

# Python Network & DB Programming

## InLab-8

---

### Submission Guidelines for assignment

---

1. In the file readme.txt in the team-name directory, which contains the contribution of each team member, roll number and references (cite where you get code/code snippets from).
2. Rename the directory team-name to actual team name instead of  
E.g. Coders
3. Compress the directory to <team\_name>.tar.gz  
e.g. coders.tar.gz
4. Submit one assignment per team. Please.
5. Since this InLab assignment contains bonus questions, we have already extended the deadline to 12 AM tonight, with the cut-off for late submission being 5AM tomorrow morning (5 more hours). There is no penalty whatsoever till 5 AM, but a big zero after that.

---

### Problem 1

---

Write a python program that recognizes those **ip-addresses** (ranging from '10.130.154.1' to '10.130.154.132' ) of machines currently connected to the network. Your program should save the addresses of the connected machines in a text file named '**working\_ip\_address.txt**' in the directory the program is run and the addresses of those machines that are not connected in a file named '**non\_working\_ip\_address.txt**'.

Use q1.py

(Hint:- Use **ping** from the **OS** module and try each address in the given range).

## Problem 2

Write a python program which makes use of **urllib** module to fetch the content of a webpage with the URL <https://www.cse.iitb.ac.in/page222?batch=MTech1> and prints the CSE username of a given student. (Use regular expression on the website content. You may **NOT use BeautifulSoup or other packages** here. Just the regular expression module in Python3.)

**Input:-** Valid student name in uppercase as an argument.

**Output:-** corresponding CSE username

**Example:-**

```
>python3 q2.py "DURGAM NIKHIL"
```

**nikhildurgam**

If the name given in the input is NOT found, print an error "Error: Name not found".

## Problem 3

Write a python program to create and manipulate a Database in Sqlite3. The program must take as input the absolute path to a file containing the data for this question. The DB you connect to must be called **employeeDB** (Note that you need to submit employeeDB.db file which will be created). The table you must create is to be named **employeeInfo** and must have the following columns:

Name(text)	ID(INT)	Salary(INT)	City(text)
------------	---------	-------------	------------

Make the connection to the DB, setting up the cursor and creating the table in the **\_\_init\_\_** method of a class called **Employee**. For testing use **employeeInfo.csv** available in the Data directory to populate the table in a method called **populate\_table**.

Finally, write two more methods to handle two queries specified below. The **Employee** class you write must have separate methods for each of the following operations:

- **\_\_init\_\_** : connect to the DB, set up the cursor and create the table
- **populate\_table**: populating that table using the given CSV file
- **print\_all** Executing and printing the result of a query that returns the entire contents of the **employeeInfo** table.

- **highest\_salary:** Executing and printing the result of the following query: find the name of the person having the highest salary. Assume that there is one highest salary.

You should call `print_all` and `highest_salary` from your programme, as to print the result to the output.

### Sample Execution:-

**python q3.py employeeInfo.csv**

`x1<tab>x2<tab>x3<tab>x4` // The `x1`, `x2`, `x3` and `x4` correspond to the 4 columns and there will be multiple such rows and `x1` has the highest salary.

This simply means that `hight_salary` (this should print the whole row containing the height salary) has to be executed first, then `print_all`.

=====

### BONUS QUESTIONS - C++ Challenge

=====

Do you want 10 extra marks?

Can you solve these two questions with no doubts asked?

It should be simple since all of you are well-versed with C++. Use any c++ IDE; submit `cq1.cpp` and `cq2.cpp` in the folder structure.

Please keep in mind these bonus questions do not affect your marks for this lab. This is a chance for making up for a botched up InLab or OutLab, Your lowest InLab or OutLab marks will be replaced by these full marks on a successful attempt to these questions. Also, Any of us TAs will not entertain any doubts regarding these two questions. Assume things and try to do your best.

Here you go:

=====

Q1 - 5 marks

=====

1. Define a class to store an extensible array. It should be possible to index into the array, and it should be possible to extend the array using a `push_back` operation. A skeleton definition of the class is given below. You are to fill in the ... portions, and then type the entire struct into the textbox of the assignment. You should implement the protocol that at any time there must be exactly one pointer to space allocated on the heap, and your implementation must prevent memory leaks and dangling pointers.

```

struct eArray{
private:
    ... // put data members here
public:
    eArray(){...} // construct an array with 0 elements
    int &operator[](int i){...}
        // return a reference to the ith element of the array
    void push_back(int v){...}
        // Append v to the current array
        // Use a simple implementation: allocate a new array to
        // accommodate the extra element v. Then copy the current
        // array into it. Copy v, and delete the current array.
    int size() const {...}
        // return the current size of the array
        // "const" says this function will not change the receiver
    eArray(const eArray &rhs){...}
        // copy constructor
    ~eArray(){...}
        // destructor
    eArray& operator=(const eArray &rhs){...}
        // assignment operator
};

```

Using this it should be possible to write programs of the following kind. The following programs has already been typed in and will be used to test your code.

```

void f(eArray A){A[5] = 5000;} // changes only local copy
void g(eArray &A){A[6] = 6000;} // changes original

```

```

int main(){
    eArray A,B;
    int n; cin >> n;
    for(int i=0; i<10; i++){
        int v; cin >> v;
        A.push_back(v);
    }
    // at this point A should contain all values read.
    f(A);
    g(A);
    B = A;
}

```

```

    B[8] = 800;
    A[8] = 8000;
    for(int i=0; i<B.size(); i++) cout << B[i] <<' ';
    cout << endl;
}

```

On input 10 0 10 20 30 40 50 60 70 80 90 this should print 0, 10, 20,30, 40, 50, 6000, 70, 800, 90.

Note that the eArray as defined above is similar to the vector class in the standard library. Your implementation can be very simple; whenever an element is appended, you can just allocate a new array of a larger size, copy the elements, and delete the array. In the vector class, a large memory is allocated every time the current allocation is found inadequate; this way the number of allocation operations is reduced.

=====

Q2 - 5 marks

=====

Write a program that reads an integer  $n$ , and then  $n$  pairs of names, and finally two additional names  $S$ ,  $B$ . Each name is a sequence of non-whitespace characters delimited by whitespace.

In each pair the first name is the name of an employee and the second name is the name of the boss of the employee. Assume that each employee has at most one boss.

Say that an employee  $E$  is "above" an employee  $F$  if  $E$  is the boss of  $F$ , or  $E$  is the boss of the boss of  $F$ , or the boss of the boss of the boss of  $F$ , and so on.

Your program is to print 1 if employee  $B$  is above employee  $S$  and 0 otherwise.

Hint: use a map to store the boss of each employee if known.