

Q5

We will begin by making two 2-D arrays, one array for the Intern Preference and the second for the Employer Preference. Both these arrays will be of size $n-1 \times n-1$. Each array index will keep track of the position preference. Let's take for example if we have a 2-D array of Intern Preferences called IP then for Employer 5 and Intern 1 which is at Position 3, so in our 2-D array at IP[0][4] position we will store 3. So Employer Y and Intern X in our Intern Preference Matrix will map to IP[X-1][Y-1] in our 2-D array. This will be done for all elements of our Intern Preference Matrix as well as our Employer Preference Matrix and will be put in another 2-D array called EP.

To find out whether Intern (Ia) prefers Ex or Ey we will have to see the value/position at IP[a-1][x-1] and IP[a-1][y-1] and compare the two numbers. Whichever index stores the smaller of the two values will be the preferred candidate that means it will have a higher preference. Hence we will get a time complexity of $O(1)$ because we directly pick it up from its indices. And the space complexity will be $O(n^2)$ because it is a 2-D array of dimensions $n-1 \times n-1$.