

The following document gives an example of the customer reports produced by Cactus. This particular example is produced using (anonymised) Key Stage 4 data from a real school with 69 potential students and 11 subjects. The solutions require three options columns with a maximum of six subjects per column.

School	School X
Contact	Mrs A. N. Other
Date	N/A
Comments	<p>In this document you will find customised solutions for School X, produced according to data submitted to us. Solution 1 below meets all the constraints given in your data, and allows 58 of the 69 students (84.06%) to study all of their preferred subjects.</p> <p>As a Gold Service customer, additional solutions have also been included that are able to satisfy a higher percentage of students’ choices, providing a small number of plausible adjustments are made. Firstly, in Solution 2 an additional History class has been imagined. This reduces the optimal solution to just 4 clashes, all of which are third choices (94.2% of students can now study all of their preferred subjects).</p> <p>For Solution 3 an additional History and Art class have been imagined. Note, however, that this creates additional clashes compared to Solution 2, due to the Art students now being spread across two columns. Consequently, just 91.3% of students now have all of their choices completely satisfied.</p>

Supplied Data

Here is the complete list of the data supplied to us by School X:

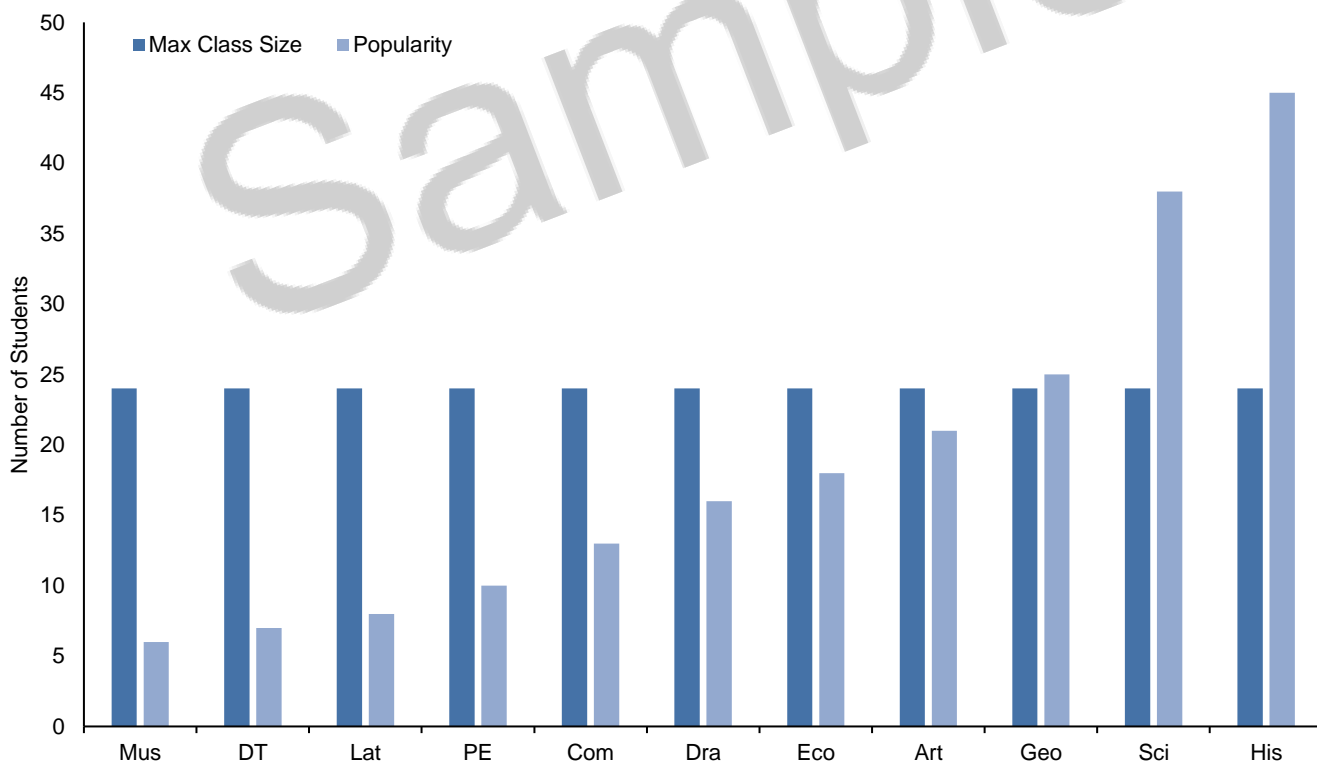
Student	Option 1	Option 2	Option 3
1	Sci	Art	His
2	Sci	His	Eco
3	Lat	His	Mus
4	Sci	His	Art
5	PE	His	Sci
6	Sci	Geo	Art
7	PE	Sci	Geo
8	Lat	Sci	Mus
9	Sci	His	Geo
10	Sci	His	Eco
11	Sci	Dra	Art
12	Geo	Eco	Dra
13	Sci	His	Lat
14	DT	Geo	His
15	His	Dra	Mus
16	His	Art	Dra
17	Sci	His	Lat
18	Geo	PE	DT
19	Com	Geo	Sci
20	Geo	Eco	Dra
21	Sci	PE	Dra
22	His	Art	Dra
23	Art	Com	Eco
24	His	Art	Geo
25	Dra	His	Geo
26	Sci	Art	DT
27	Sci	His	Geo
28	His	Sci	Com

29	Dra	Mus	Geo
30	Sci	His	Geo
31	Sci	Art	His
32	His	Eco	Geo
33	Sci	Com	Eco
34	His	Dra	Mus
35	Geo	His	PE
36	Sci	Com	Geo
37	His	Geo	PE
38	Sci	PE	His
39	Sci	His	Lat
40	Art	His	Eco
41	Eco	Com	His
42	Dra	His	Art
43	Dra	His	Eco
44	Eco	Com	Art
45	Lat	DT	Sci
46	His	Geo	Sci
47	Sci	Com	Eco
48	Sci	Dra	His
49	PE	Dra	His
50	Dra	His	Sci
51	Sci	Geo	Art
52	His	Eco	Sci
53	Sci	His	Geo
54	His	Sci	Mus
55	His	Art	Com
56	DT	Geo	Art
57	His	Eco	Art
58	DT	Art	Geo
59	Sci	Com	DT
60	His	Sci	Lat
61	Art	Dra	His
62	Sci	Com	His
63	Com	His	Sci
64	Geo	Eco	Art
65	PE	Com	His
66	Sci	Geo	Eco
67	Sci	His	Lat
68	His	Eco	Geo
69	PE	Eco	Art

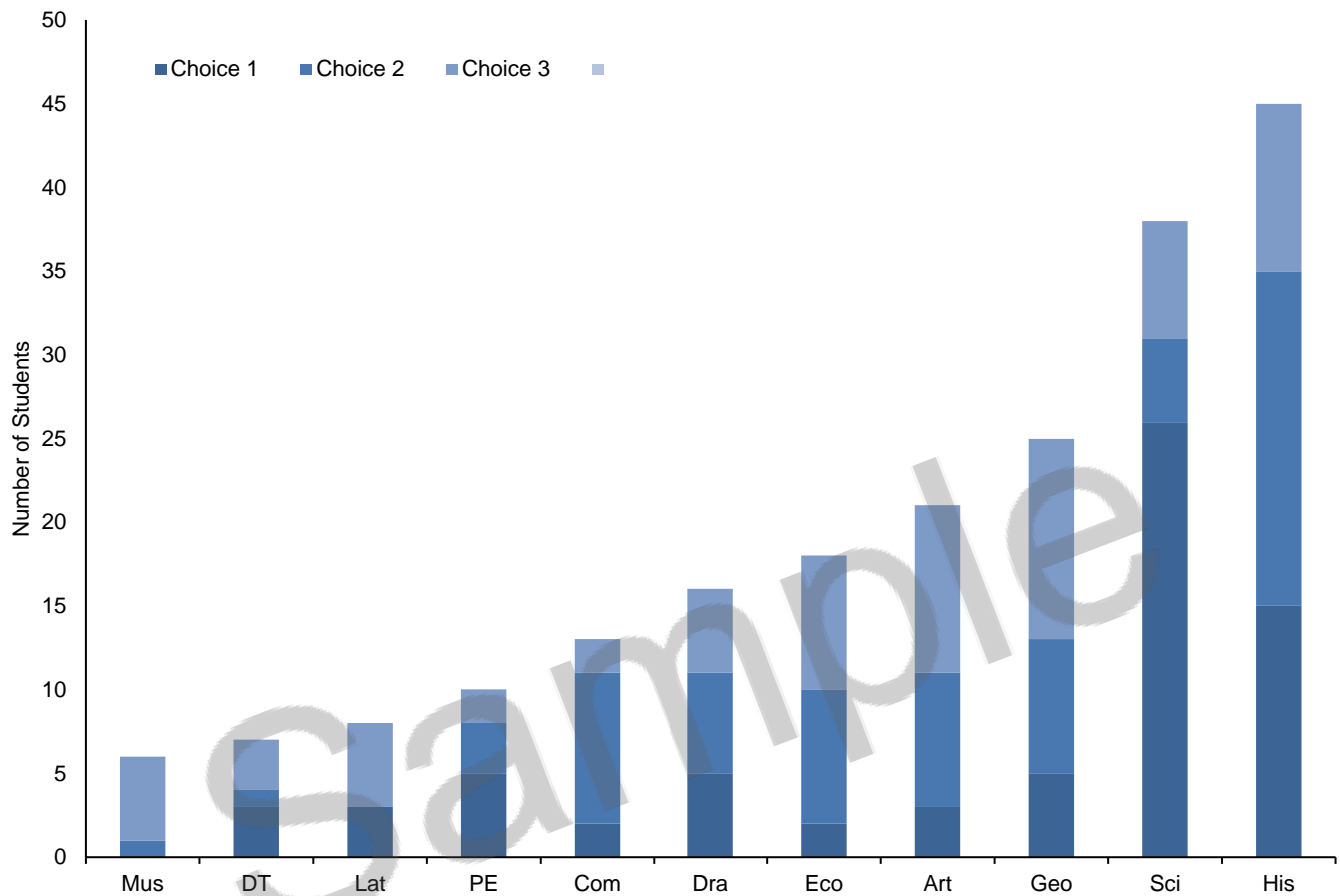
Here is the complete list of the subjects, class sizes and teacher numbers that you supplied to us:

Subject Name	Class Size	Num. Teachers
Art	24	1
Com	24	1
Dra	24	1
DT	24	1
Eco	24	1
Geo	24	1
His	24	1
Lat	24	1
Mus	24	1
PE	24	1
Sci	24	1

The following graph shows the number of students that have selected each subject in comparison to the maximum class sizes that you stated.



The following graph shows the number of students that have selected each subject, by choice.



Advisories

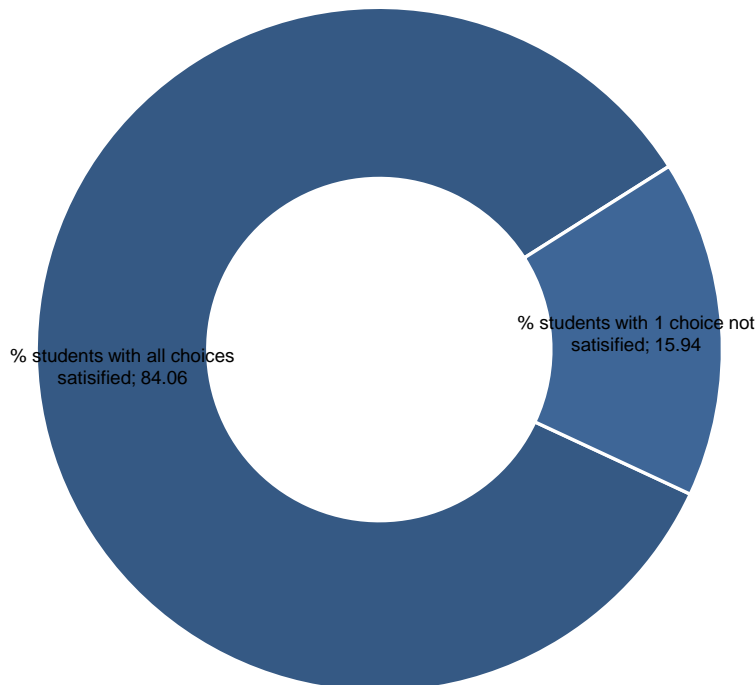
- 69 students are included in the input data.
- **Geo** has been selected by 25 students. The maximum class size is 24, so 2 classes have been created.
- **His** has been selected by 45 students. The maximum class size is 24, so 2 classes have been created.
- **Sci** has been selected by 38 students. The maximum class size is 24, so 2 classes have been created.
- The classes **Geo-1** and **Geo-2** should occur in different columns (taught by the same teacher).
- The classes **His-1** and **His-2** should occur in different columns (taught by the same teacher).
- The classes **Sci-1** and **Sci-2** should occur in different columns (taught by the same teacher).
- The five most popular subject combinations are:
 - **His** and **Sci** (24 students).
 - **Geo** and **His** (12 students).
 - **Art** and **His** (11 students).
 - **Dra** and **His** (11 students).
 - **Geo** and **Sci** (11 students).

Solution 1

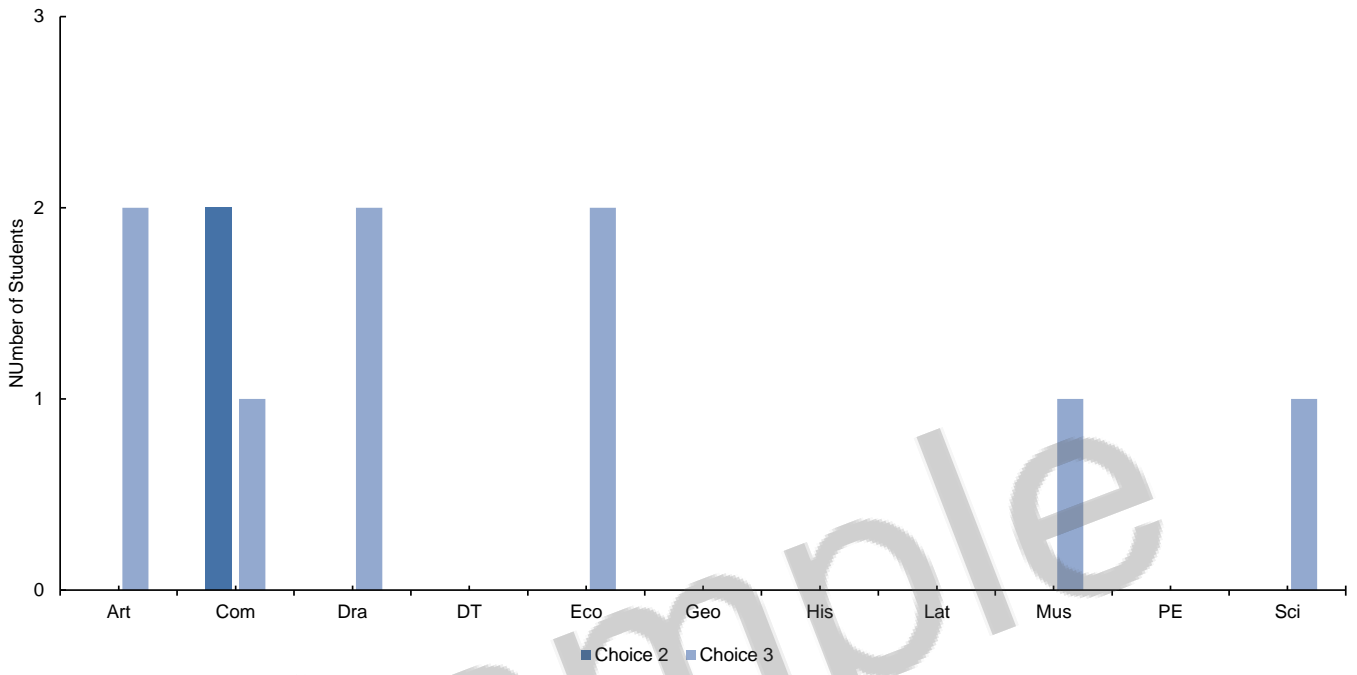
Here is the optimal solution to your supplied data when all options have been treated equally, and when all desired constraints have been factored in.

Column 1	Column 2	Column 3
Dra	Art	Geo-2
DT	Com	His-1
Eco	His-2	Lat
Geo-1	Mus	Sci-1
Sci-2	PE	

- The above solution is optimal according to the data provided.
- 58 of the 69 students (84.06%) have all of their choices satisfied by this solution.
- However, the following choices cannot be satisfied:
 - Student-3 cannot select: Choice 3 (**Mus**).
 - Student-12 cannot select: Choice 3 (**Dra**).
 - Student-20 cannot select: Choice 3 (**Dra**).
 - Student-23 cannot select: Choice 2 (**Com**).
 - Student-43 cannot select: Choice 3 (**Eco**).
 - Student-44 cannot select: Choice 3 (**Art**).
 - Student-45 cannot select: Choice 3 (**Sci**).
 - Student-55 cannot select: Choice 3 (**Com**).
 - Student-65 cannot select: Choice 2 (**Com**).
 - Student-66 cannot select: Choice 3 (**Eco**).
 - Student-69 cannot select: Choice 3 (**Art**).
- As requested in your original data, all subjects have been grouped into three columns, and all options columns contain fewer than 7 subjects.
- Here is a summary of the above



The following graph shows the locations of the options that cannot be satisfied in the above solution.

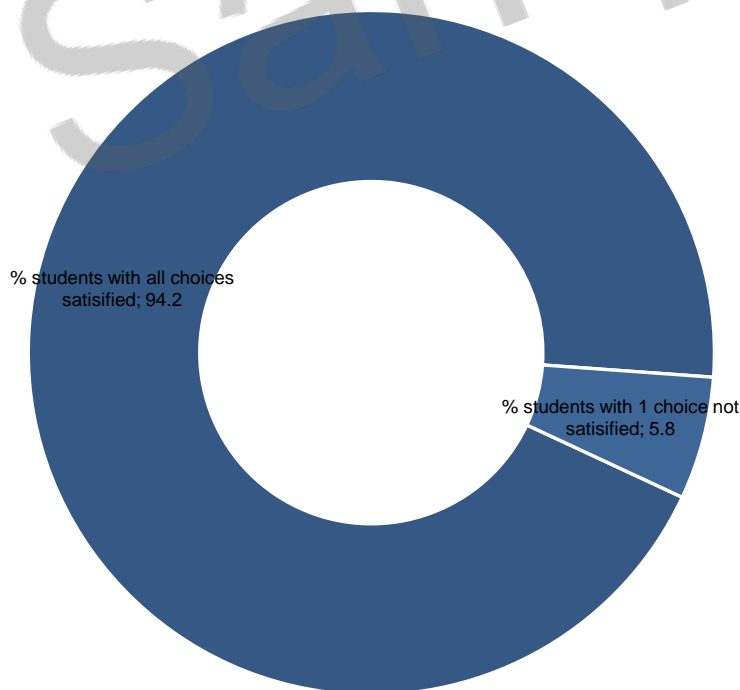


Solution 2

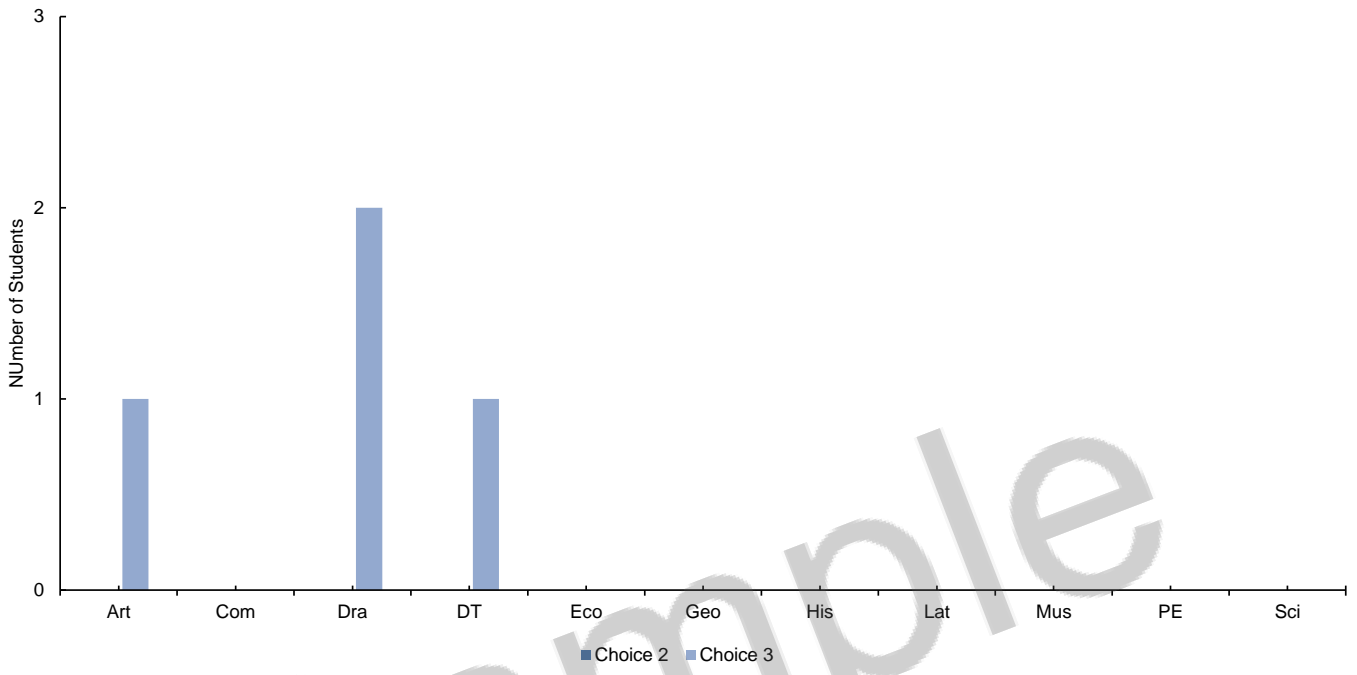
The following solution uses the above data but, as an advisory, includes one extra History class in order to eliminate excess clashes,

Column 1	Column 2	Column 3
Com	Art	DT
Dra	His-2	Eco
Geo-1	Mus	Geo-2
His-3	PE	His-1
Lat	Sci-2	Sci-1

- The above solution is optimal according to the data provided.
- 65 of the 69 students (94.20%) now have all of their choices completely satisfied by this solution.
- However, the following choices cannot be satisfied:
 - Student-12 cannot select: Choice 3 (**Dra**).
 - Student-20 cannot select: Choice 3 (**Dra**).
 - Student-26 cannot select: Choice 3 (**DT**).
 - Student-69 cannot select: Choice 3 (**Art**).
- As requested in your original data, all subjects have been grouped into three columns, and all options columns contain fewer than 7 subjects.
- Here is a summary of the above.



The following graph shows the locations of the options that cannot be satisfied in the above solution.

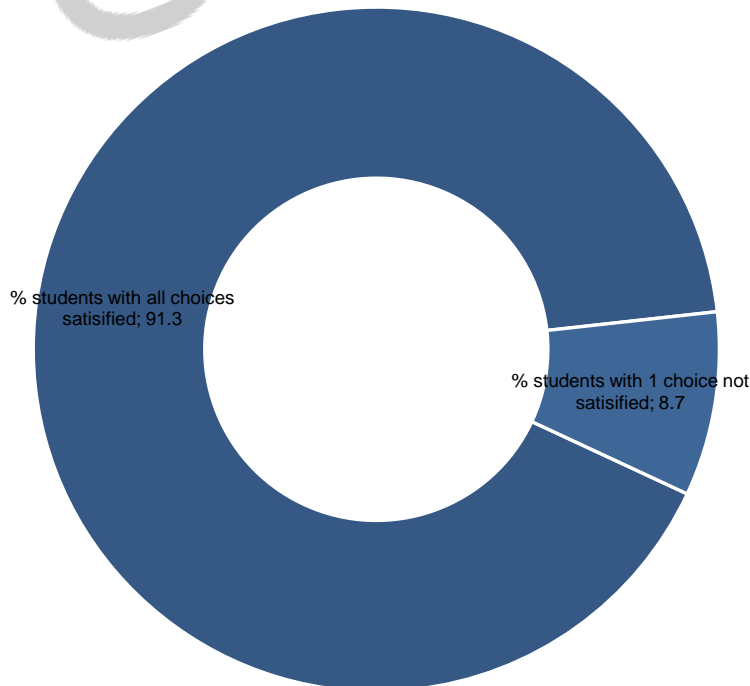


Solution 3

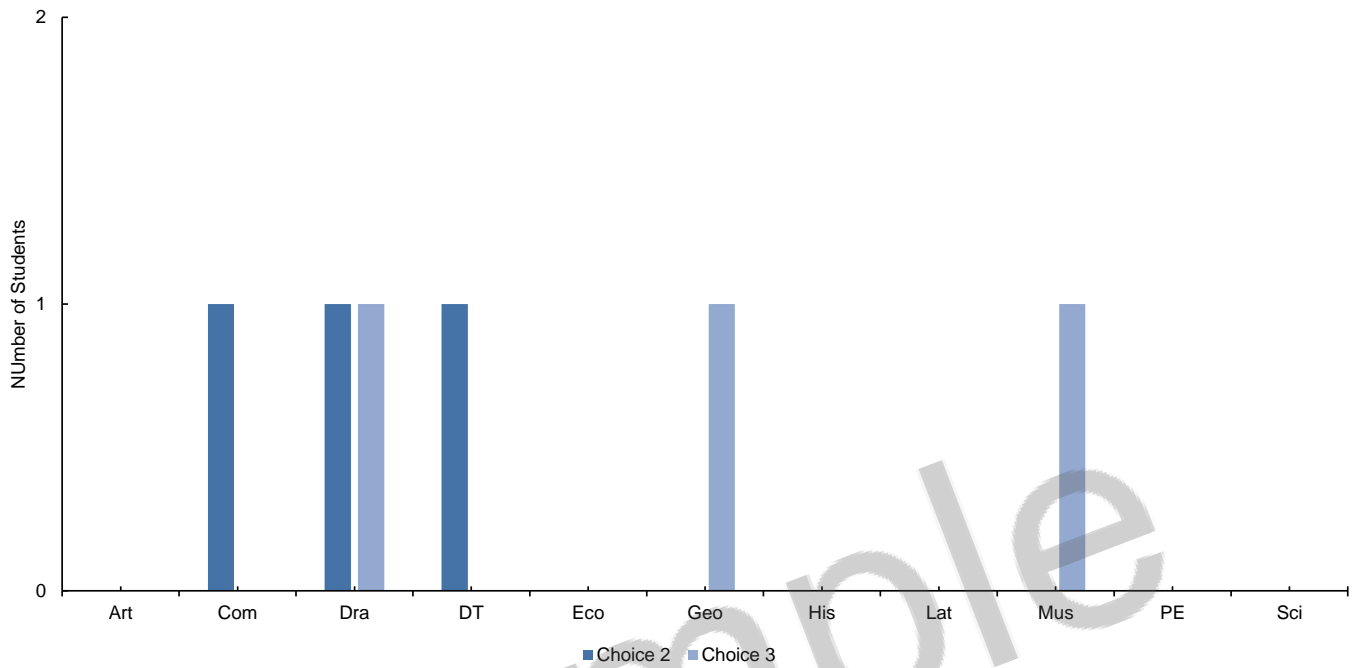
The following solution uses the above data but, in an attempt to eliminate excess clashes, has included one additional History class and one additional Art class. Note that this has created additional clashes compared with Solution 2, due to Art students now being spread across two columns.

Column 1	Column 2	Column 3
DT	Art-2	Art-1
Eco	Com	Geo-2
His-1	Dra	His-3
Lat	Geo-1	Mus
Sci-2	His-2	Sci-1
	PE	

- The above solution is optimal according to the data provided.
- 63 of the 69 students (91.30%) now have their choices completely satisfied by this solution.
- However, the following choices cannot be satisfied:
 - Student-8 cannot select: Choice 3 (**Mus**).
 - Student-21 cannot select: Choice 3 (**Dra**).
 - Student-29 cannot select: Choice 3 (**Geo**).
 - Student-45 cannot select: Choice 2 (**DT**).
 - Student-49 cannot select: Choice 2 (**Dra**).
 - Student-65 cannot select: Choice 2 (**Com**).
- As requested in your original data, all subjects have been grouped into three columns, and all options columns contain fewer than 7 subjects.
- Here is a summary of the above.



The following graph shows the locations of the options that cannot be satisfied in the above solution.



Sample



REFUND POLICY: At Cactus we pride ourselves on the quality of our solutions and our service. We want to make sure that you are completely satisfied; however, if for any reason you are not, then you must contact us via email within fourteen (14) days of receipt of this report, including the following information: (1) A brief summary of why a refund is being requested; (2) A solution that is different to the ones provided by Cactus with proof that it satisfies a greater number of your students' options compared to ours (please note that the students' choices must correspond exactly to those originally provided to us, and the solution must satisfy the constraints that were sent to us via our original questionnaire). If these conditions are satisfied, we will refund your order. Refunds are processed within approximately seven (7) business days of our receipt. Your refund will be credited back to the same payment method used to make the original purchase. If you paid by credit card, refund times will depend on the credit or debit card company's policies.