Algorithm for allocation groups:

const ds = data.reduce((acc, pref) => {

  const {name, ...rest} = pref;

  acc[name] = rest;

  return acc;

}, {});

Sample JSON data to run an algorithm:

const data = [

  {

    name: 'student-1',

    p1: 'topic\_name\_2',

    p2: 'topic\_name\_4',

    p3: 'topic\_name\_5',

    p4: 'topic\_name\_7',

    p5: 'topic\_name\_1'

  },

  {

    name: 'student-2',

    p1: 'topic\_name\_5',

    p2: 'topic\_name\_7',

    p3: 'topic\_name\_1',

    p4: 'topic\_name\_3',

    p5: 'topic\_name\_4'

  }

}

]

JSON data which comes from database, gives us names and their five preferences of all the students.

First to run the implemented algorithm, we need to convert the data which we get from the database to required format. Data we get from the DB is in JSON format. We need slight modification to it, so we can use this in our algorithm. In the above code we created a new function called ds which returns the array ‘acc’ of student’s preferences.

const groups = {};

for (let i = 1; i <= 5; i++) {

   const priority = `p${i}`;

  for (let key of Object.keys(ds)) {

    const x = ds[key][priority];

if (!groups[x]) {

      groups[x] = [];

groups[x].push(key);

       delete ds[key];

     } else if (groups[x] && groups[x].length < 5) {

       groups[x].push(key);

       delete ds[key];

     } else {

     }

   }

}

const groups = {};

We created an empty array names groups so we can add the allocated groups into it.

for (let i = 1; i <= 5; i++) {

const priority = `p${i}`;

We need to allocate no more than five students in each group, so we have created a main outer loop which runs for five times. We have declared a variable named priority and for every time the loop runs, it acts as preference of each student from first preference to fifth preference.

groups[x].push(key);

delete ds[key];

for (let key of Object.keys(ds))

Now we have an inner loop which runs for every student. We get each student’s priority, key (which is unique for every student) and name from ds variable which we created initially.

const x = ds[key][priority];

We created a new variable X for every student with all their preferences. (Example: ds[student-1][Preference-1], ds[student-1][Preference-2], ds[student-1][Preference-3], ds[student-1][Preference-4], ds[student-1][Preference-5]).

if (!groups[x])

groups[x].push(key);

delete ds[key];

We have an if condition to check if we already have a group with x, if not, we will push the student with selected key to that array and delete them from ds array.

} else if (groups[x] && groups[x].length < 5) {

groups[x].push(key);

delete ds[key];

else{

}

we have an else if block where we check if there is already a group[x] and it has less than five students in them and deletes the student from the array ds. At the end we have an empty else block which allocated student to any other group if all the groups if allocated with all their preferred topic.