

# THE TOURNAMENT



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## 9 THE TOURNAMENT

### 9.1 OVERVIEW

Each 2008 FRC Regional Competition and the 2008 FRC Championship will be played in a tournament format. Each tournament will consist of three sets of matches called “practice matches,” “qualification matches,” and “elimination matches.” The purpose of the practice matches is to provide each team a chance to run its ROBOT on the playing field prior to the start of the competition matches. The purpose of the qualifying matches is to allow each team to earn a seeding position that may qualify them for participation in the elimination matches. The purpose of the elimination matches is to determine the event Champions.

### 9.2 PRACTICE MATCHES

#### 9.2.1 Schedule

The practice matches will be played throughout the first day of each competition. The practice match schedule will be available on the morning of the practice day. Practice matches will be randomly assigned. Each team will be assigned an equal number of practice matches. At some events, additional matches may be available on a standby basis. Each practice match will consist of a ten-minute period in which teams may operate their ROBOT on the field.

- The first five minutes of each practice match will start with a 15-second hybrid period, followed by a “free-form” session, in which the ROBOTS may be exercised to evaluate operational characteristics, gain driver experience, determine system robustness, etc. During this five-minute period robots avoid robot-to-robot interaction.
- The second five minutes of each practice match will be conducted as a “competition match” with approximately two minutes for set up, two minutes and fifteen seconds of regular game play (including operations), and one minute to clear the field.

### 9.3 QUALIFICATION MATCHES

#### 9.3.1 Schedule

The qualification matches will be played throughout the second day of the competition and the first half of the third day, ending approximately at noon. The qualification matches will consist of a series of matches, with an arena reset between each match. The qualification match schedule will be available on the second morning of the competition.

#### 9.3.2 Match Assignment

The scoring system will assign each team two ALLIANCE partners for each qualifying match played using a predefined algorithm. The algorithm employs the following list of criteria:

- a. Maximum time (in number of matches) between each match played for all teams
- b. Minimum possible number of times a team plays opposite any team
- c. Minimum possible number of times a team is allied with any team
- d. Minimize the use of surrogates.
- e. Even distribution of matches played on Blue and Red Alliance (without sacrificing a, b, c and d)

See the FRC Manual web site (<http://www.usfirst.org/frc/2008/manual>) for a white paper detailing the algorithm as well a stand-alone program demonstrating its capabilities.

All teams will play the same number of qualifying matches **except** if the number of teams in attendance is not divisible by six; in that case the scoring system will randomly select some

teams to play an extra match. For purposes of seeding calculations, those teams will be designated as SURROGATES for the extra match. If teams play a match as a SURROGATE, it will be indicated on the match schedule, and it will always be their third match.

### **9.3.3 Earning Points**

At the conclusion of each match, each participating team will earn both qualifying points and ranking points. These will be accumulated during the tournament to determine each team's qualifying score and ranking score. The scoring system will use the combination of qualifying score and ranking score to continuously determine the seeding of teams during the qualification matches. The ranking information will be displayed in the pit area.

### **9.3.4 Match Qualifying Points**

At the completion of each qualification match, each team will receive a win, loss or tie depending on the final score:

- Each team on the winning ALLIANCE will receive two (2) qualifying points.
- Each team on the losing ALLIANCE will receive zero (0) qualifying points.
- In the event of a tied score, all six teams will receive one (1) qualifying point.

### **9.3.5 Match Ranking Points**

All teams on the winning ALLIANCE will receive a number of ranking points equal to the un-penalized score (the score without any assessed penalties) of the losing ALLIANCE.

All teams on the losing ALLIANCE will receive a number of ranking points equal to their final score (with any assessed penalties).

In the case of a tie, all participating teams will receive a number of ranking points equal to their ALLIANCE score (with any assessed penalties).

### **9.3.6 Match Point Exceptions**

A SURROGATE team will receive zero qualifying points and zero ranking points.

A team is declared a no-show if **no** member of the team is in the ALLIANCE ZONE at the start of the match; a no-show team will be disqualified from that match.

During the qualification matches, teams can be individually disqualified in a match. A disqualified team will receive zero qualifying points and zero ranking points.

In the very unlikely case that all three teams on an ALLIANCE are disqualified, all three teams on the winning ALLIANCE would get their own score as their ranking points for that match.

### **9.3.7 Qualifying Score**

The total number of qualifying points earned by a team throughout their qualification matches will be their qualifying score.

### 9.3.8 Ranking Score

The total number of ranking points earned by a team throughout their qualification matches, divided by the number of matches played (excluding any SURROGATE matches), then truncated to two decimal places, will be their ranking score.

*Note: because your ranking score is derived directly from the match scores of your opponent ALLIANCES, it is in your interest that both your ALLIANCE and the ALLIANCES you “defeat” obtain a high score. The most valuable “WIN” results from a close, high-score match.*

### 9.3.9 Highest Match Score

The scoring system will keep track of the highest match score earned by each team during the qualification matches but this score will not be displayed.

### 9.3.10 Qualification Seeding

All teams in attendance will be seeded during the qualification matches. If the number of teams in attendance is 'n', they will be seeded '1' through 'n', with '1' being the highest seeded team and 'n' being the lowest seeded team.

The scoring system will use the following seeding method:

- Teams will be broken into tiers based on their qualifying score. A tier is made up of all teams with the same qualifying score. Tiers will be seeded in decreasing order by qualifying score.
- Within each tier, teams will be seeded in decreasing order by their ranking score.
- If any teams within a tier have the same ranking score, they will then be seeded in decreasing order by their highest match score.
- If any teams within a tier have the same ranking score and the same highest match score, then the scoring system will seed those teams based on a random electronic coin toss.

## 9.4 ELIMINATION MATCHES

At the end of the qualification matches, the top eight seeded teams will become the Alliance Leads. The top seeded ALLIANCES will be designated, in order, Alliance One, Alliance Two, etc., down to Alliance Eight. Using the alliance selection process described below, each team will choose two other teams to join their ALLIANCE.

### 9.4.1 Alliance Selection Process

Each team will choose a student Team Representative who will proceed to the playing field at the designated time to represent their team (before the lunch break on the third day of the Competition). The Team Representative for each Alliance Lead is called the ALLIANCE CAPTAIN.

The alliance selection process will consist of two rounds during which each ALLIANCE CAPTAIN will invite a team seeded below them in the standings to join their ALLIANCE. The invited team must not already have declined an invitation.

Round 1: In descending order (Alliance One to Alliance Eight) each ALLIANCE CAPTAIN will invite a single team. The invited Team Representative will step forward and either accept or decline the invitation.

If the team accepts, it is moved into that ALLIANCE.

- If an invitation from a top eight ALLIANCE to another Alliance Lead is accepted, all lower Alliance Leads are promoted one spot and the next highest seeded unselected team will move up to become Alliance Eight.

If the team declines, it is not eligible to be picked again and the ALLIANCE CAPTAIN extends another invitation to a different team.

- If an invitation from a top eight ALLIANCE to another Alliance Lead is declined, the declining team may still invite teams to join their ALLIANCE, however, it cannot accept invitations from other ALLIANCES.

The process continues until Alliance Eight makes a successful invitation.

Round 2: The same method is used for each ALLIANCE CAPTAIN'S second choice except the selection order is reversed, with Alliance Eight picking first and Alliance One picking last. This process will lead to eight ALLIANCES of three teams.

#### **9.4.2 Elimination Match Pit Crews**

During the elimination matches, extra team members are often needed to move the team ROBOT from the team's pit area to the queuing area and onto the playing field. For this reason, each team is permitted to have three (3) additional "pit crew" members who can also help with needed ROBOT repairs/maintenance. We suggest that all teams assume they may be chosen for an ALLIANCE and think about the logistics of badge distribution and set a plan prior to the pairings. It is each ALLIANCE CAPTAIN'S responsibility to get their team's badges to the team pit crewmembers.

#### **9.4.3 Backup Teams**

Of the remaining eligible teams, the highest seeded teams (up to eight) shall remain on standby and be ready to play as a BACKUP TEAM. If a ROBOT from any team in an elimination match ALLIANCE becomes inoperable the ALLIANCE CAPTAIN may have the highest seeded BACKUP TEAM join the ALLIANCE. The resulting ALLIANCE would then be composed of four teams, but only three teams will be permitted to continue with match play. The inoperable team remains part of the ALLIANCE for awards but can not play, even if their ROBOT is repaired.

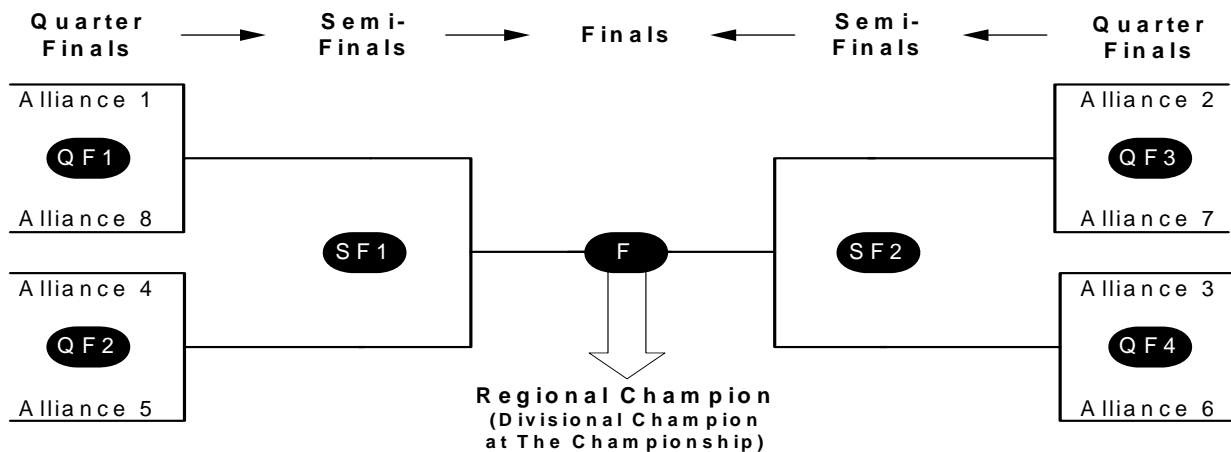
The original three-team ALLIANCE shall only have one opportunity to draw from the BACKUP TEAMS. If a second ROBOT from the ALLIANCE becomes inoperable, then the ALLIANCE must play the following matches with only two (or even one) ROBOTS. It is in the best interest of all teams to construct their ROBOTS to be as robust as possible to prevent this situation.

- Example: Three teams, A, B and C, form an ALLIANCE going into the elimination matches. The highest seeded team NOT on one of the eight ALLIANCES is Team D. During one of the elimination matches, Team C has their ROBOT disabled. The ALLIANCE CAPTAIN decides to bring up Team D to replace the disabled ROBOT. Team C and their ROBOT may not play in any subsequent elimination matches.

In the case where a BACKUP TEAM is called up onto the winning ALLIANCE, there will be a four-team Champion Alliance.

#### 9.4.4 Elimination Match Ladder

The elimination matches will take place on the third afternoon in a ladder format as follows:



In order to allow equal time between matches for all ALLIANCES, the order of play will be:

QF1-1, QF2-1, QF3-1, QF4-1,  
Then QF1-2, QF2-2, QF3-2, QF4-2,  
Then QF1-3\*, QF2-3\*, QF3-3\*, QF4-3\*  
Then any QF replays due to ties\*  
Then SF1-1, SF2-1, SF1-2, SF2-2, SF1-3\*, SF2-3\*  
Then any SF replays due to ties\*  
Then F-1, F-2, F-3\*  
Then any F replays due to ties\*

(\* - if required)

#### 9.4.5 Elimination Scoring

In the elimination matches teams do not earn qualification points; they earn a win, loss or tie. Any tied matches will be replayed.

Within each bracket of the elimination match ladder, matches will be played to determine which ALLIANCE advances, as follows:

The first ALLIANCE to win two matches advances.

#### 9.5 CHAMPIONSHIP ADDITIONS

For the 2008 FRC Championship, teams will be split into four divisions. Each division will play exactly like a Regional Event and produce the Division Champions. Those four ALLIANCES will then proceed to the Championship Playoffs to determine the 2008 FRC Champions.

Procedures in Sections 9.1-9.4 apply during the Championship, with the following additions:

### 9.5.1 Championship Pit Crews

Only team members wearing proper badges are allowed on the arena floor. *FIRST* will distribute these badges to the ALLIANCE CAPTAINS during the ALLIANCE CAPTAIN meeting, which takes place on the division fields. These badges will provide the necessary access to the field for pit crewmembers.

### 9.5.2 Championship Backup Teams

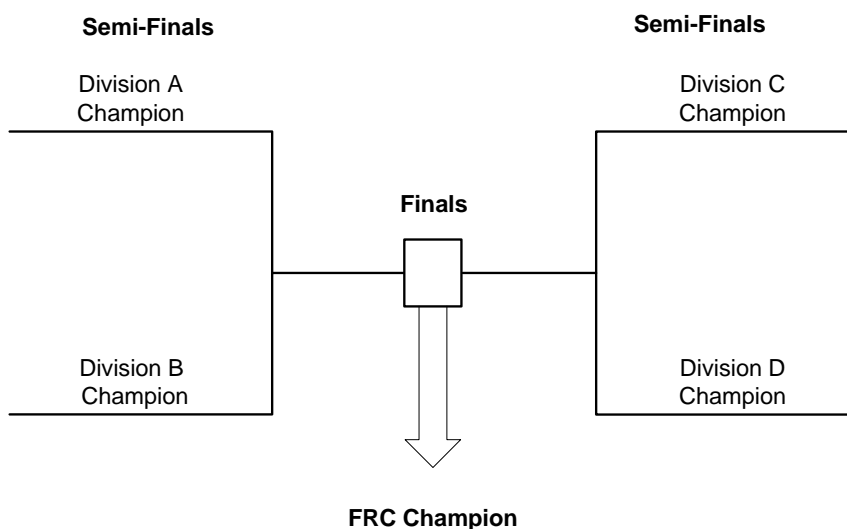
If an ALLIANCE has not previously brought in a BACKUP TEAM, and a ROBOT becomes disabled during the Championship Playoffs and can not continue, the ALLIANCE may request a BACKUP TEAM. The ALLIANCE CAPTAIN will be presented the option of having one of the three lead Division Finalist teams, chosen randomly, from their division join the ALLIANCE as a BACKUP TEAM.

If an ALLIANCE has won their division with a BACKUP TEAM and moved on to the FRC Championship Playoffs, the BACKUP TEAM continues to play for the ALLIANCE in the Championship Playoffs.

As noted in Section 9.4.3, the original three-team ALLIANCE shall only have one opportunity to draw from the BACKUP TEAMS. If the ALLIANCE has brought in a BACKUP TEAM during the division elimination matches or the Championship Playoffs, they cannot bring in a second BACKUP TEAM. If a second ROBOT from the ALLIANCE becomes inoperable during the Championship Playoffs, then the ALLIANCE must play the following matches with only two (or even one) ROBOTS.

In either case, the replaced team remains part of the ALLIANCE for awards but can not rejoin match play, even if their ROBOT is repaired. If the ALLIANCE wins the Championship Playoffs, the FRC Champions will be all three original members of the Division Champion ALLIANCE and the BACKUP TEAM.

### 9.5.3 FRC Championship Match Ladder



The FRC Championship matches will play exactly like the Semi-Finals and Finals of the elimination matches.



## 9.6 TOURNAMENT RULES

### 9.6.1 Safety Rules

- <T01> All competition attendees must wear safety glasses while on the field.
- <T02> Radio control mode of ROBOT operation is not permitted areas anywhere off the field. ROBOTS must only be operated by tether when not on the competition field.

### 9.6.2 Referee Interaction Rules

- <T03> The Head Referee has the ultimate authority on the field during the competition. THE HEAD REFEREE RULINGS ARE FINAL! The referee will not review recorded replays under **any** circumstances.
- <T04> If a team needs clarification on a ruling or score, a pre-college student from that team should address the Head Referee after a field reset has been signaled. Depending on timing, the Head Referee may postpone any requested discussion until the end of the subsequent match. Head Referees will only discuss calls, scores, penalties or match outcomes with pre-college team members.

### 9.6.3 Yellow and Red Card Rules

- <T05> The Head Referee may assign a YELLOW CARD as a warning of egregious ROBOT or team member behavior. This will occur at the completion of a match, before the field is reset, and will be indicated by the Head Referee standing in front of the team's PLAYER STATION and holding a yellow card in the air. In the first match that a team receives a YELLOW CARD, it acts as a warning.
- <T06> After a team receives a YELLOW CARD, a yellow flag will be placed on their ROBOT at the beginning of all subsequent matches as a reminder to the team, the referees, and the audience that they have been issued a YELLOW CARD.
- <T07> A team will be issued a RED CARD (disqualification) in any subsequent match that they receive an additional YELLOW CARD. This will occur at the completion of a match, before the field is reset, and will be indicated by the Head Referee standing in front of the team's PLAYER STATION and holding a yellow card and red card in the air simultaneously. The team will still carry their YELLOW CARD into subsequent matches.
- <T08> YELLOW CARDS do not carry forward between qualification matches and elimination matches. All teams move into the elimination matches with a clean slate.
- <T09> If a team is disqualified during a match for a reason other than receiving an additional YELLOW CARD, they will receive a RED CARD. This will occur at the completion of a match, before the field is reset, and will be indicated by the Head Referee standing in front of the team's PLAYER STATION and hold a red card in the air.
- <T10> During the qualification matches, a team that receives a RED CARD will receive zero ranking points and zero qualification points. The rest of the team's in their ALLIANCE will still receive the earned qualification points and ranking points.
- <T11> During the elimination matches, a team receiving a RED CARD will cause the disqualification of their entire ALLIANCE for that match.

### 9.6.4 Field Reset Rules

- <T12> At the conclusion of a match, all players shall remain in the Player Zone until the Head Referee issues the "field-reset" signal. Once the Head Referee issues this signal, the 3-minute "match-reset" period will begin. During this time, the field must be cleared of ROBOTS from the match just ended, and the ROBOTS and OPERATORS CONSOLES for the following match must be in position and ready to start before the expiration of the "match-reset" period. Field Attendants will reset the field elements during this time.

- <T13> Field power to the ROBOTS will **not** be re-enabled after a match. ROBOTS must be designed to permit removal of TRACKBALLS or other ROBOTS without requiring activation of the ROBOT power system. Teams should design mechanisms that allow easy release of TRACKBALLS. At the discretion of the head referee or field manager, ROBOTS may be powered up and controlled via tether to collapse the ROBOT to permit safe and/or rapid removal from the field and transport to the pits. Teams that power up to collapse their ROBOTS must do so in a timely manner. For information on using the tether, please refer to the control system documentation from Innovation First, Inc.
- <T14> The qualification match schedule will indicate ALLIANCE partners and match pairings. It will also indicate the ALLIANCE color assignment, RED or BLUE, for each match. The color is used to determine the placement of each team's ROBOT, drivers, ROBOCOACHES, and COACHES around the playing field. Teams must line up behind their team LED at the Player's Station.
- <T15> The higher seeded ALLIANCE will have the last opportunity to orient their ROBOTS within the selected locations.
- <T16> If, in the judgment of the Head Referee, a "field fault" occurs that affects either the play or the outcome of the match, the match will be replayed. Example field faults include broken field elements, power failure to a portion of the field, improper activation of the field control system, errors by field personnel, etc.

### 9.6.5 Time-out and Backup Team Rules

- <T17> There are **no** time-outs in the qualifying rounds. If a ROBOT cannot report for a match, the queuing manager must be informed and at least one member of the team should report to the field for the match to avoid disqualification.
- <T18> During the elimination rounds, if circumstances require an ALLIANCE to play in back-to-back matches, they will be granted an additional minute of set-up time to reset and allow their ROBOTS to cool down.
- <T19> In the elimination matches, each ALLIANCE will be allotted one TIME-OUT of up to 6 minutes. If an ALLIANCE wishes to call for a TIME OUT, they must submit their TIME OUT coupon to the Head Referee within two minutes of the Head Referee issuing the field reset signal preceding their match. When this occurs, the Time-out Clock will count down the six minutes starting with the expiration of the arena-reset period. Both ALLIANCES will enjoy the complete 6-minute window. In the interest of tournament schedule, if an ALLIANCE completes their repairs before the Time-out Clock expires, the ALLIANCE CAPTAIN is encouraged to inform the Head Referee that they are ready to play and remit any time remaining in the TIME-OUT. If ALLIANCES are ready before the 6-minute window, the next match will start. There are no cascading time-outs. An opposing ALLIANCE may not offer their unused TIME-OUT to their opponent.
- <T20> If during a TIME-OUT an ALLIANCE CAPTAIN determines that they need to call up a BACKUP TEAM, they must submit their BACKUP TEAM coupon to the Head Referee while there is still at least two minutes remaining on the Time-out Clock. After that point, they will not be allowed to utilize the BACKUP TEAM. Alternatively, an ALLIANCE CAPTAIN may choose to call up a BACKUP TEAM without using their TIME-OUT by informing the Head Referee directly within two minutes of the Head Referee issuing the Field Reset Signal preceding their match.
- <T21> In the case where the ALLIANCE CAPTAIN's team is replaced with the BACKUP TEAM, the ALLIANCE CAPTAIN is allowed in the Team Zone as a thirteenth ALLIANCE member so they can serve in an advisory role to their ALLIANCE.

### 9.6.6 Special Equipment Rules

<T22> The only equipment that may be brought on to the field is the OPERATOR CONSOLE, reasonable decorative items, and special clothing and/or equipment required due to a disability. Other items, particularly those intended to provide a competitive advantage for the ROBOCOACH, are prohibited.

Devices used solely for the purpose of planning or tracking strategy of game play are allowed inside the ALLIANCE ZONE, if they meet ALL of the following conditions:

- Do not connect or attach to the OPERATOR CONSOLE
- Do not connect or attach to the FIELD or ARENA
- Do not connect or attach to another alliance member
- Do not communicate with anything or anyone outside of the ALLIANCE ZONE (for example wireless communications must be disabled).
- Do not in any way affect the outcome of a MATCH, other than by allowing team members to plan or track strategy for the purposes of communication of that strategy to other alliance members.