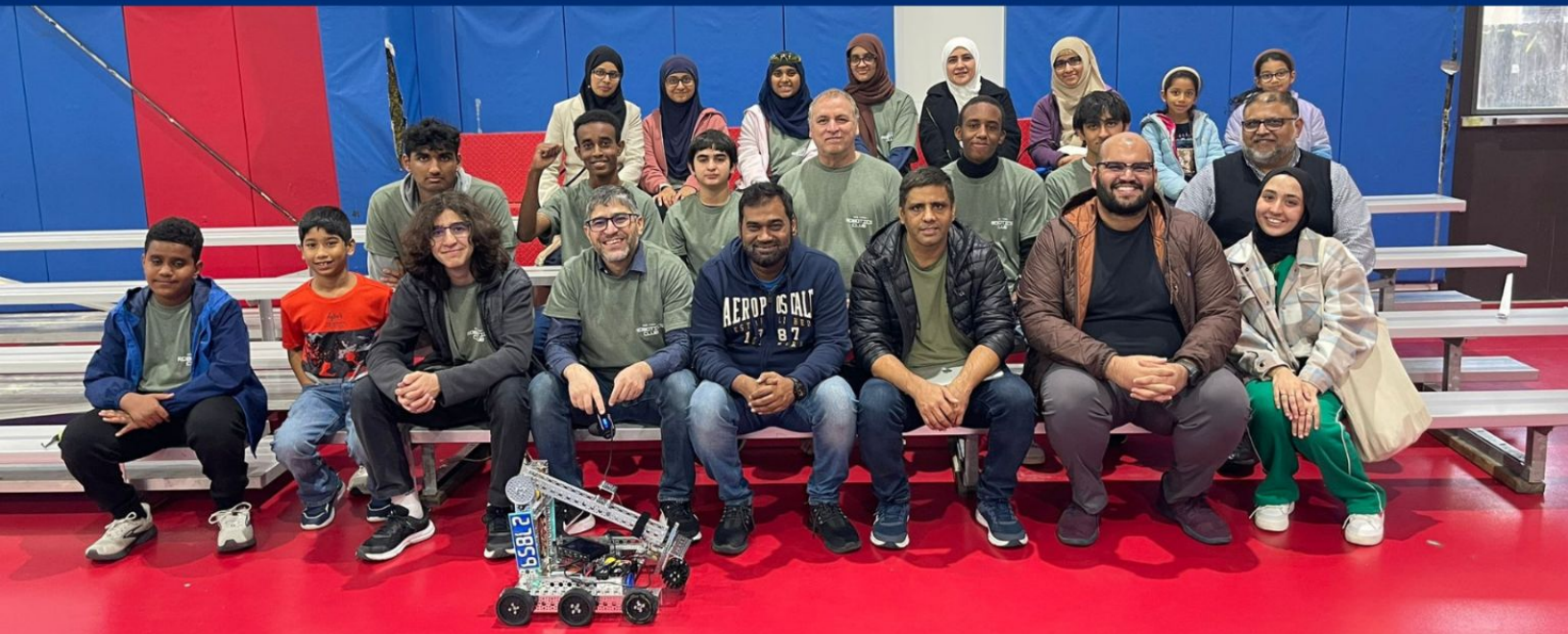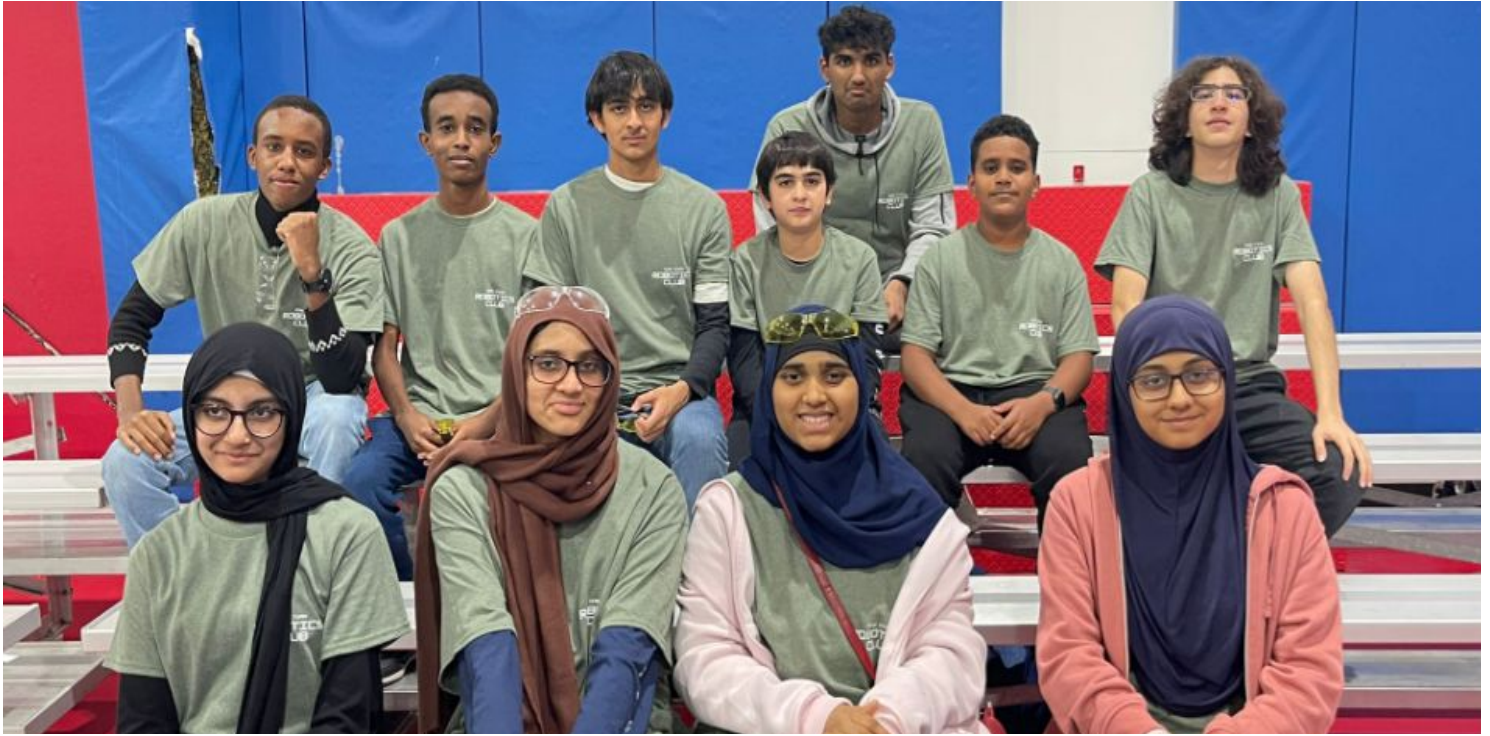# ICBC-ITKAN

Raven Bots

#27859

Engineering Portfolio: Feb 2025

Our Team:

Top (Left to Right): Abdalla [Human Player, Electrical], Ibrahim-Abdalla [Operator], Hadeed [Coach], Rayaan [Driver], Ibrahim [Programmer], Yusuf [Fabrication/Design], Yasir [Fabrication/Design]

Bottom: Nusaybah [Programming, Strategy], Alishba [Programming], Afiya [Programming, Strategy], Faaezah [Programming, Strategy]

Not Pictured: Hamzah [Fabrication], Nour [Programming], Mohid [Programming], Ihsan [Programming], Humayd [Programming],

A Special Thanks To Our Mentors: Br. Hawzhin, Br. Mussab, Br. Akber, Br. Mohib, Br. Khalid, Br. Kabeer

We're team 27859, the RavenBots, a rookie team based in Cedar Park, Texas. We are a local community team, commuted by the Islamic Center of Brushy Creek. WIth the help of ITKAN Robotics, we started in the year 2024 and also started multiple FLL teams alongside. We meet every Saturday from 11AM-2PM with additional optional meetings throughout the week from 8PM-10PM.
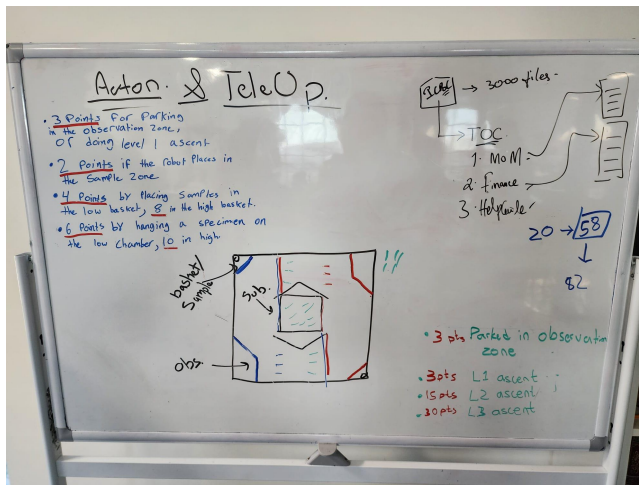
Progression:

Funding: We gained funding mainly by the grant provided by the Islamic Center of Brushy Creek. In addition, we had a bake sale and received a grant from FIRST.

Competition: We attended our first competition with a Gobuilda starter kit robot.

Analyzing: From our first official competition experience, we set a baseline from which we created a plan to improve. Analyzing each path and the opportunity cost associated with each decision. In the end, we took the risk of redesigning our arm and chassis to accommodate the high basket. We also created an autonomous plan accordingly, developing a 20 point auto.

With consistent improvement, and ambition, we were able to score #1 in OPR (average points per team) in the HSATigers League Meet 3. We plan to continue improving with the goal to be able to score more than 150 points to be able to place at the State level competition.

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SEASON TIMELINE

① September
- Started team and worked to obtain funding

② October
-First Meeting and kickoff to team

③ November
-Built a GoBuilda starter bot and competed in our first practice tournament

- Started a parallel FLL team for younger ages

④ December
-Heavily modified robots with viper kit for scoring in high basket, 20 point auto and more.

- Scrimmage with #26903 Cyber Salam

- Redesigned intake mechanism

- Secured FTC grant

⑤ January

- Redesigned arm mechanism to achieve level 3 ascent

- Refined code with 23 point autonomous, auto hanging, auto submersible intaking and utilizing a color sensor

-Redesigned intake again

- Achieved second highest OPR ranking at practice tournament

Unboxing GoBuilda Kit: Kickoff

Scrimmage with #26903

Successful Level 3 Ascent

Despite starting late, we were able to get funding and perform at a competitive level in the HSAT league. With a 23 point autonomous, level 3 ascent, skilled drivers, and driver aid programs, we successfully overcame all of our challenges.

Brainstorm
Every single time the team comes together, we try to come up with ideas with how the robot could be improved to maximize our advantage in the games. We generally target things like cycle time, and point scoring consistency. In this stage, anyone is allowed to throw in ideas for whatever section of the robot.

Filtering
In this next step, we try to figure out what ideas are worth pursuing. In order to make a decision, we consider factors such as the time to the next competition, potential complexity of the build, and estimation of the effectiveness of the build. We then put the "best" idea as the first item of the list.

Design
Once the filtering stage is done and an idea is selected, we start building the parts in CAD. We generally use OnShape to design our models. This allows us to easily print out the designs and test to see if they are effective or not.

Assemble
Once we have the prototypes in our hands, we put them onto the robot. This process is relatively simple. In this stage, if any software changes need to be made, we also do those here.

Evaluate
After assembly, we test to see if the new parts are effective. Here we determine if this prototype was to the standard that we want to meet. This is also where we determine if the idea that we had originally decided to build for was actually worth it or not. Based on the information we collect during this stage, we make some decisions.
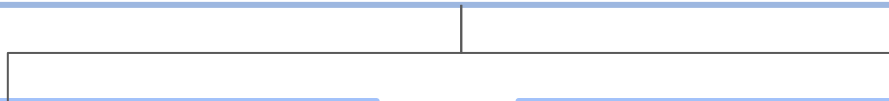
Abandon
If we decide that the original idea was flawed, or is no longer feasible, then we abandon the idea. Sometimes this has to happen in engineering.

Iterate
If the prototype seems to show some promise, then we will continue to perfect the idea, using different materials, or even slight decision changes.

Our Resources as a rookie team

Discord
We are in many helpful FTC Discord Servers, where experienced members, mentors and even referees from other teams and regions contribute and answer questions that are asked. This is one of our favorite resources as it usually takes less than 30 minutes to get a response.

Competition Manual
Per requirement., most members of the Ravenbots have read through the entire 2024-2025 FTC Into The Deep Competition Manual. Here, official rulings can be found quickly and instantly. This resource is perfect for answering quick questions requiring an instant answer.

Other Teams
Through our relationship with rookie team #26903, we have been able to get advice and many questions answered. Other teams like team # 5189 Wolves Robotics and FRC #418 LASA Robotics have provided valuable tips, ideas and general ideas as well as their support.

Videos
As a team, we have watched countless gameplay videos on Youtube from established teams, giving means of inspiration.

ITKAN
Our team started under the ITKAN Robotics branch. Having ITKAN Robotics as a resource was very beneficial as a rookie team, as they helped us register for competitions, inform us about how to obtain funding, and provide miscellaneous advice when we started.

#27859

Chassis

- Built from a GoBuilda Starter kit with many changes for form factor, accommodating more features, and for durability

Viper Kit

- From intake to outtake, our motored viper slider kit with durable construction can score in the high basket or even perform a level 3 ascent.

Hook for Hanging

- Attached to viper kit. Can automatically do level 2 and even a level 3 ascent with driver assist.

Drivetrain

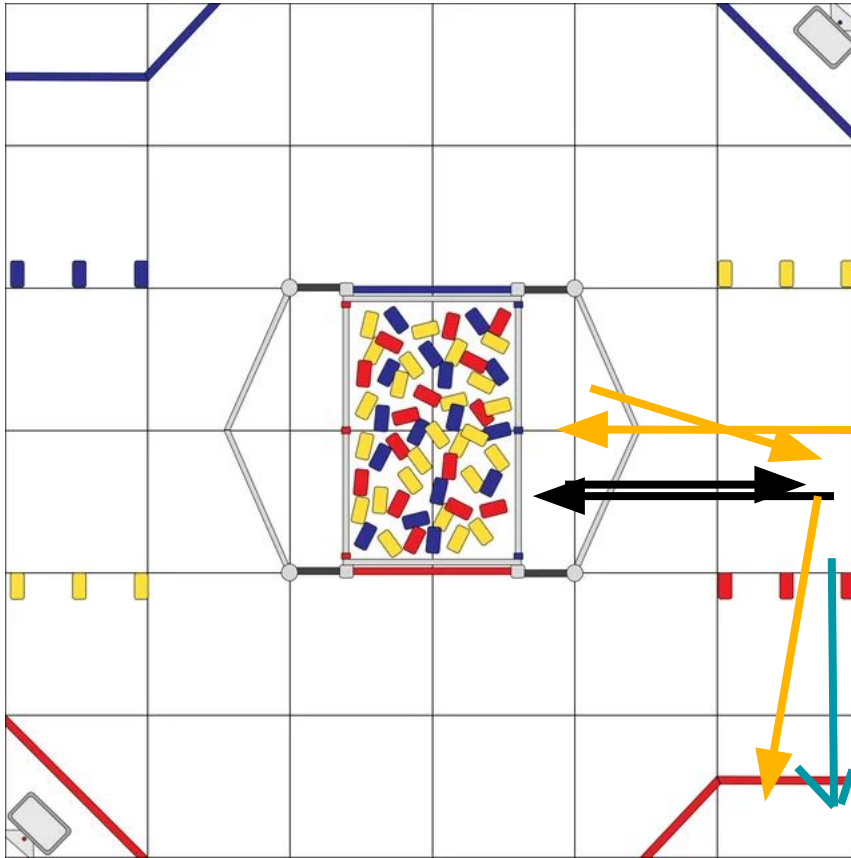- It has a 2 12 volt motors and 2 multi directional wheels and four normal wheels

Intake/Outtake

- It has a spinning servo and a wheel intake which will make the block lock in the scoop
- The outtake makes the servo spin the other way

We also have a second identical robot which we test new ideas and code on before committing onto the main robot.

AUTONOMOUS PATHS

Auto 1 (3 Points)
Auto 2 (20 Points)
Auto 3 (23 Points)

In addition to these autonomous programs, we have driver and operator assist programs for hanging, intaking from submersible and other functions. We also have a color sensor installed which we plan on utilizing for alignment to the basket and autonomous in the near future. These features aid the drivers in making efficient use of time on the competition field.

We are able to consistently score 20 points in auton in both far and near locations.

In Tele-Op, we try to score at least 7 samples. We coordinate with our partner to figure out most efficient strategy.

In endgame, we can do a level 2 ascent in under 7 seconds and can even do a level 3 ascend

TELE-OP GAMEPAD CONTROLS

Viperkit extend
Auto submersible
Viperkit descend
Move arm completely up
move arm down
Lift arm
outtake
Stop servo
Lift arm above ground
Autonomous submersible inn (pressed)
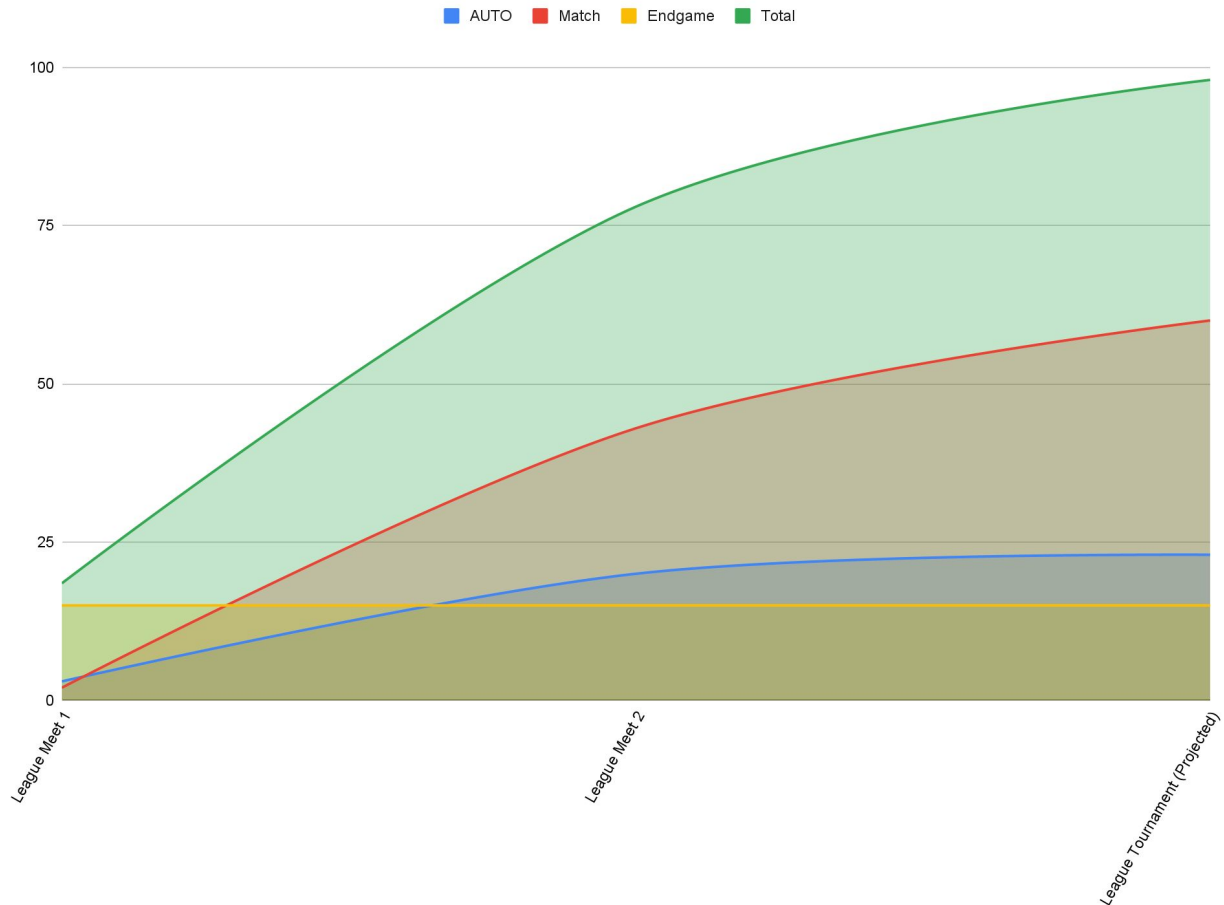**Autonomous submersible inn (pressed)**
intake

Operator

boost
Auto hang
movement

GAME STATISTICS (OPR)

In our first League Meet, we had an OPR of about 20, which mostly came from our level 2 ascent. In our next competition, our OPR jumped to 79 thanks to our Auto and ability to consistently and quickly score in the high basket. We hope to continue these improvements with our projected OPR for Feb 8 at close to 100 points. Our goal is an OPR of 150+ points for State

OUTREACH – LOCAL FIRST COMMUNITY

Scrimmage With Cyber Salam
Scrimmaging with another rookie team, we both helped each other improve and provided tips and pointers

Bake Sale
We hosted a bake sale for which all profits went directly to both the FTC and FLL teams started.

OUTREACH

@icbcfirsttechchallenge

SPONSORS

Google

ISLAMIC CENTER OF BRUSHY CREEK

$10,840 income

$6,901 expenses

$3,595   Robot 1 & Robot 2 Parts
$1,549   Into The Deep Field
$956   Robotics Controllers
$453   Robotics Challenge Set
$345   Robot Upgrades (More motors, viper kits)

$500   FTC Rookie Team Grant
$500   Google Sponsorship
$9,000   ICBC Sponsorship
$840   Bake Sale

Excess income from the ICBC Sponsorship to support the FLL teams

TEAM SUSTAINABILITY

Since our team has a limited amount of available seats and since we have noticed interest among younger students, we have started multiple FLL teams which we help with. These teams allow us to grow our reach and exposure, making grants and sponsorships more attainable. We also have sponsors and plan to contact more businesses for more potential sponsorships

FUTURE PLANS
During the offseason, we'd like to

- Continue working and building strong connections with local teams who we can have a symbiotic relationship with.
- Practice and try autonomous projects like RoadRunner.
- Reach out to local businesses and large corporations for more sponsorships for the 2025-2026 season.
- Continue practicing driving, operation, maneuvering and fixing planted issues in past robots.
- Recruit more members to our team and continue our outreach efforts with our FLL teams.