FIRST Tech Challenge

November 2022







Topics

- Robots
- Game and Strategy
- Competitions
- Gracious Professionalism
- Judging
- Robots!!!!!!!

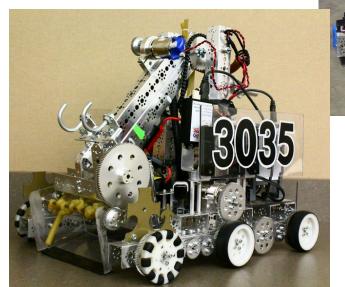


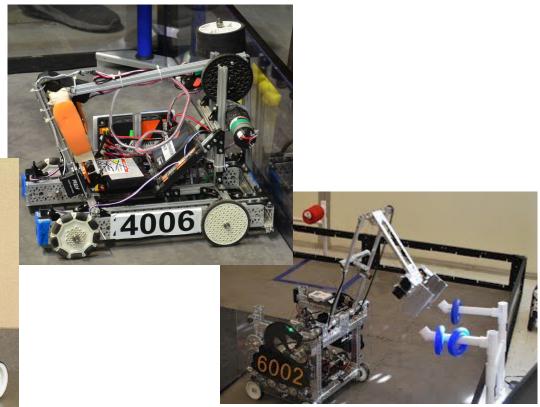




Robots

What is required on all FTC robots?









Robots

- Fit in 18" sizing cube
- Limits on electronics (max 12 DC motors, 6 servo motors)
- Must have a power switch
- Must have team number
- Alliance Markers
- Wiring!!!!!!!!!!!

Read the Robot and Field Inspection checklists!







Robots Parts





Robots Parts

- Building Channel Ideas (Angle bar, flat bar, square channel, and flat plate)
- Plastics (PETG easy to cut, 3D Printers)
- Hardware Store (Locknuts, Longer set screws, Velcro zip ties, Threaded rod, Heavy pipe cut into shorter lengths)
- COTS drawer slides, lazy susans, ...
- Wiring ask a electrician (zip ties, conduit, ...)

FTC Game Manual Part 1 - Chapter 7





Robots - Bringing it all together



Surgical Tubing
1" pvc rollers
Cardboard ramp
Square channel (green bars)
4" pvc (aiming device)
3D Printing (phone Mount)





Game and Strategy



PRESENTED BY













Decide on a strategy and design a robot that fits that strategy

Don't forget to read Game Manual Part 2!

Traditional Events - https://www.firstinspires.org/sites/default/files/uploads/resource_library/ftc/game-manual-part-2-traditional.pdf

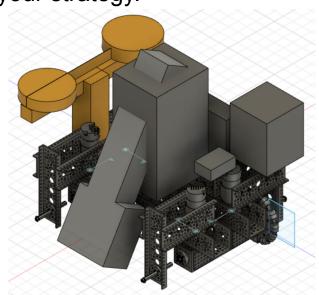
 $Remote\ Events\ \hbox{--} \ {\tt \underline{https://www.firstinspires.org/sites/default/files/uploads/resource\ library/ftc/game-manual-part-2-remote.pdf}$





- Decide on a strategy and design a robot that fits that strategy
- Agree on the mechanisms needed to implement your strategy.

Think about space allocation.
Where will the mechanism go?
Where will the battery and hubs go?







- Decide on a strategy and design a robot that fits that strategy
- Agree on the mechanisms needed to implement your strategy.
- Choose a drive base and start building

Programmers and drivers can get started even before mechanisms are on the robot.





- Decide on a strategy and design a robot that fits that strategy
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- Choose a drive base and start building
- Choose a programming language

```
to runOpMode
Put initialization blocks here.
set FrontRight . Direction to Direction
set BackRight . Direction to Direction
                                       REVERSE
set Foundation1 Position to
set Foundation2 Position to
set Capstone Position to 0.05
call Dec1stBlocksteleop waitForStart
if call Dec1stBlocksteleop opModelsActive
do repeat while v call Dec1stBlocksteleop opModelsActive
    do set vertical v to _ v gamepad1 v RightStickY v
        set horizontal v to gamepad1 v RightStickX v
        set pivot v to gamepad1 v LeftStickX v
        set stonemover v to gamepad2 v RightBumper v
        set FrontRight . Power to
                                      - v pivot v + v
                                                            vertical - horizontal -
        set BackRight Power to
                                      - * | pivot * | + *
                                                            vertical * + * horizontal *
        set FrontLeft Power to
                                                      vertical + horizontal +
        set BackLeft . Power to
                                     pivot + *
                                                     vertical v - v horizontal v
```

```
An OnBotTeleop.igvg | FTC Code Edi: X
 🔛 Apps M Gmail 管 RTM 🍲 Weather 📂 FreshBooks 🤡 Linkedin 🚳 Feedly 🚱 Read Later 🞧 GitHub 👻 Jira м MS login 🔟 Trello 🥞 Evernote
                                                             // Choose to drive using either Tank Mode, or POV Mode
                                                             // Comment out the method that's not used. The default below is POV
Project Files
                                                              // POV Mode uses left stick to go forward, and right stick to turn.
 ▼ ■ org.firstinspires.ftc.teamcode
                                                             // - This uses basic math to combine motions and is easier to drive strain

    OnBotTeleop.java

                                                             double drive = -gamepad1.left_stick_y;
                                                             double turn = gamepadl.right stick x:
                                                             leftPower = Range.clip(drive + turn, -1.0, 1.0);
                                                             rightPower = Range.clip(drive - turn, -1.0, 1.0);
                                                             // Tank Mode uses one stick to control each wheel.
                                                             // - This requires no math, but it is hard to drive forward slowly and ke
                                                             // leftPower = -gamepad1.left_stick_y ;
                                                             // rightPower = -gamepad1.right_stick_y ;
                                                              // Send calculated power to wheels
                                                              leftDrive.setPower(leftPower);
                                                             rightDrive.setPower(rightPower);
                                           Build started at Thu May 16 2019 20:44:05 GMT-0700 (Pacific Daylight Time)
                                           Build finished in 2.8 seconds
                                           Builld succeeded!
```





- Decide on a strategy and design a robot that fits that strategy
- Agree on the mechanisms needed to implement your strategy.
- Choose a drive base and start building.
- Choose a programming language
- Start testing ideas for mechanisms







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Get a simple robot working, test it, learn what works and what doesn't, then plan your next robot.





Resources

FTC Docs - <u>ftc-docs.firstinspires.org/index.html</u>

FTC Game Manual 0 - https://gm0.org/en/latest/index.html

FIRST BC workshop videos (drive base options, mechanisms, ...) https://www.youtube.com/playlist?list=PLIBrpYHdy1Jgt1GeZRJWE40N1G1NkYJFg

Online resources created by vendors (Tetrix and REV have video series) https://www.youtube.com/c/TETRIXbyPitsco

Online resources created by teams





Competitions

Dec. 1-7 Remote Scrimmage

Jan. 19-25 Remote Qualifier

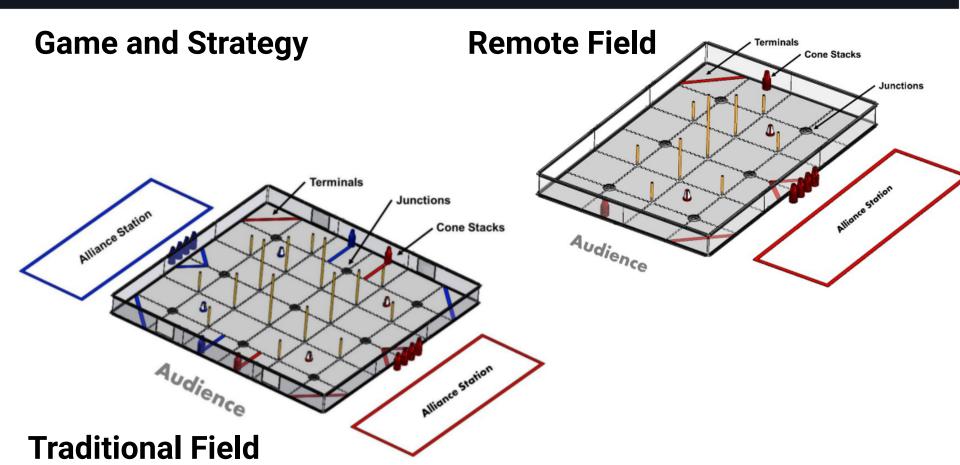
Judging on Jan. 21 (virtual interviews)

Feb. 25/26 Provincial Championships in Vancouver

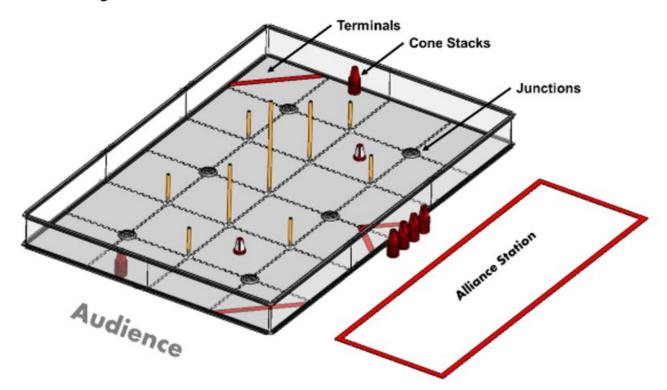
for top teams from Qualifiers







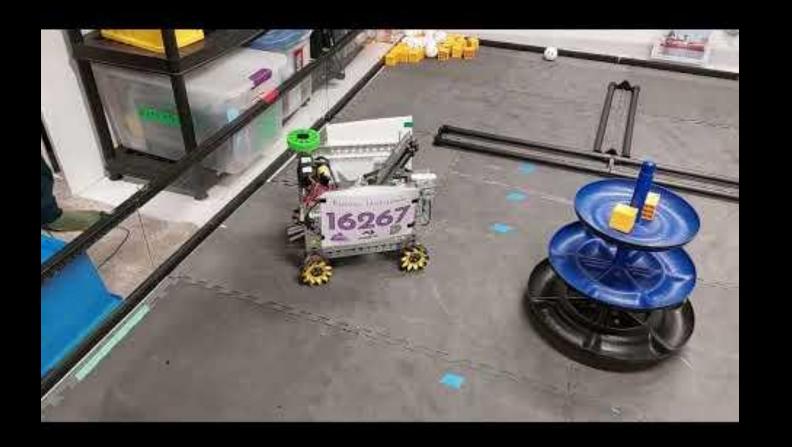
Remote Field Layout

























Gracious Professionalism





Gracious Professionalism

It's a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community. With Gracious Professionalism, fierce competition and mutual gain are not separate notions.







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Interviews with Judges

- find out about what you've learned this season.

Read Award descriptions in Game Manual 1.





Interviews with Judges

- find out about what you've learned this season.

Engineering Portfolio

- max. 15 pages about your team, your robot, your activities





Interviews with Judges

- find out about what you've learned this season.

Engineering Portfolio

- max. 15 pages about your team, your robot, your activities

Control Award

- Info about programs and example video





Resources

FTC Docs

https://ftc-docs.firstinspires.org/

Questions and Answers

https://ftc-qa.firstinspires.org/

Other teams

- FTC British Columbia Discord https://discord.gg/AC6dtEev
- Youtube videos
- Team websites

Questions







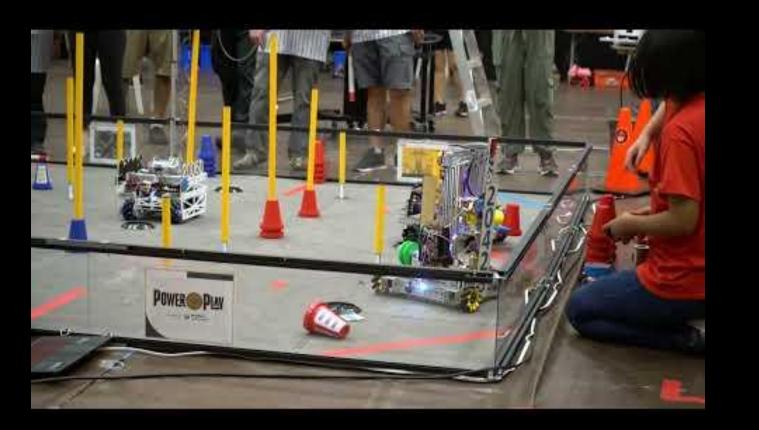








Robots!!!!!!!



Questions

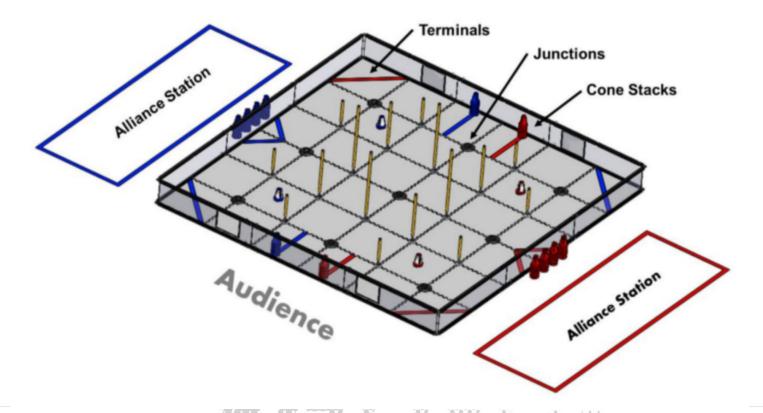








POWERPLAY Field









Remote Field Layout

