

WSDC 2015 Draw

My thanks to Sayeqa Islam and Luke Churchyard for spotting the two issues that triggered these changes.

The first is that ABEF teams have all their unprepared debates against ABEF teams, and conversely CDGH have all their prepared debates against ABEF teams.¹ At current, every team has 2 prepared and 2 unprepared debates against each of the top and bottom half of the draw, satisfying what we had designated as the ideal situation under condition 6. However, this first issue suggests that we haven't quite achieved a perfect balance between type of debate and strength of opponent because although there is balance between the halves, there is an imbalance within the halves.

A similar issue can be raised in regards condition 7, and the balance between side of debate and strength of opponent within the halves of the draw.

To quantify these issues, I have added columns HY and IH. Column HY gives a weighted score of the strength of opponents faced (as in column EX) by a team as proposition. Column IH similarly gives a weighted score of the strength of opponents faced in a debate with a prepared motion. Ordinarily² the ideal score is 18 and both scores assume that imbalances in opposition and unprepared motions respectively are mirrored in any proposition and prepared motion imbalances.

Unfortunately, I have not been able to find a complete solution for these first issues. In many instances these two conditions seemed to work against each other, where achieving a correct balance on condition 6 created imbalance on condition 7 and vice-versa. Even where a correct balance could be achieved for one of the conditions, these were often undone by necessary changes due to the expansion to 52 teams, the further adjustments for the cannibal round and logistical changes. Finally, because of the logistical need for at least one set of 6 teams on Day 1, this often necessitated undesirable pairings of top-half teams against each other in R2.

Whilst a complete solution regretfully could not be found, the new draft grid does improve slightly on the previous position, with 65 teams facing imbalances instead of 73. I do not doubt it is theoretically possible to improve this further but alas I haven't been able to yet find the magic formula.

The second issue concerned the removal of the AvH round and replacing it with AvE and DvH. I have left it to section 6 to expand on why we have sought to remove the AvH round, which I appreciate generated concerns amongst some affected teams. In terms of our shifting of the A and H teams to face D and E opponents, I am extremely appreciative of the feedback and analysis on the shift.

The original shift was taken because analysis of the results of the last five years suggested group E is one the most volatile groups. It therefore seemed appropriate for distortions to lie where they would be least determinative of the final outcome, because they'd be just one of many other factors making the pre-tournament rankings inaccurate.³

However, as Sayeqa and Luke noted, an additional E and D team are not inconsiderable distortions for A and H respectively (both more stable groups), and it creates a significant imbalance in opponent strength between adjacent groups when their past results do not necessarily justify this difference.

In light of this, I have sought instead to break up the CF pairing in Round 7. This reduces the distortion in the strength of opponents faced (on average from ± 1.348 to ± 0.744 , standard deviation of 2.287 down from 2.950), whilst keeping it to relatively unstable groups (C is 2nd and D is 4th highest in annual rank-shifting, and they are respectively 6th and 3rd in annual result-shifting).

¹ There is a related issue that the draw results in teams having two of their closest match-ups on the final day. This is understandably a difficult position, but I have not been able to reach a solution on it. This is not ordinarily a problem with the existing grid, but arises because the logistical arrangements triggered the swapping of Round 2 to Round 7, making Round 7 and 8 both close match-ups instead of just Round 8. It also seemed to be less problematic that later rounds should have more close match-ups, after teams have gotten into the rhythm of the tournament. Finally, the inability to solve the first issue made it far more difficult to address this related issue.

² An additional H team as a 53rd team means the true ideal strength of opponents drops slightly to 17.735.

³ Group E has the highest annual rank-shifting of 11 places (if we converted A-H to 1-6 and calculated the absolute difference for E teams between pre and post-tournament rankings), and is the 2nd highest group for annual result-shifting (where we calculated the change in average wins and judges between pre and post-tournament). D teams are 7.6 in rank-shifting (3rd) and 4th in result-shifting.

1. Basics

This grid is based substantially on the grid structure which was developed by Simon Quinn and Christopher Erskine for WSDC 2010 and has been implemented at WSDC in the intervening years by Simon Quinn. Credit also to Derek Lande and Luke Churchyard for inspiring and writing portions of the analytics. Any errors present in either this explanation or in the attached grid structure are, however, the responsibility and fault of Paul Lau alone. I apologies in advance if any such errors exist.

Reading the grid: Each cell represents a debate. The first number represents the round in which the debate will occur. There is then a 2 letter code that refers to the position of the left team in debating the top team. For example, Team A1 will be Proposition against Team A2 in Round 8, an unprepared round.

[SHEET NAME] indicates the sheet that reflects the changes, adjustments or discussion point referred to in the explanation.

- Solid black bullet points list distortions or imbalances arising from the draw. All other lists are for other purposes.

Groups refer to the ranked groups (A, B, C, D, E, F, G and H).

Pools refer to groupings of teams made by the grid (The first pool is A1, H1, D1, E1, C6, F1, B1, G6).

Type of debate refers to whether a debate is of a prepared motion or an unprepared motion.

2. Criteria

These are the criteria that the draw should satisfy as far as possible, roughly in order of how easy it is to achieve not priority

	General Statement	Ideal Position	Notes
1	Every team has the same number of debates	Every team has 8 debates, 1 in each round	Column EM indicates how many debates a team has, ideally 8. Columns EC-EK count if a team has a debate in Rounds 1-0
2	Every team has the same number of prepared and impromptu debates	Every team has 4 each of prepared and impromptu debates	Column FC and FD indicate the number of prepared and impromptu debates respectively, ideally both 4
3	Every team debates as proposition and opposition the same number of times	Every team debates 4 times each as proposition and opposition	Column EZ and FA indicate the number of debates as proposition and opposition respectively, ideally both 4
4	Every team faces opponents of a similar strength and difficulty	Every team faces 1 opponent from each of groups A-H	Column EO-EV count how many times a team faces opponents from a certain group. Column EX summarizes this to represent the overall strength of the opponents faced. 36 represents 1 from each A-H, a higher number represents more high-seed opponents and a lower number represents more low-seed teams ⁴ . EX68 counts how many teams do not have a 36 strength of opponents, whilst EY68 shows the standard deviation of opponent strengths. EO68-EV68 indicate the average opponent strength for the relevant group of teams
5	Every team has fair balance between type of debate and side of the debate	Every team has 2 each of Prepared proposition, Prepared opposition, Unprepared proposition and Unprepared opposition	Column FF-FI count number of debates in each combination of type and side, ideally all 2. This criteria aims to avoid a team having 4 Prepared debates as proposition and 4 Unprepared debates as opposition
6	Every team has fair balance between type of debate and	Teams have as many prepared debates as unprepared debates against both A-D and E-H teams, 2 of each type within each half. Within	Column FN and FO indicate how many times a team faces an A-D opponent in a prepared and unprepared debate, ideally both 2. Column IH gives a weighted score of the strength of opponents faced in prepared debates, column

⁴ Given the addition of a 53rd team (an H team), the average strength of opponents actually falls slightly to 35.472

	strength of opponent	each half strength of opponent faced should also be balanced	IJ checks if this is a desirable score (TRUE is desired, FALSE indicates imbalance), with the number of imbalanced teams indicated in IJ2. It is assumed that imbalances in E-H opponents and in unprepared debates is mirrored in A-D and prepared imbalances. The exception is where a team faces more or less than 4 A-D teams, whose occurrence is indicated in column FM. This criteria aims to avoid a team having 4 Prepared debates against their 4 higher-seeded teams and 4 Unprepared debates against their 4 lower-seeded teams
7	Every team has fair balance between side of the debate and strength of opponent	Teams have as many proposition debates as opposition debates against both A-D and E-H teams, 2 of each within each half. Within each half strength of opponent faced should also be balanced	Column FK and FL indicate how many times a team faces an A-D opponent as proposition and opposition, ideally both 2. Column HY gives a weighted score of the strength of opponents faced as proposition, column II checks if this is a desirable score (TRUE is desired, FALSE indicates imbalance), with the number of imbalanced teams indicated in II2. It is assumed that imbalances in E-H opponents and in opposition debates is mirrored in A-D and proposition imbalance. The exception is where a team faces more or less than 4 A-D teams, whose occurrence is indicated in column FM. This criteria aims to avoid a team facing A-D teams only ever as Proposition and E-H teams only ever as opposition
8	Draw as a whole does not create sub-pools	The debates are spread as evenly and randomly across the whole grid. If A1 and A2 face each other at some point, they face different B-H teams.	At current we are only able to check this by visually examining the grid as a whole to see the extent of distribution of modules around the grid
9	Every team has debates on both sides in a given day	In any given day 1 debate is as proposition and 1 as opposition	Column HL-HO indicates whether a team has the same side in a given day/pair of rounds. 1 indicates 2 different sides, 0 indicates a repeated side
10	Teams do not need to change venues during the day	Modular structure ⁵ remains intact	Relevant only for R1 and R2 for WSDC 2015 Singapore. At present, this requires a visual examination about the extent to which the grid's modularity has been altered

3. The 52 team draw

The nearest multiple of four to 53 is to build a 52 team draw. I have taken a generic 48 team draw [48] and extended it to 52 teams [52].

52 teams gives us 4 sets of 13, AB represents the first 13 teams, CD represents the second 13 teams, EF represents the third 13 teams and GH represents the final 13 teams. For reasons related to the cannibal round (see later), groups B, C, F and G have 7 teams, whilst A, D, E and H have 6 teams.

This requires us to list teams in the grid slightly differently to reflect these new sets (AHDECFBG rather than AHBGCFDE).

Due to the cannibal round (see later), pools 1, 2, 6 and 7 are listed with an additional difference (emphasis added):

- | | | | |
|------------------|---|------------------|---|
| - Rather than | A1, H1, D1, E1, C1, F1, B1, G1 | - Rather than | A2, H2, D2, E2, C2, F2, B2, G2 |
| They are listed: | A1, H1, D1, E1, C6 , F1, B1, G6 | They are listed: | A2, H2, D2, E2, C7 , F2, B2, G7 |
| - Rather than | A6, H6, D6, E6, C6, F6, B6, G6 | - Rather than: | C7, F7, B7, G7 |
| They are listed: | A6, H6, D6, E6, C1 , F6, B6, G1 | They are listed: | C2 , F7, B7, G2 |

⁵ The modular structure means that blocks of 4 debates are clumped together, creating sets of 4 teams that debate within the set of 4 over the course of the two rounds on any given day. Provided those 4 teams are at the same venue and the modular structure remains, the need to change venues is eliminated in so far as venues accommodate multiples of 4 teams.

The extension to 52 teams creates the following distortions:

- C1, F6, B5, G5 face 2 C and 2 F teams in place of 2 A and 2 H teams.
- B6, G1, C5, F5 face 2 B and 2 G teams in place of 2 D and 2 E teams.

This is tolerable for two reasons. First, an extension to 52 teams adds a B, C, F and G team to the draw, making it inevitable we will have 56 debates involving B, C, F and G teams, as indicated in the totals at the top of column EO-EV. Second, the distortion does not affect the overall strength of the opponents that those teams face. Column EX shows that the overall strength of opponents faced remains 36 despite the distortions because they cancel/balance each other.

4. The 52 team cannibal rounds [52 cannibal]

Round 3 and 8 present a difficulty because these are rounds where teams debate other teams within their own 13 team set, but 13 being an odd-number would leave the 13th team without an opponent. I therefore drew on the adjustment made for WSDC 2010 which had a 56 team base. The fuller explanation is as follows courtesy of Simon Quinn and Christopher Erskine:

With 56 teams there are eight groups of seven teams. This works cleanly for every round except for the round where teams debate against a team from their own group. In that round, six of the seven teams in each group will have an opponent, but the seventh team will not.

However, when we looked closely at the rankings, we found that there was very little to distinguish the seventh-ranked team in a group from the first-ranked team in the next group.⁶

Therefore, if we ensure that the team in Pool A without an opponent from that group is the team ranked either sixth or seventh, and that the team in Pool B without an opponent from that group is the team ranked either eighth or ninth, we can arrange for those two teams to meet each other. That ensures that those two teams debate against a team of similar standard, even though the opponent is actually in the adjoining group.

To do this, we must restrict the choice of teams to fill those positions. This is unfortunate, because it slightly reduces the randomness of the draw. However, we believe this is a small price to pay to ensure that the draw for the seeded teams is as fair as we can make it. And, of course, all the other positions are drawn randomly, so it is only three debates out of the entire competition where the choice of teams is restricted.

Adapting this to a 52 team draw, this means in Rounds 3 and 8 the teams at the bottom of set AB and EF face teams from the top of set CD and GH respectively. This will restrict the choice of teams to fill those positions, but I think is a reasonable trade-off, and affects only four debates out of 104 in the entire tournament. This generates the following distortions⁷:

- C1, C2 face an additional B team instead of a C team
- B6, B7 face an additional C team instead of a B team
- F6, F7 face an additional G team instead of a F team
- G1, G2 face an additional F team instead of a G team

A second set of distortions is that 4 teams (F6, G1, F7 and G2) have imbalances in (i) the type and side of debate and (ii) side of debate and strength of opponent. We can eliminate this by adjusting the side that G1 and G2 will debate in Round 2 and 5 respectively, and then chase this around the draw until it folds onto F6 and F7 respectively.

⁶ The affected B and C teams have a range of 5.00 to 5.33 average wins, and 14.00 to 16.33 average judges. The 7th B team and the 1st C team have identical average wins and are separated by just 0.67 average judges. The 5th B team and the 3rd C team are separated by 0.33 average wins and 1 average judge.

The affected F and G teams have a range of 1.00 to 3.00 average wins, and 5.00 to 9.33 average judges. Although this is a comparatively wider range, this is consistent with the greater range of groups F and G. Moreover, half of the affected F and G teams have missed at least 1 of the last 3 WSDCs, reducing the utility of the averages in and of themselves.

⁷ These are distortions uniquely arising from Round 3 and 8. For C1, F6, B6 and G6, these distortions will be in addition to those inherent in a 52 team draw and noted above.

This results in these teams debating on the same side in a given day:

- D1, E1, C6, F1, A2, H2, B2, G7, D3, E3, C3, F3, A4, H4, B4, G4, A6, H6, B6, G1, D5, E5, C5, F5, C2, F7 debate on the same side on Day 1 and 4 (Rounds 1, 2, 7, 8)
- D1, E1, C6, F1, D2, E2, C7, F2, D3, E3, C3, F3, D4, E4, C4, F4, D6, E6, C1, F6, D5, E5, C5, F5, C2, F7 debate on the same side on Day 2 and 3 (Rounds 3, 4, 5, 6)

The first set of distortions will be eliminated after we make logistical adjustments to Days 1 and 4 so that Day 1 is all prepared debates and Day 4 is all unprepared debates.

The second set of distortions is undesirable, particularly as it affects half of all teams. Nevertheless, I do not think this distortion is so significant as to vitiate the draw. Whilst some teams might have debaters specifically assigned to certain roles for prepared and unprepared debates and therefore be required to debate twice in one day, it is no generally uncommon for debaters to debate twice in a day regardless of whether a team debates on the same side or not. More generally, the need for teams to debate on different sides in a given day certainly is desirable but I think of lesser priority.

As Simon Quinn and Christopher Erskine noted in their explanation in 2010, this affects the draw in the following way (with adjustments in square brackets to reflect its application to a 52 team draw):

For Groups [B and F], the draw will begin by randomly selecting [two] of the [fifth-,] sixth- and seventh-ranked teams in their group. Th[ese] team will be the team[s] that debates against the highest-drawn team[s] from the next group (that is, the teams will be assigned to position [“B6”, “B7”, “F6” and “F7”] respectively). For Groups [C and G], the draw will begin by randomly selecting [two] of the first-, second- [and third-]ranked teams in the group; these teams will be assigned to [“C1”, “C2”, “G1” and “G2”] respectively. Having done that, they will then draw the remaining teams out of a hat to be assigned to the remaining team codes for their group in the anonymous draw.

5. The 53 team draw [53 R0]

We extend the draw to 53 teams by adding H7 to the bottom and then construct Round 0 based on the method used in WSDC 2013 by Simon Quinn:

We need eight ‘rotatable teams’. For this, I have chosen the seven teams assigned to Group H (i.e. teams H1 to H7), as well as team [G7].

In each round, one of the rotatable teams has a bye. For simplicity, I have assigned H1 to have a bye in Round 1, H2 to have a bye in Round 2, and so on. G[7] has its bye in Round 8. In each case that a team has a bye, its position in The Grid is taken by the added team, H7 (except, of course, in Round 7, when H7 would anyway be assigned to the bye.)

Each of the rotatable teams then meets another rotatable team in Round 0. These teams are paired so as to preserve the balance across Proposition and Opposition and prepared and impromptu motions.

This generates the following strength imbalances:

- H1 faces an additional H team instead of a B team
- H2 faces an additional H team instead of a G team
- H3 faces an additional H team instead of a F team
- H4 faces an additional G team instead of a C team
- H5 faces an additional H team instead of a E team
- H6 faces an additional H team instead of a D team
- H7 faces an additional G team instead of a A team
- G6 faces an additional H team instead of a G team
- G7 faces an additional H team instead of a G team

The imbalance is tolerable. First, it is inevitable with the addition of a 53rd team that some imbalances will arise. Second, in so far as the 9 teams have opponents of a differing strength, it is always the case that they have an easier draw, and it seems fair that G and H teams are given this leeway that arises inevitably from an extra H team being added to the mix.

By convention and given the number of pre-released motions, Round 0 is composed of 4 impromptu rounds. This means:

- H1 and H5 have 5 unprepared debates and only 3 prepared debates, 3 unprepared Opposition debates and only 1 prepared Opposition debate
- H3 and H7 have 5 unprepared debates and only 3 prepared debates, 3 unprepared Proposition debates and only 1 prepared Proposition debate

Finally, H1, H4, H6 and H7 will face only 3 opponents from groups A-D and 5 opponents from groups E-H. This accounts for the distortions to balance between (i) type of debate and strength of opponent and (ii) side of the debate and strength of opponent.

6. The AH Adjustment [52 AHCF]

Currently A and H teams face each other in Round 7. We have sought to remove this round with the aim of providing for a more even draw and more meaningful debates, not in terms of facing a team from every letter but in terms of the relative strength between teams. This is a conscious break from the strict confines of condition 4, but one that we hope creates a better set of debates for teams, whilst minimising its knock-on effect on other aspects of the draw.

In order to do so, we break up the pairing of C and F in Round 7 so that A faces Frather than H and H faces C rather than A. As a result:

- A teams face an additional F team rather than H team
- F teams face an additional A team rather than C team
- H teams face an additional C team rather than A team
- C teams face an additional H team rather than F team

I should note that even if we had not sought to remove the AH round, the logistics of Day 1 and its requirement for at least one set of 6 teams would have necessitated us breaking up the AH round at least once (of three), generating an imbalance in the average opponent strength faced by each group.⁸ This is not a justification for removing the AH round, but an indication that our removal of the AH round itself does not generate as much distortion as the shift itself might suggest.

7. Logistics Adjustments [53 logistics]

There are two logistical issues that need to be resolved. First, Round 1 and 2 must both be prepared debates whilst Round 7 and 8 must both be unprepared debates. Second, there are venue restrictions for day 1. Days 2, 3, and 4 are unaffected as Singapore has helpfully arranged for a single central venue either in the 2nd round of a day or for both rounds.

The least disruptive solution appears to be to swap all of the debates that would have occurred during Round 2 (unprepared) with those of Round 7 (prepared), satisfying the first issue. The debates themselves do not change, the only operative difference being that a debate that would have happened in Round 2 now happens in Round 7, and vice-versa.

On the second logistical issue, we need to make some additional adjustments to the draw:

- A1 faces G4 rather than a F team (the F team itself having replaced a H team)
- H1 faces B4 rather than a C team (the C team itself having replaced an A team)
- D1 faces G6 rather than a E team
- E1 faces B1 rather than a D team
- C6 faces F1 rather than a H team (the H team itself having replaced a F team)
- F1 faces C6 rather than an A team (the A team itself having replaced a C team)

⁸ I have included the comparative values in [53 AHCF] in cells EO69-EV69.

- B1 faces E1 rather than a G team
- G6 faces D1 rather than a B team
- B4 faces H1 rather than a G team
- G4 faces A1 rather than a B team

Thanks to these added adjustments, the grid generates the following sets of team who must be in the same venue for day 1:

- (4) E1, B1, H6, C1 (Yellow)
- (4) D1, G6, A6, F6 (Pink)
- (4) C6, F1, D6, E6 (Light Blue)
- (6) A1, G4, G1, A5, F5, B5 (Sky Blue)
- (7) H1, B4, B6, H5, C5, G5, H7 (Green)
- (8) D2, E2, B2, G7, A3, H3, C3, F3 (Red)
- (8) A4, H4, C4, F4, D5, E5, B7, G2 (Pale Orange)
- (12) A2, H2, C7, F2, D3, E3, B3, G3, D4, E4, C2, F7 (Purple)

This is compatible with the hosting arrangements that the convenors have indicated in the following manner:

School A: 7 teams	3 debates	7 teams
School B: 10 teams	5 debates	6 teams + 4 teams
School C: 12 teams	6 debates	8 teams + 4 teams
School D: 12 teams	6 debates	8 teams + 4 teams
School E: 12 teams	6 debates	12 teams