

IIT Guwahati
Lab Evaluation - 4

CS594 – Python Programming Lab

November 7, 2022

TIME ALLOWED: 2.5 HOURS

1. Define a class **IP_node** that has the following specifications:

Attributes: PUBLIC

- Four integer type attributes representing the 4 octets of the IP address

The **IP_node** class's `__init__` method should accept an argument for each octet to initialize the IP address.

Define a class **IP_ops** having the following specifications:

Attributes: PUBLIC

- A list containing all IP addresses where each IP is an object of class **IP_node**
- Integer type attribute indicating the total number of IP addresses in the list

Methods: PUBLIC

- `Sort_ip()`:
 - This function is responsible for sorting all the IP addresses in the list.
 - **NOTE:** `sort()` library function is not allowed. You need to implement some sorting algorithm from scratch
 - Sorting of IP addresses: If IP is of form A.B.C.D, first sort by A; within the sorted records of A, sort by B; within the sorted records of A, B, sort by C; within the sorted record of A, B, C, sort by D
- `Compare_ip(ip1, ip2)`:

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- This function returns 1 if two IP addresses are equal, 0 otherwise
- **Find_lan()** :
 - This function reports the number of different LANs present in the IP address list. You also need to report those LANs which contains more than 1 IP Address
 - Two IP addresses are said to be part of a LAN if their first three octets match
 - Example: If the list of IPs is - A.B.C.D, A.B.C.F, A.M.I.J, B.C.O.P,
Output: Number of different LANs present : 3, Lan A.B.C - 2

- (a) **Task 1:** Define the classes **IP_node** and **IP_ops** [0.3 marks]
- (b) **Task 2:** Read IP addresses from the input file, make an object of class **IP_ops** and populate its attributes using the data from file [1.5 marks]
- (c) **Task 3:** Implement **Sort_ip()** [0.6 marks]
- (d) **Task 4:** Implement **Compare_ip(ip1,ip2)** [0.1 marks]
- (e) **Task 5:** Implement **Find_lan()** [0.5 marks]

NOTE: You are free to use any other helper functions outside of class methods

Input File: ip_data.txt

File Content: Each line has a single IP address

FORMAT of the IP address: First number (dot) Second number (dot) Third number (dot) Fourth Number (slash) Fifth number [Eg - 192.116.17.8/10]. You can ignore the number after slash for your computations and only consider the first four octets
