CS 115 - Introduction to Programming in Python

Lab Guide 06

Lab Objectives: 2D Lists / Classes

1. Complete the following using 2D lists:
   a. Write a function `valuesBefore()` that takes a two-dimensional list of integers and an int search value as parameters. The function should search each column in the two-dimensional list and count the number of values that come before the first occurrence of the search value in each column. If the search value is not found in a column, the count should be -1. Store the counts in a one-dimensional list. The function should return the array which stores the counts.

   For example, if two D array is as follows:

2	4	8	6
6	2	2	5
8	7	7	9
4	6	2	3
8	9	3	8

   searchValue = 8

   the function will return:

2	-1	0	4

   b. Write a program to initialize a two-dimensional list with integers and call the above function by passing the list and an integer value and display the result as shown in the sample run.

   Sample Run:

```
Enter the number to search: 8
There are 2 values before 8 in column 0
There is no 8 in column 1
There are 0 values before 8 in column 2
There are 4 values before 8 in column 3
```

2. Write a class called `Faculty` which represents a faculty member of a particular department in a university. The class will have the following attributes:

   - `name`: String (name of the faculty member)
   - `officeBuilding`: String (building name of a faculty's office)
   - `roomNo`: int (room number of a faculty's office)

   a) Your class should have an `init()` method that takes the values of all three attributes as parameters. The default values for amount and availableCount are 1 if not given.

   b) In addition, the class will have the following methods:

      - `get` method for `name` attribute and set methods for `officeBuilding` and `roomNO`.

      - `isMember(type)`: returns True if the faculty member is in the building whose type is given as a parameter, else returns False.

   c) In addition to the above methods, your class should define the following special methods:

      - `__str__` method which returns a string as follows:

      ```
      Faculty Name: Daly Pearson     Address: A103
      ```

      - `__repr__` method which returns a string as follows:

      ```
      (Faculty)     Daly Pearson     A103
      ```

      - `__lt__` method. A Faculty Member is less than the other one if his/her officeBuilding is less than (comes before alphabetically) the officeBuilding of the other Faculty Member passed as a parameter. If they have the same officeBuilding, the method will compare their Room Numbers.

2. Create an application that does the following:

   a. Write a function `readFaculty` which reads faculty info from **`faculties.txt`** and creates and returns a <u>list</u> of `Faculty` objects.

   b. Input building type (A, B and C) display all `Faculty` members whose offices are in the given building.

   c. Input a Faculty name, office building and room number and if there is a Faculty member with the given name in the list, update his/her office building and room number with the new input values, else add a new Faculty Member to the list.

   d. Sort the list and display the sorted list.

Sample Run 1:

```
Enter building name ('A','B','C'): B
Faculty Name:   Oscar Babcock   Address:   B202
Faculty Name:   Emerald Milton  Address:   B201
Faculty Name:   Mark Philips    Address:   B104

Enter name: Emerald Milton

Enter new building: C

Enter room no: 201
[(Faculty) Keara Cornell   A101, (Faculty)  Ava Eads   A102,
(Faculty)  Jerald Adam     A103, (Faculty)  Mark     Philips
B104, (Faculty)  Oscar Babcock   B202, (Faculty)  Daly
Pearson C101, (Faculty)    Gareth Robinson C102,  (Faculty)
Emerald Milton  C201]
```

Sample Run 2:

```
Enter building name ('A','B','C'): A
Faculty Name:   Jerald Adam     Address:   A103
Faculty Name:   Ava Eads   Address:   A102
Faculty Name:   Keara Cornell   Address:   A101

Enter name: Jane Block

Enter building: B

Enter room no: 102
[(Faculty) Keara Cornell   A101, (Faculty)  Ava Eads   A102,
(Faculty)  Jerald Adam     A103, (Faculty)  Jane Block B102,
(Faculty)  Mark Philips    B104, (Faculty)  Emerald   Milton
B201, (Faculty)  Oscar Babcock   B202, (Faculty)  Daly
Pearson    C101, (Faculty)  Gareth Robinson  C102]
```