TABLE OF CONTENTS

TABLE OF CONTENTS

INTRODUCTION

ABOUT UNT ROBOICS:

Robotics is revolutionizing the way the world works, and we here at UNT Robotics are committed to unlocking the potential in students to solve unique problems, live on the edge of authentic discovery, and provide them with a diverse set of skills and tools to act as a catalyst to solve the much larger industrial, environmental, and unmet issues of the future.

We focus on developing student's skills in engineering & robotics, which involves a range of beginner workshops, industry talks, robotics-based hackathons, recreational projects and competitions.

We've grown a lot since our conception in late 2018. UNT's Engineering program teaches students much of the theory needed to flourish, however there was a gap for the invaluable hands on experience that we give our members. As a result, we've become a part of the growth and development of students here at UNT.

As a student organisation, we also develop the social skills of students. We host social and team building events and extensively network with industry partners who value the skills that we have given their recruits.

BOTATHON:

Founded in 2019, Botathon is a cross-disciplinary bracketed competition hosted by students, for students. It's themed exclusively each year to broaden the skill sets of the entrants. Our purpose is to inspire moments of creativity, enable personal and professional growth, and ignite change by sharing the power of engineering. We strive to lead each participant to become a leader in their team to nurture critical thinking and prepare them to find profound solutions to complex problems even after they graduate.

During the course of 2 weeks, teams are required to prioritize the planning and execution of the general principles adopted by this year's competition. All UNT students are eligible to enter for free, and materials for the robot build are provided as well as prizes for the champions!

Competitions create a platform for individuals to share, innovate, and build on ideas in the pursuit of discovery, development, and integrity. We aim to compel students to thrive by working together in challenging scenarios that make use of each individual's strengths while also improving shortcomings. For many, this is one of the first opportunities to work cross-disciplinary and see how other fields build upon their own, while also learning the basics of other disciplines simultaneously.

INTRODUCTION

WHY YOU SHOULD COMPETE:

There are many reasons why you should compete in Botathon! School can be a long, draining, stressful, and let's face it, boring process at times. There's so much more to the UNT experience than sitting in a chair all day learning. Participating in events gives students the opportunity to make connections, build a sense of community, discover new interests and skills, alleviate stress and have fun! Attending university also opens the door to many career paths, but just that alone won't set you apart from the crowd of people pursuing a degree just like you. It's what we fill our university experience with that attracts employers! Being a part of a competition is a great resume booster, as well as a good topic to discuss during interviews.

VOLUNTEERING

There are several different reasons to volunteer. If you are unavailable on the day of the competition, not eligible to compete, or just looking for a chance to mentor a community of eager robotics beginners, then volunteering is an excellent opportunity to still be involved. Many students interested in robotics get stuck at the entryway, and it's because of our fantastic volunteer mentors that these students are able to progress and develop new skills while building on their existing ones. These are the different ways you can get involved as a volunteer:

- Event planning/Marketing
- Aid in building a code base
- Virtual mentoring
- Being available for contact if players have technical questions

Volunteering is an excellent opportunity to gain new skills, experience, and knowledge while enhancing your employment prospects. If you would be interested in volunteering, contact us at:

UNT.Robotics@unt.edu

GAME OVERVIEW

SCENARIO

You are a pirate who recently caught wind of a legendary treasure so magnificent and vast that you and your crew would be set for life. The tale you eavesdropped revealed the location of a lifetime's worth of plundered booty by the lost legendary pirate, Ol' Peg-Legged Sebastian McKrakken. It is said that he stashed all of his booty in a cave on Scrappy island and hid the keys to the treasure room on his loyal guard octopus, The Kraken.

The problem is that you're not the only pirate to eavesdrop on this conversation. It would be a daunting and perilous journey, and it seems that you're not the only pirate crazy enough to partake in it as the other eavesdropping pirates' eyes shine with gold and gems. In your pirate scheming mind you forge a plan to ally with the rival pirate and his crew of swashbuckling criminals since a meat shie… I mean partner might come in handy for finding a lost magnificent treasure...for now…

OVERVIEW

In Botathon 2021 two pirate crews work together to find a way to access Ol' Peg-Legged Sebastian McKrakkens secret treasure room on Scrappy Island. The keys to the treasure room are hidden with the Kraken, a fearsome octopus who can only be defeated by use of the cannons staged around the island. If the Kraken is defeated within the time period, pirates will enter a bonus round where they compete to collect treasure in Ol' Peg-Legged Sebastian McKrakken's treasure room.

During stage 1, two pirate crews cooperate and work together to defeat the Kraken. This means that during this stage, points are shared by both pirate crews. Points are awarded depending on the time it takes to defeat the Kraken.

During stage 2, both pirate crews compete against each other to collect treasure after gaining access to Ol' Peg-Legged Sebastian McKrakken's treasure room. In this round, points are no longer shared and each pirate crew will receive different point values depending on how much treasure is in their coffers by the end of the round, and also by what type of treasure was collected. Different types of treasure will have different point values. This stage has a 3 minute time limit
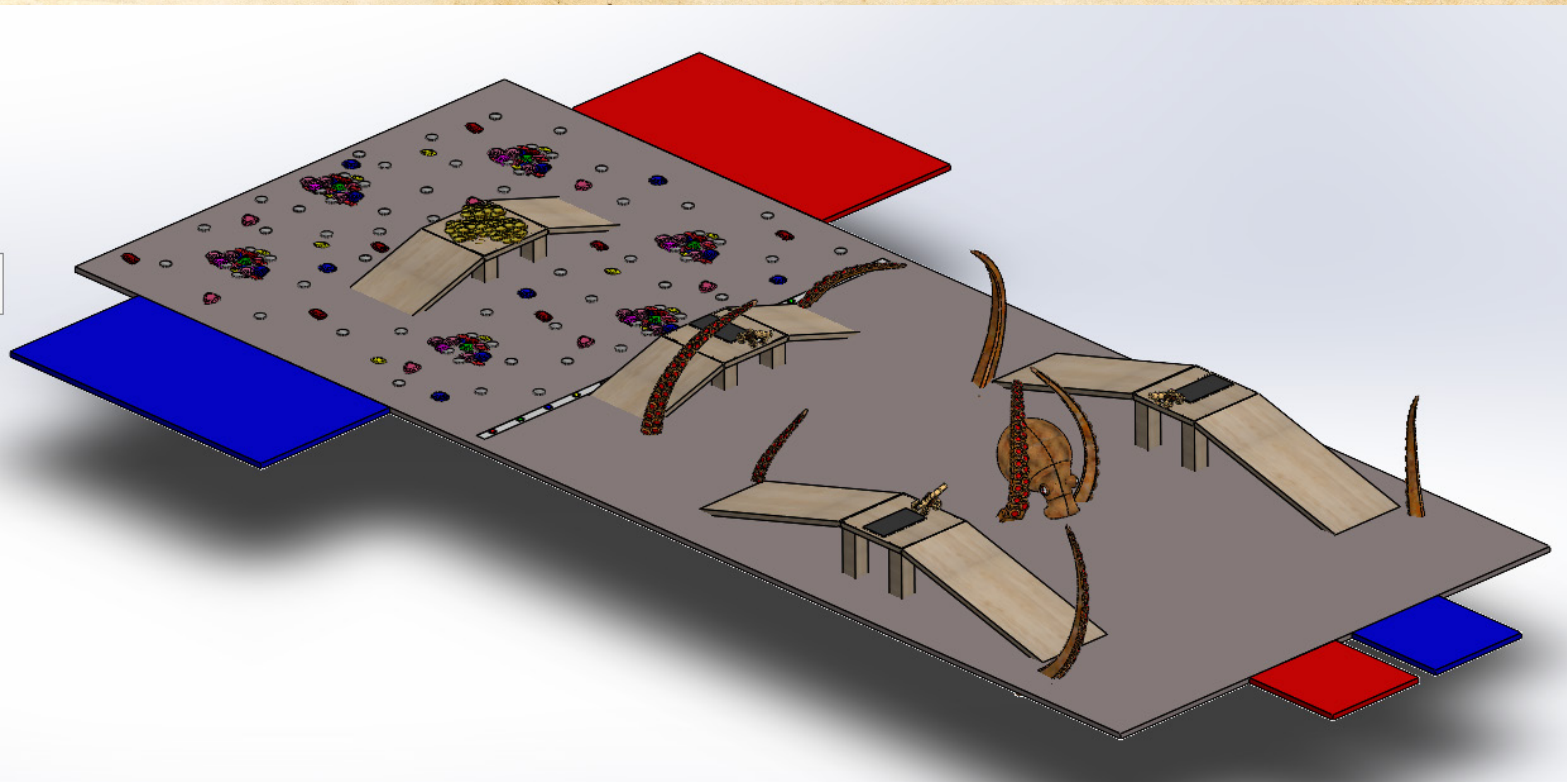
SCRAPPY ISLAND

ABOUT:

Scrappy Island is where the entirety of Botathon 2021 will take place. It will be pre-assembled the morning of the competition. Scrappy Island is designed to withstand and handle different competitive styles. Every effort made will be to ensure that the final island is as close to the one described below, although there might be minor differences. To be successful, pirate crews will need to design their ship to best navigate the Island.
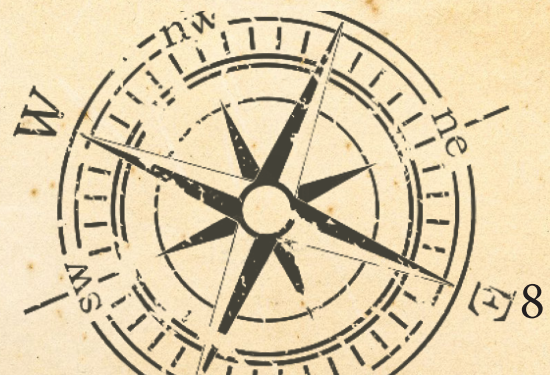
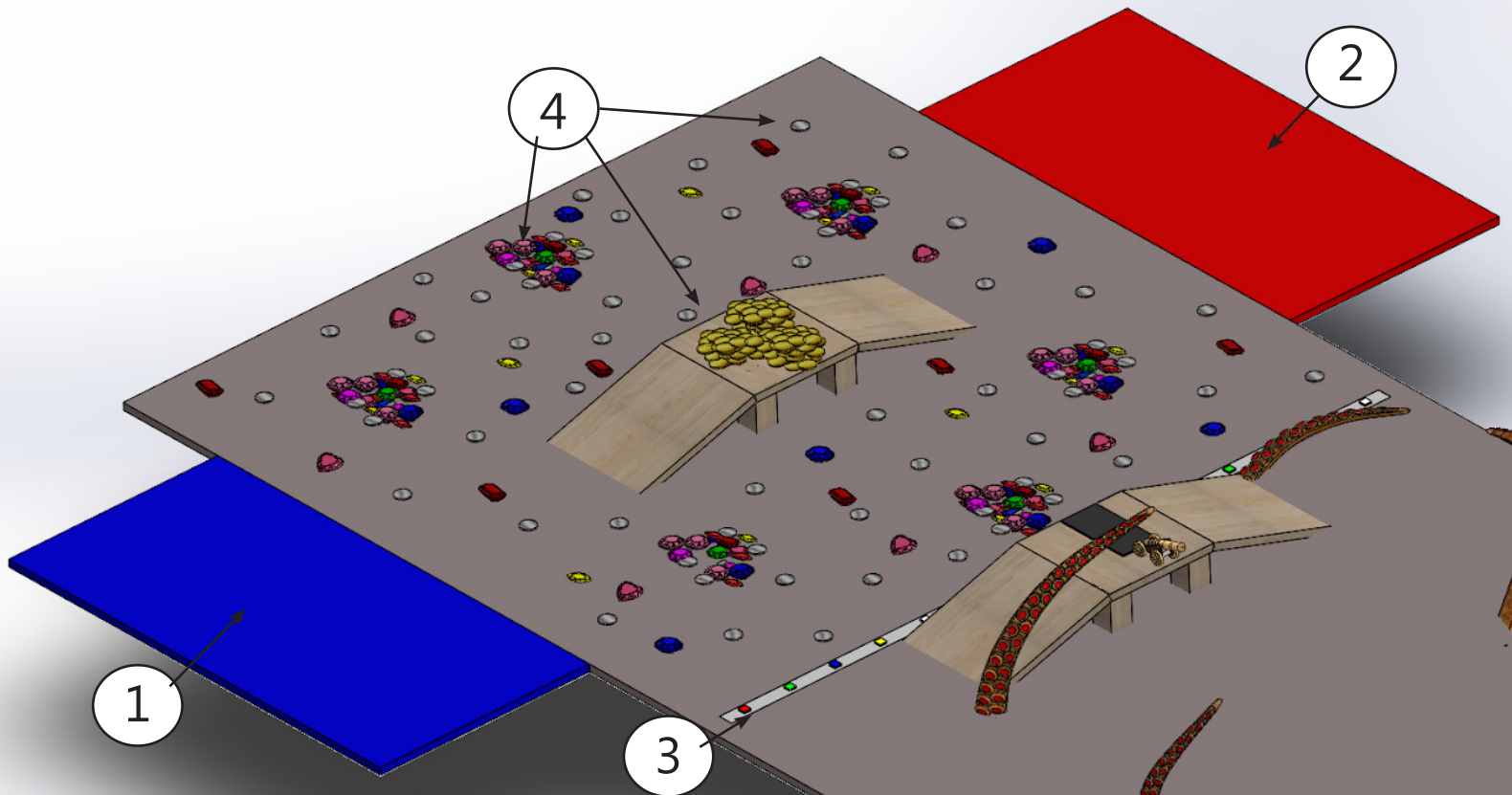## CAD OF FIELD:

STAGE 1: THE KRAKEN

POINTS OF INTEREST:

1. Starting point for both pirate ships
2. Wooden ramps
3. The Kraken
4. Tentacles: will move up and down during stage 1
5. Cannon and Trigger

POINTS OF INTEREST:

1. Coffers for blue crew
2. Coffers for red crew
3. LED strips to indicate entry to Treasure Room
4. Booty: Gold, Silver, and Precious Jewels & Gems

POINTS

Use these tables to find out how scoring is determined in both stage 1 &2. During stage 1, points are shared by both pirate crews on Scrappy Island. The number of points is determined by the amount of time it takes to defeat The Kraken

STAGE ONE

Time(Min)	Points
0-1	10
1-2	8
2-3	6
3-4	4
4-5	2
>5	0

During stage 2, points will no longer be shared between both pirate crews as they split up and compete to collect treasure. The number of points is determined by both the quantity and quality of the treasure in a crew's treasury.

STAGE TWO

Amount of Booty	Points Recieved	Type of Booty	Points Recieved per Piece
0-15	3	Gold	10
15-30	6	Silver	8
>30	15	Jewels	2

TIES

If the end of the competition is reached, and teams that are eligible to win prizes are tied, then a tie breaker will commence. Tie breakers this year will be decided by the referees in a competition of aesthetics. The team whose pirate ship best represents the pirate theme will win the tiebreaker and win the contested prize. All referees available will vote anonymously and will be observed by an unbiased individual.
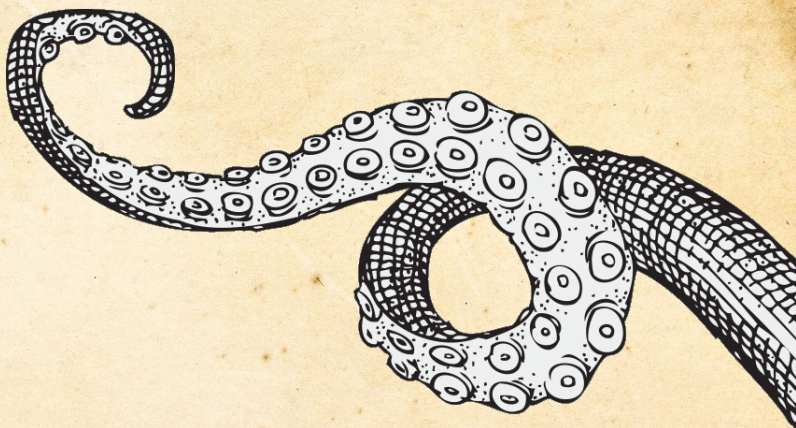
GAMEPLAY

STAGE ONE

Stage 1 starts with both pirate crews ships placed in the starting position. Once the round starts both crews will need to work together to climb the ramps and go over the pressure plates which activate the cannons. An LED will be attached to each cannon which will turn on when that cannon has been fired. The Kraken's tentacles will be moving up and down in random time intervals at the base of the ramps to attempt to obstruct its attackers. All 3 cannons have to be fired to finally take down The Kraken. After The Kraken has been defeated, The Treasure Room will automatically unlock.

STAGE TWO

Stage 2 starts when both both pirate crews align their pirate ships behind the LED strip on the field that indicates The Treasure Room entrance. Once both ships are aligned, the LED strip will light up signaling the start of the race. Competing pirate crews will have 3 minutes to push as much treasure as they can into their indicated coffers. The highest point value treasure, gold, is located on a ramp located in the center of The Treasure Room.

PIRATE CREWS

GENERAL

Pirate crews will be made of up to 4 people. Pirates can only be in one crew and cannot be a part of multiple. Despite this, cooperation between teams is highly encouraged since pirate crews will be randomly paired up to work together in stage 1 of Botathon Season 2.

HOW TO FORM A PIRATE CREW

During registration for Botathon 2021, competitors will have the choice to join a pirate crew from people they already know, or be put into a random crew. If you know 1-3 other UNT students who you think would make a solid pirate crew, then write their name(s) when asked and you will be put into a team with them. If less than 4 people are in your team, the remaining spots will be filled by individual competitors if you would like.

Forming the right pirate crew is key to scoring high, so we recommend teams diversify their members from different majors and classifications. A part of what makes robotics great is that it requires knowledge from several different branches of engineering. To be advantaged, a pirate crew should choose members who have some knowledge in electrical, mechanical, and computer engineering. For individual competitors, pirate crews will not be decided randomly but engineered to diversity majors and classifications.

Although it is advantageous to have a crew of diversified engineers, this competition will be perfectly doable without any pre-existing engineering knowledge due to the help from our virtual build sessions, mentors, and open chat discussions for any questions.

RECRUITMENT

If you would like to advertise and recruit people for your own Pirate Crew, we will have an Excel spreadsheet available where participants can list the name of their pirate ship, and what skills they are looking for in their recruits. Individuals can also list their name and major so pirate crews can recruit them.

RULES

GENERAL

In the spirit of competitions, matches can often get very intense and stressful. Not only is this the perfect occasion to learn how you and your peers handle high pressure situations, but it's also the perfect occasion to learn how to overcome them successfully. These rules are in place to ensure all of the pirates in Botathon 2021 are competing on an even playing ground, and everyone has an equal chance of success.

- Only enrolled UNT students are eligible to compete
- Only the 5 people in a pirate crew may work on their competition robot before the competition
- Advice and help can be received by mentors and other competitors within the Botathon group chat, Outside help should be limited.
- Only members within a pirate crew may operate their robot ship during their match.

During the competition, volunteers will be available to make minor fixes on competition robots should a part break or stop working. Whether or not a repair is minor will be up to the volunteers discretion but can include:

- Reattaching fallen pieces
- Troubleshooting wifi connection issues

All pirates in your crew must be present virtually during your match time. Even though only one person will be controlling your ship, the other pirates should be ready to suggest new strategies and give motivation as well as suggest fixes if the robot should malfunction. Exceptions can be made on a case-by-case basis.

Common sense rules such as being respectful and not engaging in unsafe behavior aren't listed but are expected of all participants.

RULES

ROBOT

Because Botathon 2021 is a virtual event, competitors will be operating their robot ships from home meaning that all parts of the robot are finalized once it's handed in for inspection prior to the event. It's imperative that pirate crews think ahead about possible problems they might encounter during the match and prepare for them beforehand.

Below outlines rules all robot ships must abide by to pass inspection. If a robot ship does not pass inspection, it can be re-inspected as long as it's within the inspection period.

When handed in for inspection, all pirate ships must follow these specifications:

- Dimensions of a pirate ship can be no greater than 1 ft. x 1 ft. x 1 ft. at starting position
- After the match starts, extendable parts can be used but cannot exceed 6 in. outside the 1 ft. starting dimensions. Total dimensions cannot exceed 1.5 ft x 1.5 ft x 1.5 ft
- Ships can only be made by parts from the distributed robot kit plus any extra pre-approved parts
- There cannot be any parts that are intended to be purposely detached
- The only power source is from batteries

Pre-approved material examples:

- Controllers
- More of anything already included in the robot kits
- Cardboard
- Pool noodles
- Custom circuits
- Motors/Actuators

Materials that are not allowed include:

- Loud speakers/airhorns
- Lasers/High intensity light sources
- Anything that is intended to make flames
- Hydraulics
- Any circuitry exceeding 24 Volts
- Anything that will damage or leave marks on the competition field

ROBOT KITS

There will be two different robot kits available during this year's competition. Each pirate team will get to decide which kit they want before we distribute them. We have 15 of each kit, so it'll be first come first serve when the form opens.

MECANUM WHEEL CAR ROBOT

This is our advanced kit only because it has mecanum wheels. These are slightly harder to program, but they do allow an advantage when competing because these wheels can move in any direction.

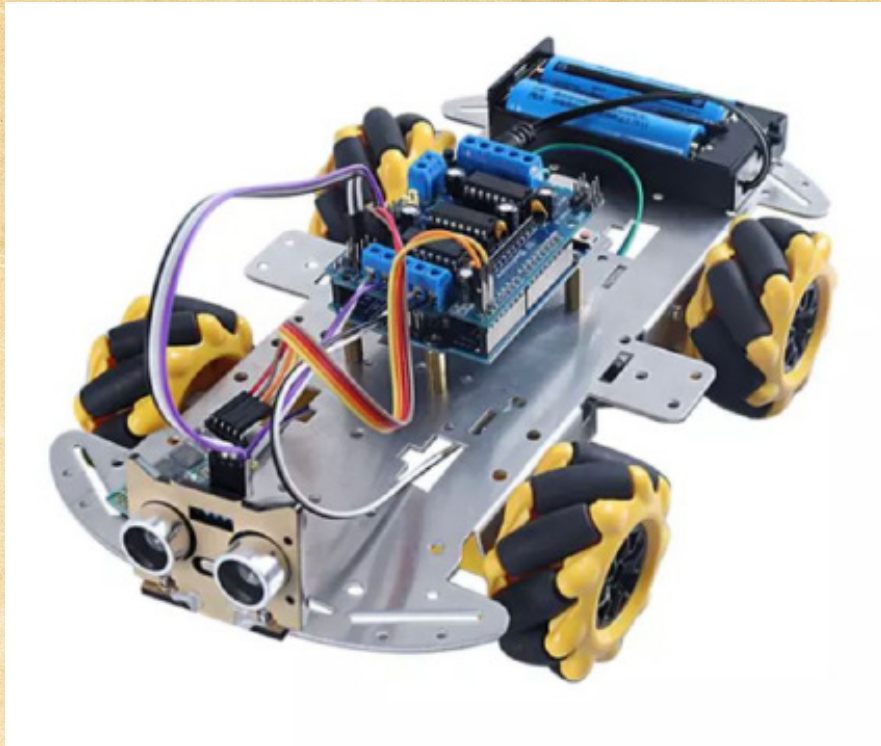| Part	Quantity
CH340G UNO R3 Development Board	1
L293D Driver Board	1
HC-SR04 Ultrasonic Module	1
HC-05 Bluetooth Module	1
Ultrasonic Bracket	1
18650 Battery Box	1
M3*15 Double Pass Copper Pillar	4
M3 Nut	2
M3*8 Screw	10
20cm Female to Female Dupont Wire	16
Mecanum Wheel Aluminum Chassis	1

ROBOTKITS

RUBBER WHEEL ROBOT CAR

This is our beginners kit. These normal rubber wheels aren't able to move in any direction like the mecanum wheels, but it still has its advantages for those who aren't as skilled at programming.
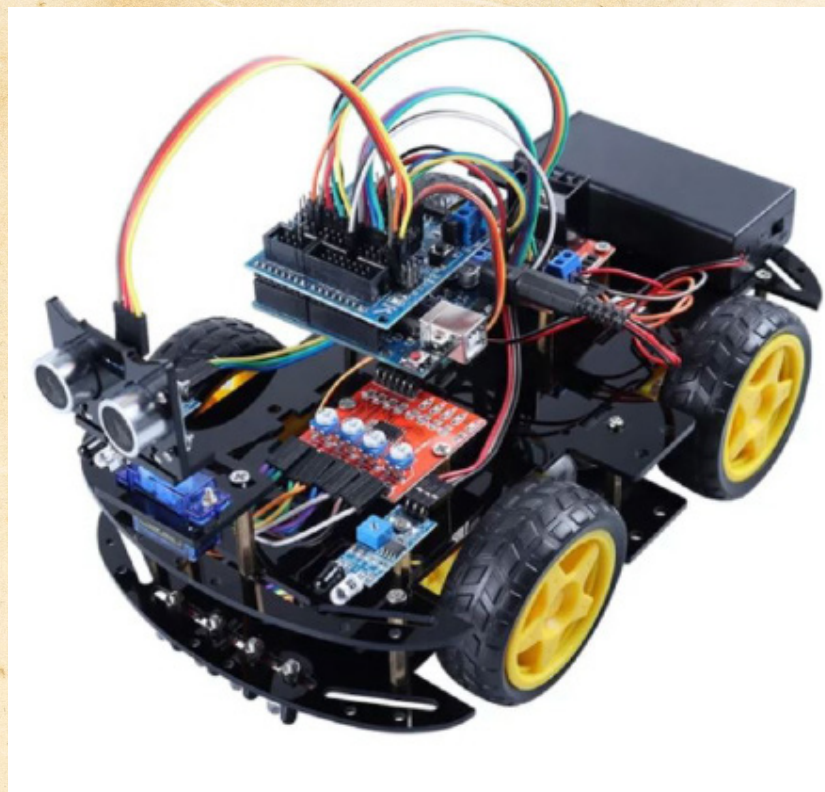
Part	Quantity
CH340G UNO R3 Development Board	1
UNO Expansion Board	1
L298N Driver Board	1
HC-SR04 Ultrasonic Module	1
Four-Way Tracking Module	1
Infrared Detection Module	2
DC Motor	4
Ultrasonic Bracket	1
Servo	1
Servo Bracket	1
Rubber Wheels	4
Speed Code Disk	4
T-Shaped Geared Motor Fixing Bracket	8
18650 Battery Box	1
M3*30 Double Pass Copper Post	10
M3*15 Double Pass Copper Pillar	6
M3 Nut	16
M3*8 Flat Head Screw	36
M3*30 Round Head Screw	8
M2*12 Round Head Screw	5
M2 Nut	5
M1.6*8 Round Head Screw	6
M1.6 Nut	6
M2*8 Self-Tapping Screws	3
20cm Female to Female Dupont Wire	38
20cm Male to Male Dupont Wire	12
Acrylic 4-Wheel Car Bottom Plate	2

MECANUM WHEEL CAR

RUBBER WHEEL CAR

MCKRAKKEN'S COVE

Looking for for parts to spice up your pirate ship?! Look no further! McKrakken's Cove has everything you need to make your pirate ship stand out from the croud! Each Pirate Crew automatically recieves 500 Doubloons to spend in our in game shop, McKrakken's Cove! You will be able to pick what you want to buy in the same form where your crew chooses your robot kit. Parts will be distributed together with the robot kits. (Everything must be returned during inspection week)

Part Name	Quantity	Cost in Doubloons
Arduino	1	50
Raspberry Pi	1	300
Servo	1	50
Metal Gear Servo	1	100
Arduino Servo Shield	1	100
Motor/Wheel	1	50
4WD Chassis	1	100
Buiding Materials	1	TBD
Battery Harness	1	50
AA Battery	4	50
LED	1	10
Ultrasonic Sensor	1	75
3D Printing 30 mins	Unlimited	30
Misc. screws & bolts	Unknown	FREE
Jumper cables	Unknown	FREE
Mini breadboards	Unknown	FREE
3D Printed Bulldozer Bucket	1	100

SAFETY

COVID-19

2021 is a special year, and it needs special accommodations to keep everyone safe. All of the mechanics in this year's Botathon have been intentionally set up to keep this competition contact-free and safe.

- Robot Kits will be picked up by a chosen member on a pirate crew from one of our lockers at Discovery Park.
- Build sessions will take place over Zoom with the person who picks up the kit as the primary builder.
- After the build period, Robots will be placed back into a locker for inspection.
- On the day of the competition, pirate crews will pick one team member to control their ship remotely.
- The prizes for the winners will be mailed

If you have any suggestions on how we can make this process even safer, then we are always open for suggestions!

SAFETY

GENERAL

The safety of every participant is always paramount and each of these rules have been established to ensure the competition runs smoothly without any injuries or property damage. Since everyone will be building their robots from home this season, it's imperative to recognize unsafe behaviors and conditions and learn how to correct them. The safety of everyone is first, but we also don't want anyone accidentally destroying their robot a few days before the competition.

All safety measures in robotics can be outlined into these categories:

1. Human errors;
2. Control errors;
3. Unauthorized access;
4. Mechanical hazards;
5. Environmental hazards; and
6. Electric, hydraulic, and pneumatic power sources.

Recognize safety red-flags so you can fix them immediately!

- An emergency stop button is recommended
- Use common sense, if it doesn't seem safe it's probably not
- Remember that we have mentors available if you are unsure of how to do something
- Pirate ships designed to be unsafe or dangerous are not permitted
- Use tools only for their intended purposes
- Never use tools that seem broken or disfunctional in some way
- Follow safe work practices, including safe use of all tools and personal protective equipment (safety glasses, shoes, gloves, hearing protection, etc.).
- Maintain a healthy attitude regarding safety.
- Always walk and work in a controlled and thoughtful manner. Keep full control of the robot at all times.
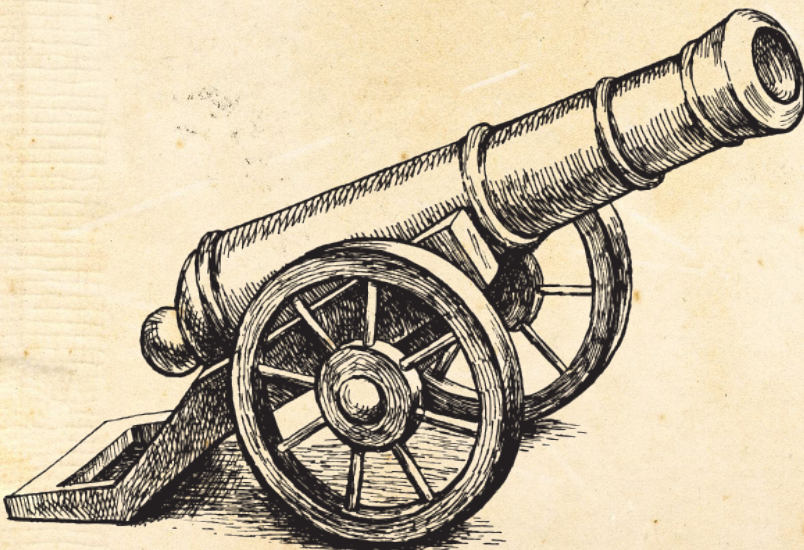
SAFETY

SOLDERING

- Never touch the tip of the soldering iron
- Hold wires that are going to be heated with tweezers or clamps
- Ensure the cleaning sponge is wet
- Never solder a live circuit
- When not in use, the soldering iron needs to be on the stand
- Unplug when done

ELECTRICAL

- Never work on a wet surface
- Do not overload your batteries
- Although AA batteries have low voltage, they can still hurt
- Shorting out batteries can potentially burn, if battery is heating up, turn power switch off and try to troubleshoot problem
- Never touch any part of a circuit that has power
- Even after power is off, electricity can remain

WINNER'S

HOW TO WIN

In Botathon Season 2, winners will be decided by the Pirate Crew's that have the most points at the end of stage 2.

The top 3 scoring pirate crews will be the winners! Each pirate in a winning category will recieve the same prize, which will be mailed to them after the event.

PRIZES

Each winning pirate will recieve:

- Trophy (Gold/Silver/Bronze)
- Arduino Plack (Gold/Silver/Bronze)
- Competition Swag

QUESTIONS?

If you have any questions, please email:

UNT.Robotics@unt.edu

Stay tuned in our Discord, where we post updates and suggestions!

@untrobotics