

Maximizing Friends in School Classes

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Abstract

The development of friendships is important in the lives of school-age children. This is crucial to their mental and social development. Social skills such as communication, problem-solving, and cooperation are enhanced by having friends in their classes. Another benefit of having friends is that school becomes more enjoyable. *Teacher's Pet* developed by Liu (2016) is a new, innovative tool that enables schools to place students with some of their friends in the same classroom based on their own wishes. Many schools including some large and high-ranking ones have used the *Teacher's Pet* website to create their class lists. *Teacher's Pet* has evolved and improved due to countless feedback from teachers. School principals are very happy, because the once most frustrating and time-consuming task for the teachers has now become quick and intuitive. Principals and teachers no longer receive complaints from parents regarding their kids having no friend in their class. This article provides a brief and complete overview of the *Teacher's Pet* website (Liu). The reader will have a very good idea on what this tool can do and how it is used to solve the problem that exists in every school in the world.

In schools that reshuffle students into new classes every year, students having friends in their classes is important for their emotional well-being. For this reason, before this reshuffle exercise starts, schools would allow students to submit a list of three to five friends, so that the teachers can keep some of these friends together in the reshuffle.

However, it is impossible for the human brain to remember five friends for each of the one hundred students in the same grade, let alone working out the best allocation which gives every student as many friends as possible. Schools resort to all sorts of primitive measures such as coloured paper cards. It is usually one of the most time consuming and cumbersome tasks in a school year, and yet many students are still left friendless in their new class, feeling anxious to go into the next school year. Teachers often receive complaints from parents regarding their child's lack of friends in their classes.

The class allocation task becomes even more difficult when there are other criteria to consider at the same time. Other criteria that should also be considered in the class allocation task include: gender, academic level, behaviour, faith, special need, exclusions, and inclusions.

Now, with *Teacher's Pet* (Liu, 2016), which is based on an innovative mathematical algorithm, a teacher is able to allocate hundreds of students into many classes, catering for any number of criteria including the "friends" criteria, in a few mouse clicks. Each student is guaranteed at least one friend in their new class, and in average each gets three or four friends.

Teacher's Pet (Liu, 2016) does not compete with or replace the existing school management or timetabling software systems. Instead it is a supplement to their software systems. The existing software systems can do many things. However, none of these software

systems can do what *Teacher's Pet* can do, and that is to maximize friends in school classes meanwhile catering for an array of other class-allocation requirements.

The Whole Class-Allocation Process

The whole class allocation process consists of three simple steps (see Figure 1). They are:

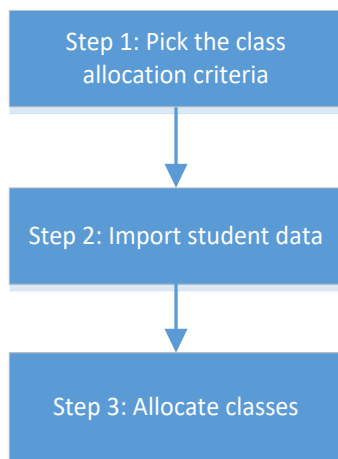


Figure 1. Three simple steps.

Step 1: Pick the Class Allocation Criteria

Right after you login as a teacher, you will see a list of class-allocation criteria (see Table 1).

Table 1

Step 1: Pick the Class Allocation Criteria

Classing Rule	Description
Class by academic levels	All top-level students in one class, all medium-level students in one class, and all bottom-level students in one class.
Academic levels mixed	Each class has roughly the same number of top-level, medium-level and low-level students.
Behaviour	Spread students with different behaviours evenly across classes
Even class sizes	All classes have the same or very similar sizes.
Friends	Try to give each student as many friends as possible
Faith	Spread students with/without or with different faith evenly across classes
Separated by gender	Boys and girls must be separate, e.g. when allocating dormitories.
Gender balance	Each class has roughly same number of boys and girls.
Must include	Certain students must be in the same class - this takes much higher priority than the "Friends" rule
New students in class	Each class should have some new comers - we don't want to have the same classes as last year.
Secondary language	Students studying the same secondary language subject are better in the same class.
Special Need	Spread students with/without or with different special needs evenly across classes
Must exclude	Certain students must not be in the same class.

Check the boxes of those criteria that you want to affect the allocation result. Leave unchecked those criteria that you don't want to affect the result. Then, enter the names of the classes into which you want to allocate your students.

Step 2: Import Student Data

Once you finish **step 1**, click the **step 2** link. The **step 2** page is displayed, on which you enter data about the students (see Figure 2).

Step 1: Pick the class allocation criteria >> **Step 2: Data Input** >> Step 3: Allocate Classes

Class-Allocation Task: Creating classes for the new school year ▼

[Upload Data](#) [Unfinalize](#) ⓘ [New Student](#) [Exclusions/Inclusions](#) [Pick My Friends](#) [Download Data](#)

Students (0)	Email	Current Class	Academic Level	Gender	Secondary Language	Desired Friends	Include	Delete	Edit
							<input type="checkbox"/>	<input type="checkbox"/>	

Figure 2. Step 2: Data input.

The criteria you have selected in Step 1: *Pick the Class Allocation Criteria* (see Table 1), determines the data you need to enter for each student. For example, if you have selected the “**academic levels mixed**” criteria, you need to provide the academic level of each student. If you have selected the “**gender balance**” criteria, you need to provide the gender of each student.

You can enter each student’s data manually on the user interface. When you do this, the system will only ask you to enter the data that are needed for your selected criteria (see Figure 3).

Student Details

[Hide](#)

Note: the combination of the student's first name, middle name and last name must be unique in your school.

First name:	<input type="text" value="ALISE"/>	
Middle name:	<input type="text"/>	
Last name:	<input type="text" value="COLMENERO"/>	
Email:	<input type="text" value="silanliu@gmail.com"/>	
Current Class:	<input type="text" value="1"/>	Add or delete items in this drop-down
Academic Level:	<input type="text" value="3"/>	Add or delete items in this drop-down
Gender:	<input type="text" value="OTHER"/>	Add or delete items in this drop-down
Second Language:	<input type="text" value="CHINESE"/>	Add or delete items in this drop-down

Desired Friends

Each student gets to specify a number of friends to be in his/her class

Add a friend by name, then hit enter:

Friends already added:

JOAQUIN ELKIN	<input type="text"/>
TYREE BRECHT	
MELISSIA MCGLOTHLEN	
SHANIKA LAMOREAUX	
ISA ETHEERTON	

[Save student](#)

Figure 3. Student data entered manually for selected criteria.

As you can see in Figure 4, since you did not select the **“behaviour”** and **“faith”** criteria on *Step 1: Pick the Class Allocation Criteria* (see Table 1), the system doesn't ask you to enter data about student behaviour or faith. However, if you decide to select the criteria **“behaviour”**, you will need to go back to step 1 and select the **“behaviour”** checkbox. Next you will go back to the step 2 page. There you will see an extra dropdown box called **“behaviour”**. This is how you would select different criteria.

The items in the dropdown boxes are determined by you. The engine doesn't care. They could be anything. For example, first year teachers may have “A,” “B,” “C,” and “D” in the **“academic level”** dropdown box, while third year teachers may want to use “1,” “2,” and “3” to represent academic level. If you intend to manually enter student data, you need to select the **“add or delete items in this drop-down”** link (see Figure 3) to add or delete the items in each dropdown box. If you intend to import student data by uploading a CSV (comma separated values) file, then you don't need to manually add those items since they will be picked up from the data in the CSV file.

Compared with entering student data manually, a much quicker way is to import a student data CSV file. You don't need to guess what columns are needed in this CSV file. On the *Step 2: Data Input* (see Figure 2) page, you can click the **“Show me the data file format”** or **“Download sample data files”** link. The first link will display on the screen a sample CSV file which contains some sample data, while the second will download the sample CSV file onto your PC. The columns that are in the sample CSV file are determined by the criteria you marked in *Step 1: Pick the Class Allocation Criteria* (see Table 1).

The sample file displayed or downloaded will look like the following (see Figure 4).

First Name	Last Name	Current Class	Academic Level	Desired Friends	Gender	Second Language
ARDELLA	ALBERTSON	A	1	ELLIOT HELFRICH,CHONG FLOURNOY,ADRIANA MCKITTRICK,WAI TILLISON,DARLINE NICHOLE	M	French
BRAIN	BAZEMORE	B	2	JARRETT DEPAOLI,HASSAN BALKE,TAMEKIA TIMMINS,DONELLA LAZARD,OPHELIA LETOURNEAU	F	Chinese

Figure 4. Sample file.

Again, since you have not selected the “**behaviour**” and “**faith**” criteria on *Step 1: Pick the Class Allocation Criteria* (see Table 1), the sample CSV file doesn’t contain columns for behaviour or faith.

With this sample CSV file, all you need to do is four steps. First, export the student data from your existing school management system into a CSV file. Second, remove unneeded columns. Third, rename the column names if they are different from that in the sample file. Fourth, upload this file into the system in a few mouse clicks.

You don’t have to have all the needed columns in the CSV file. If your school management system doesn’t contain data for some of the columns – typically it wouldn’t have contained the data in the “**desired friends**” column, you can still upload this CSV file. You will then manually enter the missing data on the screen (see Figure 3).

The “**pick-my-friends**” module allows the students to pick their own friends on the *Teacher’s Pet* (Liu, 2016) portal, as long as they have their own emails and have access to the Internet. All you need to do is to click an “**invite students to pick their own friends**” link. The system will send invitation emails to all students in your year level. The email contains a secured link. The student clicks this link and it automatically logs him/her into *Teacher’s Pet* (Liu, 2016) portal without needing to enter student ID or password. No student can impersonate another. There the student can pick his/her own friends. Each student takes two to five minutes. The whole year level finishes picking friends within half an hour.

Once the students are in the system, they don’t need to be re-entered every year when they move up the grade. So, in the following years, the class allocation can be done in a matter of half an hour.

Step 3: Allocate Classes

Once you have imported all needed data, you can go to step 3 to allocate the classes (see Figure 5).

Creating classes for the new school year

Silan's School Year 3 J. Smith (Teacher)

Step 1: Configure class-allocation tasks >> Step 2: Data Input >> **Step 3: Allocate Classes****Allocate Classes**

[Allocated] 2016-12-28 16:58

Saved allocation results:

<Create New>

Classing rule weightings :

Academic levels mixed 0

Class sizes 49

Friends 0

At least one friend 73

Gender balance 0

Secondary language 50

Must exclude 0

3A (25)	3B (25)	3C (25)	3D (25)
Megan Bowley	Alise Colmenero	Ardella Albertson	Daniel Frisk
Adriana Mckittrick	Brain Bazemore	Cecily Reese	Darline Nicholes
Carole Caudill	Chong Flournoy	Eboni Gibbens	Edyth Aguayo
Darron Poulsen	Donella Lazard	Elyse Pinner	Leo Mefford
Ophelia Letourneau	Elliot Helfrich	Joaquin Elkin	Leonard Sisco
Tomoka Eadie	Lawrence Arguelles	Lai Fine	Xavier Cheesman
Cheyenne Raver	Romona Rufus	Magen Evensen	Darren Levin
Johnathan Edelson	Tyree Brecht	Qiana Bourland	Georgiana Vancleave
Marceline Strohl	Wai Tillison	Shanta Obermiller	Lionel Heyen
Ruben Gao	Bella Cortese	Carrol Bealer	Maryjane Sippel
Troy Laiche	Evelia Kinsella	David Pitter	Rosario Manos
Zane Gambrel	Florance Lapeyrouse	Leslie Speer	Tamekia Timmins
Arnoldo Melito	Gina Minear	Stan Claudio	Elton Cokley
Deena Berti	Hassan Balke	Artie Fobbs	Jarrett Depaoli
Dexter Welling	Hilario Mclarty	Bernie Regina	Kenyetta Bassin
Euna Forward	Kera Arsenaull	Dalton Greenlee	Peggie Cosner
Evan Rappaport	Pat Sowell	Danille Franzoni	Santos Yip
Francine Merlos	Pearlene Hocker	Del Seckman	Shanika Lamoreaux
Guillermo Gaulin	Ward Lederer	Isa Etherton	Tanika Seagraves
Melissia Mcglothlen	Alysia Turnbull	Velma Mcmillian	Ariel Pucci
Morris Dorais	Clifford Ellingsworth	Dorathy Hurwitz	Frank Proudfoot
Stephenie Madill	Ellis Mosteller	Dylan Bien	Margarito Carbone
Terresa Nau	Ena Dangelo	Jason Rodd	Murray Kulas
Trey Copas	Ernesto Sica	Kieth Poehler	Sunni Stangl
Werner Perreira	Velva Litchfield	Nathanael Entrekin	Towanda Bangs

Figure 5. Step 3: Allocate classes.

As you can see in Figure 5, each class-allocation criterion you have selected in *Step 1: Pick the Class Allocation Criteria* (see Table 1) is shown as a slider bar. You slide the slider bars to assign different weights to the criteria. After you finish, click the “**allocate classes**” button. The engine finishes the allocation following your weightings in a few seconds.

By nature, most of the class allocation criteria conflict with each other. For example, if you want the “**friends**” criteria to take priority, the language criteria will become secondary. Using the slider bars, you can change the weights of different criteria to fine-tune the class allocation outcome. You can repeat the “**change then reallocate**” process as many times as you want. The engine does the heavy lifting, while you have full control of the outcome. It is like you driving your children to school - it is not a machine that sends them to school, it is you, because you have full control over the machine. At the end of the allocation, you can drag a student from one class and drop it into another. The teacher has the final say over the computer.

The user interface allows you to visualize the effect of the class allocation in an intuitive manner. You first click a criteria. Next, you click a student. All other students that are associated with this clicked student through the clicked criteria will be highlighted in yellow.


For example, if you click the “**friends**” criteria and then a student, all of his/her friends will be highlighted (see Figure 6). The pink student is the one clicked, and the yellow students are his desired friends.

Creating classes for the new school year

Silan's School Year 3 J Smith (Teacher)

Step 1: Configure class-allocation tasks >> Step 2: Data input >> **Step 3: Allocate Classes** **Allocate Classes** [Allocated] 2016-12-28 18:06

Saved allocation results:

<Create New> 

Classing rule weightings ⓘ :

Academic levels mixed 0

Class sizes 49

Friends 50

At least one friend 191

Gender balance 0

Secondary language 50

Must exclude 0

3A (26)	3B (25)	3C (25)	3D (24)
Donella Lazard	Ardella Albertson	Alise Colmenero	Chong Flounoy
Edyth Aguayo	Eboni Gibbens	Brain Bazemore	Daniel Frisk
Leo Mefford	Elliot Helfrich	Cecily Reese	Darline Nicholes
Megan Bowley	Leonard Sisco	Elyse Pinner	Lawrence Arguelles
Romona Rufus	Magen Evensen	Joaquin Elkin	Qiana Bourland
Adriana Mckittrick	Xavier Cheesman	Lai Fine	Shanta Obermiller
Carole Caudill	Carrol Bealer	Tyree Brecht	Wai Tillison
Darron Poulsen	David Pitter	Belia Cortese	Darren Levin
Evelia Krsella	Gina Minear	Florance Lapeyrouse	Hassan Baika
Hilario Mclarty	Pat Sowell	Georgiana Vancleave	Lionel Heyen
Kera Arsenaull	Pearlene Hocker	Leslie Speer	Rosario Manos
Maryjane Sippel	Stan Claudio	Danille Franzoni	Alysia Turnbull
Ophelia Letourneau	Tomeka Eadie	Isa Etherton	Bernie Regina
Tamekia Timmins	Artie Fobbs	Shanika Lamoreaux	Clifford Ellingsworth
Ward Lederer	Dalton Greenlee	Tanika Seagraves	Ellis Mosteller
Cheyenne Raver	Kenyetta Bassin	Velma Mcmillan	Elton Cokley
Del Seckman	Ruben Gao	Ariel Pucci	Ena Dangelo
Ernesto Sica	Troy Laiche	Dorothy Hurwitz	Jarrett Depaoli
Johnathan Edelson	Velva Litchfield	Dylan Bien	Peggie Cosner
Marceline Strohl	Euna Forward	Frank Proudfoot	Santos Yip
Zane Gambrel	Kieth Poehler	Jason Rodd	Deena Berti
Arnoldo Melito	Melissia Mclothlen	Morris Dorais	Evan Rappaport
Dexter Weeling	Murray Kulas	Sunni Stangi	Francine Merios
Guillermo Gaulin	Nathanael Entrekin	Terresa Nau	Margarito Carbone
Stephanie Madill	Towanda Bangs	Trey Copas	
Werner Perreira			

Figure 6. Example of the friends' criteria.

If you click the “**gender**” criteria and then a student, all students of the same gender as the clicked student are highlighted. The tooltip tells you what gender are the highlighted students (see Figure 7).

Creating classes for the new school year

Silan's School Year 3 J Smith (Teacher)

Step 1: Configure class-allocation tasks >> Step 2: Data Input >> **Step 3: Allocate Classes** **Allocate Classes** [Allocated] 2016-12-28 18:06

Saved allocation results:

<Create New>

Classing rule weightings:

Academic levels mixed: 0

Class sizes: 49

Friends: 50

At least one friend: 191

Gender balance: 0

Secondary language: 50

Must exclude: 0

3A (26)	3B (25)	3C (25)	3D (24)
Donella Lazard	Ardella Albertson	Alise Colmenero	Chong Floumoy
Edyth Aguayo	Eboni Gibbens	Brain Bazemore	Daniel Frisk
Leo Melford	Elliott Helfrich	Cecily Reese	Darlene Nicholes
Megan Bowley	Leonard Sisco	Elyse Pinner	Lawrence Arguelles
Romona Rufus	Magen Evensen	Joaquin Elkin	Qiana Bourland
Adriana McKelrick	Xavier Cheesman	Lai Fine	Shanta Obermiller
Carole Caudill	Carrol Bealer	Tyree Brecht	Wai Tilson
Darron Poulsen	David Pitter	Bela Cortese	Darren Levin
Evela Kinsella	Gina Minear	Florance Lapeyrouse	Hassan Balke
Hilario McLarty	Pat Sowell	Georgiana Vanceleave	Lionel Heyen
Kara Ansenault	Pearlene Hocker	Leslie Speer	Rosario Manos
Maryjane Sippl	Stan Claudio	Danile Franzoni	Alysa Tumbull
Ophelia Letourneau	Tomoka Eadie	Isa Etherton	Bernie Regina
Tamekia Timmins	Arbe Fobbs	Shanka Lamoreaux	Clifford Ellingsworth
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Arnoldo Melito	Melissa McGlothlen	Morris Dorais	Evan Rappaport
Dexter Welling	Murray Kulas	Sunni Stangl	Francine Mertos
Guillermo Gaulin	Nathanael Entekin	Teresia Naul	Margarito Carbone
Stephene Madie	Towanda Bangs	Trey Copas	
Werner Perreira			

Gender = F

Figure 7. Example of the gender criteria.

Sympathy toward Friendless Students

On the *Step 3: Allocate Classes* (see Figure 5) page, you may have noticed that the “**friends**” criteria is different from other criteria in that it has two slider bars. The first slider bar sets the weights of the “**friends**” criteria, in the same way as all other criteria. The second slider bar, which is called “**at least one friend**,” sets the weight of the first friend of each student. If you set this second weight higher than the first, it means you want the engine to guarantee that each student has at least one friend.

This feature is called “**sympathy toward friendless students**.” It is very useful in minimizing or even eliminating friendless students. Consider the following example (see Figure 8).

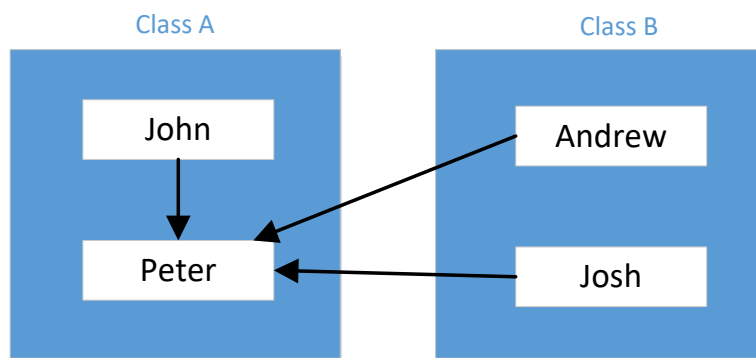


Figure 8. Example of sympathy toward friendless students.

John, Andrew, and Josh all want Peter to be in their own classes. John has no other friend in his class except for Peter, while Andrew and Josh already have some other friends. If you set the “**at least one friend**” weight lower than the first slider bar, then the engine will move Peter to class B, because this move gives an extra friend to two students, while only one student loses a friend. The overall effect is a gain, but this would result in John having no friend in his class. If you believe that a student getting his/her first friend is more important than a student getting his/her second or third friend, then you can assign a weight to the “**at least one friend**” slider bar that is higher than the first slider bar. This will prevent the above-mentioned move from happening.

Another useful scenario of using this feature is when you find that the “**friends**” criteria suppresses other criteria too much; however, if you lower the “**friends**” criteria weight, then too many students become friendless. In this case, you can lower the “**friends**” criteria weight and increase the “**at least one friend**” weight. The effects of this are:

1. If a student has no friend, the engine suppresses the competition from other criteria, including competition for friends from other students who already have at least one friend.
2. As long as each student has one friend, the engine suppresses the “**friends**” criteria to not to compete with other criteria. This would result in other criteria better satisfied.

Conclusion

For elementary school students, starting a new school year and moving into a new class can often be stressful. Students having some of their best friends with them in their new class often determines whether they are looking forward to or feeling anxious about the new school year. Based on an innovative mathematical algorithm, with an intuitive user interface and data import/export process, *Teacher’s Pet* (Liu, 2016) solves this problem completely and gracefully, offering an opportunity to make kids less stressed and happy about going to school. *Teacher’s Pet* is a tremendous tool that can be utilized by schools for kids all over the world.

References

Liu, S. (2016). *Teacher’s pet*. Retrieved from www.teacherspet.net.au