

2017 UNA Robotics Competition

“Buzz Into Spring”

Spring is about to be sprung and with that, bees will start to buzz. What do these little creatures do with all their time? Let's follow around some bees and see what they are up to all day.

Competition Rules and Problems:

The following pages provide a description of each event and an overview of how points are scored. The overall ranking for the awards ceremony is determined by the total of all three events. A tie-breaker will occur at the end of the contest, if needed.

General Scorekeeping Rules:

1. The contest consists of 3 obstacle course problems that students can attempt over a 3-hour period.
2. The set of obstacles will span various levels of difficulty. Each challenge is worth a maximum of 100 points.
3. The overall team score is the sum of all three scores (for a total possible score of 300).
4. The obstacle courses and associated problems will not be revealed until the beginning of the contest.
5. Teams may work on any problem in any order.
6. Ranking will be based on the overall combined score from the individual challenges.
7. Some problems have disqualification measures (e.g., going off the playing field).
8. If a team has not completed the course after 90 seconds, they will receive points earned before the 90 second limit.
9. All courses will have a designated starting area. 1.The robot must start completely within the starting area. 2.The robot may face any direction when starting.
10. Students may not touch or remotely control the robot other than to initially place and start the robot.
11. A team may try each course multiple times.
 1. Teams must start at the back of the line for each new attempt.
 2. Each team may only be in line for one event at a time. It is not permissible to spread team members across multiple lines at any specific time.
 3. When multiple attempts are made for a specific obstacle course, the best score of all attempts will be used in computing the overall score.
 4. Teams may modify their programs and robot before making additional attempts to improve their score. Robots may not be altered such that there is a size violation (13in x 13in x 13in).
 5. Only one team member may be in line with their robot at any time.

6. There are clear boundary lines for the starting position. A robot may start with a portion of its body on the boundary of the starting area, but not extending beyond the boundary.

7. A disqualification results in no score being posted for that round. You may try again after returning to the end of the line.

8. Three disqualifications will result in no more attempts allowed. YOU will be disqualified for the rest of the event and all scores will be set to zero.

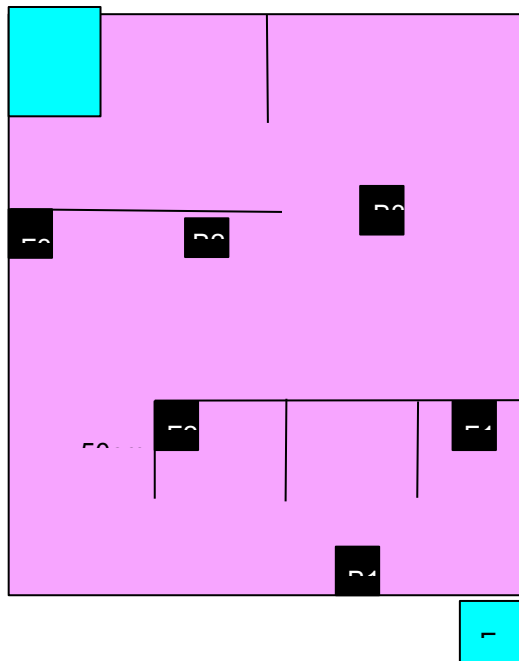


Puzzle One:

Back to the Hive

When a bee gets full, they have to head back to the hive. Your job is to get your bee back to the hive as quickly as possible. BUT WAIT!! There are obstacles in the way! Your bee must navigate its way back across the field to the hive. On the way, though, there are birds that want to eat it and some really enticing flowers your bee wants to visit. You will need to get back to the hive in less than 90 seconds while avoiding the two birds and stopping, if you can, by the three flowers.

Scoring in this event: Your base score is 90 minus the time it takes for you to get to the hive. Time is kept to the tenth of a second. If you touch a bird, you lose 10 points. Birds will be solo cups, not red. Each flower you visit, though gives you 15 points. In order to score the flower, your robot must touch it. Flowers will be red solo cups. If your robot crosses the blue field boundary tape, you receive a ten point penalty. If your robot crosses the blue tape twice it will be disqualified for the round. You may touch the blue tape, but not cross it. Sensors attached to the robot may cross over either, as long as they do not touch the floor outside. When exiting the maze field, time will stop when the entire robot (including parts not touching the floor) crosses the exit tape.



UNA Robotics “Back to the Hive”

B=Bird

F=Flower

ST=Start

Ex= Exit

F1-Centered. Touching tape

B1-Touching tape. 1.5m from right corner

F2- In corner, touching tape

F3-In corner, touching tape

B2- 1.5 m from the edge touching the tape.

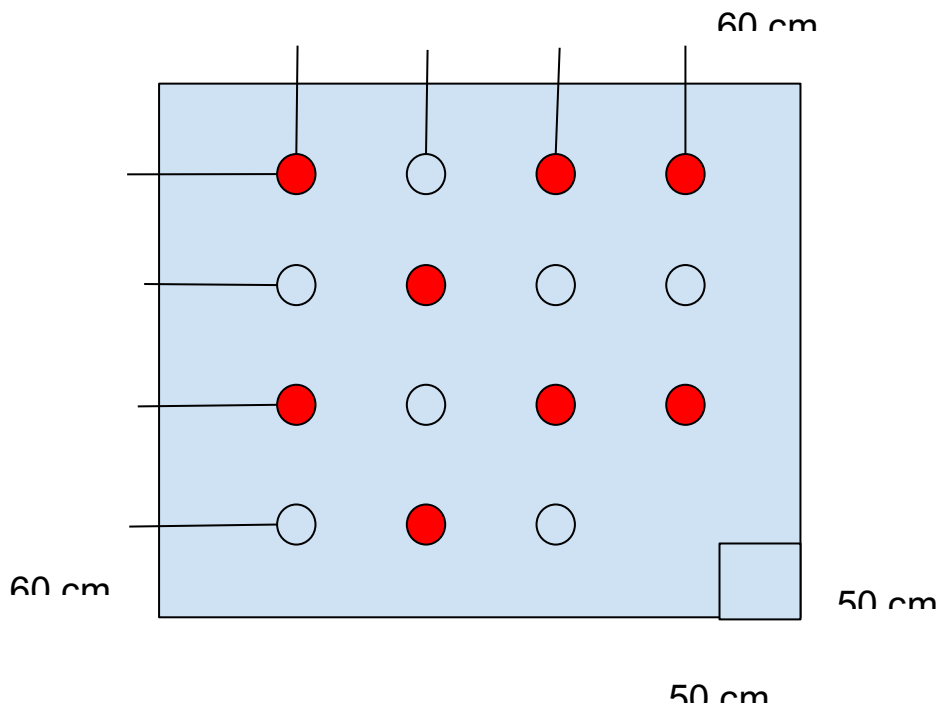
R3 1m from right edge 1m

Puzzle Two:

Waggle Waggle

The bee's job is to visit flowers, collect nectar and pollen and return to the hive. While doing this, flowers get fertilized and in turn, the plant produces seeds and fruits that are useful for humans.

Your bee will travel around the field visiting flowers (represented by solo cups). However, some flowers have had insecticide sprayed on them and are dangerous to your bee! Don't touch those. Your bee is only interested in the red flowers. Each flower has a blue tape border around it. You must push the flower completely out of the tape circle. In order to score, none of the cup may be left inside the tape. The cup may still touch the tape, however. For each flower you successfully visit, you receive 10 points. Each poisoned flower has a dot in the center of the tape outline. If any portion of the dot is visible, a 5 point penalty will be incurred. As with the other fields, there is a penalty for crossing the border tape. Please see puzzle one for the information. If your bee successfully visits all the red flowers and exits the field (see puzzle one for the definition of exit) at the start zone within 90 seconds, you will receive a bonus of 20 points. All the flowers are approximately equidistant. There may be slight variation on the field.



Useful information:

1 Solo cup (16oz size) top diameter is 3.75" (approximately 9.5 cm)
 Height: 4.75" (12 cm), Bottom Diameter 2.5" (6.4cm)

All time is measured to the nearest 0.1 second

Placement of cups is approximate. Judges are asked to be as close as possible to the actual placement each round, however, there may be slight variation.

Scoring cup (red cups) placement will always be in the same location.

Field 2 and 3 are 3m square. Field 1 is 3m x 4m

A sample of tape will be available for teams to measure and calibrate color sensors.

Field 1 score sheet

Time (in seconds to the nearest tenth)	
Time Score=90-time	
Birds touched	
Bird score=Birds touched x 10	
Flowers Touched	
Flower score= Flowers touched x 15	
Lines/PVC crossed	
Penalty= Lines/PVC crossed x 10	
Score= Time score+ Flower score- Bird score-penalty	

Field 2 score sheet

Time	
Cups Passed	

Cup Score=Cups passed x 10	
Cups pushed	
Cup penalty= Cups Pushed x 5	
Lines Crossed	
Penalty=Lines crossed x 10	
If time<90 then bonus =90-time	
Score= Cup score-Cup Penalty-Penalty+ Bonus	

Field 3 Score Sheet

Time	
Flowers Touched	
Flower Score= Flowers Touched x 10	

Poison Flowers Touched	
Poison Score= Poison Flowers x 5	
Lines crossed	
Penalty=Lines crossed x 10	
If time < 90, bonus = 90-time	
Score= Flower Score-Poison Score-Penalty+bonus	