

Q5. If we use each column to reference a single particular employee or intern by corresponding the column number to their own number and assign each index a numbered preference, then the queries can be completed in $O(1)$ time. For example, Intern Preference Matrix $[3][7] = 4$ would mean the E_7 is I_3 's 4th preference. The queries can then be computed at $O(1)$ because no matter how big 'n' might be, the program will have to make only 2 array accesses to get the answer. For example, in the query "Does E_x prefer I_a over I_b ?", the program will only have to look up the values at $[x][a]$ and $[x][b]$ in the Employer Preference Matrix and see which one is bigger. The space complexity of this program is $O(e*i)$, where e is the number of employers and i is the number of interns. This is because 2-d arrays created will have to contain all employers and interns.