 4, 'name': 'Lynne Foster', 'class': 'VI'}, {'student\_id': 5, 'name': 'Zachary Simon', 'class': 'VII'}]

**Extract values from the said dictionarie and create a list of lists using those values**:

[[1, 'Jean Castro', 'V'], [2, 'Lula Powell', 'V'], [3, 'Brian Howell', 'VI'], [4, 'Lynne Foster', 'VI'], [5, 'Zachary Simon', 'VII']]

[[1, 'Jean Castro'], [2, 'Lula Powell'], [3, 'Brian Howell'], [4, 'Lynne Foster'], [5, 'Zachary Simon']]

[['Jean Castro', 'V'], ['Lula Powell', 'V'], ['Brian Howell', 'VI'], ['Lynne Foster', 'VI'], ['Zachary Simon', 'VII']]

And vice versa

Task 5:

Let’s suppose that you have a list of lists. This basically is a list of people and their favorite food items. Write a python function that returns the indices of people whose list of favorite food items is not a subset of any other list of favorites food items.Keep in mind that ou have to return the indices in increasing order. Following is the given list of lists

Fav\_food\_items = [[‘pizza’,’burger’,’hotdogs’] ,

[‘pasta’,’hotdogs’],[‘pizza’],[‘burger’,’hotdogs’],[‘rice’ ,’pasta’] ,[‘pasta’]]

Output : [0,4]

Task 6:

Builds a ten-element tuple of random numbers and then sort the tupple in increasing order without using built-in function. Rember the result should be a tupple.

Numpy

Task 7:

Write a NumPy program to create an array of 10 zeros, 10 ones, 10 fives.

Task 8:

Write a NumPy program to create a 3x4 matrix filled with values ​​from 10 to 21.

Class

Create a class Campus with name, location, studentCount and facultyCount as attributes.

1. Create a function names "warning" to generate a warning if count of students are more than 5 times of the count of faculty.
2. Create a function to display all the object/instance values.