STORM

PROJECT STORM

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1 General Information

1.1 System Overview

The STORM system enables users to allocate teams, from a list of subjects, by selecting a set of criteria. The criteria can typically be marks, gender, Belbin roles, personality types or the number of times certain subjects have worked together. Multiple criteria may be used with different weights to ensure that the perfect teams are allocated. This will aid the users in such a way that the users do not have to allocate the teams manually, which may require a lot of time. The users can rather spend their time on analysing the results of each "Rocking the Boat" round to change the criteria for the next round more effectively. The process, which we call rocking the boat (RTB) was applied to teach teamwork and to facilitate the formation of effective student work-teams for a third year Software Engineering module. RTB exposed the students to situations where they could learn social skills required for teamwork in a protected environment. Students were expected to make errors related to inexperience within teams and learn from these mistakes. However, the long term negative impact that may be caused by such errors, was obviated.[1]

1.2 System Configuration

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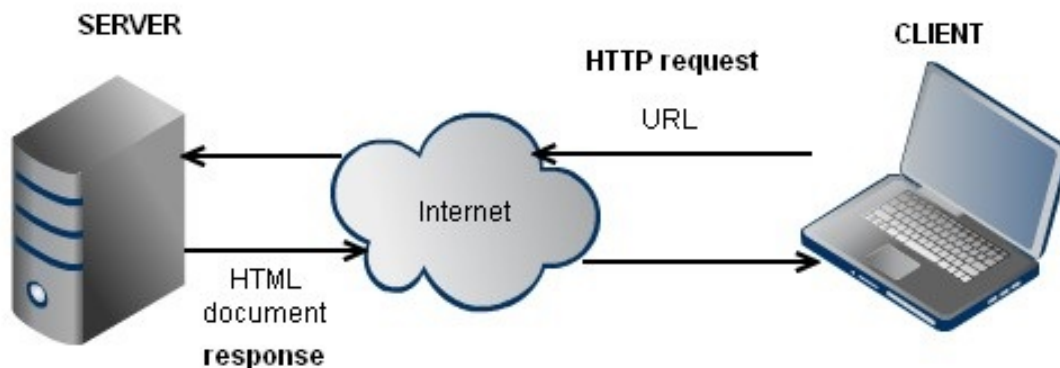
1.2.1 User Interface

Refer to this section for information on the front-end part of the system. For example the part that will be used by the bulk of the users to shuffle the teams on the web client.

For users to use the system, they only need a web activated device with a web browser. The user will be abe to import subjects for their projects by uploading a .csv file that will be added to the database. The user will also be able to download the results of their team by downloading a .csv file from the database.

The STORM system works best and is tested on Google Chrome, and is likely to work on other browsers as long as your browser supports HTML 5 and JavaScript is enabled.

1.3   Installation

1.3.1   User Interface

Refer to this section for information on the front-end part of the system. For example the part that will be used by the bulk of the users to shuffle the teams on the web client.

Because the system is web based, it does not have to be installed on your device. It can simply be opened from any web browser and software to open and edit .csv files such as OpenOffice or Microsoft Excel. Your web browser might ask you to install Java if you do not have the appropriate version. Your JavaScript has to be enabled in your web browser. It can be done by following this steps:

Google Chrome

1. Click the Chrome menu icon Chrome menu on the browser toolbar.
2. Select Settings.
3. On the "Settings" page, click the Show advanced settings... link.
4. In the "Privacy" section, click Content settings...
5. Select Allow all sites to run JavaScript (recommended) in the "JavaScript" section.
6. Click Done
7. Finally, refresh your browser.
8. If you did not manage to enbale JavaScript, follow the link for more information (http://activatejavascript.org/en/instructions/chrome#instructions)

Mozilla Firefox

1. Open a new Firefox browser window or tab.
2. Copy the following then paste it into the Firefox address bar: about:config
3. Hit the Enter key.
4. On the following page, click the button: "I'll be careful, I promise!"
5. Find the javascript.enabled row under the Preference Name heading.
6. Double-click anywhere within the javascript.enabled row to toggle the value from "False" to "True".
7. Finally, refresh your browser.
8. If you did not manage to enbale JavaScript, follow the link for more information (http://activatejavascript.org/en/instructions/firefox)

Safari

1. In the Edit drop-down menu at the top of the window, select Preferences...
2. Select the Security icon/tab at the top on the window.
3. Then, check the Enable JavaScript checkbox.

4. Close the dialog box to save your changes.

5. Finally, refresh your browser.

6. If you did not manage to enbale JavaScript, follow the link for more information (http://activatejavascript.org/en/instructions/safari#instructions)

Internet Explorer

1. Click the gear icon/Tools menu to the right of the Internet Explorer address bar.

2. Select Internet Options from the drop-down menu.

3. Next, select the Security tab at the top of the dialog box.

4. Then, select the earth (Internet) icon.

5. Then select the Custom Level button under the Security level for this zone section.

6. Locate the Scripting section within the list.

7. Under Active Scripting, select Enable, then hit OK.

8. Answer yes to the following conformation box.

9. Hit OK to close the Internet Options window.

10. Finally, refresh your browser.

11. If you did not manage to enbale JavaScript, follow the link for more information (http://activatejavascript.org/en/instructions/ie#instructions)

Please note: *There is a risk in enabling JavaScript - scripting essentially allows execution of code on the browser. The vulnerabilities range from reading your browser's history to installing malware to phishing your bank credentials - each of which can potentially cause you "harm" in some way. However, given that most of today's web sites rely on scripting, there's a huge loss in turning scripting off, up to and including the site no longer showing up in your browser. Turning off scripting also won't protect against other ways for bad things to happen to your computer, so the return for the inconvenience isn't incredibly high. Probably the most common use of scripting is analytics, which allows the webmaster for that site to gain information about who is accessing which pages, thus potentially improving the flow of the site and the information presented. However, the flip side of analytics is targeted advertising, which allows advertisers to follow users across multiple sites. The majority of scripts on websites are "mostly" harmless, just like the majority of software that's available is "mostly" harmless. Security folks focus on the malicious side of things, and continually re-learn that there's a trade-off between usability and security.*

2   Getting Started

2.1   User Interface

Refer to this section for information on the front-end part of the system. For example the part that will be used by the bulk of the users to shuffle the teams on the web client.

How to...

get a license?
>   As this is free software, there is no need to buy any licenses. To use this software, simply sign up for a UserName on the website, Log In, and make use of the shuffling system.
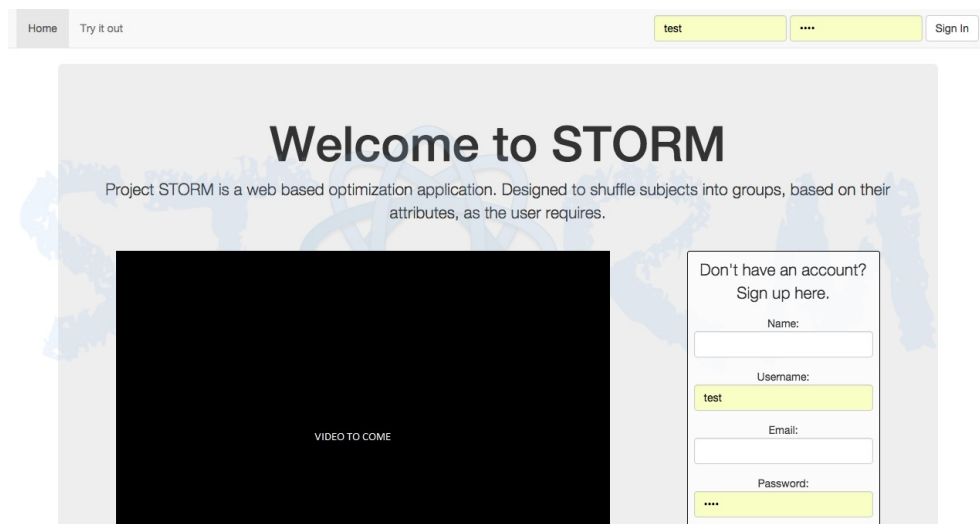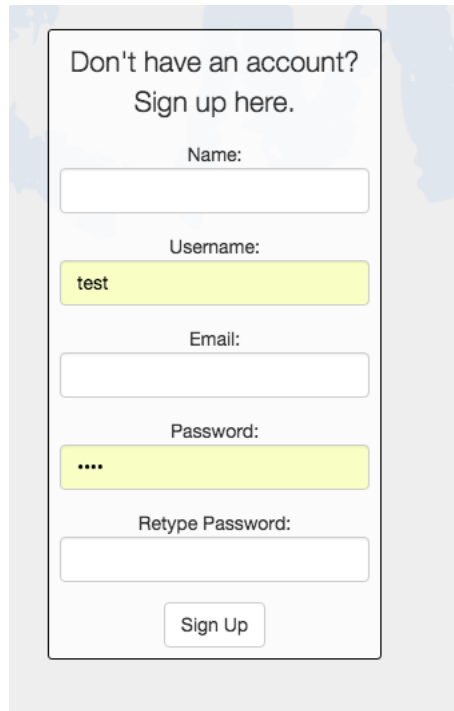

Figure 1: STORM Homepage

get a User ID
>   To sign up for an account, and get a User ID, enter user details in the appropriate fields in the following figure.

Figure 2: Signing Up to STORM

Click on submit and the system will register the user in the database.

log in

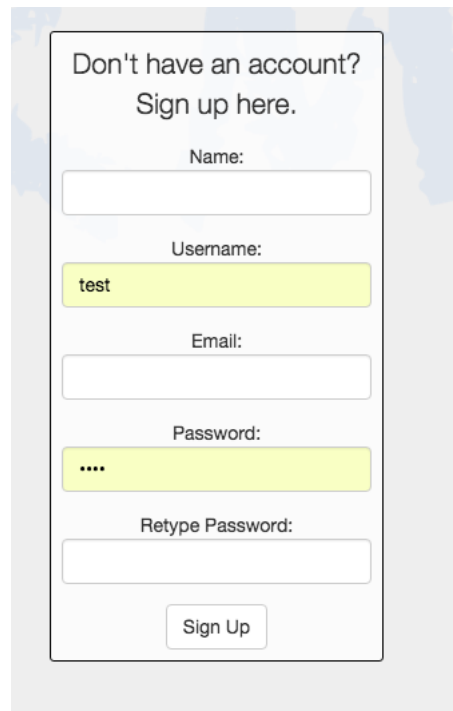To log in to an account, enter user details in the appropriate fields in the following figure.

Figure 3: Logging In to STORM

Click on submit and the system will navigate to the user's specific team shuffling page.

3 Using the system

3.1 Sign Up

To Sign up, insert your details in the following box on our Home page. To sign up for an account, and get a User ID, enter user details in the appropriate fields on our Home page in the following figure.

Figure 4: Signing Up to STORM

Click on submit and the system will register the user in the database.

3.2 Login

To log in to an account enter user details in the appropriate fields in the following figure.

Figure 5: Logging in to STORM

Click on submit and the system will navigate to the user's specific team shuffling page.

3.3 Log out

Logging out of your account can be achieved by simply clicking on the "Logout" button that will be displayed at the upper right corner of your screen after being logged in.
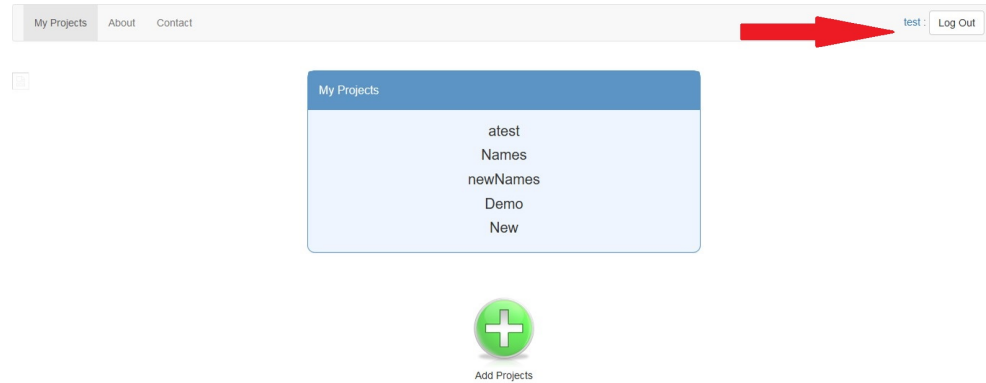

Figure 6: Logging out of STORM

3.4 Project Setup

The first page you will see after logging in, will be the Project Setup page. Where you can manage all the projects that you have created with the software. A project is created with subjects in the project, subjects can then be shuffled to create teams. Subjects can be added at any stage by uploading a .csv file. If the subjects are saved to the database, the project will include the new subjects. Projects can be added and removed from the Project Setup page. A STORM project is a container for a combination of subject sets, different team configurations (rounds) and an interface for visualizing team configurations by using graphs.

Please note: **You may not have multiple projects with the same name, each project should have a unique name.**
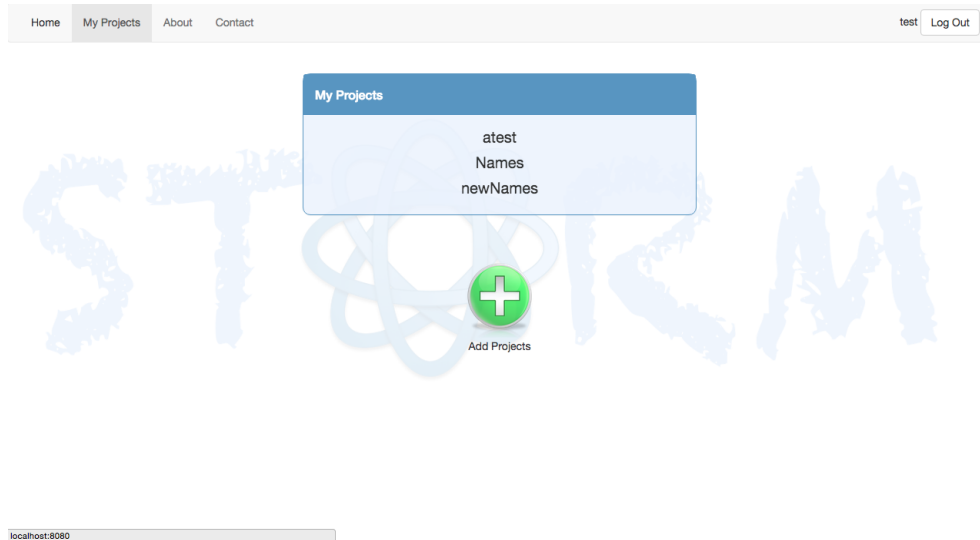
Figure 7: Team Setup Page

3.5 Shuffle

After choosing a team to work with, the following page will be displayed. Here you can see the team you have created, or start by creating your first team dynamically by using the options at the top of the page.
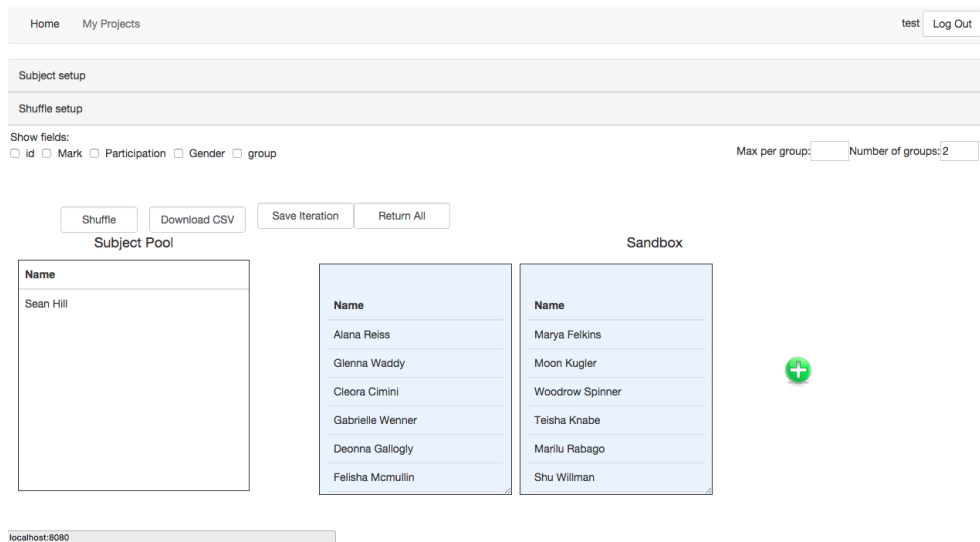

Figure 8: Shuffling Page

3.6   Subject Setup

This options tab allows users to review their subject data. All the data uploaded to the database are showed here. You can add subjects, delete subjects or edit subjects.

Figure 9: Subject Setup dropdown

- When adding subjects, you should keep the values uniform according to the columns. You should not add alphabetical characters to numeric columns. You have to validate your data when adding new subjects manually. You should remember to save or cancel your changes.

Figure 10: Add Manual Subject

- When editing subjects, you should keep the values uniform according to the columns. You should not add alphabetical characters to numeric columns. You have to validate your data when editing subjects manually. You should remember to save or cancel your changes.

Figure 11: Edit and Delete Subjects

3.7 Shuffle Setup

This options tab allows users to make choices about the shuffling algorithm to use, as well as the weights of criteria in multi criteria shuffles.

Figure 12: Shuffle Setup dropdown

3.8 Upload CSV

A .csv file can be uploaded into the system after a project has been created to add more subjects and criteria to the project. Firstly export the .csv from STORM, update the .csv and import the .csv as can be seen using the buttons in the figure below.

Figure 13: Shuffle Setup dropdown

Please note: **If a criteria is added to the project, it can't be removed.**

If a criteria was added that is no longer in use, the user can choose to just ignore the criteria by not showing it. If the user would like to remove a criteria there is a workaround by following the steps below:

1. *Export the .csv file and save it to the desktop.*
2. *Remove the first column in the.csv file which is a unique ID.*
3. *Remove any unwanted columns (criteria) or rows (subjects).*
4. *Create a new project and upload the .csv file that has been updated.*

- The following rules apply to uploading the initial .csv

  1. The file cannot be empty
  2. The file must contain at least 1 column
  3. The file must contain at least 2 subjects
  4. The first row must be column headers(Criteria names)
  5. The first column must contain subject names with header "Name" as this value is the default value to display subjects in the team setup shuffling page.
  6. Each student must contain a value for each column.
  7. Any number of columns can be present
  8. Any number of subjects can be present
  9. Values may not contain instances of ";" or "," characters.

	A	B
1	Name	
2	Ronnie	
3	Shaun	
4		

Figure 14: Minimal Initial Upload

	A	B	C	D	E
1	Name	Surname	Gender	AvgMark	
2	Ronnie	Van Dyk	M	77	
3	Shaun	Meintjes	M	80	
4	Sean	Hill	M	81	
5	Dian	Marx	M	76	
6	Sandy	Du Preez	F	60	
7					

Figure 15: Correct Initial Upload

	A	B
1	Student number	Name
2	12204359	Ronnie
3	12207871	
4	12209865	
5		Andy
6	12201546	Sean
7		
8		

Figure 16: Incorrect Initial Upload Example - Rules (5) & (6) broken

Figure 17: Incorrect Initial Upload Example - Rules (3) & (5) broken

- The following rules apply to uploading additional .csv files

  All initial upload rules apply to any additional uploads, except for rule (3).

  1. Hints
     (a) Download a csv containing all subjects in the current set.
     (b) Add additional criteria or subjects to that file.
     (c) Subjects can also be edited and the changed values will overwrite the current values in the set.
     (d) Do not delete a subject from the file(Deleting subjects can be done online in the subjects table)
  2. Rules for adding criteria
     (a) First column of the file must contain unique identifiers that was added during the export, one for each subject currently existing in the set. (Omitting one identifier will result in error)
     (b) New criteria can be added in the column next to the identifiers. (Omitting the rest of the columns currently in the set. This is to make it possible for the user to add criteria by using only a list of all the subjects unique identifiers. NB no additional subjects can be added in this way. See "Adding Criteria and Subjects" section. More than one new criteria can also be added in this way.)

Figure 18: Correct add criteria upload

3. Rules for adding subjects

    (a) For only adding new subjects use the whole subject set. (can be downloaded from the team setup page) and append new students at the end of the file.

    (b) New subjects must have a value for each criteria currently in the set.

    (c) New subjects must have an identifier unique from any existing subjects in the set.

	A	B	C	D	E	F
1	id	Name	Surname	Gender	AvgMark	
2	1	Ronnie	Van Dyk	M	77	
3	2	Shaun	Meintjes	M	80	
4	3	Dian	Marx	M	76	
5	4	Sean	Hill	M	81	
6	5	Sandy	Du Preez	F	60	
7	6	NewSubject	New	F	89	
8						

Figure 19: Correct add subjects upload

4. Rules for adding subjects and criteria (Growing the set horizontally and vertically)

    (a) For adding new criteria and subjects you have to use the whole subject set. (can be downloaded from the team setup page)

    (b) Append new criteria in the first available column next to the last criteria in the current set.

    (c) Append subjects to the end of the file after the last subject in the current set.

(d) New students must have values for each criteria in the current set, even newly added criteria.

	A	B	C	D	E	F	G
1	id	Name	Surname	Gender	AvgMark	NewCriteria	
2	1	Ronnie	Van Dyk	M	77	notEmpty	
3	2	Shaun	Meintjes	M	80	notEmpty	
4	3	Dian	Marx	M	76	notEmpty	
5	4	Sean	Hill	M	81	notEmpty	
6	5	Sandy	Du Preez	F	60	notEmpty	
7	6	NewSubject	New	F	89	notEmpty	
8							

Figure 20: Correct add subjects and criteria upload

4 Shuffling

4.1 The basic sorting algorithm

The actual sorting functionality is mostly done by two basic algorithms, similar and diverse shuffle.
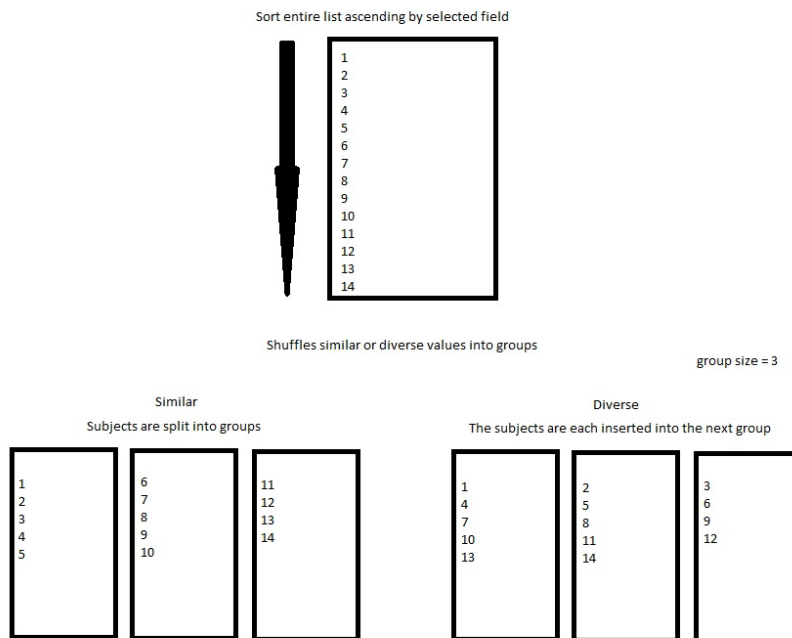
Figure 21: The basic similar/diverse shuffle algorithm

With both functions the list of subjects are sorted in ascending order, by the selected field.

The similar algorithm then splits the list of subjects into a predefined number of groups as blocks, and the diverse algorithm inserts each of the subjects into the next group in the linked list.

4.2 Shuffling by a single field

Selecting a single field runs the basic algorithm only once.
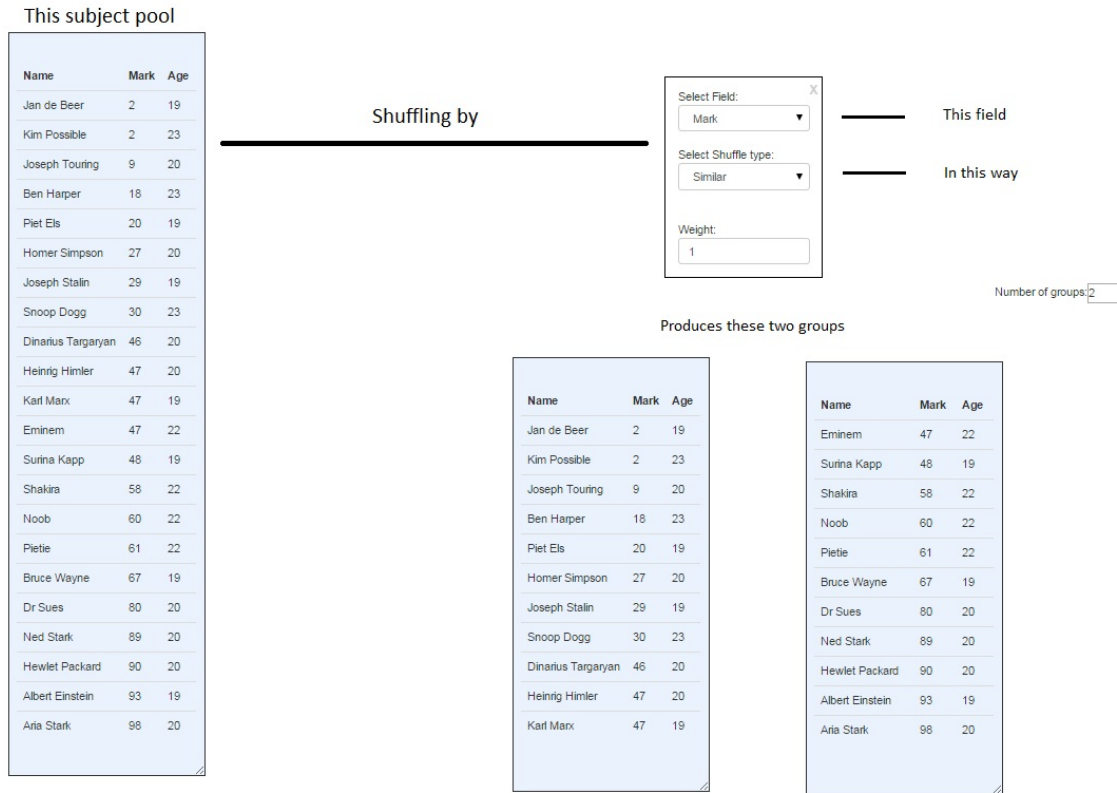
Figure 22: Single field example

With only one field selected as criteria, weight is irrelevant. Distribution is as good as it's going to get for the selected field.

4.3   Shuffling by multiple fields

Multi-level shuffling is used, the field with the highest weight(or first in line), is used to pre-shuffle the subjects into a smaller amount of teams,which are then each sorted into teams to finally reach the desired amount of teams.

Select Field:
Mark ▼

Select Shuffle type:
Similar ▼

Weight:
1

Select Field:
Age ▼

Select Shuffle type:
Diverse ▼

Weight:
1

A second field to shuffle by is added

*at lest 4 groups are needed to shuffle by 2 fields

Number of groups: 4

Weights are the same so the order is Mark, Age. The total weight is 2, so each shuffles into 1/2 * 4, which is 2. We know that mark shuffles the subjects into:

Name	Mark	Age
Jan de Beer	2	19
Kim Possible	2	23
Joseph Touring	9	20
Ben Harper	18	23
Piet Els	20	19
Homer Simpson	27	20
Joseph Stalin	29	19
Snoop Dogg	30	23
Dinarius Targaryan	46	20
Heinrig Himler	47	20
Karl Marx	47	19

Name	Mark	Age
Eminem	47	22
Surina Kapp	48	19
Shakira	58	22
Noob	60	22
Pietie	61	22
Bruce Wayne	67	19
Dr Sues	80	20
Ned Stark	89	20
Hewlet Packard	90	20
Albert Einstein	93	19
Aria Stark	98	20

And then suffle by diverse ages, shuffling each of the previous groups into two diverse groups

Name	Mark	Age
Jan de Beer	2	19
Homer Simpson	27	20
Snoop Dogg	30	23
Karl Marx	47	19
Dinarius Targaryan	46	20
Ben Harper	18	23

Name	Mark	Age
Piet Els	20	19
Kim Possible	2	23
Heinrig Himler	47	20
Joseph Touring	9	20
Joseph Stalin	29	19

Name	Mark	Age
Surina Kapp	48	19
Noob	60	22
Ned Stark	89	20
Aria Stark	98	20
Albert Einstein	93	19
Shakira	58	22

Name	Mark	Age
Bruce Wayne	67	19
Dr Sues	80	20
Eminem	47	22
Hewlet Packard	90	20
Pietie	61	22

Figure 23: Multiple field example

5   Troubleshooting

5.1   Errors

5.1.1   Functionality errors

- If you have shuffled and the wrong output is given, ensure that you have kept the integrity of the data and that no validation rules has been broken. For example no numeric value has been added instead of "M" or "F" for gender.

- If some participants stayed in the subject pool after shuffling, please return the subject to the pool, refresh the page and try again. If the error persists, please ensure the integrity of your data is still correct.

5.1.2   General errors

- If you receive the following error: "An error has occured: Could not connect to database". Please check you internet connection and try again.

- If the page is unresponsive, please refresh the page and try again.

6 References

1. "Pieterse V., Thompson L. & Masrhall L "Rocking the boat" - An approach to facilitate formation of effective teams. Proceedings of the 41st annual conference of the Southern African Computer Lecturers' Association (SACLA). (6-8 July 2011)."