A PRIMER ON DEBATE TABULATION

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# PREAMBLE

Prior to about 1990, almost all debate tournament tabulation was done by hand. The procedures for tabulation were passed from director to graduate student and if you knew how to tabulate a tournament you also learned the mechanics of how power-matching and room placement were accomplished. At present almost all debate tournaments, at least at the collegiate level, are run on computers. The advantages of computer use are enormous, notable in the speed of tab room turn-around time between the last ballot and the release of the next set of pairings, in the reduced number of calculation errors, and in the reduced wear and tear on tab room staff as they are relieved of the most mechanical tab room tasks. There was a day when all points were added by hand and all pairings and ballots were hand-typed.

However, as computers have automated many tasks the people who are running tab rooms may simply “click buttons” and may not understand the underlying processes the computer is going through to accomplish its tasks. There are two hazards here. The first is that, once the very small number of people who write debate tabulation software retire, the knowledge of the underlying processes may be lost forever or at least become much harder to come by. The second is that, for all their power, the computer programs are not always bug-free. Whether due to the sheer complexity of processes, the inability of any one programmer to fully anticipate all possible contingencies that might arise, the changing nature of tournament procedure, or some other reason, the results the computer programs produce are not always ideal. If the person pushing the buttons doesn’t understand what is supposed to be happening, they may not catch a mistake or even know that one has happened. In other words, having a good computer program is no substitute for knowing what’s supposed to be going on.

This is not to minimize the advantages to having computers makes decisions (or rather, having decisions programmed into computers), and especially routinzed ones. There is a good argument to be made that pre-programmed algorithms reduce greatly the number of tabulation errors that occur. (A more extended discussion of human intervention versus computerized decision-making is included below.) Regardless of the value of computer versus human decision-making, there will always be a need for someone to understand what should be programmed into the computer.

The point of this volume is to put in writing the process of debate tournament tabulation and explain the algorithms that are used in the tabbing tasks. They should inform the new tab room director what the computer is (or is supposed to be) doing and describe for future generations of programmers what the code needs to do in enough detail that if the current programs become obsolete a new system can be created.

An ancillary purpose is to present the arguments for and against different tabulation procedures. A large number of decisions must be made about various calculations, and tournament directors are often called upon to make decisions about quantitative issues with little formal guidance. It is my hope that this document can outline the pros and cons of different decisions.

This volume is intended primarily for 2-person team debate contests, but most of the procedures apply for single-person debate (Lincoln-Douglas) or three-person teams. The primary audience is collegiate users, but many of the descriptions here apply equally well to any tournament without a specified tabulation procedure. It will focus on tabulation issues rather than tournament logistics per se, but the two issues inevitably overlap and where they do this text will not shy away from commentary about tournament administration.

There are two giants on whose shoulders the rest of us stand. I list them here in the order I came to know them, not in any order of importance.

Of the various early efforts to computerize debate tournaments, the most successful and widely used was the Tab Room on the Mac (TRM) developed by Rich Edwards, presently of Baylor University, originally in the 1980s. He stopped supporting the Mac platform around 1998 and now exclusively works on TRPC. The collegiate National Debate Tournament uses the TRPC software.

Gary Larson of Wheaton College developed equally successful software named the Smart Tournament Administrator, which was the companion of his academic work with artificial intelligence. The program was originally developed on a proprietary spreadsheet/database program. In 2004 he switched over to Visual Basic code in Microsoft Excel on the most recent version, STA-XL. The Cross Examination Debate Association’s national championship tournament is run on STA-XL, as do several large collegiate debate tournaments (including Kentucky, Wake Forest, and Northwestern).

I am Jon Bruschke, a humble computer grunt who’s main contribution has been the debateresults.com website and not any tabulation software, and must confess upfront that I am a long-time TRPC user which has created those biases one attains from repetition and familiarity. In compiling this monograph I have gained a deeper appreciation for both Rich and Gary, and have learned many valuable things from both approaches.

Having laid my biases bare, this paper is not intended as a comparison of the two sets of software, but rather a primer on tabulation that attempts to survey the various approaches possible. TRPC and STA are mentioned from here on out only as reference points to locate the origins and manifestations of particular approaches. Too much heated debate has already gone into program comparisions; for my part, I am awed by the intellectual and logistical successes of each program and approach, and I hope that this discussion will focus on the best ideas rather than any particular programmer or program.

Also contributing is Terry Winebrenner, a forensic hero who has earned his Purple Heart by attending 10 collegiate tournaments every year since 1964. If a tabulation issue has come up at a tournament, he’s seen it. As the master of the small division, he has contributed invaluably to the discussion of that issue and all of Appendix A is his.

The contributions of these three have been enormous; the errors below are all mine.

-- Jon Bruschke

# I. PRELIMINARIES

## TIEBREAKERS AND SEEDING

All debates are scored in some fashion; it is standard that one team is selected as a winner, each speaker receives speaker points (usually on a 1-30 scale), and each speaker is ranked, 1st through 4th. Speaker points may be duplicated (i.e., two speakers may both get 28 points) but ranks may not. If there is more than one judge in each round, each judge’s ballot may be counted individually. It is possible that a tournament may use 2 judges (or any even number) in preliminary rounds; if this occurs, individual ballots may be counted instead of wins (since a 1-1 split can produce a tie), or used as a second tie-breaker after wins.

All these scores may be combined in a variety of ways, and these combinations and their prioritization form a tiebreaking system. Here are the calculations for tiebreaker variables:

1. Wins: The sum of a team’s preliminary wins.
2. Ballots: The sum of all individual judge ballots for a team (only used if there is more than one judge). Although it is theoretically possible to calculate adjusted ballot counts by throwing out the high and low ballot count, I know of no tournament that does so.
3. Total speaker points: The sum of a speaker’s or team’s speaker points.
4. High/Low adjusted speaker points: The sum of a speaker’s or team’s speaker points with the highest and lowest score thrown out. This can only be calculated after a minimum of 3 scores have been received. “Double adjusted” speaker points throw out the 2 highest and 2 lowest scores have been received and can only be calculated after 5 scores have been received. “Triple adjusted” speaker points throw out the 3 highest and 3 lowest scores and can only be calculated after 7 scores have been received. “Quadruple adjusted” speaker points throw out the 4 highest and 4 lowest scores and can only be calculated after 9 scores have been received.
5. Ranks: The sum of ranks for a team or speaker.
6. High/Low Adjusted Ranks: The sum of ranks for a team or speaker with the high and low scores thrown out, similar to speaker point adjustments described above in #4. Unlike all other tiebreakers, a lower rank indicates a better performance; in other situations a higher score indicates better performance.
7. Opponent wins: The sum of wins of all opponents. For example, if before round 3 a team debated an opponent in round 1 and beat them, and that OPPONENT went on to win round 2, that opponent would have 1 win. If they lost to their round 2 opponent, and that opponent won their first round, the round 2 opponent would have 2 wins. The team in question would then have a record of 1-1 with 3 opponent wins.
8. Opponent points: The team speaker point totals for all opponents, calculated in the same fashion as opponent wins.
9. Judge variance/Z-score/Standard Deviation: A “standard deviation” is a specific calculation that can be performed on a set of data and is described in detail in all introductory statistics books. Verbally, it is the square root of the sum of all deviations from the mean divided by the number of scores minus one. It is calculated by taking all speaker points a judge gives and calculating the average. That average is subtracted from each individual score and the difference is squared. The sum of all the squared differences are then divided by the number of scores minus one, and the square root is calculated for that final score. To calculate a z-score for any given speaker, the score the judge gave that competitor is subtracted from the average speaker points a judge gives out and divided by the standard deviation for that judge.

Tiebreaker order**.** There is a community consensus that for teams, the first tiebreaker should be wins, the second should be ballots (if they are used), the third should be adjusted speaker points, and the fourth should be total speaker points. The logic of “adjusting” speaker point totals by throwing out the high and the low score is threefold: First, some judges might have a tendency to given habitually high or low speaker points. Tossing out the highest and lowest points a speaker earned protects, to some extent, a speaker who has simply been assigned critics who tend to give points outside the range of the rest of the judge pool. Second, removing extreme values might give a “truer” picture of a speaker’s performance. In any set of 8 numbers some variance might be expected, and the values that tend to the middle are considered in most statistical contexts to be better measures of a true, unknown value (in this case, the actual quality of a speaker, as subjectively evaluated by judges). Third, some good speakers might have exceptionally bad rounds or lapses of etiquette that result in lower points (or conversely, bad speaker might have exceptionally good rounds), and removing the high and low points from the overall total provides a degree of forgiveness.

There are also arguments for maintaining total points as a criterion. First, part of good debating is judge adaptation, and one effect of throwing out high and low points is that the final scores for consideration are based on the opinions of a fewer number of critics. Speakers who can perform consistently well in front of a wide range of audiences tend to excel when total points are used as a criterion. Second, what is viewed as useful forgiveness from one perspective can be seen as an unfair pass from another, and at any rate a speaker who has received high points in all 8 rounds has surely performed better than a speaker who received equally high points in 7 rounds but not the 8th. Finally, more data might generally be considered better, especially in a data set as small as 6 or 8.

As already mentioned, these arguments usually flesh themselves out with adjusted points being a higher tiebreaking criteria than total points, although total points are included in the mix. This approach is not universal, however, and some tournaments use only adjusted or only total points, although the former is more common than the latter.

Beyond the fourth tiebreaker there is not consensus, however, that does not mean that the consideration is unimportant and there are numerous instances of cuts being made that involve the fifth tiebreaker or lower. Tournament directors are advised to review the other options and make their own decision about which measure they find to be the most meaningful. Several are discussed below.

There is a community consensus that for speakers, the first tiebreaker should be adjusted points and the second should be total points. Beyond that, there is no consensus, although double-adjusted points would be typical.

There are several items of special note that deserve discussion.

Points versus ranks**.** Thought should be given to the value of ranks versus points. One school of thought is that ranks are meaningless, because good teams at power-matched tournaments who debate each other and have good speaker performances might still receive low ranks. For example, the 4th ranked speaker in a match between undefeated opponents might still perform better than the 1st ranked speaker in a contest between winless teams. Another school of thought holds that, since speaker points are so subjective, ranks add a measure of validity to the scores. Different judges may habitually give higher or lower speaker points and thus point totals, to some extent, always reflect the tendencies of judges rather than the performance of debaters. Ranks, however, are not sensitive to scale, and thus counteract speaker point tendencies of judges. A community consensus is that ranks should generally be no higher than a mid-level tiebreaker, however, the use of ranks becomes more tenable as (a) the number of preliminary rounds gets larger and the number of power-matched rounds gets smaller, and (b) as the variability in speaker point scores between judges rises.

One special case is that of speakers on the same team; if those speakers are tied through several other criteria, a direct comparison of ranks avoids most of the pitfalls discussed above. A computer program might not accept this option (the TRPC does not), however, and thus applying this tiebreaking criteria to the single case of same-team speakers may require manually sorting the two speaker spots in question.

Team and individual speaker point calculations**.** Team speaker point totals are calculated separately from individual speaker point totals, *and the two scores will not always match*. For each round, team speaker point totals are calculated by summing the individual speaker points for both speakers on a team. For adjusted speaker points, the high and low scores for that team are thrown out. The high and low scores for a given team will not necessarily be those of individual speakers. Here is an example of a situation where team and individual speaker points do not match:

Speaker 1 Speaker 2 Team

Round 1 24 23 47

Round 2 29 28 57

Round 3 22 24 46

Round 4 27 28 55

Total: 102 103 205

High/Low dropped: 51 52 102

Notice that the summed adjusted points for the speakers is 103 (51 plus 52), but that the summed total for the team is 102.

Adjustments with multiple preliminary round judges**.** At a tournament with multiple preliminary round judges, high and low scores might be calculated either by round or by judge. For example, at an 8-round tournament with 3 judges in each preliminary round, each speaker will have 24 different speaker point scores, one from each judge. One possibility is that the highest and lowest score from each individual judge is thrown out, and the remaining 22 scores are summed. A second possibility is to calculate the highest and lowest scores for each round, throw out the high and low round totals, and sum the remaining 18 scores. At the National Debate Tournament, the former procedure (calculating adjusted points by throwing out individual judge scores) is utilized.

The value of z-scores**.** There are some special considerations for the z-score measurement. It’s advantage is its rigor; standard deviations are well-known statistics in common usage and are very powerful ways of evaluating the variation of scores. Their value is that they evaluate a speaker’s performance relative to the other scores that a judge gives. For example, imagine a judge has heard 4 rounds and thus 16 speakers, awarded 15 of them 25 speaker points, and given the 16th speaker 27 points. Imagine a second judge heard 4 rounds and gave an average of 28 speaker points with 6 scores of 27, 6 scores of 29, and 4 scores of 28. Arguably, the score of 27 from the first judge is a greater accomplishment than receiving 28 speaker points from the second judge. Z-score measures can capture this difference, and therefore at least partially neutralize distortions in the data caused by judges who give habitually high or habitually low speaker points.

The use of the measure is not without caveats. One limitation is that judges may hear different levels of competition, for example, a judge may hear 2 rounds in the junior varsity division and 2 rounds in the varsity division. One might expect better speaking performances in the varsity than the junior varsity division, but if no accounting is made of this the varsity debaters would receive higher z-scores scores than opponents judged only by critics who judged all varsity rounds. In addition, it is possible that a given judge heard rounds that were genuinely worse than others. A judge who only heard bad teams might give low points because the performances deserved low points; in this situation, a student receiving, say, 27 points from a judge who was averaging 26 points would receive an unfair boost to their z-scores. Finally, as with all measures, standard deviations are more suspect with fewer numbers, and using the measure for judges who have only heard a single or perhaps 2 rounds may be troublesome, especially if those scores are being used in conjunction with judges who have heard 8 rounds (although this limitation applies, in degrees, to all tiebreakers).

The value of opponent measures**.** It should be noted that opponent wins and opponent points are measures of opponent strength, not performance proper. They may be useful for determining which team should face a more difficult opponent (for example, which team should get “pulled up” in a power-matched round as described below) than in determining performance quality per se. One concern some have is that while all other tiebreakers can, at least to some degree, be controlled by the competitors, teams have no control over how their past opponents perform in future rounds. Thus, teams whose opponents flop in subsequent rounds or who receive byes may be more likely to get pulled up through no fault of their own.

In addition, the measure is dynamic and can change radically over single rounds. Imagine a team that has had 4 opponents after 4 debates that have won every debate they were in except those against the team in question. Undoubtedly, that team would have the best opponent win total. Now imagine that the same set of opposing teams all lost in round 5. The ranking of opponent wins would, in all likelihood, drop several notches, even though the teams involved would stay exactly the same. In other words, the measure of opponent quality would have changed sharply even though the list of opponents was unchanged. Because all the distortions that go into other measures of team success – getting an especially favorable or unfavorable judge, getting pulled up or down, receiving byes, etc. – also go into opponent wins, the opponent win rating at any point in a tournament may not give an entirely “true” read on opponent strength. It may still be the best estimate to use at any given point.

Averaging for byes and foreits**.** There are occasions for averaging points. Generally speaking, if a team receives a bye, they have their speaker points and ranks averaged and receive the full benefit of a win. If a team forfeits (due to failure to appear or misbehavior) they receive zero speaker points, maximum ranks, and the full disadvantage of a loss. Note that for ranks, higher scores should be awarded and lower scores will indicate a better performance. For team ranks, teams generally receive a score of 7 for forfeited ranks. Individuals may either receive a 3.5 each, a 4 each, or one may be awarded 3 and one awarded 4 at the tournament director’s discretion.

If the tournament director deems that the situation warrants it, a team may receive a forfeit but have their points and ranks averaged, or teams may receive a “double bye,” where each team is awarded a win and has their points and ranks averaged. Similarly, a “double forfeit” may occur where both teams receive a loss and zero points and maximum ranks.

A special consideration is how opponent wins and points should be calculated for teams receiving a bye. The two options are to (a) award zero wins and points, or (b) to average them across the other rounds. The argument for awarding zeros is that opponent win and point totals are measures of opponent strength, and victory by designation rather than performance is the easiest possible opposition. The argument for averaging is that under normal circumstances teams cannot control whether they receive a bye, and since teams with low opposition totals can be disadvantaged in later seeding (they might, for example, be more likely to get “pulled up” in power matched rounds as described below), they should not be disadvantaged by the receipt of a bye. The default option in the TRPC is to average byes.

Special care should be taken for situations with multiple byes or forfeits. If a team receives two byes at a tournament, averages should be calculated on the remaining rounds, and zeros should not be calculated for either missing score.

Seeding. Teams are typically seeded after the conclusion of each preliminary round. Seeding ranks the teams from 1st to last based on the tiebreakers. For example, teams are first sorted by wins, and if more than one team has the same number of wins, the teams are then sorted by the second tiebreaker, and so on, until each team is ranked. Individual speaker point scores are usually seeded only at the conclusion of all preliminary rounds.

Speaker awards are given on the final speaker rankings at the conclusion of preliminary rounds. Elimination rounds are not included in speaker point totals because teams competing in elimination rounds would have a larger number of rounds than other competitors.

At the conclusion of the preliminary rounds a given number of teams are placed in a single-elimination bracket (described below). The order in which they are placed is based on their seeding. Unless an alternative format is specified (such as the double-elimination system used at the high school National Forensics League championship), teams are not re-seeded at the conclusion of elimination rounds.

## HOW MANY ROUNDS?

If a tournament is relatively large (20 teams or more per division), the number of preliminary rounds is usually dictated by the time available. The considerations are how many days a tournament will last and how many hours each day will be devoted to competition.

A two-person policy debate round takes roughly an hour-and-a-half to two-and-a-half hours to complete. Because of this, there are rarely more than 4 debates held in a single day, although at some tournaments 5 rounds are held on a single day. Additionally, elimination rounds involving more than 4 teams typically take a full day to complete. Given these time considerations, a one-day tournament rarely has more than 4 preliminary rounds and usually does not hold elimination rounds, a two-day tournament usually does not have more than 6 preliminary rounds (a typical schedule would be 4 preliminary rounds on day 1 and elimination rounds on day 2), and a three-day tournament typically has 6 to 8 preliminary rounds (days 1 and 2 are reserved for preliminary rounds and day 3 is for elimination rounds). A common variation for the 3-day tournament with 6 preliminary rounds is to hold the first elimination round at the end of day 2.

Usually, tournaments have an even number of preliminary rounds to achieve side balance. If an odd number of preliminary rounds are held teams will have one more affirmative than negative or vice versa. However, because an 8-prelim schedule can be grueling, some 3-day tournaments have held 7 preliminary rounds with a coin toss to determine sides in the final preliminary round.

## CONSTRAINTS

Any number of limitations can be added or ignored when matching preliminary rounds. The following limitations enjoy a community consensus:

* No team should debate another team from their own school.
* No two teams should debate each other twice during preliminary rounds. The exception to this occurs during very small tournaments (discussed below). If there are more than 12 or so teams in a division, there will virtually never be a need to relax this restriction. If teams do debate each other a second time during preliminary rounds, they should switch sides in their second meeting.
* No team should receive more than one bye.
* Each team should have an equal number of affirmative and negative debates. This is accomplished by having teams debate the opposite side in even rounds than they did in odd rounds. Example: If a team is affirmative in round 7 (an odd round), they will be negative in round 8 (an even round). Even rounds are often referred to as “side constrained” rounds, which means that in addition to other restrictions, a team will not debate a team due to debate the same side that they are that round. If the tournament has an odd number of rounds, teams should have an equal number of affirmatives and negatives prior to the final round and toss a coin (or use some other system of side determination) to determine sides in the final preliminary round. “Side equalization” refers to the procedure by which all teams switch sides in even-numbered rounds; for example, all teams who were affirmative in round 3 will be negative in round 4, and vice versa. (The phrase “side equalization” has a different meaning for elimination rounds, discussed below.)

One additional constraint, often used in preset rounds, is geography. Teams are divided up according to some geographical scheme (such as NDT or CEDA districts, or parts of a state) and, to the maximum extent possible, teams from the same geographical region do not debate. The idea is that teams that are close to each other usually debate each other a lot anyway and one advantage of a tournament that draws from a large area is to expose teams to other teams that they would be unlikely to compete against otherwise. It is common practice to observe geographical constraints in preset rounds but not in power-matched ones. Additionally, at tournaments such as the NDT where the number of judges needed is very close to the number of judges actually present, and the stakes of tournament are quite high, there is an emerging feeling that geographical constraints can be relaxed in favor of mutually preferred judging (see the judge placement discussion below).

## SPECIAL CONSIDERATIONS OF SMALL TOURNAMENTS OR SMALL DIVISIONS AT A TOURNAMENT

A tournament with fewer than 20 teams is generally considered small, but if the number of teams is around 10 or fewer, pairing preliminary rounds using normal procedures may prove very difficult. A first consideration is the maximum number of rounds that are possible.

If a tournament is small and the normal constraints described above are honored, the maximum number of preliminary rounds possible can be obtained by subtracting the number of teams from the school with the largest entry from the total number of teams entered in a given division. For example, imagine that a division has 8 teams and 3 from the same school. The maximum number of rounds would be 5 (8 minus 3). Any other configuration would require that the teams from the school with 3 entries would debate each other.

Some of the normal constraints can be relaxed or altered in order to maximize the number of rounds possible at a small tournament.

The first change is to provide the same number of affirmative and negative rounds but not to alternate each round. Instead of pursuing the “side equalization” process, a team might have several affirmatives or negatives in a row. There is community consensus that this change is fairly non-obtrusive and can usually be made without notifying the participants.

A second change is to allow teams to debate a second time but on the opposite side. For example, if two teams debated in round 1 and will debate again in round 5, the team who was affirmative in round 1 would be negative in round 5. This change rarely meets with objection, but it is good protocol to notify the affected directors of the procedure (usually at registration).

A final change is to allow teams from the same school to debate each other. This is typically only done if all directors with teams in a division assent. The concerns are that within-squad debates can be nasty, since schools typically share evidence and a student could have their own evidence assignment read against them. Another concern is that the school debating itself may be unfairly disadvantaged because one team will, of necessity, lose each intra-school debate. Alternatively, a school debating itself may be unfairly advantaged because the competitors could intentionally lose a round in order to manipulate the records of the teams involved.

Rather than begin a small tournament and hope that tabulation procedures will produce the requisite number of rounds, it is good practice to “preset” the entire tournament, that is, pair all the rounds before the competition starts. Because limitations will severely restrict which teams can debate, power-matching is rarely possible, and even if it is possible, it usually involves very few meaningful choices. It is almost always much better to pair the tournament/division in advance.

One method is simply to instruct the computer program to attempt to pair the entire tournament before any rounds are held. TRPC will perform this function and also allow double-checks of each individual round to make sure no desired constraints have been violated. It is important to note that if the option to preset a small tournament is selected, TRPC will automatically relax some constraints the tournament director might not desire. An alternative is to manually indicate that each round is a preset (see the preliminary round pairing description below) and then to pair each round manually and one at a time.

An alternative is to systematically rotate the teams so that all possible debates occur, or utilize a preset schedule. An extended discussion of these procedures and preset pairings for many circumstances are contained in Appendix A.

## OTHER GROUND RULES

Number of judges. It is very typical that all preliminary rounds will have one judge and all elimination rounds will have at least 3 judges. At some very large and important tournaments, such as the NDT, 3 judges are used in preliminary rounds. The main consequence to this is that wins and ballot counts must be configured in the seeding process. If three judges are desired, it will seriously impact the number of judges needed at the tournament; consult the “how many judges do I need?” section below.

At some tournaments, such as high school NFL districts and some NDT district qualifier tournaments, 2 judges are used in each preliminary round. If this process is utilized, an important decision to make is whether wins will be counted, and if they are, what their tiebreaker priority should be. The use of 2 judges is unusual enough that there is no community consensus on this issue. Consider this example: Team A has 6 debates and splits all 6 decisions. Team B wins debate 1 on a 2-0 decision and loses 0-2 decisions in all 5 remaining debates. If wins are the first tiebreaker, Team B is seeded higher than Team A. If ballots are the first tiebreaker, Team A is seeded higher than Team B. An additional consideration is whether a “tie” is considered a better performance than a loss. The use of 2 judges also impacts the number of judges needed to complete the tournament.

Double wins. In rare circumstances, a judge might indicate a willingness to vote for both teams. If such a decision is allowed, the decision to make is whether each team is awarded 1 win or .5 of a win. If 1 win is awarded to each team, it is arguably unfair that in some debates 2 wins are up for grabs and in other debates only 1 win is up for grabs. On the other hand, awarding 1 win to each team is very similar to a double-bye, which is used in other circumstances. At present, neither TRPC nor STA-XL can accommodate a .5 win.

The argument against double-wins is that all debates are subjective, and although different judges might decide differently, it is philosophically impossible that two teams would be exactly equal on all possible arguments, and if they are not, it is the task of the judge to determine which argument is of greater importance. The argument for a double-win is that there are circumstances where it is logically impossible to resolve the issues either way, or that the arguments made in the debates themselves (such as arguments against logical hierarchies) make it impossible (or unethical) to select between them.

The issue is best resolved in advance; usually the rule should be specified in the tournament invitation. Community consensus is that each debate should have only a single winner, and double-byes (where circumstances were beyond the control of the judge or debaters, or where no debate occurred) are the only circumstance where double wins are allowed.

Fractional Points and Minimums. Common collegiate practice is to allow .5 increments on a 30-point scale. The argument in favor of the practice is that because only the top end of the scale is typically used (it is very rare for fewer than 25 points to be awarded), the .5 fraction allows judges to make finer differentiations between speakers. The counter argument is that judges should simply use more of the 30-point scale, and that fractional distinctions are so slight that they are substantively meaningless.

In practice, it may be the case that a very experienced collegiate judge may be better at distinguishing a performance that deserves a 27.5 as opposed to a 27 than a relatively less experienced high school judge. Generally speaking, the more that judges come from a homogenous community with a well-understood scale for speaker points the less need there is for any adjustment to the scores. Conversely, when the judges at the tournament vary widely in their speaker point criteria and awarding practices, there is more for the tournament director and the tab room to make adjustments for scores that would be deemed “statistical outliers” in other contexts.

Some judges may attempt to award other fractional amounts (for example, 27.3 speaker points). I know of no serious discussion to justify or condemn this practice, but I have witnessed its occurrence a handful of times. Gary Larson has contributed these observations, which I have edited: *There is both a philosophical and practical consideration here. The philosophical issues have received some discussion in measurement theory, which suggests that when measures are aggregated the resulting sum or average can’t be conceived of as more precise than the least precise measure that is aggregated. If we’re measuring how far someone throws a football and some observers pace it off, some use a yardstick, some use a tape measure with inches indicated (no fractions) and others use a tape measure calibrated to millimeters, any attempt to aggregate or compare their observations can’t use or report any more precision than that obtained by the person pacing off the throws. A common trick question in ninth grade general science is to ask students to add 27 + 26.4 + 28.32 with the correct answer being 81 as opposed to 81.72 (or even 82). The whole trick is significant digits. To get 81.72 we would need to add 27.00 + 26.40 + 28.32. We need to note that the observer who reported 27 might have actually observed 26.51 but rounded to 27. In a debate context, if SOME observers use decimals and others don’t we can’t make any valid or reliable comparisons or aggregations of their scores. If one judge rounds to halfs and another reports decimals, we might incorrectly conclude that the 27.5 reported by the former is higher than the 27.4 reported by the latter (even though they had actually rounded it from what they might have thought was a 27.3 if they could have or would have used decimals). For some communities, even using halfs creates comparison and aggregation problems since some judges always report points as whole numbers. Unless EVERYONE simultaneously moves to decimal precision, the entire process has become less reliable rather than more if we pretend that we can use the decimals to distinguish awards.*

*The practical consideration is less critical but is still substantial. The use of decimals significantly increases ballot entry time. Both STA-XL and TRPC are designed to minimize keystrokes by assuming .5 increments. Other increments can be entered but require more keystrokes.*

Although most judges tend only to use the high end of the scale, some judges use a much wider range of scores, and their low scores tend to be substantially lower than the majority of the judging pool. An argument against this practice is that individual judges deviating substantially from the rest of the pool in their use of lower-end scores so skew the results that any speaker who was assigned that particular judge is severely disadvantaged in team and individual seedings; even if adjusted points are the top tiebreaker, total points are usually one of the first 3 tiebreakers. In the collegiate debate community points below 26 are usually used to communicate rude or unethical behavior and may be very damaging to the self-confidence of the speakers. This not a sacrosanct number, but in the era where points are almost always between 26 and 29 some directors are sensitive to lower points sending unwanted messages to the debaters who receive them.

A correction is that a tournament can specify a minimum number of speaker points, usually 20 or 25 unless a speaker has been incredibly rude or unethical. An argument against the minimum rule is that judges should be free to assign points according to their own scale, and that if 25 points is the real minimum than the tournament is really only using a 5-point scale (26-30), and the tournament should not claim to be using a 30-point scale if this is the case. A counterpoint to the latter argument is that many subjective competitions, such as gymnastics and high-diving, usually only use the top end of their scales without any disadvantage to their results. Quantitatively, there are drawbacks to individual judges using a much different scale than others in the pool, and mandatory minimums (or judge variance) are ways to deal with these issues.

The counterpart of judges using the low end of the scale is judges who habitually give higher points than the rest of the judging pool. Some judges may assign all 4 debaters in a round a perfect score of 30 each, or assign every speaker they judge in all rounds of the tournament a perfect 30 points. Just as judges using the low end of the scale disadvantage the students they judge in ways that are largely unrelated to the performance of the debaters, judges using only the high end of the scale unduly advantage the competitors they judge. Corrections involve disallowing more than the assignment of one score of 30 per round, disallowing more than the assignment of one score of 30 per tournament, or making ranks a more important tiebreaker.

One over-riding consideration is whether the tab room should ever modify a ballot without a judge’s consent or even knowledge. Such a practice is questionable; if tab rooms begin to enter the business of changing some components of a judge’s decision it opens the door for a host of other unpleasant decisions. If a tournament has rules about speaker point ranges, it is almost always best to include them in the invitation and to have the ballot table enforce them. If a judge has given points outside the range the tournament has deemed acceptable, the ballot table should refuse to accept any ballot with points outside the range ask the judge to correct it.

Adjusted speaker point totals do correct for these distortions to some extent, but do not eliminate the problems. If two students have roughly equal scores but one is judged by a critic who uses the low end of the scale, it is often the case that the second-lowest score for that student (which would have been thrown out had they not received the points by the habitually low-awarding judge) will be lower than their counterpart who was not judged by the same critic, and thus their adjusted point total will also be lower due to the very low score from the low-awarding critic.

As with double-wins, these issues is best dealt with prior to start of the tournament and specified in the invitation. It is common for tournaments to enforce minimum speaker point rules; it is very unusual for tournaments to put limits on the maximum number of points that may be awarded.

# II. PAIRING PRELIMINARY ROUNDS

Preliminary rounds are divided into two types: Presets and power-matched rounds. Pre-set rounds happen first and are constructed without any knowledge of a team’s record, although they may use pre-tournament rankings to equalize the draw. Power-matched rounds utilize the accumulated records of the teams and, generally speaking, match teams with an equal record against each other. Because they require that results are obtained power-matched rounds occur after the preset rounds.

## PRESETS

How Many Presets? The first decision is how many preset rounds there should be. Preset rounds generally proceed faster than power-matched rounds because the tab room does not have to wait for the results of one round to come in before they post the pairings for the next round. As a result, the more preset rounds there are the faster the tournament can proceed; power matching usually adds a half an hour to an hour between each round. The downside is that the more preset rounds there are the more likely it is that teams will have an unequal draw. Since power-matching necessarily pairs teams with equal records against one another, it has the effect of correcting inequalities in competition. If a team does well in preset rounds because they debated against easy opponents, power-matching will then pair them against the most difficult teams at the tournament and correct the discrepancy. If a team has a difficult draw early on and loses, they will then get paired against other teams with losing records in power-matched rounds. In short, the general tradeoff between presets and power-matched rounds is that presets are faster but power-matched rounds do more to equalize the draw.

Generally speaking, the fewer the number of rounds at a tournament the lower percentage of preset rounds there should be because there are fewer power-matched rounds to correct any discrepancy in draw quality. Usually, a 6-round tournament would have 2 rounds preset while an 8-round tournament would have 3 or 4 preset rounds. A tournament of fewer than 6 rounds will usually power-match the last two rounds, although for a tournament that short the risk of an inequality in opponent quality is greater and more difficult to correct with power-matching given the relatively few number of rounds to fix any problems.

If the tournament is especially large (over 60 teams and spread across several buildings), the speed advantages of presets may outweigh the drawbacks of potential draw inequality. The Northwestern college tournament, for example, routinely attracts over 150 teams and the debates occur in many different buildings. To get in 8 debates in 2 days, the tournament presets all of the first four rounds. However, other tournaments of similar size such as Wake Forest and Kentucky have fewer presets.

What System for Presets? The general issue to deal with during presets is equality of draw, that is, you want teams to have a roughly equal quality of competition in the preset rounds. You want to avoid, for example, one team drawing the three hardest teams in the country in three presets and being functionally disqualified from elimination round contention before the power-matching ever starts, while another team draws three teams that are relatively easy to beat and ends up 3-0.

The easiest system of presets is to pair teams randomly. The computer uses a random-number generator to pair teams against each other and to assign sides. Although a random number generator is, by definition, free from bias, over a small number of instances (such as preset debates) there is no guarantee that all teams will have an equal draw in terms of opponent quality. Across the pairings and over a large number of tries randomness will equal things out, but for the purposes of pairing 2-3 debates it is quite possible that one team (or more) will have an especially difficult draw while other teams will have an easier draw.

There are a number of schemes that involve assigning quality rankings to the teams. Teams may be placed into different quality categories on the basis of performance earlier in the year. For college policy teams, the debateresults.com website includes a host of information about win/loss records, records in elimination rounds, and team rankings. A procedure commonly used in the past was to have schools entering the tournament to rank their own teams. Asking teams to rank themselves can produce faulty results because teams may misperceive their own quality, lack a sense of the relative strength of the pool, or try to manipulate their draw by changing their ranking. Having the tab room rank teams introduces the situation of a decision being made without knowing much about some but not all of the teams. Ranking a team higher or lower than they perceive themselves to be might create hard feelings, especially if the preset draw is a difficult one. Any means of ranking will inevitably involve some degree of subjectivity, especially for teams without an extensive track record. At the same time, no system of presets that relies on rankings can be effective without accurate team rankings.

Generally, some system of ranking is usually preferred to random pairing, and those rankings should as closely as possible be tied to a team’s past performance with some objective criteria applied. (For example: Any team that has cleared at 2 of the 3 largest tournaments to date is an “A,” any team that has not attended or not cleared at the 3 largest tournaments is a “C,” and all other teams are “B.” Any team not fitting these criteria will be placed at tab room discretion.) An extensive discussion of in-season team ratings is available on the debateresults.com website.

There are two basic schemes for ranking. The first group of schemes involves the use of a relatively small number of categories. Common protocols require that (a) there not be more categories than preset rounds, (b) each category should have an equal number of teams, and either (c1) each team should debate one other team from every other category, or (c2) the summed rank of opponents should be equal for all teams. It is possible to use a plus/minus system within each category, although two things should be noted about this approach. First, if the minuses and pluses are treated as their own categories, the number of categories in use increases threefold, and there are not widely understood systems for presetting a large number of categories. Second, the complexity involved in establishing a scheme of pairings without treating each category as separate massively increases complexity and it is not clear that the use of the system can truly balance out opponent strength. For example, if one team gets an A- and a C+, is their draw truly equal to a team with an A+, C- draw? If both teams involved are A teams and should easily beat any C, the team with the A- draw has quite an advantage over the team with the A+ draw in terms of the likelihood of ending up 2-0 after the two debates.

Here are some common examples:

There are 2 presets and all teams are placed into two categories with category “A” being better than category “B.” In round 1 all A teams debate B teams (A-B), and in round 2 all A teams debate other A teams (A-A) and all B teams debate other B teams (B-B). The result is that all teams have one debate against an A and one debate against a B.

Three presets and 3 categories: Round 1 is A-B, C-C, Round 2 is A-C, B-B, and Round 3 is A-A, B-C. All teams debate an A, B, and C.

Four presets and 4 categories: Round 1 is A-B, C-D. Round 2 is A-C, B-D. Round 3 is A-D, B-C. Round 4 is A-A, B-B, C-C, D-D.

Side assignment is crucial in these debates. Half of the teams for each ranking in each odd-numbered round should be on the same side and half should be on the other side; that is, 50% of the teams in each category should be affirmative and 50% should be negative. In example #1 above, if all A teams in round 1 are affirmative and all B teams in round 2 are negative, the A-A and B-B matches in round 2 are impossible because no A teams can be affirmative and no B teams can be negative. Assigning sides at random will rarely produce a desired outcome.

A powerful way to avoid room moves is to place teams in “pods” that form the minimum grouping of teams that can complete the preset cycles and put them in rooms close to one another. Because teams only debate other teams that will be in those rooms, the procedure not only minimizes room moves overall but also the total distance any team has to travel to get between their rooms. See the discussion of “pod systems” in the room placement section for details.

The alternative to the category system is to rank all the teams in order, something called “ordinally ranking.” For example, if you have 20 teams, you should rank the teams in order from 1 to 20. The task now is to make sure the summed ranks of the opponents are equal for all teams. If there are 20 teams and a team debates team #1, they should then debate #20 for a summed rank of 21 (and an average opponent strength of 10.5). This means that a team who debates #11 in round 1 should debate #10 in round 2, or if they debate team #4 in round 1 they should debate team #17 in round 2.

In a 2 preset system where dividing the pool by 2 puts an even number in the top and bottom half, this can be accomplished the following way: Divide the teams into the top half and bottom half based on their rankings. Pair the teams at the top against each in order so that 1 debates 2, 3 debates 4, and so on. Repeat the process for teams in the bottom half of the pool. Put these debates in order based on the highest seed. For example, the debate with team #1 in it is placed at the top. If the debate with team #2 in it is not debating against #1, that debate goes second. If #1 is debating #2, then #3 is the highest remaining seed, so their debate goes second. Now set sides so that in every odd debate the higher seed is negative, and in every even debate the higher seed is affirmative.

Here is an example with 12 teams:

|  |  |  |
| --- | --- | --- |
| **Aff** | **Neg** | **Comments** |
| 1 | 2 | This is debate #1 (odd round) so the higher seed is aff. |
| 4 | 3 | This is debate #2 (even round) so the higher seed is neg. |
| 5 | 6 | This is debate #3 (odd round) so the higher seed is aff. |
| 8 | 7 |  |
| 9 | 10 |  |
| 12 | 11 |  |

For round #2, take a team from the top half of the bracket and have them debate the team in the lower half of the bracket that will give them a summed rank of the top rank plus the bottom rank in the pool. In this example, the top rank is 1 and the bottom is 12 so the summed rank to shoot for is 13. Since team #1 debated team #2, they now debate team #11 to give them a summed rank of 13. Here is round 2:

|  |  |
| --- | --- |
| **Aff** | **Neg** |
| 11 | 1 |
| 2 | 12 |
| 3 | 9 |
| 10 | 4 |
| 7 | 5 |
| 6 | 8 |

Here are the totals after 2 debates. Note that each team has one aff and one neg and that their ranks all sum to 13.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Team** | **Side 1** | **Oppon. 1** | **Side 2** | **Opponent 2** | **Summed Ranks** |
| 1 | Aff | 2 | Neg | 11 | 13 |
| 2 | Neg | 1 | Aff | 12 | 13 |
| 3 | Neg | 4 | Aff | 9 | 13 |
| 4 | Aff | 3 | Neg | 10 | 13 |
| 5 | Aff | 6 | Neg | 7 | 13 |
| 6 | Neg | 5 | Aff | 8 | 13 |
| 7 | Neg | 8 | Aff | 5 | 13 |
| 8 | Aff | 7 | Neg | 6 | 13 |
| 9 | Aff | 10 | Neg | 3 | 13 |
| 10 | Neg | 9 | Aff | 4 | 13 |
| 11 | Neg | 12 | Aff | 1 | 13 |
| 12 | Aff | 11 | Neg | 2 | 13 |

Of course, the quality of the ordinal ranking system rests on the ability to provide meaningful rankings for the teams. The difficulty in obtaining objective data to provide useful rankings has been discussed above; this concern is even more important when making finer distinctions between teams.

## POWER-MATCHING

Power-matching is the process where teams debate other teams with the same record. As described below, teams are almost always put into a “bracket” based on the number of wins, and are then either paired in order (a “high-high” power match) or with the top teams debating the bottom teams (a “high-low” power match). The term “power protect” refers to the archaic practice of teams with the most wins being paired against teams with the worst records and is not used at any contemporary tournament I am aware of.

In addition to the opposition-equalizing function noted above, there are educational arguments in favor of power-matching. The fundamental premise is that teams learn the most when matched against opponents of roughly equal skill; little is gained when very good teams win easily against very bad teams. Very good teams might get even better, however, if pushed by another of the very best teams, and very bad teams might make more progress debating teams they can compete against.

A contrary opinion is that to be the best you have to compete against the best, and power matching is one way of ensuring that the best teams will repeatedly debate against each other, will improve themselves markedly in those debates, and this process makes the gap between them and other teams even larger.

Although on the collegiate circuit it is empirically true that the top 25 teams or so usually have many more debates against other top 25 teams than any team not in the top 25 team, the overwhelming community consensus is in favor of some form of power matching.

Which rounds to power-match? All rounds after the preset rounds are power-matched. There is some debate about which rounds should be high-high and which rounds should be high-low. One position is that all power-matched rounds should be high-low, since the teams at the top of each win bracket have earned their spot and should not be disadvantaged by having to debate the best of the other teams, increasing the risk that they would lose and thus fall in the seeding order. In addition, high-high power matches guarantee that the very best teams “bump each other off,” potentially leaving better teams out of elimination rounds. For example, imagine a 4-3 bracket with 30 teams at a tournament where all teams with 5 wins advance to the elimination rounds. If there are no distortions and the round is power-matched high-high, seed 1 would debate seed 2 and seed 29 would debate seed 30. Arguably, the loser of the 1 vs. 2 debate might still be better than the winner of the 29 vs. 30 debate, but would not advance to eliminations because their record would be 4-4 while the 29 vs. 30 winner was 5-3. Since a significant purpose of the preliminary rounds is to identify the best teams to compete in the elimination rounds, the high-high power match would frustrate that purpose.

A contrary position is that high-high rounds serves the function of “weeding out” teams that are seeded higher than their true talent level warrants (perhaps as a result of weaker opponents in the presets), and that if the top teams debate each other a team that is seeded higher than their ability will quickly lose. The same team at a tournament that exclusively employs high-low power matching will continue to debate weaker competition (within the limits of the win-loss bracket) and continue to enjoy the advantage of weaker preset rounds.

An additional benefit of a high-high power match is that it can offset a situation where a team has received especially low speaker points due to judge habit rather than poor performance. A team that is judged by a critic who awards points much lower than the community average will be lower in the seeding, even after the high and low speaker totals have been thrown out (although that procedure can be a partial correction; see the discussion above). This is especially true if power-matching begins in round 3, since it is at that point impossible to make any differentiation between teams by throwing out extreme scores. Teams in this situation will continually be at the bottom of each win bracket for the remainder of the tournament, and will thus repeatedly debate the best teams in whatever bracket they are in. If high-high power-matching is utilized, that same team will have at least some debates against teams that are at the bottom of the bracket.

Traditionally, all odd numbered rounds were power-matched high-high, and all even numbered rounds are power-matched high-low. A contemporary consensus is that at least one power-matched round, usually the first odd-numbered round after the presets, should be a high-high power match, and that all subsequent rounds should be power-matched high-low.

Procedure for a high-high power match. After the teams are seeded the teams debate other teams closest to their seeding starting with the highest ranked (seed 1 would be the highest-ranked team), so that seed 1 debates seed 2, seed 3 debates seed 4, and so on. If there are an odd number of teams at the tournament, the lowest-ranked team not to have received a bye already is awarded the bye. It is usually very useful to assign the bye before matching teams.

If 2 teams cannot debate because they are constrained against each other (usually because they are from the same school or have debated before at the tournament), the lower seed switches places with the team right beneath them. For example, if seed 3 and seed 4 are from the same school, seed 5 would switch with seed 4.

If one switch still produces a conflict, continue down the seed listing until the highest un-paired seed has an opponent. For example, if seed 3 and seed 4 conflicts, and seed 5 also conflicts with seed 3, pair seed 3 against seed 6.

If the last two un-paired teams are constrained (for example, there are 30 teams, all other teams are paired, but seeds 29 and 30 are constrained against each other), take the higher-ranked of the remained seeds, unpair the debate above them, and switch places with the higher seed in the last debate and the next-highest seeded team. Example: there are 30 teams and seeds 29 and 30 are constrained. Un-do the 27-28 match and switch 28 and 29. Seed 27 now debates seed 29, and seed 28 now debates seed 30.

If this switch still produces a conflict, continue switching the next-to-last seed with the next-higher-up seed until both remaining debates can occur. For example, if switching seed 29 and seed 28 fails to result in all teams being matched, switch seed 29 with seed 27.

In odd-numbered rounds, sides are assigned by alternating the affirmative assigned to every other odd-numbered seed. For example, if seed 1 is affirmative, seed 3 should be negative, and so forth. This process will reduce skewing in subsequent rounds due to side constraints (discussed below). For example, imagine that after 2 rounds there are 8 undefeated teams. If the higher seeds (always the odd seed unless there are constraints that forced adjustments) all win and were all affirmative, then in round 4 when side equalization occurs all 4 undefeated teams will be due negative, and since there will be no undefeated teams due affirmative there will be 4 teams pulled up from the 2-1 bracket to debate the undefeated 3-0 teams. If, however, the odd seeds alternated sides and all of them won, 2 teams would be due affirmative, 2 teams would be due negative, and there would be no pull-up debates at all. This is an additional argument in favor of the use of high-high debates, although at very large tournaments (more than about 60 teams), the advantage might be very slight.

Although deviations from “natural” seeding (1 vs. 2, 3 vs. 4, etc.) can occur, often called “skewing,” the resulting distortion is usually inconsequential due to the small difference in the quality of the competition. For example, at a 60-team tournament it would be very difficult for seed 33 to complain that they were significantly disadvantaged because they had to debate seed 31 instead of seed 32.

It is possible that teams with unequal records to debate one another; for example, if there are 7 undefeated teams, the lowest-seeded undefeated team will debate the highest-seeded 1-loss team.

A variation is to choose to use a different tie-breaker to determine which team to “pull up” and debate the team with a better record. For example, if there are 7 undefeated teams after 4 rounds, it may be desirable to pull up the 3-1 team with the weakest opposition record on the logic that, since some team with a 3-1 record will have to debate a 4-0 team, it should be the team with the weakest opposition record. This is not common practice and counter to much of the logic of the high-high power match.

A second possibility is that if there are an even number of teams with the same win total, and the last 2 teams with the same win total are constrained against debating each other, it may be desirable to switch the seeds upwards rather than downward to prevent record skews. For example, if there are 8 undefeated teams and seed 7 is constrained against seed 8, it is possible to switch seed 6 and seed 7 rather than seed 8 and seed 9. Switching 8 and 9 guarantees that 2 debates will involve teams with mismatched records: Undefeated seed 7 and undefeated team 8 will each debate teams with at least one loss. This is not standard practice; the argument against it is that raw seedings are the best indicator of team quality and that win-loss records are not more meaningful than other tiebreaker criteria. The process might be referred to as “high-high within win-loss bracket” or the shorthand “high-high within brackets.”

Either process described above might be more consistent with pairing in other odd numbered rounds if some of those odd-numbered rounds are high-low power-matched.

Gary Larson has noted that in cases where there are an uneven number of teams in an early high-high round (3 or 5) and there is thus a skew, empirically it is often the case that the team with more losses both defeats their opponent with a better win-loss record and goes on to post a better record for the tournament. This highlights the important point that win-loss record is not always a reliable indicator of which team is disadvantaged (speaker points discrepancies might better indicate a mismatch rather than win-loss records, especially in early rounds). It also demonstrates that there is often more at stake in any given pairing decision than simply the win-loss records of the teams.

Procedure for a high-low power match**.** High-low power matches always occur within brackets (otherwise, the system is the archaic “power protect” system); because of this, the first step is to place an even number of teams in each bracket, starting with the highest win total. For example, imagine that after 4 debates there are 7 undefeated teams. To “even up” the bracket, one team from the 3-1 bracket must be “pulled up.” Teams are then re-seeded within the bracket assuming they all have an equal win record (otherwise the team pulled up is always the lowest seed and thus has to debate the top seed in the higher bracket, an especially dubious penalty for the team that already has to face tougher competition than other any team with the same win-loss record).

A community consensus is emerging that opposition wins are the best measure to use. A team with the lowest opposition wins in their bracket has had the easiest draw compared to other teams with the same record; the logic is that if one team in the bracket will be disadvantaged by having to debate harder competition in the given round, it should be the team who has had the easiest draw to that point. For this reason, it is important that decisions have been made about whether opposition wins should be averaged in the case of a bye or treated as zero.

An alternative is to pull teams from the middle seedings of the lower bracket; most often, these teams will now be seeded by adjusted speaker points (since their win totals will be equal and adjusted team points is the most common 2nd tiebreaker). Pulling from the middle minimizes the skewing of the remaining matchups, especially if the pulling up from that bracket (e.g., the 3-1 bracket) results in an odd number of teams remaining, necessitating a pull-up from the next lowest bracket (e.g., the 2-2 bracket). Pulling from the top of the bracket seems to punish teams for doing well and has the drawback of the high-high power-match of pairing so that better teams (i.e., the highly seeded 3-1 that gets pulled up into the 4-0 bracket and loses, now with a 3-2 record) might end up with worse record than inferior teams (i.e., a middle-seeded 3-1 who beats a mid-range 3-1 team and is now 4-1). Pulling from the bottom of the bracket insures that the team who is pulled up with probably debate a very highly-ranked team in the higher (4-0) bracket, doubly-punishing the pulled-up team.

A common constraint is that no team should be pulled up a second time unless either (a) they have also been pulled down, or (b) all other teams in the bracket have also been pulled up. To actuate this standard, simply remove any team pulled up once and never pulled down from consideration, and pull up the other team in the bracket best fitting the pull-up criteria.

Unlike a high-high round, a team that is pulled up can debate a much more highly-seeded team than they otherwise would have. Because of this, the decision about which team to pull up is extremely important.

Although this is common practice, it is very important to remember that if the overall goal of power-matching is to give all similarly situated teams an even draw by the end of the tournament, then counting even-record matches at specific points in the tournament may not be the best way to ensure that outcome. For example, imagine 2 teams with 4-3 records going into round 8. The first team was 1-2 and was pulled up in round 4 to debate a 2-1 team, and that 2-1 team went on to lose the remainder of their debates to obtain a 2-5 record going into round 8. The second 4-3 team was 1-2 after 3 rounds and debated another 1-2 who went on to accumulate a 5-2 record. If opponent wins are counted, the second team had a much harder draw, debating a 5-2 opponent while the first team debated a 2-5 opponent. If pull-ups are counted, the first team is credited with a harder draw by virtue of the records at the end of round 3. This situation argues for counting only opponent records when pulling teams up or down and ignoring prior pull-up counting. (This paragraph suggested by Gary Larson.)

If the round is an even round, side equalization applies and there must be an even number of affirmative and negative teams in the bracket. This may result in pulling up several teams. Once the brackets have been set and the teams have been re-seeded within the bracket, the highest-seeded affirmative is paired against the lowest-seeded negative. If those two teams are constrained, pair the highest-seeded affirmative against the next-lowest seeded negative. If the final two teams in the bracket are constrained, switch the negative with the next-lowest seeded negative, until the remaining 4 teams can debate.

If the round is an odd round then side equalization does not apply, and you can simply have the top seed debate the bottom seed, the second-highest seed debate the second-lowest seed, and so on, until all the teams are paired. If the last 2 teams are constrained, switch the lower seed with the next-lowest seed until the remaining 4 teams can be paired.

Beginning with the highest bracket, repeat this procedure for each bracket. If the final (lowest-seeded) bracket has an odd number of teams, begin by assigning the bye to the lowest-seeded team who has not yet received a bye, and then pair the rest of the bracket.

Special circumstances**.** An alternative to pulling teams up into the next highest bracket is to “pull the leftovers down.” Instead of pulling up teams to even out the bracket, simply begin by pairing the highest affirmative against the lowest negative, and once all teams on either side of the bracket have been paired move the remaining teams to the next-lowest bracket. Example: After 5 rounds there are 6 undefeated teams, 2 due affirmative and 4 due negative. Pair the highest negative against the lowest affirmative, the lowest negative against the highest affirmative, and move the other two teams due negative down to the next-lowest bracket. If any match produces teams that are constrained, attempt the pairing against the next-closest negative seed. Of course, this same logic works if more teams are due affirmative than negative.

If a tournament or bracket is small enough that there are only 3-4 teams on each side of a bracket, it will occasionally happen that one team can only debate one opponent on the other side of the bracket. If this situation occurs, it is usually best to pair that match first and then pair the remaining debates trying to maintain the high-low pattern as best possible.

Sometimes a team will be constrained against every possible opponent in the bracket. If this occurs, it is usually best to pull that team down, even the remaining bracket if necessary, and then conduct the high-low match in the remaining brackets.

If the tournament is large enough to allow power matching but small enough that there are many constraints in the later prelim rounds (roughly 20 or fewer teams), it may make sense to put all the teams in a single bracket and try to do the best job possible of creating within-bracket debates or the closest approximations possible. For example, if there are 20 teams and 6 rounds, a given team could easily be constrained against 6 to 8 of their possible opponents due to school and prior meeting constraints, resulting in only 2 possible opponents. In this situation the best results might be obtained by viewing all the teams in a single bracket and attempting to pair the most constrained teams first.

Lag power-matching**.** Power-matching typically involves seeding the teams based on the results of all prior rounds up to the round preceding the round to be matched. For example, round 5 would be power-matched off of rounds 1 through 4. Lag power-matching seeds the teams based on some number of rounds other than all rounds preceding the round to be paired. For example, round 5 might be paired off the results of the first 3 rounds without the results of round 4.

This is almost always done to save time. At the Northwestern tournament, for example, getting the several hundred teams to the right rooms in the right buildings takes quite a bit of time, and saving 30 to 45 minutes can make a big difference in when the last round of the day gets out. For this reason, after the first day is done and all the results are in round 5 and 6 will be paired together with round 6 lag-powered off of the results for the first 4 to save time and conclude round 6 roughly an hour earlier than it would be with power-matching that incorporated the first 5 rounds (often called “straight up” power matching). Another example where lag-power matching might be incorporated is to save time at a high school tournament where 5 rounds have been scheduled in one day. Rounds 1 through 3 might be preset, with round 4 lag power-matched off the results of the first 2 and round 5 power-matched off the results of the first 3.

A lag power-match is then conducted in a manner identical to a straight-up power match. There are two additional considerations. First, the computer program (especially TRPC) might be programmed to automatically count byes, and in the lag-powered round will count the bye in the prior round as a win. For example, if round 5 is being lag-powered off of the results of the first 3 rounds the team that received the bye in round 4 will have the bye counted as a win while no other team will have a decision for that round. The result is that the team receiving the bye might be placed one bracket higher than they should be. The STA does not automatically count the bye as a win until all the other rounds have been tabulated.

Second, two measures from the immediately prior round can be obtained even though no other results from that round are known. Opponent wins can be included as can information about whether a team was pulled up in round 4. Careful attention should be paid to how pull-ups and pull-downs are counted in lag powered rounds. Imagine after 4 rounds a 2-2 team is pulled up in a lag-powered round 6 to debate a 3-1 team. If during round 5 the 2-2 team wins and the 3-1 team loses, round 6 is then a pairing of teams that both have a 3-2 record, and no pull-up has occurred. Conversely, imagine 2 teams, A and B, who both have 2-2 records after 4 rounds and are power-matched in round 6. If A wins round 5 and B loses round 5 then round 6 will match a 3-2 against a 2-3 team, and a skew has occurred. Whether to count these circumstances as pull-ups or pull-downs for purpose of constraints on subsequent bracket setting is an important issue and is best decided prior to the tournament. Obviously, if opponent wins are the only consideration for bracket construction and pull-ups and pull-downs are not used, this particular pitfall can be avoided.

# III. ASSIGNING JUDGES

## HOW MANY JUDGES DO I NEED?

No tournament can happen unless there are enough judges to hear all the debates. Typically, any school entering a tournament is required to bring qualified judges, and the first job of the tournament director is to determine how many judges to require. Here are some variations.

The simplest system is to require that all judges be available for all rounds; in this case, the number of judges needed is one-half the number of debate teams entered. For example, if there are 20 teams there will be 10 debates a round, so you need at least 10 judges. In this system, each school would be required to provide 1 judge for every 2 teams or fraction thereof, that is, 1 judge for the first 2 teams, 2 judges for 3 or 4 teams, 3 judges for 5 or 6 teams, etc. This system will make judge placement easier than others but may un-necessarily exhaust the judges. It may also treat unfairly teams who bring an odd number of judges. For example, a school entering 1 team and 1 judge would provide the same number of rounds of judging as a school brining 2 teams and 1 judge, even though the second school was creating twice the demand for judging compared to the first.

Despite its drawbacks, this system may be the most preferable if you are running a large high-school tournament and the sheer size and diversity of your judging pool ensures that not all judges will reliably arrive to pick up their ballots.

If the tournament is especially short of judges, a variation is to require that all judges be available for all rounds and “double flight” the rounds; that is, to hold half the debates of a given round first using all available judges, and at the conclusion of those debates to hold the second half of the round with the same judge pool. This system will double the amount of time required for each debate to occur, and it is usually not reasonable to hold more than 3 double-flighted rounds (which would involve each judge hearing 6 debates) per day. For this reason, the use of double-flighting should be avoided except for emergency circumstances. The exception to this is Lincoln-Douglas debate, where the debates take half the time of a two-person policy debate and double-flighting is standard practice.

The second option, and by far the most common collegiate practice, is to count judges by rounds provided. Under this system, each school must provide one-half of the total preliminary rounds per team. For example, if there are 6 preliminary rounds, each school must provide 3 rounds of judging per entered team. For example, a school with 2 teams owes 6 rounds of judging, and could bring 1 judge who hears all 6 rounds, 2 judges who 3 each, 3 judges who hear 2 each, or any combination of different judges hearing different numbers of rounds that adds up to 6. A school with 1 team could bring 1 judge who hears 3 rounds, 2 judges with the first hearing 1 round and the second hearing 2, and so forth. This eliminates any unfairness against teams brining an odd number of teams.

Regardless of the system, it is always a good idea to have roughly 10% more judging than minimally necessary. If the tournament requires all judges hear all rounds, for example, and there are 30 teams, 15 judges are minimally necessary to hold a round, and it would therefore be a good idea to have 17-18 judges. The leeway is useful if one judge takes a long time to make a decision and the additional time will delay the start of the next round, if a judge informs you of a conflict with a debater after the pairings have been announced, or if a judge for any unannounced reason fails to pick up their ballot. It is very dangerous to start a tournament with no more than the minimum number of judges possible to hold the tournament; even at collegiate tournaments with very reliable judging pools very few tournaments conclude with every judge picking up every ballot that is assigned to them.

A special note on small tournaments: Because a typical constraint is that a judge will not hear the same team twice in preliminary rounds, small tournaments almost always require much more judging than the minimum number. For example, if a tournament only has 6 teams, 2 are from the same school, and that school brings one judge, it will be impossible for that judge to hear more than 2 rounds. The judge cannot judge either team from their own school, and after having judged once the judge cannot hear either of the teams judged in that round again, leaving only 2 teams the judge is eligible to hear. If those teams debate later in the tournament, the judge will be able to hear 2 rounds, and if they don’t debate, the judge will only hear 1 round. This situation creates a 4-round judge shortage. Generally, it the number of teams is less than double the number of preliminary rounds (for example, if there are 6 rounds and the total number of teams is less than 12), it may be safer to assume that no judge will be able to hear more than half the preliminary rounds (for example, 3 rounds at a 6-round tournament).

If more than one judge is used during preliminary rounds, the judge needs increase accordingly. Twice as many judges (or rounds of judging) are necessary with 2-judge preliminary rounds, and three times as many judges (or rounds of judging) are needed with 3-judge preliminary rounds. In these circumstances, some tournaments may relax the requirement that no judge hear the same team twice (as described below).

## JUDGE CONSTRAINTS

In addition to team constraints, it is typical that no judge hear a debate involving their own school. An exception may be made if the judge has been hired by a school but has no connection to the school otherwise and does not know any of the debaters. This exception may not be granted if the tournament director feels that being paid by a school creates a conflict of interest.

In addition, no judge should hear a debater that they have a personal relationship with. No judge should hear a student they have dated or had a romantic relationship with. Other common reasons for preclusion are that a judge debated with a competitor at any point, coached at the school in the prior 2 years or during a time when the competitor was on the squad, or was on the squad at the same time the competitor was.

Other tournaments may have additional restrictions. Some high school tournaments may not allow first-year judges at all; some college tournaments will require that all judges have graduated or renounced their eligibility to debate in the future.

Because tournament directors generally do not know all the histories of the judges, at registration it is important to present all judges with a list of all teams and ask them to indicate teams that they are conflicted with. That list of teams should specify circumstances that would create a conflict.

Generally, a judge should not hear the same team twice during preliminary rounds. If a shortage of judges makes it impossible to honor this constraint, or if tournament rules allow otherwise (such as at several NDT district tournaments), a judge should hear the team on the opposite side (i.e., affirmative in the second round if the team being heard a second time was negative in the first round).

During elimination rounds, the judging pool constantly shrinks as schools that have been eliminated depart, and it is not uncommon for the same judge to hear the same team repeatedly in elimination rounds. Having heard a team in preliminary rounds is generally not a preclusion against hearing the team in elimination rounds. Despite these practices, it is a good idea to avoid having a judge hear the same team repeatedly if possible.

## SHOULD MUTUAL PREFERENCE JUDGING BE USED?

The single most sensitive decision a tab room is likely to make is that of judge placement. Because debate judging is an inherently subjective activity, certain judges will be much more favorable to some teams than others. Because of this, several tournaments use a process where teams are allowed, before the tournament starts, to rank the judges according to some scheme. At one extreme, teams are allowed no input and all judge placement is done at the discretion of the tab room. At the other extreme, teams rank all judges at a tournament and can expect to receive only those judges that are highly ranked (the system in place at the NDT and CEDA championships).

The use of mutual preference judge placement is commonplace at collegiate tournaments, especially large tournaments, and is used in some form at some larger high school tournaments. Its use is not entirely uncontroversial.

Advocates of mutual preference judging maintain that some judges, for whatever reason, may exhibit some form of bias against some teams. This bias may not be malicious or even conscious, but some teams will have a more difficult time winning in front of some critics rather than others, and the people in the best position to identify these biases are the affected teams. In addition, the systems eliminate tab room subjectivity to a large extent, and competitors are less likely to be dissatisfied with a tab room decision about judge placement if those decisions are made within the limits of the team’s own ranking of judges. Finally, the system may preserve the overall quality of judging, since the only judges placed are those both teams agree are in the top portion of the judge pool.

There are three basic arguments against mutual preference judge placement. First, some believe that adaptation to different audiences is a basic debate skill, and if the teams themselves pick the judges they are never required to debate in front of a critic who will require them to change their arguments and style. Second, because some judges tend to be highly ranked across the board and some are less preferred by a majority of teams, mutual preference judging can create a system that is elitist; that is, a small and fairly limited number of judges hear most of the best rounds. This can make it harder for new or less experienced judges to develop into high-quality judges. Third, some feel that the more experienced judges, and especially directors, lose control over the less cautious group of undergraduate debaters in terms of in-round practices because a judge who will disallow newer and potentially unacceptable practices can be excluded from judging a team wishing to engage in those practices.

A related issue is that if some judges are not preferred by a large enough portion of the teams at a tournament they might not be place-able at all. If this happens, the rounds that judge was going to cover must now be judged by other critics, potentially straining the limits of the judge pool. Depending on the size of the judge pool and the demands of the tournament, this can be a very serious issue (the NDT, for example, struggles with this issue every year).

Regardless of the type of judge placement system employed, there are two ethical principles that should govern all systems. First, the tab room should never place a judge to intentionally try to dictate the outcome of a round. Above all else, the tab room should maintain neutrality. Second, if any system of mutual preference judging is used, it should be made available to all teams at the tournament and not some but not others. Similarly, it should not be in place for some debates but not others; for example, if there are 10 scheduled debates and 9 of them have judges that are mutually preferred, it is generally unacceptable to place an un-rated judge (for example, a judge who did not appear on the rankings sheet) in the 10th debate. If a team declines to submit preferences, either through failure to follow instructions or for more systematic reasons, it is general practice to give their opponents a preferred judge without regard for what the team that failed to submit preferences might hope for. An exception that some tournaments make to this rule, discussed below, involves the situation where both teams in a debate have already been eliminated from participation in the elimination rounds.

## DIFFERENT MUTUAL PREFERENCE SYSTEMS

Categorical systems ask teams to place judges into one of a number of tournament-defined categories. The fewest number of categories is two (preferred or not), and the largest number of categories is roughly six (as discussed at more length below, systems with more than 6 categories take on the characteristics of ordinal ranking rather than category placement). Regardless of the system used, entrants should expect that they may receive any judge ranked in the top 40% of the pool, and that in some debates they will have a judge ranked in the top 50%.

For example, in a 4-category system with roughly 25% of judges in each category, it will not be possible for the tournament to place only judges in the top category, because 25% is too small a percentage to ensure a mutually-preferred judge. In a 6-category system, the top 2 categories will constitute roughly 35-40% of the pool. It will be possible for the tab room to use a judge in the top 2 categories for most circumstances, but there will be some debates where a judge in the 3rd category (40th to 60th percentile) will be used.

Here is an example from the 2006 Fullerton Winter tournament: There were 83 teams, creating 41 debates for 6 rounds. The tab room required 246 rounds of judging from a total pool of 275. We used a 6-category system and required 51 rounds (not units or head counts) in categories A-D, allowed 51 rounds of strike, and put the rest in category E. Each category included roughly 18.5% of the judges. The 41 debates over 6 rounds created 492 instances of teams being assigned a judge they had ranked. Overall, 457 times (92.8%) we were able to place a judge rated A or B (the two highest categories), 29 times we used a C judge, and 6 times we used a D judge. In 35 of 36 times that we placed a C or D judge, the teams had already been eliminated from elimination round participation (all but one such use came in round 4 or later). The one time we placed a C judge for a team with a chance of clearing was in round 2, where there was no judge who better fit for the debate. In 89 of the 246 debates (36%) there were off-1 mismatches (that is, one team had rated the judge one category higher than their opponent), and all off-1 matches were A-B matches except for debates where the teams had been eliminated. For most debates with a team in contention to clear we were able to place an A or B judge, effectively drawing from the top 37% of the ratings, but not all debates and not even all debates in contention received an A or B judge.

The Fullerton tournament had some advantages over others; the draw was large making later-round constraints more easily managed than they would be at a smaller tournament, we had more rounds of judging than were minimally required to run the tournament, and our system of placement allowed an off-1 judge placement if the judge was in the top 2 categories for both teams. At other tournaments with smaller draws and more constraints (such as the 2006 Gonzaga fall tournament, which used the same 6-category system) conditions were much less favorable and judges in the 3rd category were placed much more frequently.

The table below summarizes the differences; the take-home point is that the success in providing highly-preferred, mutual judging can vary considerably across tournaments even when the same placement procedure is used. These data also reinforce the point that within mutual preference constraints *most* rounds can receive a favorable judge placement, but at least *some* percentage of rounds (ranging between 1% and 13% here) will receive a judge rated in the bottom half of the pool, even if the teams are still eligible to advance to elimination rounds. To attain an 80-90% “B or better” judge placement within a 6-category system, roughly 35-40% of the “B or better” placements will be off-1 matches, that is, a judge rated an A by one team and a B by the other.

|  |  |  |
| --- | --- | --- |
|  | **2006 Fullerton** | **2006 Gonzaga** |
| *A or B judge overall* | 92.8% | 80.7% |
| *% of B or better judges who were off-1 matches* | 36% | 41.3% |
| *C judge or lower* | 7.3% | 19.3% |
| *C judge or lower, still eligible to advance* | 1 of 36, 2.7% | 15 of 22, 68.1% |
| *% of rounds receiving lower than B judge and still eligible to advance* | Less than 1% | 13.1% |

The following sections describe different categorical systems; they are followed by a discussion of the difference between categorical and ordinal systems, and then a discussion of ordinal judge placement.

Strikes and random placement. The simplest system is to allow all teams to strike a certain number of judges in the pool (usually 10%), and place the rest randomly. The argument for the system is that it allows teams to eliminate any critic who is decidedly biased against them, and are required to adapt to the remaining judge pool that might have different perspectives but are not predisposed for or against anyone. A concern with the system is that certain judges in the remaining pool may still be very predisposed for one team and not the other.

Circles and strikes. Teams are allowed to strike a certain percentage of judges (usually 10-20%) and circle another portion (usually 45-55%). Teams will never be judged by struck judges, and will only be judged by critics they circle unless the criteria is relaxed (discussed below). The advantage of the system is that teams can functionally exclude up to half the potential judge pool, and any team that feels more than half of the judge pool is unfairly biased against them is probably being too selective. The downside is that, within the potential pool of judges, imbalances can still exist. For example, if there are 100 judges in the pool and teams are required to circle 40, a judge in a given round might be the top choice of 1 team and the 40th choice of their opponent.

Four category system. Teams place judges into one of four categories, typically A, B, C and strike, with letters earlier in the alphabet designating more preferred judges. Often, some judges will remain unranked, creating a “shadow” 5th category. The tab room attempts to place a judge ranked “A” by both teams in each debate. Typically, it is not always possible to place a mutual A judge, in which case a mutual B judge is used. Mutual C judges are avoided but used if no other judge is possible. The advantage is that since there are typically about 20% of all judges in each category, the odds of a judge being highly preferred by one team but not the other are much lower. Using the example above, a judge who is the top choice of one team can be no lower than the 20th-most preferred judge of their opponent. (Note that while most debates will have an A or B judge, often it will not be possible to place an A or B judge in all debates.)

Six category system. Teams place judges into one of six categories; the final category is the equivalent of a strike. The 5th category is often used for judges who are constrained against a team, or used to catch the “leftovers.” An alternative approach includes placing an even number of judges in all categories. The six-category system is preferable to the 4-category scheme in that it makes the “shadow” category explicit and allows one more level of differentiation for the judges that are placed. Usually, a judge is not placed unless they are ranked in the same category by both teams and are in the top 3 categories, with a preference given to more highly-ranked judges. Typically, the categories are referred to be number rather than letter (A=1, B=2, etc.), and the TRPC implements the lettering system as A+, A, B+, B, C+, and strike.

Categories, number lines, mutuality, and the difference between categories and ordinal ranking. The first quantitative concept to wrap your brain around is that numbers can either be treated as categories or as continuous entities. A categorical number simply assigns a numeric figure to things or phenomena in different categories; for example, eye color is categorical, and everyone with the same eye color could be assigned the same number (1=blue, 2=green, etc.). A continuous number is anything that falls on a number line, like body height in inches, weight in pounds, a checking account balance, etc.

The basic difference is a computational one: Categorical data are converted to percentages, and continuous data are converted to averages. In a judge placement context, if judges are categorized A-B-C it is typical to think about the *percentage* of judges who are mutual As, or that if a team gets 6 A and 2 B judges over 8 rounds they have received 75% A judging. If judges are ranked 1-9, it becomes more common to think about an average: e.g., the *average* judge a team received was a 3.4, or the *average* difference in judge preference between opponents was .8.

Strictly speaking, the judge preference data we typically deal with are entities called “ordinal” numbers, that is, categorical data that is ranked. An example might be average income, broken into the traditional categories: Low income, lower-middle income, middle income, upper-middle income, and high income. Low income is obviously of a lower rank than high income, whereas it might not make sense to rank blue versus brown eyes, or other purely categorical data. Note also that you can always convert continuous data into categorical data by breaking it into chunks; the cutoff for a low income might be $16,000 a year, $30,000 for lower-middle, etc. The converse is not true; categorical data cannot be converted into continuous data.

Practically, and this occurs all the time in quantitative social science literature, once a system of ordinal categories gets to about 7 or more the data are treated as if they are continuous, and averages are calculated. If there are 4 or fewer categories, the data are typically treated as categorical, and averages are computed.

In a similar way, once 7 or more judging categories are used, it makes more sense to think about judge placement in continuous terms and utilize averages rather than percentages. From a judge placement perspective, these procedures typically move beyond common-sense counts of categorical placement and usually involve more complex calculations. For this reason, human intervention in judge placement is less useful and may often be dangerous. From an evaluative perspective, this means that the statistics used to evaluate a “good” judge placement solution may be quite different.

This concept does not provide anything close to the final word on the advantages and disadvantages of any given system, but understanding the difference between a categorical and continuous number is crucial to beginning to appreciate the issues involved. In more pedestrian terms, comparing the results of ordinal versus categorical systems often involves comparing apples to oranges, or in this case comparing percentages to means.

The second concept that is especially important is that as the number of categories increases, so too does the precision of mutuality. In a powerful way, increasing the number of categories can produce solutions that are of necessity better than those provided by a smaller number of categories. The following is edited commentary supplied by Gary Larson:

“The operational principle regarding categories is that it is always best to conceptually map the number and size of categories into percentile equivalents.  For instance, if you have 9 equal sized categories, each represents 11% so that the bottom of category 3 is the 33rd percentile.  This is important when comparing between different choices regarding size and number of categories.  The fear is always that we will lose either preference, mutuality or both when we increase the number of categories.  Other than category labels that might communicate differently it should be clear that we gain rather than lose (or at worst stay the same).

Imagine two systems - a 3 category system and a 9 category system where each category in the former is divided exactly into thirds in the latter.

We "could" imagine an algorithm that permits advantages but avoids all disadvantages

A1/A1

A2/A2

A1/A2

A3/A3

A2/A3

A1/A3

B1/B1

B2/B2

B1/B2

B3/B3  etc..

Essentially this algorithm says that everything that would count as an AA match in the three category system is considered before anything that would be a BB match.  So the worst case scenario for the 9 category system is that it would default to the 3 category system.  But while it is making AA matches it is not doing so randomly, it is increasing preference by doing A1/A1 matches well before A3/A3 matches AND it is increasing mutuality by considering A1/A1 or A2/B2 log before it considers A1/A3.  If we suggest that because the categories are smaller it will have a harder time finding each kind of match, it is still the case if we use the above ordering that it will still find all of the AA's that the 3-category system could have found.

In real life it is not quite as sanguine since it is possible that the finding of A1/A1 matches might ultimately cannibalize the ability to find other AA matches since we will decrease the power of the algorithm that says "find the pairing that has the fewest AA matches AND find the judge that fits in the fewest AA rounds."  This algorithm loses some of its tree pruning power if you decrease the size of the categories and the overall number of direct matches.  But the "loss" of power of this algorithm is greatly overcome by ability to make six discriminations within the AA category that potentially improve both pref and mutuality for all matches made within the category.

Of course it is also the case that we probably would use the order described above where all AA matches (including A1/A3) would be used before moving to B1/B1.  This question revolves around our basic understanding of mutuality and preference.  We might say that the former is an AA match and the latter is a BB match so that the former is preferable (at least rhetorically).  But that would be misleading and actually demonstrates the reason that more categories is better.  Within any category system we have an illusion that within category differences are small while between category differences are large.  But just the opposite might prove to be the case.

While one might say that it is rhetorically superior to say that there are NO off-matches in a system while another system might permit off-matches, in percentile terms the (AA) (A1/A3) is LESS mutual than the A3/B1 (AB) match.  Even more crucially, the three category system might end up requiring an AB match that might really be an A1/B3 (off-five match in the nine category system).”

I will close by noting that there is an upper limit to the levels of differentiation that make sense. Although conceptually each judge can be given an exclusive rating, that is, in a pool of 100 judges each judge is ranked 1-100, it is rarely the case that there are meaningful differences in true team preference between the judges that are that fine. A team may be quite happy with any judge rated 1-10, but have a strong opinion about the difference in quality between a judge rated 30 and one rated 40.

The difficulty is always finding a system with enough differentiation to take advantage of the more refined mutuality possible with a large number of categories, while at the same time not having more levels of categorization than truly exist in the minds of the teams rating the judges. A related concern is that too many levels of differentiation can add quite a bit of time to the rating task, which can slow down tournament administration and make the already exhausting tournament experience even more burdensome.

Although the issue is far from settled, a community consensus seems to be emerging that 9 categories represents a fair balance for those wishing to use continuous rather than categorical approaches.

Nine-category system. The 9th category is the equivalent of a strike, and the 8th category is a catch-all. Teams place an equal number of judges in the top 7 categories. Judges are placed in the same manner as the other category systems, however, because there are more levels of differentiation, judges need not always be ranked in the same category by both teams. The advantages of the system is that it strikes a useful balance between giving a large degree of differentiation between judges while remaining small enough that most teams ranking judges are not overwhelmed by the number of categories. It is also less complex than ordinally ranking all judges. Categories are typically referred to by number rather than letter. Gary Larson recommends that judges with conflicts be placed in category 6.

Ordinal ranking**.** All teams rank all judges in order and not judge receives a duplicate rank. If there are 132 judges, the most preferred judge is ranked 1 and the least preferred judge is ranked 132 will all numbers in between being used. Ordinal ranks are converted into percentiles by dividing a given rank by the total number of judges (example: a judge ranked 91 out of 132 would produce a percentile of 68.9%, the equivalent of 91 divided by 132). Because it takes competitors a relatively longer time to rank all judges, this system is not in common use. An additional consideration is that because of computational issues it can only really be performed with the assistance of a computer. The implication is that if the computer crashes, even if backup copies of the results are available it may not be possible to complete the tournament tabulating by hand.

Finally, judge rating is a dynamic area where new developments occur rapidly. Between the time this document was originally drafted and when it was posted on-line Gary Larson developed 3 new systems for judge ratings. The point of this discussion is to familiarize readers with the basic principles of judge rating, not to accurately portray the system in most common use at any given point.

## HOW MANYJUDGES IN EACH CATEGORY?

The first question to ask is how many judges are in the pool. The easiest method is a simple head count, which has the drawback of counting all judges equally even if some judges are hearing all rounds and some judges are only hearing one. This can create difficulties in judge placement; if teams are reqired to place 10 judges in category “A,” for example, and one team places 10 judges who are all scheduled to hear only 1 round and another team places 10 judges who are scheduled to hear 6 rounds, it will be much more difficult to place judges for the first team compared to the second. In the later rounds, all judges for the first team will have filled their commitment and will not be available to judge at all.

A reason to be unconcerned about this event is that the team will simply have more “B” or “C” category judges, and that if the team is unhappy with this situation they could have corrected it in the first place by simply placing judges in the “A” category who were scheduled to hear more rounds. A reason to remain concerned is that teams cannot control how many round the judges for other schools, and they might therefore be disadvantaged if their most preferred judges, for whatever reason, are not hearing a large number of rounds. Additionally, many tab rooms will attempt to place highly-rated judges, and thus simple head-count systems may tax the tab room if the most highly rated judges are hearing a small number of rounds. At any rate, concerns about head-count systems are heightened when tournaments have a smaller number of judges and use a category-ranking system rather than a circle-strike system. If a large number (usually 9 or more) of categories are used or a strike-only or circle-strike system is in place, head counts are often adequate.

One way to account for different judging loads is the unit system. In this scheme, all judges scheduled for a certain number of rounds (usually half or more) are counted as “2” unit judges, and all other judges count as 1 unit. For example, at an 8 round tournament all judges who will hear 4 or more rounds might be counted as 2-unit judges, and all other judges might count as 1 unit. Teams are then required to place a certain number of units of judging each category, as opposed to a simple count of judges. This system ensures that, roughly speaking, each team will have not only the same number of judges in each category but that those judges will also be available roughly the same number of rounds. Although the system has its benefits, it is neither as accurate as a round-count system (described next) nor as simple as a head-count system. The unit scheme is employed at the NDT, but is not in common use at other tournaments.

A round-count system simply counts the number of rounds a judge will hear and teams are required to place a certain number of rounds of judging into each category. This system ensures that all teams will have a roughly equal number of judges in each category and exactly the same number of rounds of available judging. Its drawback is that it can require quite complex calculations; it is one thing to ask teams to keep a running total of the number of “A” judges that they have, and it is quite another to keep a running total of the number of rounds each judge is hearing. The counting becomes especially complex if a team moves a judge from one category to another. Because of these complexity concerns, the round-count system is generally only possible if judge preference is taken on a computer, which will do the simple math for the entrants. Such a system is supported by debateresults.com.

Once a scheme for judge counting has been adopted, the remaining task is to determine how many judges should be placed in each category. Generally speaking, if any category system is used simply divide the total judge count (heads, units, or rounds) by the number of categories. Most tournaments require slightly more than an equal percentage of judges in the top categories; that is, in a 6-category system where each category would 16.67% of judges, tournament directors might require 18-20% of judges in the top 3 categories. If a strike-only or circle-strike system is in place, use the percentages recommended above. Usually teams are instructed to place judges from their own school or who are constrained against them into the second-to-last category. A detailed explanation is located at <http://commweb.fullerton.edu/jbruschke/web/TourneySetupHelp.aspx>.

It is common for a host school to use it’s own judges at a tournament but as “emergency only” judges. Such critics are usually not entered as full-time judges because other tournament administration tasks will require their time and attention. Generally, these critics should be included on the preference sheets with the minimum judging commitment (as 1 unit or 1 round). This will allow the tab room to place the judges in circumstances that require it (the judge pool is quite short, or there is one debate for which only the host-school judge is mutually preferred) without having teams rank judges that will not actually hear many rounds.

No matter what scheme is used, teams should expect that they can be judged by critics rated in the top 40-50% of the pool. The schemes differ in the means by which judges are placed and the degree of mutuality enforced. This does not mean that all systems are equal; different approaches and algorithms can produce more mutuality and higher preferences. Regardless of the system, however, there will likely be some situations where a team might receive a judge in their 40th to 60th percentile.

## IMPLEMENTATION OF MUTUAL PREFERENCE JUDGING SYSTEMS

Overall, there are 2 goals for judge placement. First, if a mutual preference system is in place, teams should receive judges that are mutually-preferred. Second, the judge pool should be managed so that there will be sufficient judging available for all rounds. For example, imagine a 6-round tournament with 20 teams and 14 judges who are committed for a total of 60 rounds of judging. Twenty teams will create 10 debates a round for 6 rounds, requiring 60 rounds of judging. If one judge with a 6-round commitment is given a round off, there are now only 59 rounds of judging available, and *there will not be enough available judges to hold round 6*. Although the tournament director can always try to persuade certain judges to judge rounds beyond their commitment, as a tab room function it is always important to try to avoid this situation in the first place. If these two values (mutual preference and pool usage) come into conflict, pool usage is generally given priority because the consequences are more dire if pool use fails (the tournament can’t happen versus some debates involving judges the teams are less happy with).

Achieving a balance of these goals is the most delicate part of tab room operation, and all systems struggle with these tensions in different ways. At one extreme, pool use is favored over mutual preference (as in strike-only systems), making pool use relatively easy but risking competitor dissatisfaction with judging or judges rendering biased or unfair decisions. At the other extreme, mutual preference is favored over pool use (such as at the NDT, where judge availability is under constant strain), creating satisfied competitors but placing additional strain on the tab room and judge pool.

Strike-only. Debates should be ordered randomly, judges not eligible to hear either team should be excluded (usually because they have been struck or are otherwise constrained), and a judge should be randomly selected from the remaining pool to hear the round. No special consideration needs to make for judge commitment, unless a certain judge can only hear a certain round. For example, if a given judge is committed to hear 2 rounds and will only be available for rounds 1 and 2 that judge should be placed in rounds 1 and 2. If the randomization process does not assign that judge in those rounds the judge should randomly be placed into a round that they are eligible to judge.

If the strike-only (or circle-strike) system is in place, it is not appropriate for the tab room to use any system other than randomization to place eligible judges. For example, the tab room should not place what it considers to be “good” judges in “important” rounds. If some judges are indeed better than others, it is usually best to allow the teams (rather than the tab room) to rank the judges and simply incorporate mutual preference judging.

Circle-strike. Debates should be ordered randomly, and a judge should be randomly selected to hear the round from the list of mutually-circled judges who are eligible to hear both teams. No special consideration needs to make for judge commitment, unless a certain judge can only hear a certain round (as described above). As with the strike-only system, judges should be assigned randomly and by no other criteria.

Four-category system. Debates should be ordered from those with the fewest mutally-preferred judges to those with the most. (As noted elsewhere, for this and all other category systems debates where neither team is eligible for elimination round participation may be excluded from ranking, at tournament director discretion, and have their judges placed only after all other debates.) The debates can be ordered based on simple mutual-A, mutual-B, mutual-C counts, or by an index that awards points (a mutual-A judge is worth 3 points, a mutual-B judge is worth 2 points, etc.). Judges should be ranked from the most difficult to place to the easiest to place, again using simple mutuality counts or some index. Beginning with the most difficult to place debate, the judges should be searched from the most difficult to the most easy to place, and the first mutually-preferred judge should be placed in the debate. Sorting in this order should result in the most difficult to place debates first receiving judges, and the most difficult to place being used first (if possible).

One effect of this sorting is that debates with many mutually preferred judges, and hence those that will have their judges placed last, may end up with a more lowly-ranked judge than they would given a different sorting order. Although this may not be desirable, generally speaking the tradeoff will be between a debate with many mutually preferred judges receiving a less preferred judge (for example, a mutual-B rather than a mutual-A) and another debate having no eligible judges or a very unsatisfactory judge (a mutual-C, a mutually unranked judge, or a mutual strike).

In general, the criteria used to select from a pool of judges who are both mutually preferred in a given debate is their round commitment and the number of other debates for which they are mutually preferred.

If there is more than one judge who is mutually-preferred, for example, when there is more than one mutual-A judge for a debate, the judge committed for more rounds should generally be chosen. Thus, if two judges are mutual-A judges for a given debate, a judge who is committed to hear 6 rounds should be placed before a judge who is committed to hear 5 (or fewer) rounds. This will maximize the number of possible judges for later rounds.

An additional consideration is the number of other debates a judge will fit in. If two judges are both mutual-A judges for a given debate, and each has the same round commitment, the judge who fits in fewer other debates should be placed for the purposes of maximizing flexibility of the remaining pool of un-placed judges. If the round commitments are relatively close and the discrepancy in preferences for other debates is large, it may make sense for the “preference in other rounds” criteria to supercede the commitment criteria. For example, if one judge is committed for 3 rounds and a second judge is committed for only 2 rounds, but the 2-round judge fits in only 2 debates and the 3-round judge fits in 10 debates, it may make sense to place the 2-round judge and save the 3-round judge for other rounds. At the extreme, some judges may be mutually-preferred in only a single debate, and in this instance, they should generally be placed in that debate regardless of other criteria.

There may be some instances where there is no mutual-A judge available for a given round. In this situation, a mutual-B judge should be utilized. If there is no mutual-B judge available, it may be preferable to place a judge who is an A for one team and a B for the other team before a mutual-C judge. A judge who is mutually struck should be placed as a last resort, after all other possible judges have been considered. Under no other circumstance should a judge who has been struck by a team judge them.

If human intervention (see discussion below) is utilized, the final pairings may be “eyeballed” to see if improvements can be made. One thing to check is to make sure that judges who are committed for all rounds are judging; if they are not, they should be switched into any debate for which they are mutually preferred. For example, if a tournament has 6 rounds and a judge committed to hear 3 debates is judging a round as a mutual-B, and a judge committed to hear all 6 debates is not scheduled to judge and is also a mutual-B in the debate, the 6-round judge should be swapped in to judge and the 3-round judge should be swapped out. In some circumstances, it may also make sense to swap in a mutual-B judge who is committed for all rounds instead of a mutual-A judge who is committed for fewer than all rounds. (It should be noted that if the number of remaining rounds exceeds the number of rounds for which a judge is still committed there is no functional difference in commitment levels, that is, with 2 rounds remaining there is no difference between a judge obligated to hear 6 rounds and a judge obligated to hear 3 rounds who has only heard 1 debate through rounds 1-3.) Generally speaking, any time a judge with a lesser commitment can be swapped out with a judge with the same mutual ranking but a greater commitment, the change should be made.

Six-category system. The procedures for a 6-category system are the same as for a 4-category system. The basic difference involves how many categories will be used. In a 4-category system A and B judges are commonly used and C judges are used as a last resort. In a 6-category system 1, 2, and 3 judges are typically used, and 4 judges are a last resort (6 judges are treated as strikes). In circumstances where the judge pool is especially tight, mutual 5 judges may be used.

A judge ranked 1 by one team and 2 by another may be preferable to a judge mutually rated 3, and a judge rated 2 by one team and 3 by another may be preferable to a judge rated a mutual 4. These are value decisions that must be resolved by the community or tournament director; in District 1, for example, tournament rules dictate the placing of 1-2 or 2-1 judge before a mutual 3. Conversely, mutuality could be valued above overall high rankings and a mutual 3 might be judged preferable to a 1-2 or 2-1 judge. This issue is *not* quantitative in nature; numerically, either system can be implemented. This decision is not unique to the 6-category system; similar tradeoffs could occur with any number of categories.

Seven-or-more-category system. As noted above, when more than 6 categories are used more advanced calculations are usually performed “beneath the hood” of the computer in an attempt to balance mutuality, to give teams judges they rated highly, and to minimize the number of rounds lost to un-used judging. The tab room director typically specifies a percentile that must be exceed for both teams (specifying 40% means that the judge must be in the top 40% of rated judges for both teams) and an absolute difference in ratings that cannot be exceeded (specifying 10% means that one judge cannot be 10 percentage points more highly ranked for one team rather than their opponent). The computer then goes through a series of iterations to attempt to meet the user specifications while meeting other criteria as well. The same basic system of algorithms can be applied to any category system, including those with fewer than 7 categories, although the fewer the number of categories involved the less it will make sense to utilize averages rather than percentages.

## BROAD MUTUAL PREFERNCE QUESTIONS

Should the tab room intervene in computer judge placement? Most generally, the arguments against human intervention are that the computer will place judges more objectively, and the arguments for human intervention are that tab room personnel can make decisions that all participants are happier with, or that improve decision-making on some objective criteria.

These are the arguments for human intervention: Often, tab room personnel may have knowledge that has not been programmed into computers. For example, the tab room may know of a judge who is likely to judge extra rounds, although that information has not been programmed into the computer. Or a director may know of a personal issue between a judge and a school that does not create a formal conflict but might make one judge a better choice to judge a round than another. For example, a conflict may not have existed at the start of a tournament, but incidents during the first day of competition may have created issues the director might want to consider. I have had the experience of knowing that a judge and debater spent the prior evening together in a hot tub, and the judge appearing as the critic for the debater in the first debate of the following day. Or a judge may have had such an emotional reaction to a debate that they were crying and very upset at its conclusion; exposing the same judge to a very similar debate might be undesirable if another judge is available for the round.

In addition, although many elements can be programmed into computers, almost all those choices involve values (such as whether pool use is more important than mutuality, and what level of differentiation constitutes a judge that is acceptably “mutual”). Since these are value choices the computer defaults are no more objective than tab room choices anyway, and at any rate the tab room director should be aware of the value choices programmed into the computer so that they can over-ride them if those defaults produce pairings the director disagrees with. Many experienced tournament directors have concluded that judge placement, particularly, is as much art as science.

Finally, there is a concern that, even if it is possible to account for every conceivable factor in a computer program, no program to date has accomplished this. (This is not to denigrate the Herculean accomplishments of the TRPC or STA-XL, only to note that some users feel that they can imagine factors that neither program accommodates.) At any rate, there are many empirical examples of tab room directors who attempted to attain objectivity by simply taking “whatever the computer spit out” and producing pairings with a number of obvious shortcomings that human intervention might have detected and prevented. Whether this is because the tab room director failed to provide the program with correct data or to use the correct settings, because the director failed to understand the algorithms that the computer was using, or because of inherent limitations in software, or due to individual programming bugs, advocates of human intervention point to these empirical failures as a rational for at least some human double-checking.

None of this is to suggest that all human interventions are equal. Changing a judge because the director believes that a team would prefer one judge over another given a certain side or argument preference is never appropriate. The situations contemplated above concerning “personal issues” involve extreme emotional events that occur in rare situations that are by their nature not predictable.

Arguments against human intervention are that any time a human intervenes to “improve” pairings, they are applying some sort of rule to the tournament data, and thus they should be able to articulate the rule. Any rule that can be articulated can be programmed. Further, although the decision of which tabbing procedure to apply may be subjective in some circumstances, the decision encoded into the computer program is more likely to be a result of community consensus, is at least transparent whereas a human intervention may never be detected, and at any rate is no more subjective than a tab director over-ride of computer pairings. Empirically, it is open to debate whether human intervention is more likely to increase or decrease errors (or at least undesirable outcomes). Arguments concerning the state of current software are warrants for additions to programs as much as they are an argument for ad hoc human interventions.

Although these arguments can be heated at times, there is widespread consensus that the use of computers has massively improved tournament administration. The only remaining debate is whether all considerations can be coded, attaining maximum efficiency, whether such a condition is ever possible, and whether a balance between computer efficiency and tab director judgment is the ideal. Obviously, the more informed about tab procedure and program performance the tab director is, the more likely their interventions will be to produce desirable rather than undesirable outcomes.

How fixed is the pool? Whatever the scheme of mutual judge placement might be, an important concern is how “set” the pool of judging is. Because few tournaments have all judges obligated to judge all rounds, the tab room has considerable flexibility in deciding which judges will hear which rounds.

One approach is to specify a given pool of judges for a given round. This can be done by selecting a proportion of available judges for the round, for example, selecting all the judges who are committed for all rounds, and a percentage of the remaining judges taking the judges with the largest remaining commitments first. The only requirement is that enough judging is selected to cover all the rounds that will occur. This system has two advantages. First, if the judges are selected appropriately it is possible to guarantee that enough rounds of committed judging will be available for later rounds. Second, the judging pool takes on characteristics of a closed system. Because of this it is, generally speaking, easier to come up with an “optimal” solution for the fixed judging pool. The downside is that there is less flexibility for adding good judges who are available but have been excluded from the pool for the given round; adding such judges might improve the overall quality of judging in a given round without seriously hampering the ability to provide quality judging in later rounds.

A second approach is to treat all available judges as potentially useable in any given round, with an eye to conserving rounds of judging for later debates. This approach has the characteristics of a more open system. The upside of an open system is that it can accommodate unforeseen changes, such as new judges arriving, existing judges leaving unexpectedly, highly qualified judges agreeing to hear more rounds, or the relaxation of judging constraints in later rounds (which can occur as teams are eliminated from eligibility for elimination rounds, freeing the tab room from an obligation to honor their preferences). The downside is that this lack of certainty about future events can increase the risk that the judge pool is over-used in early rounds and not enough rounds of mutually-preferred judging are available for later rounds.

To some extent, careful planning and hard work at registration can eliminate some of the later un-knowns. Regardless of effort, some uncertainty is inevitable, and certain situations (such as a debate in later rounds where only a single judge is mutually preferred, and that judge has filled their obligation) and events (teams or judges dropping unexpectedly) cannot be avoided.

## SPECIAL TOPICS

Switching Judges. There are situations where a judge must be replaced, either because they fail to pick up their ballot, announce a conflict that was otherwise unreported, or for some other reason. It may be the case that the judge who is the best “fit” (is the only mutually-preferred judge) to replace the departed judge is also a judge who is not committed to judge many rounds and is highly ranked. The highly preferred but unplaced judge was probably withheld from the round in the first place so that they could judge rounds later in the tournament. In this situation it is preferable to execute a “double-switch:” Take a judge who was scheduled to hear a different round (Judge B), place them in the round that the originally assigned judge will no longer judge (Judge A), and replace their spot with another un-used judge in the pool (Judge C) who is mutually preferred in Judge B’s round and is obligated to judge more rounds than the highly preferred but less committed judge (D) that you are trying to save. This requires that the tab room identify other judges in the pool who can hear the round Judge A was assigned, and then identify judges in the pool who are unassigned for the round that can replace one of those judges, ideally sorted by un-used rounds of commitment.

If Judge A is announcing a conflict that precludes them from the assigned round but is otherwise available for judging, they can simply be switched with any other assigned judge, provided that judge and Judge A are both mutually preferred in both debates.

Ideally, the process of switching will not lower the ranking of the judge of the affected teams; that is, if the two debates before the switch both have mutual-A judges, they should have mutual-A judges after the switch. This rule is not sacrosanct, however, and since any reduction in the quality of the judge is generally due to circumstances beyond the control of the tab room (the failure of the judge to pick up the ballot or their failure to report a conflict), if the switch results in a lower but acceptable level of mutuality (for example, a mutual-B rather than a mutual-A), some tab room directors are willing to make the switch, especially if the judge pool is tight (that is, the number of rounds of judging commitment that remain are very close to the minimum necessary to complete the tournament).

In any event, and especially at large college tournaments, teams should be notified if they judge who’s name appears on the pairings will not be the judge who will actually decide the round, as is always the case with judge switches.

Judge switching is performed through the Operate-Display Schedule screen of the TRPC.

When to relax mutual preference judging; is a team “out of it?” At many tournaments, even if mutual preference judging is used for the tournament, once a team is not eligible to advance to elimination rounds the tab room will cease to guarantee a mutually preferred judge. This can occur, for example, if a tournament has a stated procedure of only clearing teams with a winning record and a team cannot attain a winning record even by winning all remaining preliminary rounds.

The argument in favor of relaxing mutual preference requirements in these rounds is that it frees up more of the judging pool to place in rounds involving teams that still have a chance to advance. The argument against the practice is that all debates are educational, and that teams that will not advance have just as much at stake educationally as teams that may yet advance. Put somewhat differently, winning the last few debates is just as important to the teams that have been eliminated as those that have not been eliminated.

In some situations it may be difficult to identify when a team is no longer eligible to advance. For example, at a large tournament (over 200 teams) that guarantees that all 6-2 teams will advance up to a maximum of 32 teams, a large number of teams will have a 6-2 record but fail to clear based on other tiebreakers, almost always speaker points.

Judge preference obligations are usually not relaxed if either of the two teams involved in the debate still has a chance to advance to elimination rounds. Even where judge preference obligations are relaxed, tab room directors will typically place a mutually-preferred judge if one is available, and will still honor strikes (i.e., will not place a judge that either team has struck).

Where to start placing judges. In rounds where no team has yet been eliminated from participation in elimination rounds, it is usually best to begin placing judges in the rounds that are most difficult to place. In rounds where some teams have already qualified for elimination rounds (for example, a tournament has rule that all teams with 5 wins will advance, and a debate during round 7 matches 2 undefeated teams against against each other), and some other teams have been eliminated (a debate between winless teams in the same round), tab rooms will often begin by placing judges in those debates where one or more teams have not yet qualified for or been eliminated from elimination rounds. This is often called “Starting at the break line,” where the break line is defined as a debate where the losing team will be eliminated from elimination round eligibility.

The argument in favor of this practice is that a questionable decision is of less consequence in debates where both teams have either already qualified or already been eliminated from elimination rounds. The counter argument is that elimination round seeding is just as important to the final tournament outcome as who clears in the lower spots, and that the debates among the teams who will not advance to elimination rounds are just as educationally important as those involving teams that might still qualify. The dispute seems to hinge on how important it is to qualify for elimination rounds. If this is a factor more important than others, then debates where elimination round participation is at stake might deserve special judge quality consideration. If this is not a more important factor than others, there is little reason to alter judge placement procedures.

One final option is to evaluate the judge preference experience of the teams as the tournament progresses and begin by placing judges in the rounds where one or both teams have had less preferred judging than average. For example, consider an ABC-Strike scheme where one team has received 3 “B” judges and one team has received 3 “A” judges. This inequity can be addressed by placing the judge in the debate involving the 3-B team first and placing a mutual A judge. In an actual situation, all debates would be ordered based on some index of judge preference experience (probably the summed numeric equivalents of judge ratings, with a lower number indicating a better experience). It is also possible that in a given round one team has had a better experience than the other, measured by a lower summed judge preference total. If the judging pool is tight enough to require the placement of an imbalanced judge (one more highly rated by one team than another), it might be desirable to place the judge in a debate where one team has had a better experience than the other, with the imbalanced judge favoring the team with the worse experience up to that point.

Employing the latter system can do a better job of balancing the overall judging experience of the teams at the tournament. The downside is that, if it is assumed that later rounds take on more importance than prior rounds, compensating for early advantages in later rounds may not be perceived as fair. It may anger a team in a break round to receive a C-rated judge and be little consolation to them they received an A judge earlier in the tournament, especially if the earlier round was one that they feel they could have won easily and the later round is one that will no doubt be difficult. Conversely, a team may not be satisfied that they are receiving an A-rated judge in a break round during the last prelim (against a difficult opponent) if they feel that they received a bad decision at the hands of a C-rated judge earlier in the tournament, a decision but for which they would not be in a break round.

Combining mutual preference systems**.** Generally, once initiated a mutual preference system remains in effect throughout a tournament. There are only two deviations from this. First, sometimes random judging is utilized in the preset rounds and mutual preference judging is incorporated in power-matched rounds (or in later preset rounds). This is only done when it is not logistically possible to obtain judge preference ratings from all teams before the tournament begins. Usually, if judge preference information is taken on-line (as it usually is with the debateresults.com interface), this is not necessary. Second, some tournaments might use a different scheme for elimination rounds (circles and strikes, for example) than was used in preliminary rounds. Although tournaments will often offer separate elimination round preference sheets due to changes in the judge pool over the course of the tournament (with some new judges arriving and some preliminary round judges departing), it is not typical practice to change the ranking scheme.

Tab room ratings of judges. Especially at some large high school tournaments, mutual preference judging is not logistically possible because the registration process is so cumbersome and the list of judges at the tournament is in constant flux. In these circumstances, the tab room may rate the judges without consultation from the competitors; judges are typically placed into three categories (A, B, or C) or un-ranked. Beginning with the debate between the highest-seeded teams, the top rated judges are placed first. This scheme has the desirable effect of placing the judges the tab room regards the most highly in the most competitive debates, but has the drawback of excluding competitor feedback. Some competitors may disagree with the tab room ratings, or may feel that a judge the tab room has ranked highly is biased against them. Unlike the mutual preference system, the competitors will never be aware of the judge rankings unless the tab room chooses to reveal them. This system is not in use in the open division of any college tournament I am aware of.

# IV. ASSIGNING ROOMS

## OVERVIEW AND BASIC SYSTEM

The need to minimize room moves**.** Debaters tend to carry a lot of materials, from laptops to large plastic tubs of evidence. Some teams carry as many as 12 Rubbermaid plastic tubs. Moving these materials is time-consuming and can make it difficult to keep a debate tournament on schedule. It is also physically demanding on the debaters, and can make long days even longer. For all these reasons, it is desirable to create the fewest number of room moves possible. The most important consideration is to minimize building moves, since those take the most time. It is also important to note that not all rooms will necessarily be available for all rounds, and so some system of marking room availability must be in place.

Under all systems, a team with at least one speaker with a physical disability (such as blindness, wheelchair use, or a broken limb) should be assigned to a room that they can participate in (check with an ADA compliance officer for details) and they are assigned to that room for all subsequent rounds. All procedures described below are not applied to teams with disabilities. Some judges may similarly have mobility difficulties due to physical limitations; in such cases, it is generally best to place the judge in the debate first, and then place the debate in a room that is accessible to that judge. Accessible rooms may be rooms on the ground floor of a building, close to the judges’ ballot table (or judges’ room), or in the same building as the judge table.

Basic procedures. Unless a system of “pods” (see below) is utilized, room placement for the first round is usually random. In subsequent rounds, some procedure can almost always be utilized in to minimize room moves. A basic limitation is that no more than 50% of teams can be kept in the same rooms since teams do not debate each other twice in preliminary rounds, and at least one team will move after each round.

In even-numbered rounds where sides will be equalized one side (either the affirmative or negative) from the previous round is simply kept in the same room and their opponents are assigned to move into their rooms. Generally, negative teams are kept in the same room based on the assumption that they will have a more difficult time getting their evidence re-filed at the conclusion of the debate, but in contemporary debate practice this assumption may not always hold. This procedure guarantees that 50% of the teams (or slightly fewer if there are teams with disabilities) will remain in the same room.

In odd-numbered rounds after round 1 the goal is to try to keep at least one team in the room they were in the previous round, although this is not always possible because often opponents in an odd-numbered round will both have been on the same side in the prior even-numbered round. The STA uses a 4-pass procedure. On the first pass, teams with disabilities are assigned to the room they were in the prior round. On the second pass, beginning with the top of the bracket, a team that was affirmative in the prior round and negative in the current round is assigned to stay in the same room if that room is available. On the third pass, again starting with the top of the bracket, a team that was negative in the prior round and is now affirmative in the present round that has not been assigned a room is assigned to stay in the room they were in during the previous round. On the fourth pass, any remaining debates that have not be assigned rooms are assigned an un-used room that either team debated in during the previous round, and if no such room is available, they are assigned a room in the same building as either or both teams were in the round before. If no such room is available, they are assigned to any un-used room.

Another system is to assign teams in rooms by bracket order. A general value is to minimize room moves. At tournaments that utilize several buildings where judges announce their decisions, some tournaments place the teams in bracket order and/or place the debates at the top of the bracket near the tab room. The argument for this practice is efficiency; the debates that will take the longest for judges to decide are usually those at the top of the bracket, and if the physical time it takes to carry the ballot to the tab room is considerable, a good deal of time can be saved by keeping the debates that will take the longest to decide closest to the tab room. At the Northwestern tournament, for example, the tab room is often at the tournament hotel more than half a mile away from the most distant room. If the last ballot in comes from the most distant building, the start of the next round can be delayed by 20 minutes or more compared to a situation where the last decision rendered is done so in a room immediately adjacent to the tab room. With cell-phone and mobile communications technology, the last ballot is increasingly called in to the tab room, making the practice somewhat less necessary.

The argument against the practice is that as teams lower in the bracket are moved farther away from the tournament, it sends a physical signal to the competitors and judges that those debates are less important. This argument may hinge upon whether one considers all debates equally important or whether those debates that still can affect the seeding order of teams participating in elimination rounds deserve more consideration (see “when to relax judging reqirements” above). This decision is a value choice and not a quantitative one.

Regardless of what the practice should be in normal circumstances, when there is a break in the day it may make sense to place the rooms in bracket order the following morning. For example, if a tournament has 8 preliminary rounds over 2 days with 4 on each day, round 5, which starts day 2, should usually have the rooms placed in bracket order. Since all subsequent debates will be power-matched, the advantage to placing the rooms in bracket order is that there will be fewer room moves in rounds 6-8. Because it is extremely unlikely that in a power-matched debate an 0-6 team, for example, will debate a 5-1, placing the 5-1 teams in rooms next to each other and the 0-6 teams next to each other will have the effect of keeping the room move distances short. Because the prior round occurs at the end of the day the amount of time it takes to re-file the evidence is generally not a consideration.

Pod systems. (Note: This section is an edited version of a contribution from Rich Edwards, which draws on a system Arnie Madsen helped create.) Basically, teams are placed in even-numbered groupings (typically 4 or 6) and every team debates every other team in the group. Groups are typically called “pods” or “cells.” If the teams are rated prior to the start of the tournament, an effort is made to insure that all the pods have teams of equal strength. That is, if teams are rated A, B, C, and D before the tournament, each pod should have one A, one B, one C, and one D. The letters can be converted to numeric equivalents, and each cell should have the same summed numeric rating total. If A=1, B=2, C=3, and D=4, the summed total for each pod should be 10. Because of school constraints and uneven numbers perfect equality of cell strength may be impossible to obtain. If teams are not rated they may be placed into pods randomly. Note that if no teams from the same geographical region are placed into the same pod geographical diversity of the pod matches will be obtained.

There must be an equal number of teams in each pod or there will be one bye in each cell. Four teams per pod produces 3 debates; if the teams are numbered 1-4 the following rounds are created:

Round 1: 1-2, 3-4

Round 2: 1-3, 2-4

Round 3: 1-4, 2-3

Six teams per pod produces the following five debates:

Round 1: 1-2, 3-4, 5-6

Round 2: 1-3, 2-5, 4-6

Round 3: 1-4, 2-6, 3-5

Round 4: 1-5, 2-4, 3-6

Round 5: 1-6, 2-3, 4-5

It is very unusual to have 5 presets at any tournament unless the total entry size is quite large (over 100 teams) and there are many different buildings in use.

Each cell is then assigned the requisite number of rooms; if there are 4 teams per pod, each cell requires 2 rooms for the 2 debates that will occur. If the rooms are close to each other, no team will have to move very far between rounds.

It is quite useful to allow the computer user to over-ride computer placement of teams and rooms to cells. This is especially important for rooms, since human users are typically in the best position to assess which rooms are closest to each other.

# V. ELIMINATION ROUNDS

## NUMBER OF PARTICIPANTS

There are four basic ways to decide how many teams to advance to elimination rounds. For all schemes, tournament directors should be careful to make sure that there are enough judges and rooms to hold the desired number of rounds.

The first method is to clear all teams that the judging pool will support. Because most tournaments use 3-judge panels for elimination rounds, simply divide the number of judges who will be available for elimination rounds by three to obtain the number of debates that are possible. Multiply that number by two to arrive at the number of teams that can be cleared. Note that it is also important that there are enough rooms available to hold all rounds. The argument in favor of this system is that it maximizes the opportunities for teams to participate in elimination rounds, which may have educational benefits. There are drawbacks. First, it might reward some teams that some might consider undeserving, such as teams without a winning record or even teams with a losing record. Second, it may strain an already tired judge pool; other systems would give at least some critics what may be a needed break. Third, because elimination rounds are almost always matched high-low, a low-seeded team will debate a very highly seeded opponent, and the likelihood that the resulting debate will be lopsided may offset any educational advantage to participating. Finally, if the scheme results in more than half of the field clearing, collegiate debate organizations will not count any points earned in the division.

A second method is to clear all teams with a certain record, usually a winning record. At an 8-round tournament that is 5 wins, and at a 6-round tournament that is 4 wins. Depending on the size of the tournament, it is useful to stipulate a maximum number of teams that can clear. A tournament might specify that all teams with a winning will advance to elimination rounds, up to 64. If the 65th seed (or lower) has a winning record, they will not participate in elimination rounds. The maximum number is usually based on the number of rooms or judges that will be available, or the amount of time necessary to hold the desired number of rounds. Clearing 64 teams requires that 6 debates will be held, a figure that is difficult to fit in a single day.

A third method is to advance all teams up to a certain number. For example, the tournament might clear the top 16 teams (octo-finals), even if the 16th seed does not have a winning record. This system is rarely employed, except at high school tournaments where schedules must be set in advance and coordinated with other events offered at the tournament. The drawback of the system is that it is too static, and a larger-than-expected entry can result in a large number of deserving teams excluded from elimination rounds, while a smaller-than-expected entry can result in a number of undeserving teams participating in elimination rounds.

The fourth system is to clear up to half of the field (rounding down if an odd number of teams are participating). This is the formula used by both the NDT and CEDA point systems, which also require that all teams counting toward the final total participated in at least half of the preliminary rounds and further specify that no points, even preliminary-round points, will count if more than half of the field is advanced to elimination rounds. This is the system employed by almost all collegiate tournaments.

Gary Larson contributes the useful rule of thumb that at an 8-round tournament that requires 5 wins to clear, roughly 3/8ths (37.5%) of all entered teams will clear.

## PAIRINGS

How to set a bracket. The basic formula requires that in each round, the seed totals of the teams in each debate add up to one more than the total number of teams participating in that round. For example, in the semi-finals there will be 4 teams competing, so the #1 seed should debate the #4 seed (adding up to 5, one more than the 4 teams participating) and the #2 seed should debate the #3 seed.

If the first round of elimination competition does not include a total number of teams that is evenly divisible by an exponent of 2, all un-filled spots are awarded byes. For example, if 15 teams advance the bracket is set using the next-highest multiple of 2 (16, which is 2 \* 2 \* 2 \* 2), and the un-filled 16-seed spot is assigned to debate the #1 seed, creating a bye. (A multiple is a number multiplied by itself a specified number of times, and for practical purposes here the relevant multiples of 2 are 2, 4, 8, 16, 32, and 64.)

Brackets are set without consideration of normal team constraints, that is, teams are assigned to debate each other based on “pure” bracket order regardless of whether they have debated before, were both the same side in the prior round, or are from the same school, unless a bracket-breaking procedure (described below) is utilized.

If a lower-seeded team upsets a higher-seeded team, they assume that seed spot for all subsequent rounds. For example, if seed #15 upsets seed #2 in the octo-finals, the team that was originally the #15 seed now assumes the #2 seed spot for all subsequent rounds.

Brackets are widely available for a number of uses beyond debate, for example, the NCAA basketball tournament produces them each year. A copy of a general-use bracket appears in Appendix B. The round of 2 is called “Finals,” the round of 4 is called “Semi-Finals,” the round of 8 is called “Quarter-Finals,” the round of 16 is called “Octo-Finals,” the round of 32 is called “Double-Octo-Finals,” the round of 64 is called “Triple-Octo-Finals,” the round of 128 is called “Quadruple-Octo-Finals.” I know of no tournament that clears more than 128 teams to elimination rounds.

Whether to “break” a bracket. Unlike preliminary rounds, teams that have debated before are paired against each other again, and side constraints do not alter bracket position. If brackets are not “broken” teams from the same school are paired against each other. Usually, no debate is held and the coach of the school simply identifies which team will advance (usually the higher seed). In some unusual situations teams may decide to debate, although most tournament directors discourage the practice because of the additional work it creates for judges. Whether brackets will be broken and whether debates will be held if they are not are issues best addressed in the tournament invitation.

These are the arguments in favor of breaking brackets: First, while the goals of preliminary rounds are for the seeding of elimination rounds and exposing the students to a wide range of possible opponents, the goals of elimination rounds are simply to identify the best team at a tournament. Forcing one team from a same-school match to withdraw from the tournament frustrates that goal since the team that receives they bye has an easier time of it, and the rest of the field may have an easier draw if the team that byes-out of the tournament is a good team – they have been eliminated without anyone beating them. Second, as an issue of fairness to the teams in the same-school debate, they should have the same chance to win the tournament as the rest of the teams in the elimination rounds. Third, because debates that occur are unquestionably more educational than byes, maximizing the number of debates that occur also maximizes education.

These are the arguments against breaking brackets: First, since other constraints recognized in preliminary rounds are not applied to elimination rounds, it is not clear why the same-school constraint should continue to be recognized. Second, breaking brackets may favor larger schools with more teams, since those are the only schools that are likely to face the same-school pairing in elimination rounds. Because the advancing team has advanced on a bye, it guarantees the school a presence in the subsequent elimination round, which in turn gives them a better chance of winning the tournament. Third, if more than 2 teams from the same school are involved, there is no established procedure for breaking the bracket more than once. Fourth, because same-school debates result in a bye rather than a debate, they free up judges to hear other debates. If the judge pool is tight, this can be beneficial and will often improve the quality of the remaining panels.

As a rebuttal to the arguments for breaking brackets, the warrants for the “elimination rounds are to find the best team at the tournament” and “maximize education” arguments may be contradictory: If the point is to find the best team at the tournament, altering the bracket for the sake of education may make it harder for the best team to emerge as the champion. Fairness to the team that byes-out of the same-school match is offset by fairness to the rest of the teams in the bracket, some of whom will have their opponents altered. Further, same-school teams are treated the same as everyone else, and breaking a bracket is not denying fairness to the byed-out team but is instead granting them special treatment. Additionally, a narrow focus on fairness in terms of elimination round bracket placement may ignore broader fairness issues, since teams from large schools with large squads generally enjoy benefits from participation in those programs (additional research, better practice debate opportunities, etc.). Finally, for the overall health of the debate community it may be important to maximize the number of different schools competing in the late elimination rounds since this competitive success may encourage smaller schools with fewer teams to continue to participate in debate.

As a rebuttal against the arguments against breaking brackets, advocates claim that the same logic that precludes same-school matches in preliminary rounds applies equally well to elimination rounds, and that other constraints such as side-switching do not apply to elimination rounds because of changed circumstances (see the “side equalization” discussion below). Further, any rules decision that rests on a large vs. small school distinction is misplaced, because all teams benefit from a consistent application of fair tournament procedures. Because a failure to break brackets guarantees one team a place in the subsequent elimination rounds maintaining bracket order may actually benefit larger schools.

Tournament directors seeking an informed decision should also see the last paragraph in the next section discussing the consequences of bracket-breaking as the tournament progresses.

How to break a bracket. When teams from the same school are matched, the lower seed is switched with the team one seed spot below them. For example, if seeds 3 and 14 are scheduled to debate in octo-finals, seeds 14 and 15 are switched. For the teams not from the same school, this improves the seeding position of the lower seed while slightly harming the seeding position of the higher seed. Seed #15, who originally was going to debate Seed #2, now debates seed #3, an easier opponent to the extent that seeding reflects team quality. Seed #2, who was originally going to debate the #15 seed, now debates #14, a more difficult seed, but one against whom they still enjoy a 12-slot advantage. From the perspective of the two same-school teams, the lower seed now has a more difficult match (seed #2 instead of seed #3), while the higher seed now has an easier match (seed #15 instead of seed #14). Although the match of the higher seed is slightly easier, the alternative was a bye, and any debate introduces less certainty of victory than a bye.

In the event the same-school debate occurs with the #1 seed, the lower seed must be moved up rather than down one spot. This will reverse the normal advantaging and benefit the higher non-same-school seed and disadvantage the lower non-same school seed.

If a school advances more than 2 teams to elimination rounds, breaking the brackets can create additional skewing if, after the first same-school debate is altered according to the procedures above, a new same-school match has been created. It is not clear what the best course is in this situation. One option is to move the lower same-school seed down rather than up if that avoids the new conflict. Another possibility is to disadvantage the higher same-school seed by moving them down a spot, either to avoid the original same-school match or the subsequently-created same-school match. Finally, the invitation might specify that brackets will be broken unless the breaking of the brackets creates a new skew, avoiding the mess altogether.

The consequences of breaking brackets can become more significant as the tournament progresses. For example, while the difference between the #2 seed debating the #15 versus #14 seed in octofinals may not be large, having the #3 seed debate the #5 seed instead of #6 in the quarterfinals might be.

## ELIMINATION ROUND JUDGE USE

How many judges per round? Generally, multiple-judge panels are used in elimination rounds. The logic is that a 3-judge panel is less likely to render an erroneous decision than a single judge, and that since the consequences of a poor decision are greater in elimination rounds (the losing team is out of the tournament as opposed to being a lower seed in subsequent rounds), the importance of a correct decision is higher. Far and away, the 3-judge elimination panel is the norm.

If the judge pool is extremely tight, a single judge can be used in elimination rounds. This is usually an emergency measure and typically is utilized in the lower divisions before the higher divisions. For example, if single-judge panels must be used, they are used first in novice division, then in JV division, and finally in open or varsity division. Because an even number of judges can create a tie, even judge elimination rounds are never used (although in rare circumstances some tournaments use 2-judge panels in preliminary rounds).

If a larger pool of judges is available, there is no reason that any odd number of judges larger than 3 can be assigned. One drawback to a larger panel is that judges tend to be fatigued by the end of the tournament and it may be more wise to allow some judges a given elimination round off in order to insure their availability in subsequent rounds (this is usually done via a verbal agreement with the judge). Another drawback is that the decisions usually take longer to announce, especially if judges give oral presentations of their decisions (which almost always occurs at collegiate tournaments).

If the rounds are especially important (such as elimination rounds at the collegiate national tournaments) and the judges are available, panels of 5 judges or more are often employed. The rationale is that more judges make a better decision; the odds of an inferior team advancing due to a bad decision are lower if 3 rather than 1 judge is assigned, and the odds of losing a split decision where some judges vote in error is reduced as the number of judges on the panel becomes larger.

To insure a large enough pool of judges for elimination rounds, teams are typically required to provide judging for one round past the elimination of their last team. For example, teams that do not advance to elimination rounds would be required to stay through the first elimination round, teams that lost in the octo-finals would be required to provide judging for the quarter-finals, etc. If a team has travel issues, such as a long drive or a fast-approaching departing flight time, individual exceptions may be granted at the discretion of the tournament director.

Mutual Preference in Elimination Rounds. The simplest method for judge placement in elimination rounds is simply to utilize the preliminary round judge preferences for advancing teams. This may be undesirable if the judging pool has changed significantly between registration and the beginning of elimination rounds. Judges can drop from the tournament due to illness, irresponsibility, or changed travel plans. Judges can arrive at the tournament unexpectedly. In addition, teams may desire the opportunity to fill out their preference sheets a second time. Their experiences at the tournament may alter their opinions of a judge’s desirability, or their preliminary round rankings may have accounted for judging commitment (rating some judges higher or lower because they would judge a large or small number of rounds). The downside of issuing a new elimination round preference sheet is that collecting the new information adds logistical demands on the tab room staff. If more than 2 judges who are available to judge were not rated on the initial preference sheets, it is probably worth issuing at least a supplemental preference sheet. If more than 10% of the pool has been altered, a new preference sheet is almost certainly in order.

If a new elimination round preference sheet is issued, it need not include round commitments since all judges are obligated for all rounds. The type of preference system may be altered (moving from an A-B-C-Strike system to a circle-strike system), although it may be desirable to make the elimination round system conform closely to the preliminary round system.

Judge Placement in Elimination Rounds. The ideal situation is that all 3 judges for all panels would receive the top rating from both teams (for example, 3 mutual “A” judges on all panels). This situation is rarely possible. There are 3 goals for elimination round judge placement. First, the panels should be balanced. Second, they should be of high quality. Third, the strength of the panels should be roughly equal across all debates.

Panel balance can be assessed by assigning a numeric value to each judge rating, with 1 being the best rating. The panel is balanced if the summed ratings for each team are equal. For example, a panel is un-balanced if the 3 judges selected are rated 1, 3, and 3 (sum of 7) by the affirmative team and 1, 2, 3 by the negative (sum of 6). Note that balance can be achieved by assigning 2 different judges with imbalanced ratings off by the same increment, for example (with the first rating from the affirmative and the second rating from the negative), a 3-judge panel with a 1-2, 2-1, 2-2 sums ratings of 5 for each team. If any rating system with fewer than 9 categories is utilized, judges with ratings differing by more than 1 between the teams (for example, a judge rated 1 by the affirmative and 3 by the negative, for a difference of 2) should be avoided if possible.

Panel quality can be assessed with the summed ratings (assuming they are equal between the teams). A lower number indicates higher panel quality, at least in terms of team rankings. Thus, a panel with a mutual summed rating of 5 is better than a panel with a mutual summed rating of 7.

Panel equity – the goal of having roughly equal panel quality across all debates – can be assessed by comparing the mutual summed ratings of the debates. If one debate has a mutual summed rating of 4 and another debate has a mutual summed rating of 8, the former debate has a much stronger panel than the latter and panel inequity is created.

An optimal solution has panel balance in all debates, high quality panels (low mutual summed ratings), and equity across panels. Methods for obtaining an optimal solution vary and depend on the mutual preference system in place. There are two basic approaches that are worth pursuing.

The first is to stack the debates in terms of fewest mutually preferred judges to most mutually preferred judges, and stack the judges in from least preferred to most preferred. Least preferred judges should be placed in the debates with the fewest preferred judges first. This is similar to the method recommended above with the preliminary round judges, and it is designed to address debates that are difficult to find judges for first.

A second approach is to place at least 1 judge in every debate before placing 2 judges in any debate, and 2 judges in every debate before placing 3 judges in any debate. Filling the panel in any given debate before placing judges in any other debate will generally work against panel equity.

Jon’s recommendation: The TRPC does have an option to place judges on elimination panels. My experience has been that human intervention can generally do a better job of balancing out the 3 goals of elimination round judge placement than simply utilizing the first computer-generated solution.

Strike cards. As the tournament progresses the judge pool shrinks because judges will leave as their teams get eliminated. This can create a situation where it is not possible (or at least very difficult) to provide a panel of mutually-preferred judges. In this situation, a system of strike cards can be employed. Alternatively, if the judge pool is sufficient and a large number of judges is readily available, a strike card containing the names of mutually-preferred judges can further improve the quality of the judging panels. Furthermore, if there is an excess of mutually-preferred judging available, there is little reason for the tab room rather than the teams to select the final panel.

The mechanics of the strike card are easy to employ. First, the names of available judges should be placed on the card. Each team should receive their own copy of the names and each copy should not indicate the name of any judge the other team has struck; in particular, you do not want one team to strike a judge first and the second team to receive that information, which will happen if you use one card, hand it to one team first, and then present the card to a second team. The number of strikes allowed each team should be the largest whole number created by subtracting the desired panel size from the total pool size divided by 2. For example, if there are 8 judges and the desired panel size is 3, the calculation is 8-3 divided by 2, which is 5 divided by 2, which is 2.5. Each team can strike 2, the whole number of 2.5. If the desired panel size is 5, each team is allowed 1 strike (8-5/2, 1.5, with 1 as the largest whole number).

If the remaining number of judges exceeds the desired panel size, which can occur if both teams strike the same judge or an even number of names appeared on the strike card, the tab room should randomly remove remaining names until the desired panel size is reached. For example, if 6 names appeared on the card and the desired panel size is 3, 4 judges will remain if each team strikes a different judge. At that point, the tab room should remove the 4th judge at random. It is common practice for tab rooms to take judge travel plans into consideration at this point, and if one of the remaining judges has more urgent travel needs (such as a longer drive or a more immediate flight departure) it is typical to grant that judge that round off rather than employ a purely random scheme. As always, the decision should be motivated by the goal of fairness and should not be done to advantage one team over the other.

As a logistical consideration, it is important to indicate a time and place where the strike card should be returned. If teams wish to collaborate in their decision they are free to do so, although neither team should be compelled to collaborate with their opponents or share their strike information.

## SIDE DETERMINATION IN ELIMINATION ROUNDS

If teams have met before in preliminary rounds they should switch sides in elimination rounds; that is, a team that was negative in a prior meeting would be affirmative in a subsequent meeting. If the teams have not met before, some system of random side assignment should be used. Most commonly, teams simply flip a coin. An alternative which saves time is to have the tab room assign sides, either by having a computer randomly assign them or via a coin toss. If the bracket has been revealed to the tournament, the tab room can toss a coin and based on the result assign all even or odd teams to a given side, for example, a “heads” result might assign all odd-numbered seeds to the affirmative. If the tab room has assigned sides and the teams have not met before they are generally free to negotiate their own side arrangement. In other words, if the tab room has assigned one team to be affirmative and the other to be negative, and the teams have not met before, they are free to switch sides by mutual consent. If either team objects, sides will default to those that the tab room assigned.

These systems of randomization can create a condition where one team debates the same side repeatedly, perhaps taking the affirmative side in all elimination rounds. This can be eliminated using a system of “side equalization” (although the term is the same as side equalization for even-numbered preliminary rounds, the elimination side equalization procedure is somewhat different.) Under side equalization, teams switch sides if they have met before or one team has taken a given side more than another. For example, if during a quarter-final debate one team was negative in octo-finals and the other was affirmative, they would switch their octo-final sides for the quarter-finals. Sides are cumulative for each subsequent elimination round; a semi-final team with 2 affirmatives would be negative if their opponent had 1 affirmative and 1 negative elimination debate. If the number of affirmatives and negatives for each team is equal, a system of randomization is employed (such as a tab-room or team-based coin toss). The priority for side determination is thus: Teams switch sides if they have met before, if they have not met before the side equalization formula is applied, and if their side equalization totals are equal they toss a coin.

Side equalization for elimination rounds is in common but not universal use at collegiate tournaments.

## ELIMINATION ROUND ROOM PLACEMENT

It is common that the higher seed in any given round be allowed to stay in the same room and their opponent to move into that room. For this reason, the highest seed should typically be placed in the most desirable room in their first elimination round debate. If the highest seed receives a bye in the first elimination round, the debate that will determine their first opponent should be held in that room. In turn, the #2 seed should be placed in the second most desirable room, and so on.

If certain rooms are not available at all times, or if all elimination rounds are not held on the same day, this system should be altered in a way that does the best job of minimizing room moves. Generally, the highest seeds should stay in rooms that will be available for the most rounds.

This system is employed because higher seeds typically have more materials to move and because higher seeds tend to win more often. Both considerations mean time is save dna room moves are minimized if the top seeds stay. This can be very important if a large number of elimination rounds (4 or more) are held on the same day. Some may view this practice as un-necessarily elitist.

## SHOULD THE BRACKET BE RELEASED?

Teams advancing to elimination rounds will want to know what the bracket is, both because that alerts them to potential opponents and to know how well they are doing. For this reason, competitors will try to figure out the elimination round bracket based on their knowledge of team records and speaker awards.

A community consensus is that the bracket is not released prior the start of the first elimination round. Some feel that releasing the bracket at any point favors teams with enough coaching resources to scout future opponents. Practically, after the first elimination round the bracket can be constructed based on publicly available information (win totals and speaker awards) anyway, and there is little practical reason to with-hold the bracket at this point.

At the 2007 Fullerton and Berkeley tournaments the pairings were released the night prior to elimination rounds based on the reasoning that teams in the octofinals would be trying to figure the bracket out anyway, and the move seemed to be met with community approval and did not seem to advantage any team over another.

# Appendix A: Matching Small Divisions

(Contributed in its entirety by Terry Winebrenner of Cal Poly San Luis Obispo, and edited by Jon Bruschke.)

Some entry situations present tight pairing constraints that make matching particularly troublesome. Generally speaking, when there are very few teams entered in a division, or when one school has entered an inordinately high percentage of the teams in the division, schedule permutations are so constrained that random matching is unlikely to discover a “clean” preliminary round schedule (a schedule in which no team is paired against another team from its own school, no team is paired against a team for a second time, and each team has an equal number of affirmative and negative debates). In such cases, you have a “tight” division where it makes sense to use a *matching schematic*, a pre-set schedule that uses orderly team rotation rather than random matching or power-matching to pair debates. In such instances, your only task is to construct a clean schedule of preliminary debates. Schedule features that you might address in larger divisions, such as variety of opposing schools, side balance with opposing schools, equitable strength-of-schedule, etc., become matters of random chance rather than design, if not from necessity then from administrative efficiency.

This section addresses the basic principles behind constructing matching schematics for small divisions. The discussion and illustrations – as well as the cut-and-paste schematics at the end of the section – assume a six preliminary round tournament environment. However, the basic logic applies equally to tournaments with a greater or lesser number of rounds, although the formula will require some tweaking. Hopefully, the explanations are clear enough that you will be able to make the necessary adjustments if your tournament has more or less than six preliminary rounds.

***When Is a Division “Tight”?*** Whether or not a division is tight is a function of both the total number of teams entered in the division and the number of teams entered by the school(s) with the largest entry (including hybrid teams). Two conditions must be met in order for a clean division to be even theoretically possible: No single school may have more than one-half of the teams in the division, and the number of teams from other schools must equal or exceed the number of preliminary rounds to be matched. (When calculating the number of teams in a division, round up an odd number of entries since a BYE will need to be added to the entries to produce an even number of teams.) For example, the minimum number of teams necessary to match a six preliminary round tournament is eight (or seven plus a bye) if each school has a single team (one team plus six rounds equals a seven team requirement, which becomes eight with the bye added); coincidentally, the same number of teams is required if one or more schools has two teams (two teams plus six rounds equals an eight team requirement, which can be produced by seven entries with the bye added). On the other hand, an eight-team division will not produce six clean rounds when one or more schools have three of the teams – eight minus three equals five, which means that the sixth round will have at least one match between teams from a school or teams that met in a prior round. However, a ten-team division (or nine plus a bye) can support three teams from a school (3 + 6 = 9).

Unfortunately, the *theoretical* number of teams required for a clean division does not always equal the *actual* number of teams necessary. For instance, a ten-team division should be able to support as many as four teams from a single school, and in fact it will *so long as only one school has as many as four of the teams.* If two schools each have four of the teams, the theoretical requirement formula (4 + 6 = 10) suggests that the division can be matched, but affirmative/negative splits (half of the teams must be affirmative and the other half negative in any one round), affirmative/negative balance (each team should have three affirmative and three negative debates), and the possibility that in later rounds two teams that have only one available match have the same available match, come together in such a way that no matter what match permutations are used for earlier debates, at some point a full slate of clean debates is no longer possible.

As a rule of thumb, you can calculate the number of entries in a division that actually will produce six clean founds in the following manner: A minimum of seven teams (eight with the bye) are required to produce six clean rounds when the largest entry from one school is one or two. For each additional team from the largest entry school, add two to the minimum number of teams (e.g., a three-team-entry requires a total of nine/ten teams, a four-team-entry requires a total of eleven/twelve teams, and so on). Tighter divisions can be matched (as per the four-team-entry ten-team division mentioned earlier), but not in all entry configurations and only with the right algorithm or considerable (sometimes seemingly infinite) trial-and-error. To help you manage tight divisions, at the end of this section you will find a number of pre-set schematics for six round tournaments that cover a variety of largest-entry/total team configurations.

The problems encountered when trying to use normal matching procedures with tight divisions ought to be obvious: As rounds are paired, the number of available clean matches for each team declines, as does the probability that clean matches continue to appear on the necessary side at an appropriate time.

Here is a simple illustration. An eight-team division, four schools each with two teams, has been randomly paired for three rounds, as per the schematic below. Numbers indicate different schools, and letters associated with numbers indicate different teams from that school. The top row indicates the round, and the second row indicates the side. All rows below that are sample pairings (for example, 1a is affirmative against 4b in round 1. Due to side constraints, teams 1a, 1b, 3b and 4b must be affirmative, while teams 2a, 2b, 3a and 4a must be negative in round four. Try to match round four.

Sample Schematic 1

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 4b | 2a | 1a | 2a | 3b |  |  |  |  |  |  |
| 1b | 3b | 3a | 4a | 2b | 4b |  |  |  |  |  |  |
| 2b | 3a | 3b | 2b | 3a | 1a |  |  |  |  |  |  |
| 4a | 2a | 4b | 1b | 4a | 1b |  |  |  |  |  |  |

Here is the predicament. While each of the affirmative teams has one or more available clean matches among the negative teams, teams 1a and 3b each have only one possible match, *and it is against the same team.*

Two simple principles emerge from this illustration. First, do not try to match tight divisions randomly (with or without computer assistance). The only dependable way to avoid a matching snafu, short of incredible good fortune, is to plot a workable rotation that foresees predictable contingencies and rotates teams in a manner designed to put the right teams in the right place at the right time. Second, with a tight division, never release the pairings for a preliminary round without a workable schedule in hand for remaining preliminary rounds. In the illustration above, merely flipping sides for the round three debate between 2a and 3b opens the door for a clean round four (finding a clean round six will be virtually impossible, however). Matching tight divisions can require recursive logic – the ability to return to prior rounds and change matches or flip sides, thereby changing the constraints for subsequent rounds. Needless to say, such adjustments cannot be made after the debates have occurred.

***Basic Matching Techniques.*** For most tight division situations, the easiest rotation involves dividing the teams into two groups, and then plotting a series of inter-group and intra-group matches. If the division has an odd number of teams, use a BYE to complete the matches. When you have a BYE in a division, treat it as a one-team school in both pairings and side assignments. To control side balance, match rounds in pairs, with each team having one affirmative assignment and one negative assignment in each pair of rounds. You need not worry about establishing an A-N-A-N-A-N pattern (where “A” indicates affirmative and “N” indicates negative) or its reverse; A-N-N-A-A-N or a similar derivative will work fine. The surest ways to work yourself into a bind is to treat the BYE as an un-sided round or ignore side balancing with the thought that you can correct for it later.

Divisions with an even number of debates per round. The basic logic for matching tight divisions uses a series of four inter-group rounds and two intra-group rounds. Rather than randomly placing teams in the groups, select teams for each group in such a way as to make sure that each Group X team has four available matches in Group Y (inter-group rounds) and two available matches in Group X (intra-group rounds). Consider the same eight-team division used for the first illustration. By assigning 1a, 1b, 2a, and 2b to Group X and 3a, 3b, 4a, and 4b to Group Y, each team has four available inter-group matches and two available intra-group matches. To match the division, assign Group X teams to the affirmative and Group Y teams to the negative for round one (or vice versa) and pair the teams. For round two, Group X teams and Group Y teams will switch sides. But, leave the Group Y teams in the same vertical order as for round one, while rotating by one the vertical order of the Group X teams (e.g., in round one the top debate is the 1a-3a match; in round two, 3a remains in the top match, while 1b rotates up to be the opponent and 1a rotates to the bottom of the Group X list). Continue this pattern for rounds three and four: switch sides, retain the Group Y order, rotate the Group X order by one. (If any school has teams in both groups, stack the lists for round one in such a manner that same-school teams will not eventually rotate into a same pairing. See the next section on matching an odd number of debates for an illustration.) For round five, pair Group X with Group X and Group Y with Group Y, respecting school constraints. For round six, continue the X-X and Y-Y intra-group matching, respecting both school constraints and round five matches. Here is the resulting schematic:

Sample Schematic 2

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 3a | 3a | 1b | 2a | 3a | 3a | 2b | 1a | 2a | 2b | 1a |
| 1b | 3b | 3b | 2a | 2b | 3b | 3b | 1a | 1b | 2b | 2a | 1b |
| 2a | 4a | 4a | 2b | 1a | 4a | 4a | 1b | 3a | 4a | 4b | 3a |
| 2b | 4b | 4b | 1a | 1b | 4b | 4b | 2a | 3b | 4b | 4a | 3b |

Once you get the hang of the 4-2 matching scheme, matching divisions with an even number of debates per round is fairly simple. This sample division can be matched by hand in a matter of moments, even though it is at maximum tightness since each team has only six possible matches from the outset. It is possible to massage the scheme to have 3 inter-group and 3 intra-group matches, but that requires modifying side assignments in round three so that half of each group is affirmative and the other half is negative (otherwise you will not have a matching number of affirmative and negative teams in each group for round four, which would be the first intra-group round). In divisions with slightly more flexibility than this sample, a 3-3 matching scheme will produce some different debates (one less inter-group match and one more intra-group match for each team), but there is no fundamental difference in the *quality* of the matching, and it hardly is worth the trouble.

Divisions with an odd number of debates per round. When a tight division has an odd number of debates per round, the 4-2 matching scheme has to be tweaked. With an odd number of debates, during the intra-group rounds Group X and Group Y will each have one team without an intra-group opponent. This means that four teams (two per round) will need to have a 5-1 schedule to compensate for the odd number of debates. Odd number debate scenarios are not intrinsically more difficult to match, but they do require a little more forethought since you need to choose in advance the teams to assign a 5-1 schedule, and make sure that round five side assignments allow for round six matches. Here is an example for a ten-team division, where five schools each have two teams. Teams 1a, 1b, 2a, 2b, and 3a have been assigned to Group X, while teams 3b, 4a, 4b, 5a, and 5b have been assigned to Group Y.

Sample Schematic 3

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 3b | 3b | 1b | 2a | 3b | 3b | 2b | 3a | 2a | 2a | 1a |
| 1b | 4a | 4a | 2a | 2b | 4a | 4a | 3a | 1b | 2b | 2b | 3a |
| 2a | 4b | 4b | 2b | 3a | 4b | 4b | 1a | 1a | 4a | 4b | 1b |
| 2b | 5a | 5a | 3a | 1a | 5a | 5a | 1b | 5a | 3b | 4a | 5a |
| 3a | 5b | 5b | 1a | 1b | 5b | 5b | 2a | 5b | 4b | 3b | 5b |

Rounds one through four pose only one problem – 3a cannot be matched against 3b – which can be solved by stacking round one lists to place 3a at the bottom of Group X and 3b at the top of Group Y, and then they cannot catch-up with each other in the four round rotation (a solution that is less time consuming than letting the match happen and then searching for an available switch in whichever round the match occurs). Once the four inter-group rounds are matched, each of the teams still has one inter-group opponent available, except for 3a and 3b, which have no remaining inter-group opponents due to the same-school constraint. Before matching intra-group rounds five and six, identify two Group X teams and two Group Y teams that will have a fifth inter-group match. In the example, Group X teams 1a and 1b, and Group Y teams 4a and 4b were selected. Set aside one of the two Group X teams (1a) and its corresponding Group Y team (4a). Pair the remaining teams in intra-group matches, as per the prior example, with one exception – 1b and 4b must be on opposite sides of the bracket so that they may be paired together in round six. Complete round five by pairing 1a with 4a, making sure that 1a has the same side assignment as 1b and 4a has the same side assignment as 4b. For round six, momentarily ignore 1a and 4a and rotate teams for a second intra-group match. Substitute 1a for 1b and 4a for 4b, and then pair 1b and 4b to complete the round. This matching scheme works for any tight division that has an odd number of debates per round. The secret is to determine which teams will get the extra inter-group match before pairing the intra-group matches. Be sure to keep the same-school constraint and round six side constraint in mind when setting the extra inter-group matches.

The group migration solution. The basic requirement for the 4-2 matching scheme to work is that the teams can be grouped in such a way that at the outset each team has at least four possible inter-group opponents and two possible intra-group opponents (a 3-3 matching scheme requires three and three). There are rare cases where six clean rounds can be matched, but not by a 4-2 or 3-3 scheme since there is no way to arrange static groups that have the requisite number of inter-group and intra-group opponents. Consider a ten-team division where one school has four of the teams. Theoretically, the division can be matched since each team has six or more potential opponents (4 + 6 = 10). However, neither a 4-2 nor a 3-3 scheme will produce a clean schedule since the teams cannot be grouped in a fashion that produces the required number of inter-group and intra-group opponents.

Random chance might produce a workable schedule since teams are regrouped after every pair of rounds, assuming you have an infinite amount of time to cycle recursively through hundreds of permutations. On the other hand, a carefully conceived rotation can plot a schematic that works.

Sample Schematic 4

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | X | Y | Y | X | X | Y | Y | X | X | Y | Y | X |
|  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
|  | A | N | A | N | A | N | A | N | A | N | A | N |
| 1 | 1a | 3a | 2b | 1a | 1a | 3b | 2c | 1a | 1a | 3c | 2a | 1a |
| 2 | 1b | 2b | 3b | 1b | 1b | 2c | 3c | 1b | 1b | 2a | 3a | 1b |
| 3 | 1c | 3b | 2c | 1c | 1c | 3c | 2a | 1c | 1c | 3a | 2b | 1c |
| 4 | 1d | 2c | 3c | 1d | 1d | 2a | 3a | 1d | 1d | 2b | 3b | 1d |
| 5 | 2a | 3c | 3a | 2a | 2b | 3a | 3b | 2b | 2c | 3b | 3c | 2c |

How was this schematic plotted? The teams from the four-entry school (1a, 1b, 1c, and 1d) were all placed in Group X, as was one additional team (2a). The remaining teams were placed in Group Y. From this set-up it is easy to match five rounds by pairing Group X against Group Y, rotating one position vertically for each round, and then designating Group X teams affirmative for the odd numbered rounds and negative for the even numbered rounds (or vice versa). The problem is getting a sixth round with clean debates. The solution? An orderly pattern of group migration. To help understand the rotation, Sample Schematic Three has an additional row and column to identify match positions in the schematic. To match round two, rather than rotating 3a (Y1 position in round one) to the bottom of the Group Y (Y5), as per normal procedure, 3a was rotated to the *bottom of Group X* (X5 position), 2a (X5 position in round one) was rotated to the bottom of *Group Y* (Y5), and the remaining Group Y teams were rotated up one position. By using the same migration pattern for each round – Y1 to X5 to Y5 – you effectively have added a sixth team to Group Y, allowing six rounds of X-Y pairings. There is one minor problem: every time a team migrates groups it breaks the side assignment pattern (e.g., in round one, 3a is negative, and when it migrates to Group X for round two, that team remains negative since all Group X teams are assigned negative for that round). For the odd numbered rounds that is not a problem since there are no side constraints; the even numbered rounds, on the other hand, appear to skew the side balance. Consider this, however: When 3a migrates to the X5 position, it is assigned to the wrong side, and when 2a migrates to the Y5 position, it too is assigned to the wrong side, *but the matching rotation also happens to pair 3a and 2a in that round.* Flip sides for the X5-Y5 position debate, and the side skew has been corrected. The same thing occurs for the other two even numbered rounds, the rotation creates a side skew for the two teams that migrate groups, but coincidentally pairs those teams in the process. Flip sides for the X5-Y5 debate in those rounds and a seemingly impossible pairing scenario has been conquered.

If you have an odd division configuration that cannot be matched with static groups, some variation of group migration probably is your answer. It does, however, create its own peculiar constraints. For this migration to work, teams must migrate from top of Y to bottom of X to bottom of Y. If the migration is reversed (Y*b* to X*b* to Y*t*), the two migrating teams are assigned to the wrong side in even numbered rounds, but since they are not paired together in that round there is no easy way to correct the side skew. Second, you cannot place teams from any one school in consecutive positions in the Group Y list (treating X*b* as a Group Y position). Why? Ultimately, consecutively placed teams will end up with one in X*b* at the same time that the other is in Y*b*. What this means for a ten-team division, is that the division can be matched when one school has four teams, and the remaining schools each have three or fewer teams. If a second school has four teams, however, Group Y will have consecutively placed teams somewhere in the list, producing a same-school match at some point. While raw team and school counts do not preclude the pairing of the division, you still cannot find a six-round solution. A larger division that needs to be matched with a group migration scheme will also produce a similar kind of constraint.

Divisions with no flexibility. While the group migration scheme produced clean matches for an exceedingly tight division, some division configurations produce no flexibility whatsoever. Consider a twelve-team division where six of the teams come from one school. The division can be matched, but not with any opponent variation. In this case, the six teams from one school would be Group X, the other six teams Group Y, and the schematic would involve six rounds of X-Y debates. (If for some reason you are concerned about having all teams from a group on the same side each round, you can avoid that by forming groups W, X, Y, Z, splitting the six teams from one school between W and X and the remaining teams split between Y and Z. Match three rounds of W-Y and X-Z, then three rounds of W-Z and X-Y.) The point is, the division can be matched.

Power-matching tight divisions. As a general rule, there is no advantage to power-matching tight divisions. The purpose of power-matching is to correct possible anomalies in schedule strength produced by random or rotation matching. This assumes, of course, that in the late preliminary rounds you have a sufficient degree of matching flexibility that record can be added as a constraint. Consider this example: A division has ten teams, the large-entry school has two of those teams. On its face, it might appear as if there were sufficient flexibility for a round or two of power-matching. However, for the 6th debate a team cannot meet itself (subtract 1), cannot meet another team from the same school (subtract 1), and cannot meet a team from a prior round (subtract 5). That leaves three possible opponents. Due to side constraints, it might be that only one of those teams appears on the opposite side of the bracket (assuming that you made sure there was a workable round six before you released round five). Although the best-case scenario is that all three available opponents will be on the opposite side of the bracket, the average number of opponents across all ten teams will be 1.5. How greatly will the “power-matched” round of pairings differ from a pre-set round? Power-matching is only useful when two conditions are met: (1) the power-matched round produces fewer skewed debates – debates between teams with dissimilar records – than the pre-set schematic, and (2) the strength-of-schedule at the end of all preliminary rounds has less variance with power-matched debates than with the pre-set schematic. While the information to make the comparison is available only after-the-fact, there is little reason to suspect that either condition is present in a tight division and it is very rare that both would be.

Nonetheless, the contemporary tournament climate assumes that some of the preliminary rounds will be power-matched, usually at least two since a single round of power-matching is too restricted by side constraints to accomplish much on its own. If your division has sufficient flexibility to assure that every team will have multiple available opponents for the side-constrained final preliminary round, you can use power-matching to satisfy community expectations even though it will do little to equalize strength of schedule. If you choose to power-match, pre-set four rounds using a 2-2 scheme (two rounds inter-group, two rounds intra-group) to create a maximum variety of opponents. As a safety-play, match rounds five and six in any fashion that produces clean rounds – 1-1, 2-0, random, etc. – and set them aside as fall-back pairings (to reiterate, you cannot safely release round one without a schematic in hand that produces six clean rounds). After collecting the results data you will use for power-matching round five, re-match that round using your power-matching protocol. Using the same results data, schedule a back-up round six. If a clean round six is not possible, identify the most problematic teams, go back to round five, flip sides for one of the problematic teams, and then try once more to match a clean round six. If that does not work, try flipping a different debate, or perhaps a couple of debates. It this still does not produce a clean round six, return to round five, reposition one or two teams with equal wins but unequal points, rematch found five, then try once more to match round six. Obviously, round five cannot be released until you have a workable round six. Ultimately, you may have to abandon power-matching because the only permutations of round five that produce a clean round six have substantial record skews. If that is the case, you already have a clean version for both five and six from the pre-set schematic. If an acceptably power-matched round five produces a clean round six, set fall-back round six aside release round five. When it is time to match round six, try your power-matching protocol, knowing that you have the fall-back pairings available.

As always, time is a consideration, and it may not be appropriate to delay the release of the pairings 15-20 minutes as you work on an improvement to the pairings that is unlikely to work. In this situation, it is best to fumble with the pairings 5 minutes or so to make sure no improvement is possible, and if no solution appears in that time to release the preset pairings.

Checking your work. The basic axiom of tab room management is to double-check *everything*. This is as necessary for matching as it is for any other aspect of tabbing a tournament. If you are using TRPC, STA, or some other tabbing software, it can perform some of the checking for you. Just enter the rounds one-by-one, and look for error messages. However, you also can, and should, manually check your matching rotation with a checksum grid. The example below is the checksum grid for the eight-team divisions used for the first illustration.

The rows identify the teams in the division, the columns identify the opponents in the division, and the inner grid squares represent each possible pairing, including same-school and self matches. The squares representing same-school and self matches are blocked, since they represent illegal matches (do not forget to account for hybrid teams if there are any in the division). As each round is matched, record the pairings by noting A or N, as appropriate, in the square for the match. Since each pairing involves two teams, it needs to be recorded twice. For example, the first debate in Sample Schematic 1 pairs 1a on the affirmative with 3a on the negative. Locate team row 1a, move across to opponent column 3a, and record A (signifying that 1a is affirmative versus 3a), locate team row 3a, move across to opponent column 1a, and record N (signifying that 3a is negative versus 1a), and continue through the rest of the pairings in the round, and so on through all of the pre-set rounds.

Checksum Grid for Sample Schematic 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 2a | 2b | 3a | 3b | 4a | 4b |
| 1a |  |  | A | N | A | N | A | N |
| 1b |  |  | N | A | N | A | N | A |
| 2a | N | A |  |  | A | N | A | N |
| 2b | A | N |  |  | N | A | N | A |
| 3a | N | A | N | A |  |  | A | N |
| 3b | A | N | A | N |  |  | N | A |
| 4a | N | A | N | A | N | A |  |  |
| 4b | A | N | A | N | A | N |  |  |

As the matching progresses, if you unwittingly make an illegal match, you will catch the error when you record the checksum information because the square will be blocked or already recorded. Blank squares represent unused matches. Once all rounds have been recorded, you can quickly confirm side balance by counting A’s and N’s in each row or column (rows show actual sides, columns show reciprocal sides); if the balance is not 3-3, then either you have a scheduling error or a transposition error to correct. Preset checksum grids for a number of situations are presented later in this section.

The checksum grid is particularly helpful when power-matching. If your preferred round five does not produce a clean round six, you can use the checksum grid to identify which round five debates can be flipped to get a clean opponent for your problematic team. Also, if your division has sufficient flexibility to allow you to be concerned with variety of opposition or side assignments with particular schools, the checksum grid will identify over- or under-represented schools and loaded side assignments. Armed with that information, you can tweak the schedule if tweaking is possible.

***Mid-tournament Adjustments.*** The worst calamity that can befall a tight division is to lose one or more teams from the division once the tournament is underway. With flexible divisions, losing teams is a minor annoyance; you just drop the team that withdraws from the tournament, and resume matching. If you have pre-set rounds that have yet to take place, just toss them and repair those rounds with the remaining teams. If a team withdraws just prior to a side-constrained round, you either move from or to a BYE, and can use it to fudge the side splits.

With tight divisions, every problem is magnified. The schematic for a ten-team division with a four-entry school, for instance, looks nothing like the schematic for a twelve-team division with a four-entry school. Losing the twelfth team poses no problem, since that slot in the schematic just becomes a BYE. If the twelve-team division already has a BYE, losing the eleventh team removes both that team and the BYE. You now have a ten-team division, and your pre-set schematic is useless.

If you lose a team from a division that already has a BYE, how you proceed depends upon whether or not the immediate upcoming round is side constrained. If it is, keep the pre-set round, and using the checksum grid as a guide, adjust the round as necessary. The easiest move is to see if the team assigned the BYE can be paired with the team originally matched against the withdrawing team. If not, look for another debate to cross-match, preferably a debate in which the team on the same side as the withdrawing team has had a BYE. The object is to get the sides balanced, which gives you the best shot of recovering without having to violate a primary constraint.

If the team withdraws before an odd-numbered round (no side constraints), or after running the adjusted side-constrained round, your best course of action is to toss the original schematic and start from scratch.

Create a new checksum grid and record the matches for all rounds up to the point where you are abandoning the original schematic, but mark the pairings with an X (constraint) rather than A or N.

Now, create a new schematic for the number of rounds remaining. For instance, if a team withdraws just prior to or following round two, you now face matching a *four* round tournament. Matching ten teams for four rounds is a lot less daunting than matching them for six rounds, even given the fact that you have constraints created by the earlier debates.

Violating primary constraints. The tighter the division, the more it is likely that losing one or more teams mid-tournament creates conditions in which it is not possible to find clean matches for all of the remaining preliminary rounds. In that case, you have no choice but to violate one of the primary constraints. The hierarchy of primary constraints is a matter of personal opinion – and local community mores – rather than a matter of consensus. Some one has to decide which constraints to protect and which constraints to violate when making matching adjustments. Here are some thoughts that might help:

It is easier to maintain side balance than you might think. Losing a team mean you either had a BYE prior to the withdrawal, or will have a BYE subsequent to the withdrawal. Your hole card is the fact that BYE debates and forfeits have *theoretical* side assignments rather than actual side assignments. While it is much easier to construct a matching rotation when you respect side assignments for debates that do not take place, in the end, a team with only five actual debates will have three rounds on one side and two on the other. *The side the team would have been assigned to in the sixth round, had it happened, is of little consequence.* A additional benefit of manipulating BYE sides is that it creates greater flexibility in matching round six since you have some control over which teams get placed on which side of the bracket without skewing the eventual side balance.

The primary difficulty with repeat matches is the possibility that two teams could be matched a third time during the elimination rounds. If you are forced to violate primary constraints and choose to do so by pairing repeat matches, try to limit the repeat matches to teams that are highly unlikely to meet in an elimination round. Functionally, this means that at least one of the teams should be mathematically eliminated before the match is made.

Most people would probably agree that the same-school constraint is the most sacrosanct of the primary constraints. However, a hybrid team is not the literal equivalent of a same-school team. Given that a hybrid team creates a double set of same-school constraints, avoiding matches between a hybrid team and other teams from its “schools” is more courtesy than necessity. When a withdrawal creates a situation in which the revised schedule cannot guarantee clean debates, lifting the hybrid constraint may be a reasonable compromise. However, if you make that choice, courtesy dictates that you warn the schools involved in advance. Deal with objections before the fact, not after the fact, and be prepared to demonstrate that any alternative would involve violating another primary constraint. How you will treat hybrid teams (and whether you will allow them to enter) is an issue that might be best addressed in the invitation.

## Using Cut-and-Paste Schematics

Some tight divisions can be matched quite easily; others require considerable time and patience. To save you the aggravation of working through the schematic logistics for some of the more difficult scenarios, here are a number of cut-and-paste schematics that you can use or adapt for your small tournament situation.

To choose the appropriate schematic, look for the one that most closely resembles your tournament entries. A variety of schematic configurations are provided for eight, ten, twelve, fourteen, and sixteen team divisions. Obviously, if you have a ten-team division, you need to choose from the collection of ten-team schematics. (Remember the BYE. Nine teams entered means that you effectively have a ten-team division, and more generally if there are an odd number of teams add one to the total to select the correct schematic.) The series of numbers at the top of the page refers to entry distribution, e.g., 4-3-3 means that the schematic is prepared for one four-entry school and two three-entry schools.

***Manipulating a Schematic.*** If none of the schematics exactly match your entry distribution, choose one accommodates your large entries and know that you can combine your smaller entries. For instance, if your entry distribution is 4-3-2-1, you cannot use the 4-2-2-2 schematic because it accommodates your four-entry school, but not your three-entry school. Instead, you want the 4-3-3 schematic. Teams 1a, 1b, 1c, and 1d represent the four-entry school, and teams 2a, 2b, and 2c represent the three-entry school. That leaves 3a and 3b for your two-entry school, and 3c for your single-entry school. As long as a schematic can accommodate your entries without spreading a school across multiple code numbers, it can be modified to fit your configuration. However, the more closely a schematic’s entry distribution resembles your configuration, the better the schedule it produces. For instance, the 4-2-2-2 schematic can accommodate five two-entry schools by treating 1a and 1b as one school, and 1c and 1d as a second school. To be certain, this produces clean rounds. However, school 1a-1b will have no matches with school 1c-1d. On the other hand, the schematic specifically prepared for a 2-2-2-2-2 distribution has each team matched at least once with each of the other schools in the division.

***Combining School Codes.*** What should be done when accommodating the largest school entry means that there are not enough total school codes for all the schools entered in the tournament? As a rule, the cut-and-paste schematics presume that school codes may be split, but that they will not be combined. In fact, however, any two teams unmatched teams may be combined as a single school. Suppose you have a sixteen-team division with a 4-4-3-3-2 distribution. The closest variation cut-and-paste schematic is the 4-4-4-4 distribution. To make the necessary modification, you need to find two unmatched teams from different schools. If you can find two such teams on the checksum grid, you can combine them to produce your two-entry school code, which leave the pirated code schools with three teams each. If you examine the 4-4-4-4 checksum grid below, you will discover a host of possibilities.

Checksum Grid for 4-4-4-4 Distribution

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 2a | 2b | 2c | 2d | 3a | 3b | 3c | 3d | 4a | 4b | 4c | 4d |
| 1a | X | X | X | X |  |  | A | N |  |  | N | A |  |  | A | N |
| 1b | X | X | X | X | N |  | N |  | A |  | A |  | A |  | N |  |
| 1c | X | X | X | X |  | A |  | N |  | N |  | A |  | N |  | A |
| 1d | X | X | X | X | A | N |  |  | N | N |  |  | A | A |  |  |
| 2a |  | A |  | N | X | X | X | X |  |  | A | N |  |  | N | A |
| 2b |  |  | N | A | X | X | X | X | N |  | N |  | A |  | A |  |
| 2c | N | A |  |  | X | X | X | X |  | A |  | N |  | N |  | A |
| 2d | A |  | A |  | X | X | X | X | A | N |  |  | N | N |  |  |
| 3a |  | N |  | A |  | A |  | N | X | X | X | X |  |  | A | N |
| 3b |  |  | A | A |  |  | N | A | X | X | X | X | N |  | N |  |
| 3c | A | N |  |  | N | A |  |  | X | X | X | X |  | A |  | N |
| 3d | N |  | N |  | A |  | A |  | X | X | X | X | N | A |  |  |
| 4a |  | N |  | N |  | N |  | A |  | A |  | A | X | X | X | X |
| 4b |  |  | A | N |  |  | A | A |  |  | N | N | X | X | X | X |
| 4c | N | A |  |  | A | N |  |  | N | A |  |  | X | X | X | X |
| 4d | A |  | N |  | N |  | N |  | A |  | A |  | X | X | X | X |

Notice that teams 3d and 4d are not matched at any point in the schematic. This means that you can recode 5a as 3d and 5b as 4d. The schedule now accommodates your 4-4-3-3-2 configuration.

When you need to combine three or more teams into a new code school, you probably are going to have more luck plotting an entirely new schematic, especially if your configuration is particularly tight. However, before going to the time and trouble plotting a special schematic, check to see whether or not creative manipulation allows you to use one of the existing cut-and-paste schematics. For instance, suppose you have a sixteen-team division with a 6-5-4-1 distribution. None of the cut-and-paste accommodate that configuration, although two come close – 6-4-4-2 and 5-5-3-3. The question is whether or not either of those schematics can be modified to fit your configuration. Examine the checksum grid for the 6-4-4-2 distribution:

Checksum Grid for 6-4-4-2 Distribution

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 1e | 1f | 2a | 2b | 2c | 2d | 3a | 3b | 3c | 3d | 4a | 4b |
| 1a | X | X | X | X | X | X |  |  |  | N | A |  | N | A | N | A |
| 1b | X | X | X | X | X | X |  | A | N | A |  | N | A | N |  |  |
| 1c | X | X | X | X | X | X |  | N | A | A |  | A | N |  |  | N |
| 1d | X | X | X | X | X | X | N | A |  | N | A |  |  |  | N | A |
| 1e | X | X | X | X | X | X | A |  | N |  | N | A |  | A | N |  |
| 1f | X | X | X | X | X | X | N | A |  |  |  | N | A | N | A |  |
| 2a |  |  |  | A | N | A | X | X | X | X | N |  |  |  | A | N |
| 2b |  | N | A | N |  | N | X | X | X | X |  |  | A | A |  |  |
| 2c |  | A | N |  | A |  | X | X | X | X | N | A |  |  |  | N |
| 2d | A | N | N | A |  |  | X | X | X | X | A |  | N |  |  |  |
| 3a | N |  |  | N | A |  | A |  | A | N | X | X | X | X |  |  |
| 3b |  | A | N |  | N | A |  |  | N |  | X | X | X | X |  | A |
| 3c | A | N | A |  |  | N |  | N |  | A | X | X | X | X |  |  |
| 3d | N | A |  |  | N | A |  | N |  |  | X | X | X | X | A |  |
| 4a | A |  |  | A | A | N | N |  |  |  |  |  |  | N | X | X |
| 4b | N |  | A | N |  |  | A |  | A |  |  | N |  |  | X | X |

You are looking for five teams with no intra-group matches. Notice that teams 2b and 2d have no matches with teams 4a or 4b. Were it not for the fact that 2c has a match with 4b, you would have the five teams to serve as your five-entry school. Now check the schematic to see if the schematic can to “fixed” to eliminate that debate.

Schematic for 6-4-4-2 Distribution

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 4b | 2d | 1a | 1a | 3d | 3c | 1a | 1a | 3a | 4a | 1a |
| 1b | 3c | 2c | 1b | 1b | 2d | 3d | 1b | 1b | 2b | 3b | 1b |
| 1c | 2d | 3c | 1c | 1c | 2c | 4b | 1c | 1c | 3b | 2b | 1c |
| 2a | 1d | 4b | 2a | 2a | 1f | 1e | 2a | 1d | 4b | 2d | 1d |
| 2b | 3d | 1f | 2b | 2b | 3c | 1d | 2b | 2a | 4a | 3a | 2a |
| 3a | 2c | 1d | 3a | 3a | 1e | 2d | 3a | 2c | 1e | 4b | 2c |
| 3b | 1f | 1e | 3b | 3b | 4b | 2c | 3b | 3c | 2d | 1f | 3c |
| 4a | 1e | 3d | 4a | 4a | 1d | 1f | 4a | 3d | 1f | 1e | 3d |

The 4b-2c match occurs in round six. By checking the possible round six opponents against the checksum grid, you find that 4b on the affirmative can be matched against negative teams 1b, 3c, and 3d. But, the 1b and 3d matches are not available, since 2c on the negative cannot make the switch. However, 2c is clear against 1c, the affirmative currently matched against 3c. By switching the two debates to pair 4b-3c and 1f-3c, you have cleared the roadblock. You may now treat 2b-2c-2d-4a-4b as a five-entry school, thereby modifying the schematic to accommodate your 6-5-4-1 configuration.

***Scheduling a Hybrid Team.*** Hybrid teams are problematic, particularly when formed from two large-entry schools. Since the cut-and-paste schematics were constructed to provide as much variety of opposition as the circumstances would allow, you are unlikely to find a team from one large-entry school with absolutely no matches against another large-entry school. Once again, you probably will have to plot an entirely new schematic, and manipulate matches to respect the hybrid constraint. However, you may find an existing schematic that can be modified.

To finesse a cut-and-paste schematic to include a hybrid, count the hybrid as an entry from whichever of the two schools has the greater number of teams (School X), and use the checksum grid to locate a school code that accommodates the entry-plus-hybrid number of teams. Then, locate a school code that accommodates the number of non-hybrid teams entered by the other party to the hybrid (School Y). Finally, look to see if perchance School X team manages to avoid a match with any School Y team. If so, that team is your hybrid.

The fourteen team 6-6-2 checksum grid illustrates how a hybrid can be formed from a 6-5-2-1h configuration when the hybrid is formed from students from the five-entry and two-entry schools.

Checksum Grid for 6-6-2 Distribution

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 1e | 1f | 2a | 2b | 2c | 2d | 2e | 2f | 3a | 3b |
| 1a | X | X | X | X | X | X | N | N | A | N | A |  |  | A |
| 1b | X | X | X | X | X | X | N |  | N | A | N | A | A |  |
| 1c | X | X | X | X | X | X |  | A | N | N | A | N | A |  |
| 1d | X | X | X | X | X | X | N | N |  | A |  | N | A | A |
| 1e | X | X | X | X | X | X | A | N | A |  | N | N |  | A |
| 1f | X | X | X | X | X | X | A | A | N | N | N | A |  |  |
| 2a | A | A |  | A | N | N | X | X | X | X | X | X |  | N |
| 2b | A |  | N | A | A | N | X | X | X | X | X | X | N |  |
| 2c | N | A | A |  | N | A | X | X | X | X | X | X |  | N |
| 2d | A | N | A | N |  | A | X | X | X | X | X | X |  | N |
| 2e | N | A | N |  | A | A | X | X | X | X | X | X | N |  |
| 2f |  | N | A | A | A | N | X | X | X | X | X | X | N |  |
| 3a |  | N | N | N |  |  |  | A |  |  | A | A | X | X |
| 3b | N |  |  | N | N |  | A |  | A | A |  |  | X | X |

You will notice that team 1f has no matches with code school 3. This means that team 1f can be a hybrid between code school 1 and code school 3; team 1f avoids matches with other code school 1 teams due to the same school constraint, and avoids matches with code school 3 as a matter of happenstance.

Nonetheless, do not count on being able to modify a cut-and-paste schematic to accommodate hybrids between large-entry schools. Give it a shot, but if something is not readily visible, the time you would spend splitting code schools, combining code schools, and switching debates to finesse probably would be better spend plotting a schematic from whole cloth.

## The Cut-and-Paste Schematics

8 Team Division (2-2-2-2)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 2a | 2b | 3a | 3b | 4a | 4b |
| 1a | X | X | A | N | A | N | A | N |
| 1b | X | X | N | A | N | A | N | A |
| 2a | N | A | X | X | A | N | A | N |
| 2b | A | N | X | X | N | A | N | A |
| 3a | N | A | N | A | X | X | A | N |
| 3b | A | N | A | N | X | X | N | A |
| 4a | N | A | N | A | N | A | X | X |
| 4b | A | N | A | N | A | N | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 3a | 3a | 1b | 2a | 3a | 3a | 2b | 1a | 2a | 2b | 1a |
| 1b | 3b | 3b | 2a | 2b | 3b | 3b | 1a | 1b | 2b | 2a | 1b |
| 2a | 4a | 4a | 2b | 1a | 4a | 4a | 1b | 3a | 4a | 4b | 3a |
| 2b | 4b | 4b | 1a | 1b | 4b | 4b | 2a | 3b | 4b | 4a | 3b |

10 Team Division (4-3-3)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 2a | 2b | 2c | 3a | 3b | 3c |
| 1a | X | X | X | X | N | N | N | A | A | A |
| 1b | X | X | X | X | A | A | A | N | N | N |
| 1c | X | X | X | X | N | N | N | A | A | A |
| 1d | X | X | X | X | A | A | A | N | N | N |
| 2a | A | N | A | N | X | X | X | N |  | A |
| 2b | A | N | A | N | X | X | X | A | N |  |
| 2c | A | N | A | N | X | X | X |  | A | N |
| 3a | N | A | N | A | A | N |  | X | X | X |
| 3b | N | A | N | A |  | A | N | X | X | X |
| 3c | N | A | N | A | N |  | A | X | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 3a | 2b | 1a | 1a | 3b | 2c | 1a | 1a | 3c | 2a | 1a |
| 1b | 2b | 3b | 1b | 1b | 2c | 3c | 1b | 1b | 2a | 3a | 1b |
| 1c | 3b | 2c | 1c | 1c | 3c | 2a | 1c | 1c | 3a | 2b | 1c |
| 1d | 2c | 3c | 1d | 1d | 2a | 3a | 1d | 1d | 2b | 3b | 1d |
| 2a | 3c | 3a | 2a | 2b | 3a | 3b | 2b | 2c | 3b | 3c | 2c |

10 Team Division (4-2-2-2)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 2a | 2b | 3a | 3b | 4a | 4b |
| 1a | X | X | X | X | N | A | A | N | N | A |
| 1b | X | X | X | X | A | N | N | A | A | N |
| 1c | X | X | X | X | N | A | A | N | N | A |
| 1d | X | X | X | X | A | N | N | A | A | N |
| 2a | A | N | A | N | X | X | N |  |  | A |
| 2b | N | A | N | A | X | X |  | N | A |  |
| 3a | N | A | N | A | A |  | X | X | N |  |
| 3b | A | N | A | N |  | A | X | X |  | N |
| 4a | A | N | A | N |  | N | A |  | X | X |
| 4b | N | A | N | A | N |  |  | A | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 3a | 4a | 1a | 1a | 2b | 3b | 1a | 1a | 4b | 2a | 1a |
| 1b | 4a | 2b | 1b | 1b | 3b | 4b | 1b | 1b | 2a | 3a | 1b |
| 1c | 2b | 3b | 1c | 1c | 4b | 2a | 1c | 1c | 3a | 4a | 1c |
| 1d | 3b | 4b | 1d | 1d | 2a | 3a | 1d | 1d | 4a | 2b | 1d |
| 2a | 4b | 3a | 2a | 4a | 3a | 2b | 4a | 3b | 2b | 4b | 3b |

10 Team Division (3-3-2-2)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 2a | 2b | 2c | 3a | 3b | 4a | 4b |
| 1a | X | X | X | A | N | A | N |  | A | N |
| 1b | X | X | X | A | N | N |  | A | N | A |
| 1c | X | X | X | N | A |  | A | N | N | A |
| 2a | N | N | A | X | X | X | A | N | A |  |
| 2b | A | A | N | X | X | X | N | A |  | N |
| 2c | N | A |  | X | X | X | N | A | N | A |
| 3a | A |  | N | N | A | A | X | X |  | N |
| 3b |  | N | A | A | N | N | X | X | A |  |
| 4a | N | A | A | N |  | A |  | N | X | X |
| 4b | A | N | N |  | A | N | A |  | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 2c | 2c | 1b | 3a | 2c | 2c | 3b | 1c | 3a | 3a | 1a |
| 1b | 2a | 2a | 3a | 3b | 2a | 2a | 1c | 1b | 3b | 3b | 1c |
| 3a | 2b | 2b | 3b | 1c | 2b | 2b | 1a | 1a | 2a | 2b | 1b |
| 3b | 4a | 4a | 1c | 1a | 4a | 4a | 1b | 4a | 2c | 2a | 4a |
| 1c | 4b | 4b | 1a | 1b | 4b | 4b | 3a | 4b | 2b | 2c | 4b |

10 Team Division (2-2-2-2-2)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 2a | 2b | 3a | 3b | 4a | 4b | 5a | 5b |
| 1a | X | X | N |  |  | A | A | N | A | N |
| 1b | X | X |  | A |  | N | A | N | N | A |
| 2a | A |  | X | X | N | A | N | A |  | N |
| 2b |  | N | X | X | A | N | A | N | A |  |
| 3a |  |  | A | N | X | X | N | A | N | A |
| 3b | N | A | N | A | X | X |  |  | N | A |
| 4a | N | N | A | N | A |  | X | X | A |  |
| 4b | A | A | N | A | N |  | X | X |  | N |
| 5a | N | A |  | N | A | A | N |  | X | X |
| 5b | A | N | A |  | N | N |  | A | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 3b | 3b | 1b | 2a | 3b | 3b | 2b | 3a | 2a | 2a | 1a |
| 1b | 4a | 4a | 2a | 2b | 4a | 4a | 3a | 1b | 2b | 2b | 3a |
| 2a | 4b | 4b | 2b | 3a | 4b | 4b | 1a | 1a | 4a | 4b | 1b |
| 2b | 5a | 5a | 3a | 1a | 5a | 5a | 1b | 5a | 3b | 4a | 5a |
| 3a | 5b | 5b | 1a | 1b | 5b | 5b | 2a | 5b | 4b | 3b | 5b |

12 Team Division (5-5-2)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 1e | 2a | 2b | 2c | 2d | 2e | 3a | 3b |
| 1a | X | X | X | X | X | N | A | N | A | N |  | A |
| 1b | X | X | X | X | X | A | N | A | N | A |  | N |
| 1c | X | X | X | X | X | N | A |  | A | N | A | N |
| 1d | X | X | X | X | X | A | N | A | N | A | N |  |
| 1e | X | X | X | X | X | N | A | N | A | N |  | A |
| 2a | A | N | A | N | A | X | X | X | X | X | N |  |
| 2b | N | A | N | A | N | X | X | X | X | X |  | A |
| 2c | A | N |  | N | A | X | X | X | X | X | A | N |
| 2d | N | A | N | A | N | X | X | X | X | X | A |  |
| 2e | A | N | A | N | A | X | X | X | X | X | N |  |
| 3a |  |  | N | A |  | A |  | N | N | A | X | X |
| 3b | N | A | A |  | N |  | N | A |  |  | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 3b | 2e | 1a | 1a | 2d | 2c | 1a | 1a | 2b | 2a | 1a |
| 1b | 2a | 3b | 1b | 1b | 2e | 2d | 1b | 1b | 2c | 2b | 1b |
| 1c | 2b | 2a | 1c | 1c | 3a | 2e | 1c | 1c | 2d | 2c | 3a |
| 1d | 2c | 2b | 1d | 1d | 2a | 3a | 1d | 1d | 2e | 2d | 1d |
| 1e | 2d | 2c | 1e | 1e | 2b | 2a | 1e | 1e | 3b | 2e | 1e |
| 3a | 2e | 2d | 3a | 3b | 2c | 2b | 3b | 3a | 2a | 3b | 1c |

12 Team Division (4-4-4)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 2a | 2b | 2c | 2d | 3a | 3b | 3c | 3d |
| 1a | X | X | X | X | N | A | A |  | N | A |  | N |
| 1b | X | X | X | X | A | N | N | A | A | N |  |  |
| 1c | X | X | X | X |  | N | A | N | A | N | A |  |
| 1d | X | X | X | X | N | A |  |  | N | A | N | A |
| 2a | A | N |  | A | X | X | X | X |  | N | A | N |
| 2b | N | A | A | N | X | X | X | X |  |  | N | A |
| 2c | N | A | N |  | X | X | X | X | A |  | A | N |
| 2d |  | N | A |  | X | X | X | X | N | A | N | A |
| 3a | A | N | N | A |  |  | N | A | X | X | X | X |
| 3b | N | A | A | N | A |  |  | N | X | X | X | X |
| 3c |  |  | N | A | N | A | N | A | X | X | X | X |
| 3d | A |  |  | N | A | N | A | N | X | X | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 2c | 3d | 1a | 1c | 3c | 3b | 1c | 2a | 1d | 3d | 2a |
| 1b | 2d | 2c | 1b | 1d | 3d | 3c | 1d | 2b | 1c | 1d | 2b |
| 1c | 3a | 2d | 1c | 2a | 1a | 3d | 2c | 2c | 3c | 1c | 2c |
| 1d | 3b | 3a | 1d | 2b | 1b | 1a | 2b | 2d | 3d | 3c | 2d |
| 2a | 3c | 3b | 2a | 2c | 3a | 1b | 2a | 3a | 1a | 1b | 3a |
| 2b | 3d | 3c | 2b | 2d | 3b | 3a | 2d | 3b | 1b | 1a | 3b |

12 Team Division (3-3-3-3)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 2a | 2b | 2c | 3a | 3b | 3c | 4a | 4b | 4c |
| 1a | X | X | X | A |  | N | A |  | N | A | N |  |
| 1b | X | X | X | N | A |  | N | A |  |  | A | N |
| 1c | X | X | X |  | N | A |  | N | A | N |  | A |
| 2a | N | A |  | X | X | X | A | N |  | A | N |  |
| 2b |  | N | A | X | X | X |  | A | N |  | A | N |
| 2c | A |  | N | X | X | X | N |  | A | N |  | A |
| 3a | N | A |  | N |  | A | X | X | X | A | N |  |
| 3b |  | N | A | A | N |  | X | X | X |  | A | N |
| 3c | A |  | N |  | A | N | X | X | X | N |  | A |
| 4a | N |  | A | N |  | A | N |  | A | X | X | X |
| 4b | A | N |  | A | N |  | A | N |  | X | X | X |
| 4c |  | A | N |  | A | N |  | A | N | X | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 2a | 2c | 1a | 1a | 3a | 3c | 1a | 1a | 4a | 4b | 1a |
| 1b | 2b | 2a | 1b | 1b | 3b | 3a | 1b | 1b | 4b | 4c | 1b |
| 1c | 2c | 2b | 1c | 1c | 3c | 3b | 1c | 1c | 4c | 4a | 1c |
| 3a | 4a | 4b | 3a | 2a | 4a | 4b | 2a | 2a | 3a | 3a | 2c |
| 3b | 4b | 4c | 3b | 2b | 4b | 4c | 2b | 2b | 3b | 3b | 2a |
| 3c | 4c | 4a | 3c | 2c | 4c | 4a | 2c | 2c | 3c | 3c | 2b |

12 Team Division (3-3-2-2-2)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 2a | 2b | 2c | 3a | 3b | 4a | 4b | 5a | 5b |
| 1a | X | X | X | A |  | N | N |  | A | N | A |  |
| 1b | X | X | X | N | A |  |  | A |  | A | N | N |
| 1c | X | X | X |  | N | A | A | N | N |  |  | A |
| 2a | N | A |  | X | X | X |  | N | A | N | A |  |
| 2b |  | N | A | X | X | X | N | A |  | A |  | N |
| 2c | A |  | N | X | X | X | A |  | N |  | N | A |
| 3a | A |  | N |  | A | N | X | X | N |  |  | A |
| 3b |  | N | A | A | N |  | X | X |  | A |  | N |
| 4a | N |  | A | N |  | A | A |  | X | X | N |  |
| 4b | A | N |  | A | N |  |  | N | X | X | A |  |
| 5a | N | A |  | N |  | A |  |  | A | N | X | X |
| 5b |  | A | N |  | A | N | N | A |  |  | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 2a | 2c | 1a | 1a | 5a | 3a | 1a | 1a | 4a | 4b | 1a |
| 1b | 2b | 2a | 1b | 1b | 3b | 5a | 1b | 1b | 4b | 5b | 1b |
| 1c | 2c | 2b | 1c | 1c | 3a | 3b | 1c | 1c | 5b | 4a | 1c |
| 5a | 4a | 4b | 5a | 2a | 4a | 4b | 2a | 2a | 5a | 5a | 2c |
| 3b | 4b | 5b | 3b | 2b | 4b | 5b | 2b | 2b | 3b | 3b | 2a |
| 3a | 5b | 4a | 3a | 2c | 5b | 4a | 2c | 2c | 3a | 3a | 2b |

14 Team Division (6-6-2)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 1e | 1f | 2a | 2b | 2c | 2d | 2e | 2f | 3a | 3b |
| 1a | X | X | X | X | X | X | N | N | A | N | A |  |  | A |
| 1b | X | X | X | X | X | X | N |  | N | A | N | A | A |  |
| 1c | X | X | X | X | X | X |  | A | N | N | A | N | A |  |
| 1d | X | X | X | X | X | X | N | N |  | A |  | N | A | A |
| 1e | X | X | X | X | X | X | A | N | A |  | N | N |  | A |
| 1f | X | X | X | X | X | X | A | A | N | N | N | A |  |  |
| 2a | A | A |  | A | N | N | X | X | X | X | X | X |  | N |
| 2b | A |  | N | A | A | N | X | X | X | X | X | X | N |  |
| 2c | N | A | A |  | N | A | X | X | X | X | X | X |  | N |
| 2d | A | N | A | N |  | A | X | X | X | X | X | X |  | N |
| 2e | N | A | N |  | A | A | X | X | X | X | X | X | N |  |
| 2f |  | N | A | A | A | N | X | X | X | X | X | X | N |  |
| 3a |  | N | N | N |  |  |  | A |  |  | A | A | X | X |
| 3b | N |  |  | N | N |  | A |  | A | A |  |  | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 3b | 2d | 1a | 1a | 2e | 2a | 1a | 1d | 2d | 2f | 1d |
| 1b | 2d | 2e | 1b | 1b | 2f | 2c | 1b | 1e | 3b | 2e | 1e |
| 1c | 2e | 2f | 1c | 1c | 3a | 2d | 1c | 1f | 2f | 2d | 1f |
| 3a | 2f | 1d | 3a | 3b | 2d | 2f | 1e | 2a | 1b | 3b | 2a |
| 2a | 1d | 1e | 2a | 1f | 2a | 2e | 1f | 2b | 1a | 1b | 3a |
| 2b | 1e | 1f | 2b | 2b | 1d | 3a | 2b | 2c | 1c | 1a | 2c |
| 2c | 1f | 3b | 2c | 1e | 2c | 1d | 3b | 3a | 2e | 1c | 2b |

14 Team Division (5-5-4)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 1e | 2a | 2b | 2c | 2d | 2e | 3a | 3b | 3c | 3d |
| 1a | X | X | X | X | X | N | N | A |  |  |  | A | N | A |
| 1b | X | X | X | X | X |  | A | A | N |  |  | N | A | N |
| 1c | X | X | X | X | X | A | N | N | N | A | A |  |  |  |
| 1d | X | X | X | X | X | A |  | A | N | N | N |  |  | A |
| 1e | X | X | X | X | X | N | A |  | A |  | N | N | A |  |
| 2a | A |  | N | N | A | X | X | X | X | X |  | N | A |  |
| 2b | A | N | A |  | N | X | X | X | X | X | N |  |  | A |
| 2c | N |  | A | N |  | X | X | X | X | X | A | A |  | N |
| 2d |  | N | A | A | N | X | X | X | X | X |  | A | N |  |
| 2e |  | A | N | A |  | X | X | X | X | X | A |  | N | N |
| 3a |  |  | N | A | A |  | A | N |  | N | X | X | X | X |
| 3b | N | A |  |  | A | A |  | N | N |  | X | X | X | X |
| 3c | A | N |  |  | N | N |  |  | A | A | X | X | X | X |
| 3d | N | A |  | N |  |  | N | A |  | A | X | X | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 2c | 3c | 1a | 1a | 3d | 2a | 1a | 1c | 2a | 2d | 1c |
| 2a | 3c | 3d | 1b | 1d | 2c | 2d | 1d | 1d | 3d | 2e | 1d |
| 3a | 1d | 2c | 1c | 2b | 1c | 1b | 2b | 1e | 2d | 2a | 1e |
| 1b | 2d | 1d | 2a | 2e | 1b | 3d | 2e | 2b | 1a | 3a | 2b |
| 2b | 3d | 1e | 2b | 3a | 1e | 1c | 3a | 2c | 3a | 3d | 2c |
| 3b | 1e | 2e | 3a | 3b | 2a | 2c | 3b | 3b | 1b | 1a | 3b |
| 1c | 2e | 2d | 3b | 3c | 2d | 1e | 3c | 3c | 2e | 1b | 3c |

14 Team Division (5-5-2-2)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 1e | 2a | 2b | 2c | 2d | 2e | 3a | 3b | 4a | 4b |
| 1a | X | X | X | X | X | N | N | A |  |  |  | A | N | A |
| 1b | X | X | X | X | X |  | A | A | N |  |  | N | A | N |
| 1c | X | X | X | X | X | A | N | N | N | A | A |  |  |  |
| 1d | X | X | X | X | X | A |  | A | N | N | N |  |  | A |
| 1e | X | X | X | X | X | N | A |  | A |  | N | N | A |  |
| 2a | A |  | N | N | A | X | X | X | X | X |  | N | A |  |
| 2b | A | N | A |  | N | X | X | X | X | X | N |  |  | A |
| 2c | N |  | A | N |  | X | X | X | X | X | A | A |  | N |
| 2d |  | N | A | A | N | X | X | X | X | X |  | A | N |  |
| 2e |  | A | N | A |  | X | X | X | X | X | A |  | N | N |
| 3a |  |  | N | A | A |  | A | N |  | N | X | X |  |  |
| 3b | N | A |  |  | A | A |  | N | N |  | X | X |  |  |
| 4a | A | N |  |  | N | N |  |  | A | A |  |  | X | X |
| 4b | N | A |  | N |  |  | N | A |  | A |  |  | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 2c | 4a | 1a | 1a | 4b | 2a | 1a | 1c | 2a | 2d | 1c |
| 2a | 4a | 4b | 1b | 1d | 2c | 2d | 1d | 1d | 4b | 2e | 1d |
| 3a | 1d | 2c | 1c | 2b | 1c | 1b | 2b | 1e | 2d | 2a | 1e |
| 1b | 2d | 1d | 2a | 2e | 1b | 4b | 2e | 2b | 1a | 3a | 2b |
| 2b | 4b | 1e | 2b | 3a | 1e | 1c | 3a | 2c | 3a | 4b | 2c |
| 3b | 1e | 2e | 3a | 3b | 2a | 2c | 3b | 3b | 1b | 1a | 3b |
| 1c | 2e | 2d | 3b | 4a | 2d | 1e | 4a | 4a | 2e | 1b | 4a |

14 Team Division (4-4-4-2)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 2a | 2b | 2c | 2d | 3a | 3b | 3c | 3d | 4a | 4b |
| 1a | X | X | X | X |  |  | A | N |  |  | A | N | N | A |
| 1b | X | X | X | X |  |  | N | A |  | N | A | N |  | A |
| 1c | X | X | X | X | N | A |  |  | A | A | N |  | N |  |
| 1d | X | X | X | X | A | N | A | N | N | A |  |  |  |  |
| 2a |  |  | A | N | X | X | X | X | A |  | A | N |  | N |
| 2b |  |  | N | A | X | X | X | X |  |  | N | A | A | N |
| 2c | N | A |  | N | X | X | X | X | N | A |  | A |  |  |
| 2d | A | N |  | A | X | X | X | X | N | N |  |  | A |  |
| 3a | N |  | N | A | N |  | A | A | X | X | X | X |  | N |
| 3b |  | A | N | N |  |  | N | A | X | X | X | X |  | A |
| 3c | N | N | A |  | N | A |  |  | X | X | X | X | A |  |
| 3d | A | A |  |  | A | N | N |  | X | X | X | X | N |  |
| 4a | A |  | A |  |  | N |  | N |  |  | N | A | X | X |
| 4b | N | N |  |  | A | A |  |  | A | N |  |  | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 4b | 3d | 1a | 2d | 1a | 1a | 2c | 1d | 2c | 2d | 1d |
| 2a | 1c | 4b | 2a | 1d | 2a | 1b | 2d | 3a | 2d | 2a | 3a |
| 3a | 2c | 1c | 3a | 4b | 3a | 2a | 3c | 3b | 1b | 1c | 3b |
| 1b | 3c | 2c | 1b | 3d | 1b | 2b | 3d | 3c | 1c | 1a | 3c |
| 2b | 1d | 3c | 2b | 1c | 2b | 3a | 1d | 3d | 2a | 2c | 3d |
| 3b | 2d | 1d | 3b | 2c | 3b | 3b | 4b | 4a | 1a | 2b | 4a |
| 4a | 3d | 2d | 4a | 3c | 4a | 4a | 1c | 4b | 2b | 1b | 4b |

14 Team Division (3-3-3-3-2)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 2a | 2b | 2c | 2d | 3a | 3b | 3c | 3d | 4a | 4b |
| 1a | X | X | X | X |  |  | A | N |  |  | A | N | N | A |
| 1b | X | X | X | X |  |  | N | A |  | N | A | N |  | A |
| 1c | X | X | X | X | N | A |  |  | A | A | N |  | N |  |
| 1d | X | X | X | X | A | N | A | N | N | A |  |  |  |  |
| 2a |  |  | A | N | X | X | X | X | A |  | A | N |  | N |
| 2b |  |  | N | A | X | X | X | X |  |  | N | A | A | N |
| 2c | N | A |  | N | X | X | X | X | N | A |  | A |  |  |
| 2d | A | N |  | A | X | X | X | X | N | N |  |  | A |  |
| 3a | N |  | N | A | N |  | A | A | X | X | X | X |  | N |
| 3b |  | A | N | N |  |  | N | A | X | X | X | X |  | A |
| 3c | N | N | A |  | N | A |  |  | X | X | X | X | A |  |
| 3d | A | A |  |  | A | N | N |  | X | X | X | X | N |  |
| 4a | A |  | A |  |  | N |  | N |  |  | N | A | X | X |
| 4b | N | N |  |  | A | A |  |  | A | N |  |  | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 4b | 3d | 1a | 2d | 1a | 1a | 2c | 1d | 2c | 2d | 1d |
| 2a | 1c | 4b | 2a | 1d | 2a | 1b | 2d | 3a | 2d | 2a | 3a |
| 3a | 2c | 1c | 3a | 4b | 3a | 2a | 3c | 3b | 1b | 1c | 3b |
| 1b | 3c | 2c | 1b | 3d | 1b | 2b | 3d | 3c | 1c | 1a | 3c |
| 2b | 1d | 3c | 2b | 1c | 2b | 3a | 1d | 3d | 2a | 2c | 3d |
| 3b | 2d | 1d | 3b | 2c | 3b | 3b | 4b | 4a | 1a | 2b | 4a |
| 4a | 3d | 2d | 4a | 3c | 4a | 4a | 1c | 4b | 2b | 1b | 4b |

14 Team Division (3-3-3-3-2)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 2a | 2b | 2c | 3a | 3b | 3c | 4a | 4b | 4c | 5a | 5b |
| 1a | X | X | X | N |  |  | A | A |  | N | N |  |  | A |
| 1b | X | X | X |  |  | A | A | A | N |  |  | N |  | N |
| 1c | X | X | X |  | N | A |  |  | A | N | A |  | N |  |
| 2a | A |  |  | X | X | X | N |  | N | A |  |  | N | A |
| 2b |  |  | A | X | X | X |  | N | A |  | A | N |  | N |
| 2c |  | N | N | X | X | X | N |  |  |  | A | A | A |  |
| 3a | N | N |  | A |  | A | X | X | X | A | N |  |  |  |
| 3b | N | N |  |  | A |  | X | X | X | N |  | A | A |  |
| 3c |  | A | N | A | N |  | X | X | X |  |  | N |  | A |
| 4a | A |  | A | N |  |  | N | A |  | X | X | X |  | N |
| 4b | A |  | N |  | N | N | A |  |  | X | X | X | A |  |
| 4c |  | A |  |  | A | N |  | N | A | X | X | X | N |  |
| 5a |  |  | A | A |  | N |  | N |  |  | N | A | X | X |
| 5b | N | A |  | N | A |  |  |  | N | A |  |  | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 3a | 4b | 1a | 1b | 2c | 3c | 1b | 1a | 5b | 2a | 1a |
| 2b | 4b | 5b | 2b | 2a | 5b | 3a | 2a | 2b | 1c | 3b | 2b |
| 3c | 5b | 1c | 3c | 2b | 3c | 4c | 2b | 3c | 2a | 4c | 3c |
| 4a | 1c | 2a | 4a | 3b | 4c | 1a | 3b | 4a | 3b | 3a | 4a |
| 5a | 2a | 3b | 5a | 4a | 1a | 5b | 4a | 5a | 4c | 4b | 5a |
| 1b | 3b | 4c | 1b | 4b | 3a | 1c | 4b | 1b | 3a | 5b | 1b |
| 2c | 4c | 3a | 2c | 5a | 1c | 2c | 5a | 2c | 4b | 1c | 2c |

16 Team Division (6-4-4-2)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 1e | 1f | 2a | 2b | 2c | 2d | 3a | 3b | 3c | 3d | 4a | 4b |
| 1a | X | X | X | X | X | X |  |  |  | N | A |  | N | A | N | A |
| 1b | X | X | X | X | X | X |  | A | N | A |  | N | A | N |  |  |
| 1c | X | X | X | X | X | X |  | N | A | A |  | A | N |  |  | N |
| 1d | X | X | X | X | X | X | N | A |  | N | A |  |  |  | N | A |
| 1e | X | X | X | X | X | X | A |  | N |  | N | A |  | A | N |  |
| 1f | X | X | X | X | X | X | N | A |  |  |  | N | A | N | A |  |
| 2a |  |  |  | A | N | A | X | X | X | X | N |  |  |  | A | N |
| 2b |  | N | A | N |  | N | X | X | X | X |  |  | A | A |  |  |
| 2c |  | A | N |  | A |  | X | X | X | X | N | A |  |  |  | N |
| 2d | A | N | N | A |  |  | X | X | X | X | A |  | N |  |  |  |
| 3a | N |  |  | N | A |  | A |  | A | N | X | X | X | X |  |  |
| 3b |  | A | N |  | N | A |  |  | N |  | X | X | X | X |  | A |
| 3c | A | N | A |  |  | N |  | N |  | A | X | X | X | X |  |  |
| 3d | N | A |  |  | N | A |  | N |  |  | X | X | X | X | A |  |
| 4a | A |  |  | A | A | N | N |  |  |  |  |  |  | N | X | X |
| 4b | N |  | A | N |  |  | A |  | A |  |  | N |  |  | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 4b | 2d | 1a | 1a | 3d | 3c | 1a | 1a | 3a | 4a | 1a |
| 1b | 3c | 2c | 1b | 1b | 2d | 3d | 1b | 1b | 2b | 3b | 1b |
| 1c | 2d | 3c | 1c | 1c | 2c | 4b | 1c | 1c | 3b | 2b | 1c |
| 2a | 1d | 4b | 2a | 2a | 1f | 1e | 2a | 1d | 4b | 2d | 1d |
| 2b | 3d | 1f | 2b | 2b | 3c | 1d | 2b | 2a | 4a | 3a | 2a |
| 3a | 2c | 1d | 3a | 3a | 1e | 2d | 3a | 2c | 1e | 4b | 2c |
| 3b | 1f | 1e | 3b | 3b | 4b | 2c | 3b | 3c | 2d | 1f | 3c |
| 4a | 1e | 3d | 4a | 4a | 1d | 1f | 4a | 3d | 1f | 1e | 3d |

16 Team Division (5-5-3-3)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 1e | 2a | 2b | 2c | 2d | 2e | 3a | 3b | 3c | 4a | 4b | 4c |
| 1a | X | X | X | X | X | N | A |  | A |  | A |  | N |  | N |  |
| 1b | X | X | X | X | X | A |  | N | A |  |  | N | A | N |  |  |
| 1c | X | X | X | X | X |  | N |  | N |  |  | A | N |  | A | A |
| 1d | X | X | X | X | X | N | A |  | A | A |  |  |  | N | N |  |
| 1e | X | X | X | X | X | N |  |  |  | N | A | A |  | A |  | N |
| 2a | A | N |  | A | A | X | X | X | X | X | N |  |  | N |  |  |
| 2b | N |  | A | N |  | X | X | X | X | X |  | N |  | A |  | A |
| 2c |  | A |  |  |  | X | X | X | X | X | N | N | A |  | A | N |
| 2d | N | N | A | N |  | X | X | X | X | X | A |  | A |  |  |  |
| 2e |  |  |  | N | A | X | X | X | X | X | N |  |  | A | N | A |
| 3a | N |  |  |  | N | A |  | A | N | A | X | X | X |  |  |  |
| 3b |  | A | N |  | N |  | A | A |  |  | X | X | X |  |  | N |
| 3c | A | N | A |  |  |  |  | N | N |  | X | X | X |  | A |  |
| 4a |  | A |  | A | N | A | N |  |  | N |  |  |  | X | X | X |
| 4b | A |  | N | A |  |  |  | N |  | A |  |  | N | X | X | X |
| 4c |  |  | N |  | A |  | N | A |  | N |  | A |  | X | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 2b | 4b | 1a | 1a | 3a | 3c | 1a | 1a | 2d | 2a | 1a |
| 2c | 3c | 4c | 2c | 2c | 4b | 3a | 2c | 2c | 1b | 3b | 2c |
| 1c | 4b | 3c | 1c | 1c | 4c | 2b | 1c | 1c | 3b | 2d | 1c |
| 4a | 1d | 2b | 4a | 4a | 1b | 1e | 4a | 1d | 2b | 4b | 1d |
| 2d | 3a | 1b | 2d | 2d | 3c | 1d | 2d | 4a | 2a | 2e | 4a |
| 2e | 4c | 1d | 2e | 2e | 1e | 4b | 2e | 4c | 1e | 2b | 4c |
| 3b | 1b | 1e | 3b | 3b | 2b | 4c | 3b | 3c | 4b | 1b | 3c |
| 2a | 1e | 3a | 2a | 2a | 1d | 1b | 2a | 3a | 2e | 1e | 3a |

16 Team Division (4-4-4-4)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1a | 1b | 1c | 1d | 2a | 2b | 2c | 2d | 3a | 3b | 3c | 3d | 4a | 4b | 4c | 4d |
| 1a | X | X | X | X |  |  | A | N |  |  | N | A |  |  | A | N |
| 1b | X | X | X | X | N |  | N |  | A |  | A |  | A |  | N |  |
| 1c | X | X | X | X |  | A |  | N |  | N |  | A |  | N |  | A |
| 1d | X | X | X | X | A | N |  |  | N | N |  |  | A | A |  |  |
| 2a |  | A |  | N | X | X | X | X |  |  | A | N |  |  | N | A |
| 2b |  |  | N | A | X | X | X | X | N |  | N |  | A |  | A |  |
| 2c | N | A |  |  | X | X | X | X |  | A |  | N |  | N |  | A |
| 2d | A |  | A |  | X | X | X | X | A | N |  |  | N | N |  |  |
| 3a |  | N |  | A |  | A |  | N | X | X | X | X |  |  | A | N |
| 3b |  |  | A | A |  |  | N | A | X | X | X | X | N |  | N |  |
| 3c | A | N |  |  | N | A |  |  | X | X | X | X |  | A |  | N |
| 3d | N |  | N |  | A |  | A |  | X | X | X | X | N | A |  |  |
| 4a |  | N |  | N |  | N |  | A |  | A |  | A | X | X | X | X |
| 4b |  |  | A | N |  |  | A | A |  |  | N | N | X | X | X | X |
| 4c | N | A |  |  | A | N |  |  | N | A |  |  | X | X | X | X |
| 4d | A |  | N |  | N |  | N |  | A |  | A |  | X | X | X | X |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  | 6 |  |
| A | N | A | N | A | N | A | N | A | N | A | N |
| 1a | 4c | 3c | 1a | 1a | 2c | 4d | 1a | 1a | 3d | 2d | 1a |
| 2a | 1b | 4c | 2a | 2a | 3c | 2c | 1b | 1b | 3c | 4c | 1b |
| 3a | 2b | 1b | 3a | 3a | 4c | 4b | 1c | 2a | 4d | 3d | 2a |
| 4a | 3b | 2b | 4a | 4a | 1b | 1d | 2a | 2b | 4c | 1c | 2b |
| 1d | 4b | 3b | 1d | 2b | 1d | 3c | 2b | 3a | 1d | 4d | 3a |
| 2d | 1c | 4b | 2d | 3b | 2d | 2d | 3a | 3b | 1c | 2c | 3b |
| 3d | 2c | 1c | 3d | 4b | 3d | 4c | 3b | 4a | 2d | 1d | 4a |
| 4d | 3c | 2c | 4d | 1c | 4d | 4a | 3d | 4b | 2c | 3c | 4b |

# Appendix B: Elimination round bracket.

1

32 1

16

17 16 1

8

25 8

9

24 9 8 1

5

28 5

12

21 12 5

4

29 4

13

20 13 4 4 1

2

31 2

15

18 15 2

7

26 7

10

23 10 7 2 1

3

30 3

14

19 14 3

6

27 6

11

22 11 6 3 2

Doubles Octos Quarters Semis Finals Champion