

ENGINEERING NOTEBOOK SUBMISSION

1022X

Serena Zhang

Thomas Dong

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Team Profile and goals Sept 13, 2021

My team this year is 1022X. This year, there is three of us on the team. The team consists of:

Me (Serena) - I am responsible for doing the notebook and helping with the building process. I have been doing robotics since gr 9 (4 years) and 3 years of competitive robotics. I am in grade 12, and I'm the oldest on the team. I also play basketball, piano, flute, piccolo.

Thomas (gr11) - Thomas is the programmer and main builder. Thomas has 5 years of robotics experience, and has been programming for 5 years. He is also the driver.

Shota - Shota is in grade 11. He is new to robotics, and this is his first year. He is responsible for helping out with building and helping with whatever else necessary.

Overall, our team is pretty experienced. Thomas and I were on the same team last year but our previous teammate dropped out, so Shota was added to the team. Our goals for this year are to compete, have fun, and hopefully make it to worlds. We were really close last year, but unfortunately we just came short of qualification, so this year we would love to go.

Update: we got another teammate. 9/13/21

~~Abby - Abby is in grade 11. This is her ^{second} year ^{SZ} doing competitive robotics. She will help with programming, building, and driving. She is very committed and is always willing to help.~~

Our team will run a lot smoother with 4 people. Building will be a lot quicker as we can divide the tasks easily.

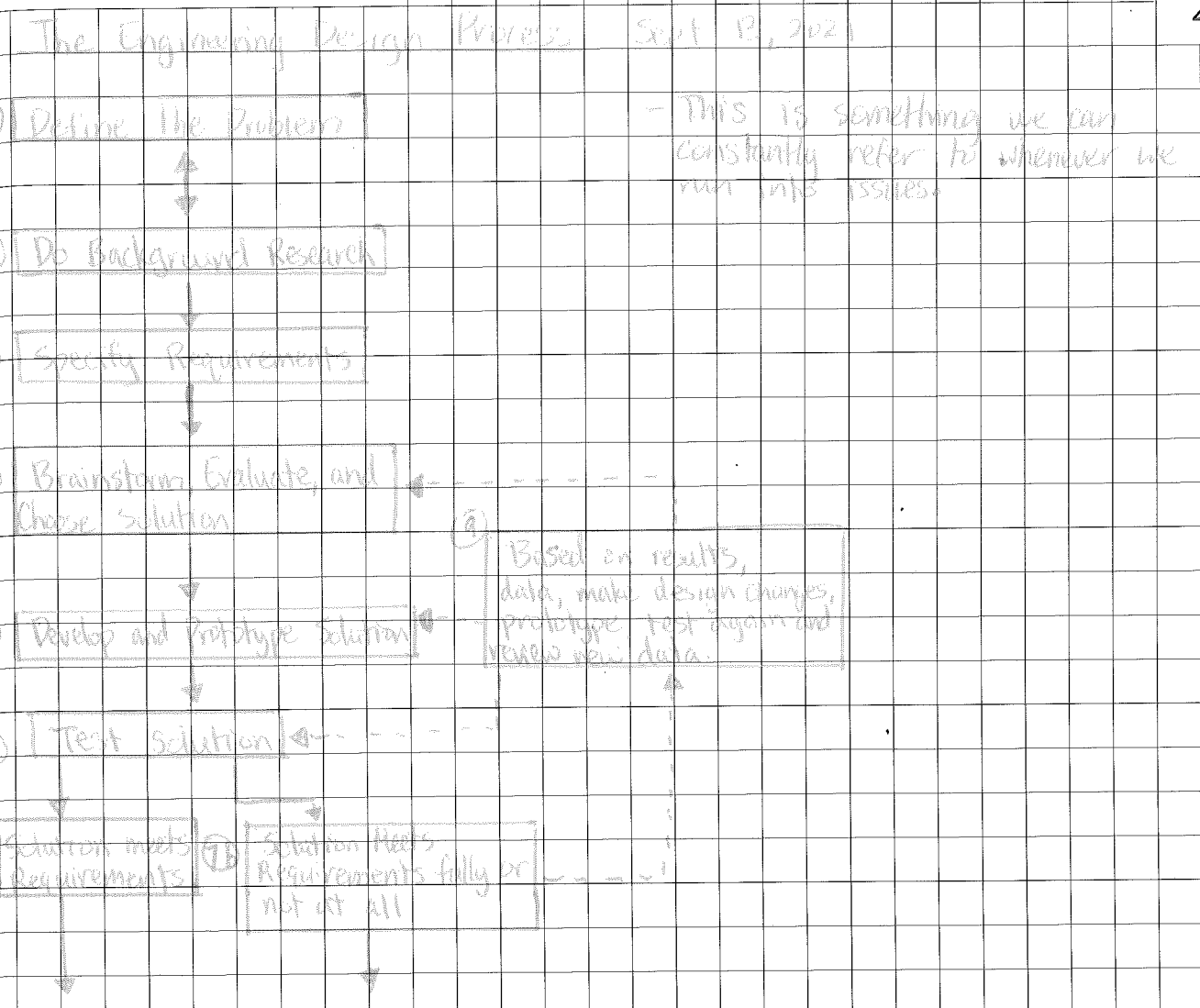
A new goal: As a team with 2 experienced members we want to help out the newer members and go to worlds!

Update: Sept 20, 2021

Abby got moved to her old team, so it's down to three of us now.

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Game Outline: Define the Problem Sept 15, 2021

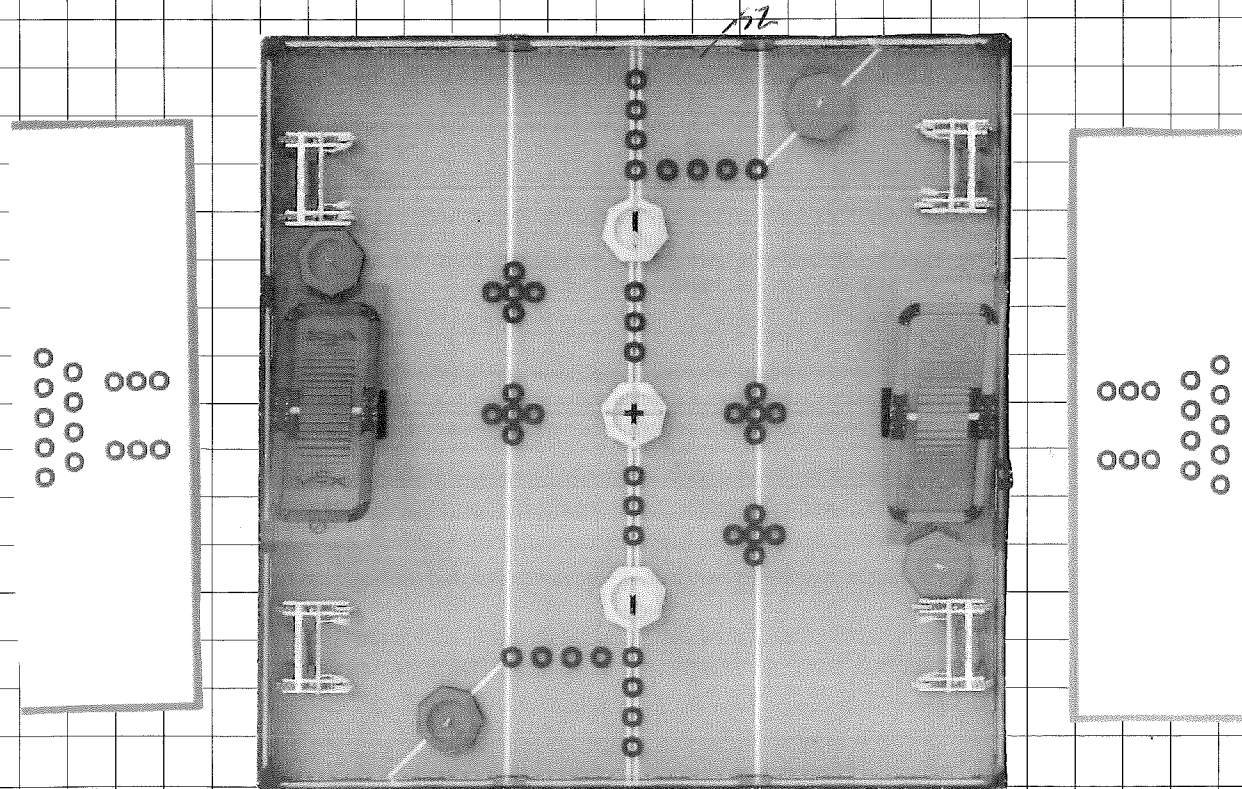
The game is played in a 12' by 12' field set up as image below shows. There are two alliances, red and blue, each composed of two teams. Teams compete in matches consisting of a 15 second autonomous period and a 1 min 45 second driver control. The game this year is called Tipping Point and the object of the game is to attain a higher score than the opposing alliance by stacking rings on towers and moving towers into their home zone or balancing bots and towers on the feeder-totter.

Notes: - Hands must stay out of the arena.

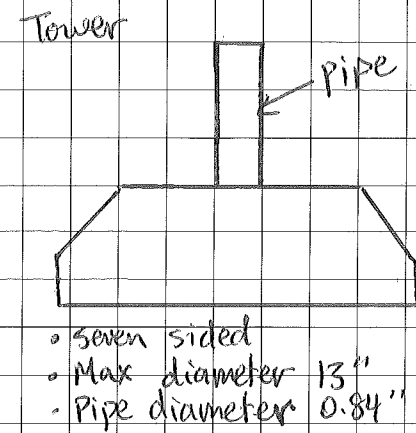
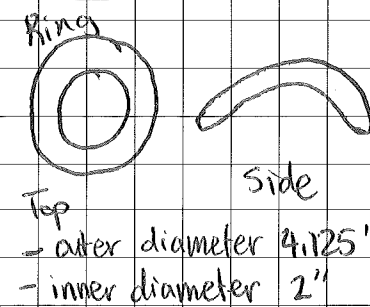
- Safety goggles worn during competition
- 3 rings as pre-load per bot, 6 rings per team.
- bots must pass tech inspection before match.

- 12 rings, 4 mobile goals, 3 neutral goals, 2 platforms

Tipping Point Field



Game Elements:



SCORING

- Ring on in a scored mobile goal
 - Mobile goal high branch 10 pts
 - any other branch 3 pts
 - mobile goal base 1 pts
- Neutral mobile goal
 - Either alliance zone 20 pts
 - Elevated on balanced platform 40 pts
- Alliance mobile goal
 - correct alliance's home zone 20 pts
 - Elevated on alliance platform 40 pts
 - Elevated on correct alliance platform 30 pts
- Robot
- Alliance
 - wins auton bonus 6 pts

Some thoughts:

- Rings on the top branch seem almost as important as elevated tower.
- How will we score while also attempting to prevent the other team from scoring?
- our bot needs to have an intake that can take multiple rings at once and reach the tower's top branch.
- gyroscope and touch sensor might be helpful...
- bot should be quick, but also stable and won't get knocked over easily.
- Can our bot descore rings effectively?

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 DATE Sept 15, 2021

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DATE Sept 15/2021
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Design Brief 9/16/21Constraints and restrictions:

- must fit in an 18" by 18" by 8" cube in starting position.
- horizontal length cannot exceed 36".
- only 8 motors allowed.
- VEX parts only.
- No altering VEX parts
- 1 bot per team.

Required components

- Drive system: moves bot quickly and accurately around field.
- Primary mechanism: an input system that grabs rings.
- Secondary mechanism: an output system that places the rings onto towers.
- Tertiary mechanism: able to lift & move towers.

Initial offensive strategies:

- Being able to elevate the tower on the platform is 40 points. Elevating the bot is 30 points. Most rings are 3 points. I think the goal on offense is to try to steal as much towers as possible and prevent the other team from possessing towers. Score on alliance tower.
- Could intake rings and put them on the alliance towers, put the alliance towers on the platform, fight for neutral goals and try to keep the neutral goals with us until the end.
- drive bot and tower up platform at the end.

Initial defensive strategies:

- take as many rings and towers as possible, prevents opponent from scoring.
- try to block their access to platform.
- try to steal neutral goals first.
- drive around and protect towers/platform
- push opposing alliance away

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Cost-Benefit Analysis 9/16/21

Task rankings: 1 - difficult task, low point value
10 - easy task, high point value

- Ring on alliance tower - easy to do, point value alright. (5)
- Balance bot on platform - easy to do, just drive on the platform. High point value. (10)
- Lift and move towers on platform - little bit harder to succeed, highest point value. (9)
- Ring on highest neutral tower branch - hard to do, not worth the 10 pts. (1)
- Win autonomous - medium task, however worth the bonus win point. (6)
- Ring on tower base - easy to do, lower point value. (4)
- Tower in alliance home zone - easy to do, points descent. (7)
- Rings on neutral mobile goals - harder, could lose all points if tower stolen. (2)
- Tower and bot elevated at end - not super hard, very high point value. (8)
- Score rings on autonomous - little harder, low/same as on driver control. (3)

9/17/21

9/16/21

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Priority Action List 9/17/21

- 1) Have a bot that's able to move and drive consistently.
- 2) Be able to lift and move towers on alliance platform.
- 3) Collect rings and put them on tower pipe.
- 4) Steal towers.
- 5) Win auton / score on auton
- 6) Have a robot able to score on neutral mobile goal.
- 7) Be able to steal/move neutral mobile goal.
- 8) Balance bot and tower on elevated platform
- 9) Play defence and prevent opposition from stealing our goods.
- 10) Push opponent's bot.
- 11) Rescore rings?
- 12) Rescore neutral towers?

~~52 9/17/21~~

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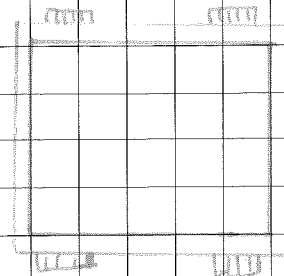
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Brainstorming Chassis Sept 11

Design 1: Square base, tank drive

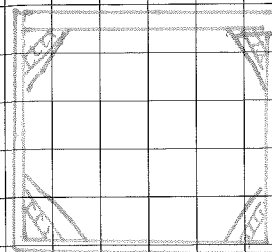


Description: This is the basic robot base. It's easy and we know it works. It consists of C-channels and either omni-directional wheels or meccanum wheels. 2 or 4 motor drive. Heavier base.

Pros: Easy to build, easy to drive, speedy, stable.

Cons: Front is blocked, no room for lift or intake. Meccanum wheels easy to push.

Design 2: X-drive

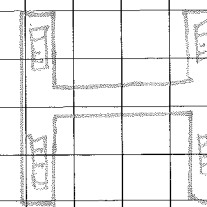


Description: Squared base, wheels are in an X shape. Base made of C-channels. Heavier/wider.

Pros: Can move in all directions with ease, quicker, smoother driving/intaking, sturdy.

Cons: easy to push, base blocks intake, easy to push off target. Kind of big. Hard to successfully make.

Design 3: H-base, tank drive



Description: H-shaped base, open front and back. Omni-directional or meccanum wheels. Lighter base overall, thinner.

Pros: this base has an open front and back, which allows intaking in both directions.

- easier to drive up platforms
- easy to build
- hard to push

Cons: Lighter might be easier to push off track
 - likely less stable, only support is in the middle.

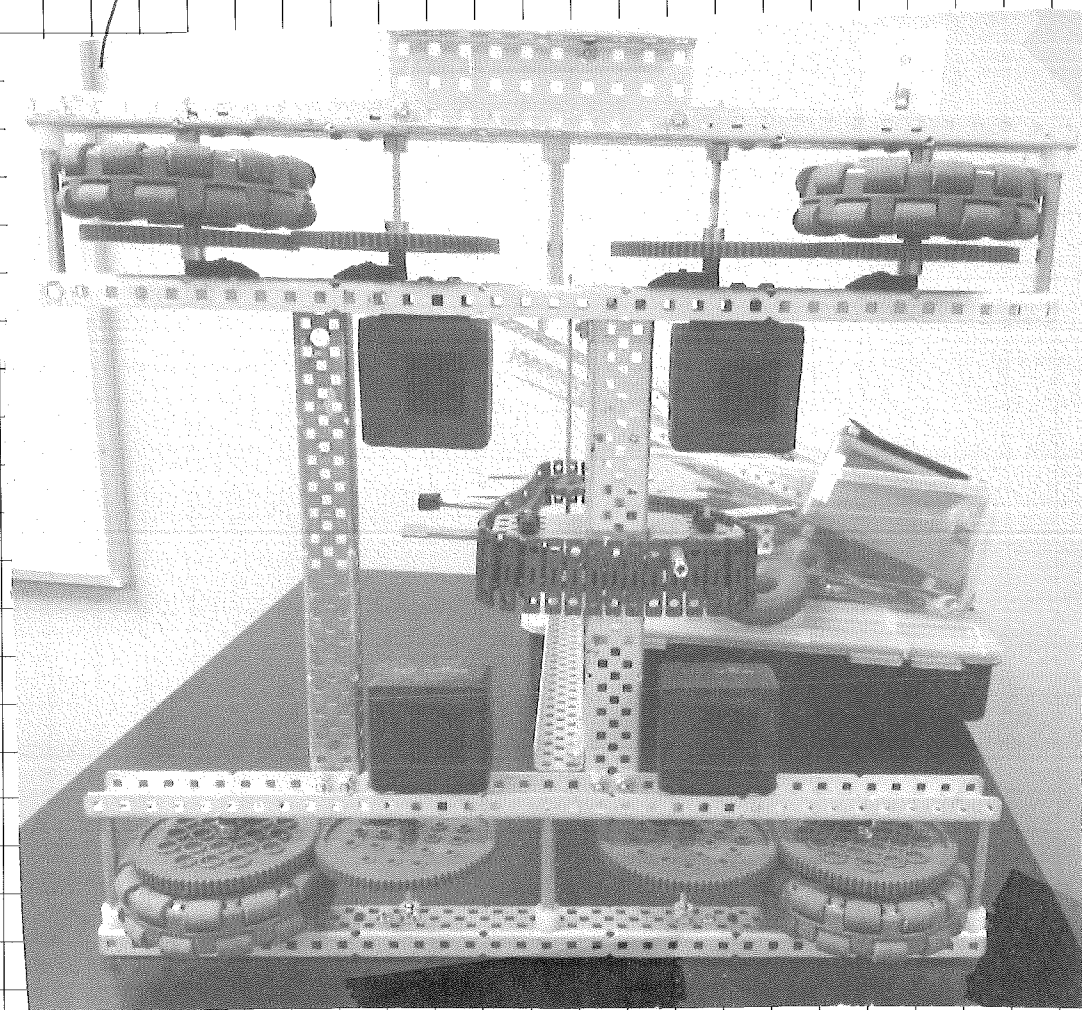
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Sept 14, 2021

Today was a build day. We started building our base. We decided to go with an H shaped base with omni-directional wheels. Our goal right now is to get a working base. We have a conveyor belt intake and output in progress right now too. We finished the base today. Picture attached below-



Bot base, bottom view. 9/14/21

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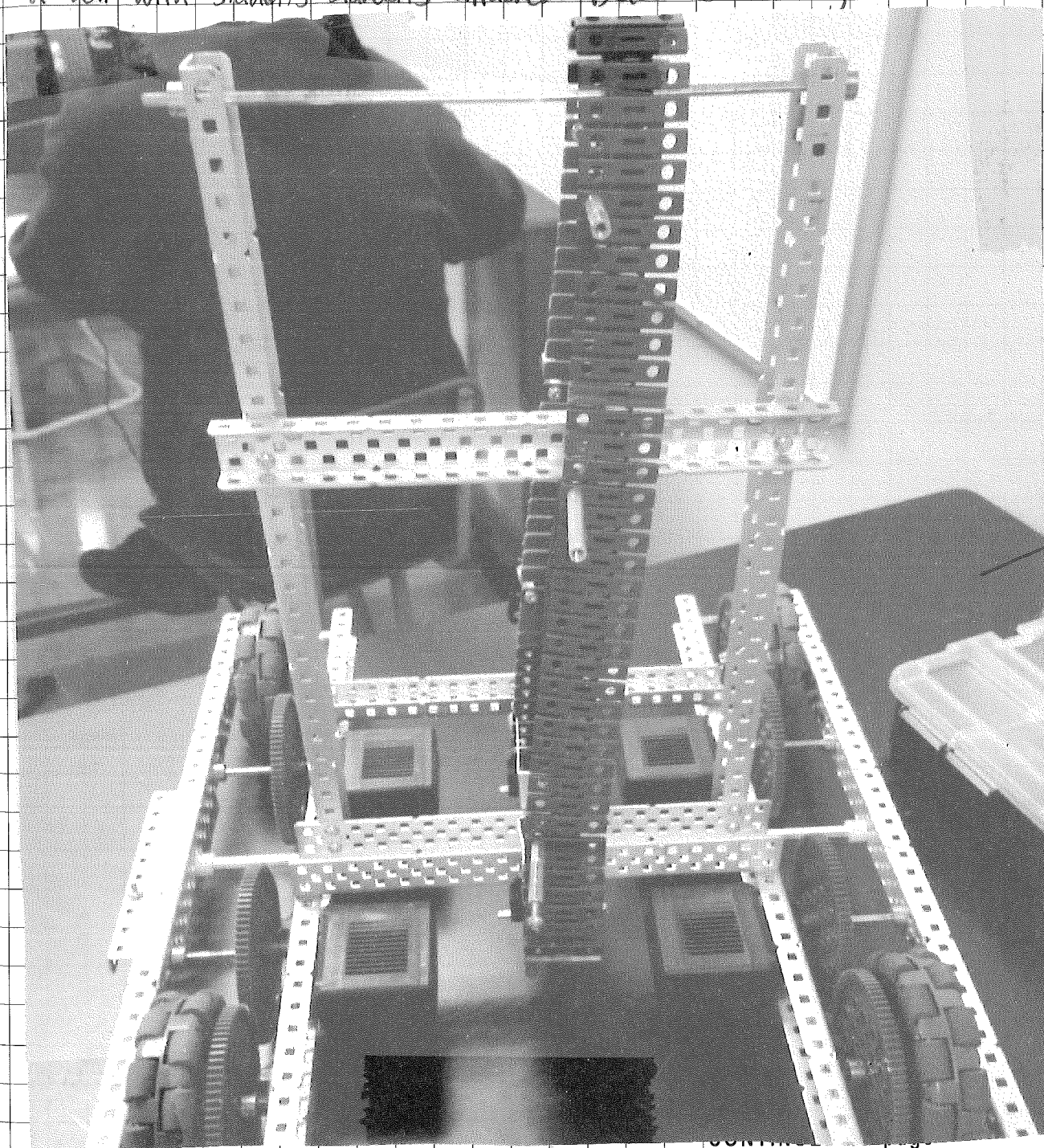
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Build day, Sept 15/21

Today we added the intake/output. Conveyor belt intake/output all in one. This is just a prototype, likely need to change it later. It's a belt with standoffs attached. Below is an image.



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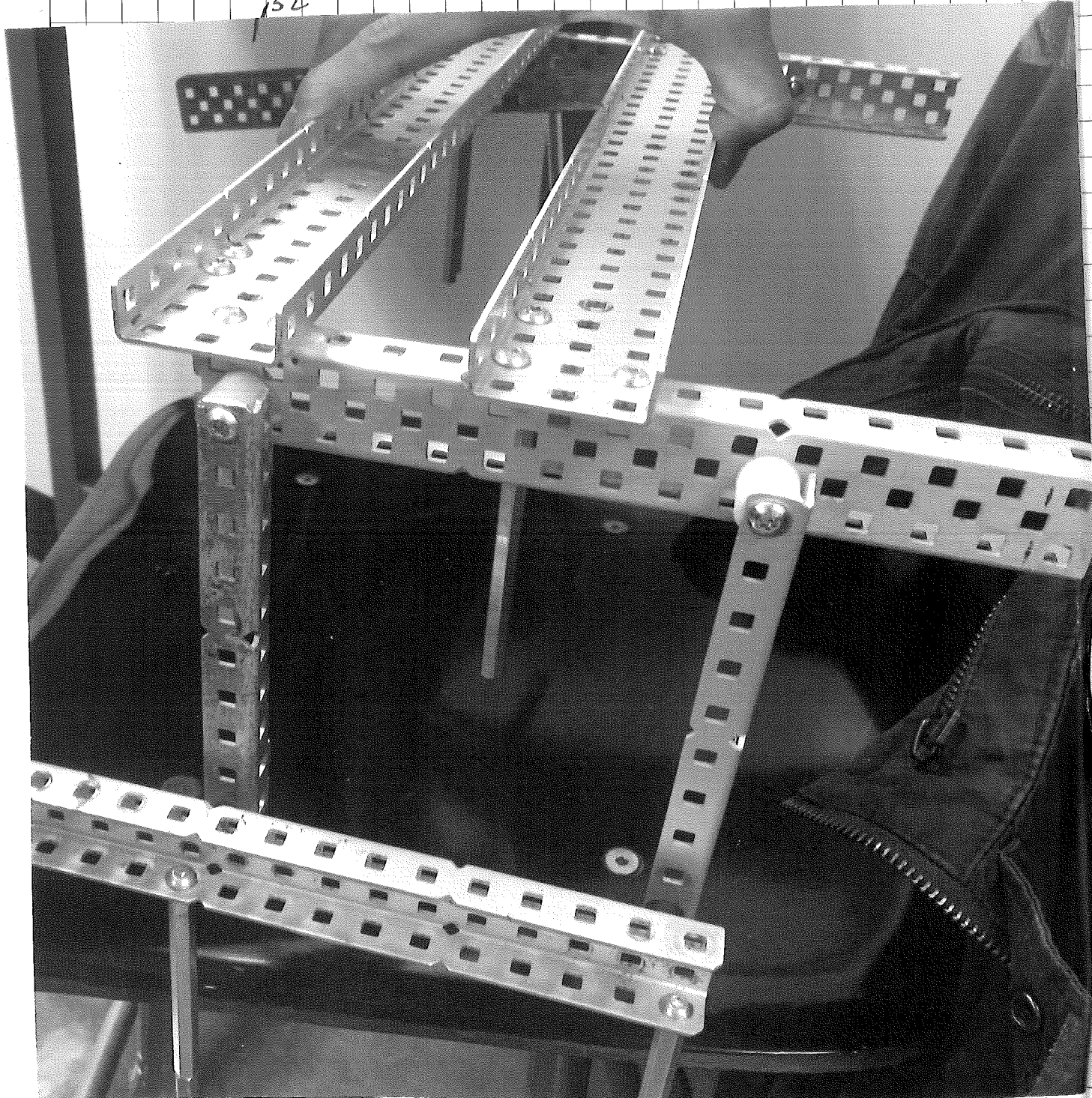
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DATE Sept 15

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We also added lift mechanisms. Pic attached below. Our current lift mechanisms compose of a parallelogram design so the lift can move up, down, in, out. It struggles to lift right now, possibly due to only having 1 red motor. We also removed the lift for now, will put it on later.

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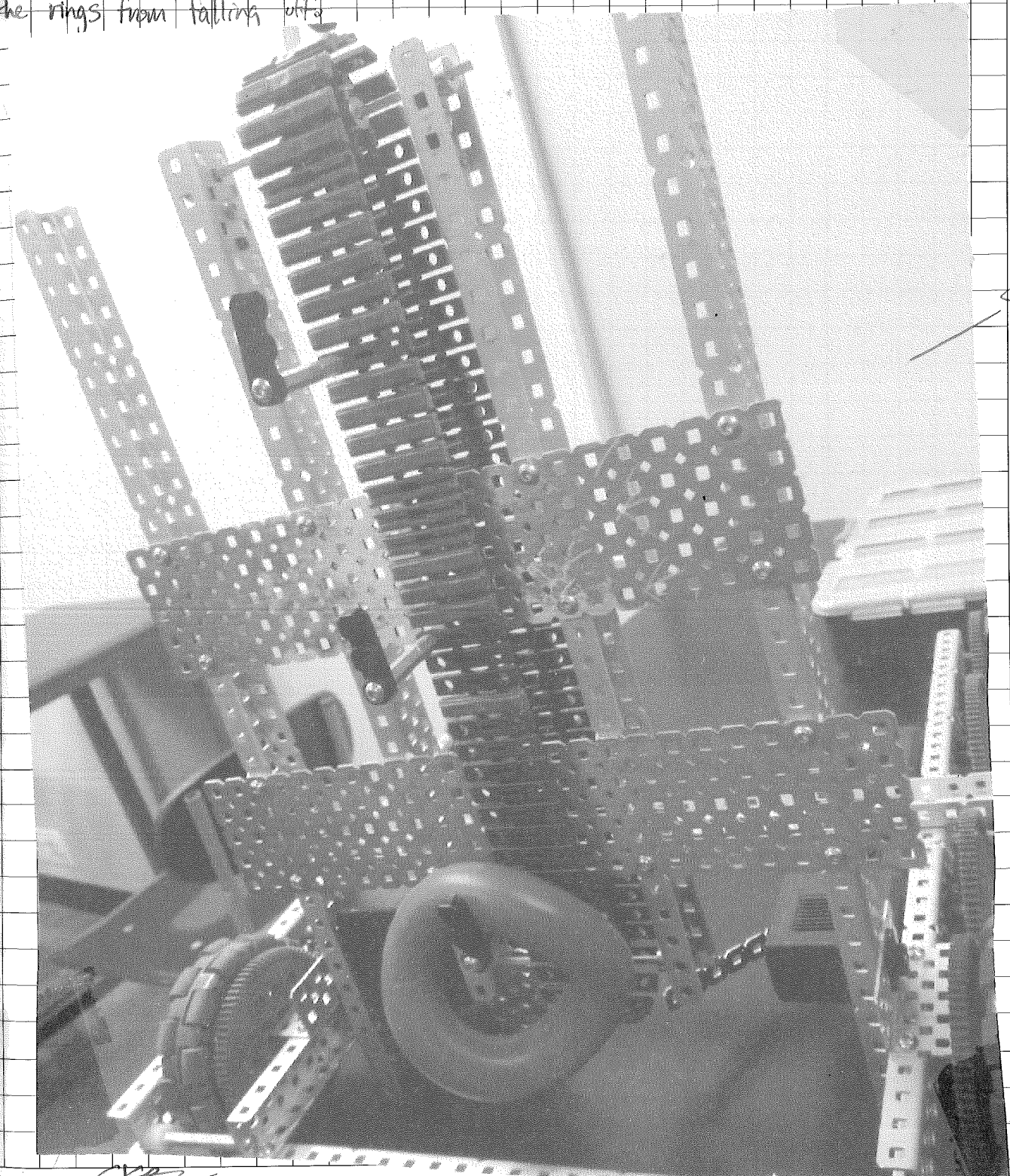


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Sept 17
Modified the conveyor belt to make it more stable added some retainers to prevent the rings from falling off.

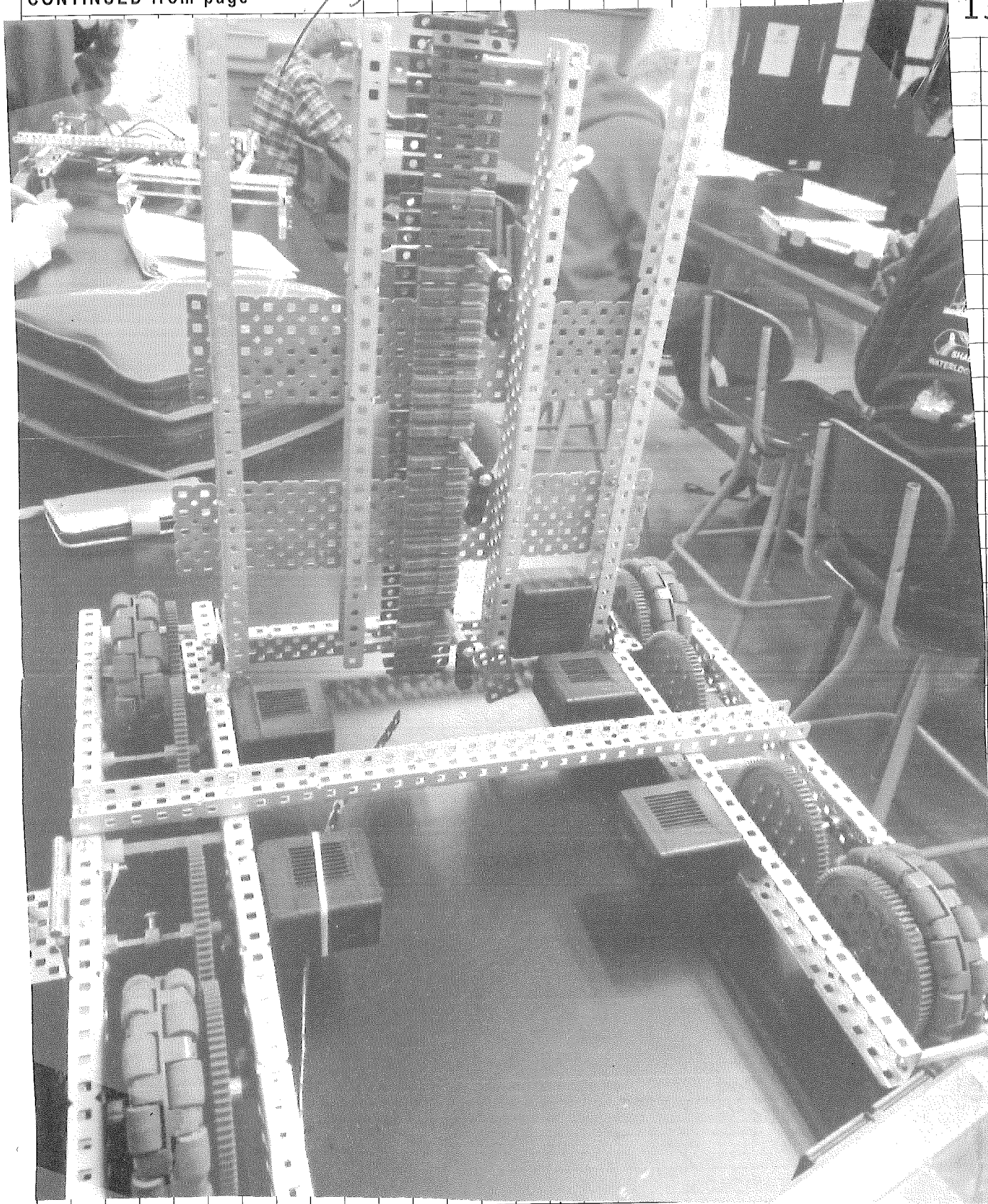


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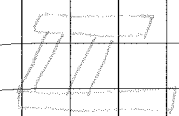
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Brainstorming: Intake & Lift mechanisms 9/17/21

our old lift mechanism are struggling. Here are other options:

① Parallelogram lift



- Our old one had trouble lifting. It was basically like this.
- I think our motors were too weak
- Pros: Able to move up, down, in, out
- Cons: not many. I think ours struggling is due to motors

② Forklift



- This is easy to make and can lift towers up and down
- It can also fold in and out and help raise/lower platform
- Probably pretty consistent

③ Shovel



- can push/shovel tower around
- Not very consistent
- hard to lift tower

Our intake doesn't seem very consistent either. Might need a total rebuild.

Currently:



- This is our current intake. It seems to miss a lot
- can take lots of rings at once and very quickly.
- Maybe angle it?

Other possibility...-



- Similar but with flaps instead
- Flaps help ring stay on
- worth a try..

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Build day, 9/20/21

Today we modified our bot again. Our old bot had trouble consistently scoring rings on the pipes. We angled the intake, and it seems to work a little better now. Thomas ^{hasn't} also finished the programming of the bot, might test it later this week to see how well it drives. The problem is scoring. We can intake fine, thanks to a stopper at the bottom of the bot. We are struggling to score consistently still. We are able to get rings in the base, but we want to score on the pipe. We will try angling the intake and seeing how that works. We were going to angle it today. Will do tomorrow

9/21/21

Our bot used to be able to intake from both directions. It still can, but we prefer for it to only intake one way. We have angled the intake so that the top is now slanted closer to the top of the pipe. It seems to be a lot better now. It can spin really fast and can score on the pipe now. Sometimes, the rings will fly out the back of the bot or they won't come off the standoffs. This is a new problem. We probably need some metal sheet or some plastic to stop the rings from flying everywhere. We could also try slowing down the motor speed to see if that helps.

9/22/21

We have temporarily removed the stopper from the bottom of the bot. We removed the black retainers from our standoffs, as they affected the rings a little. We will try with just the standoffs and see how well it works. We still haven't reattached the lift yet as we are still modifying our intake. We added two supports near the top to see if it can help guide the rings to the tower better. The red metal plates were spaced out a little more for more stability.

9/23/21

We added a plastic sheet to the back of our intake to see if it will help with the flying rings. It seems to work better now with just standoffs and with the plastic in the back. Tested the intake with the program, it works better than before. Picture attached on next page. Lift reattached too.

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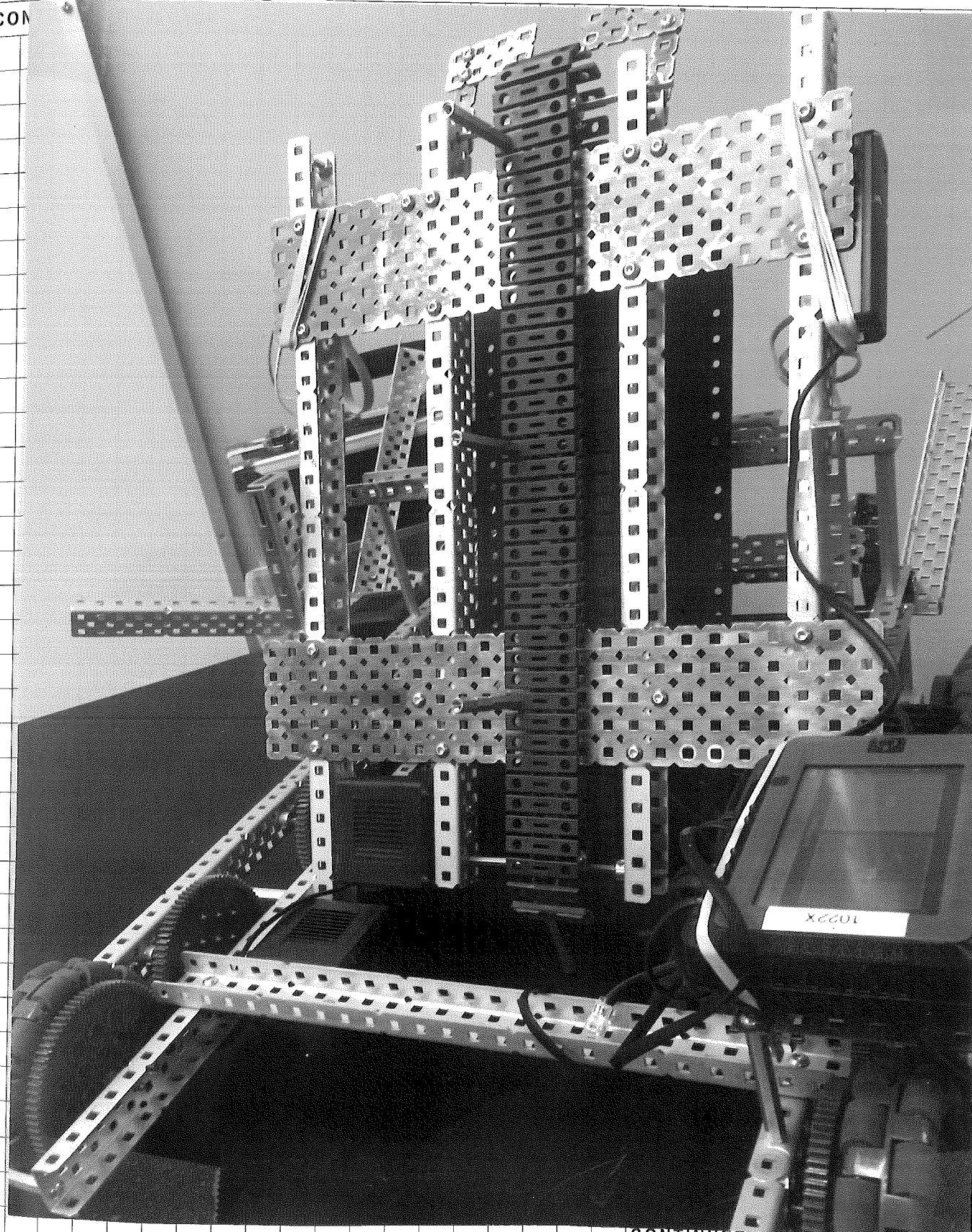
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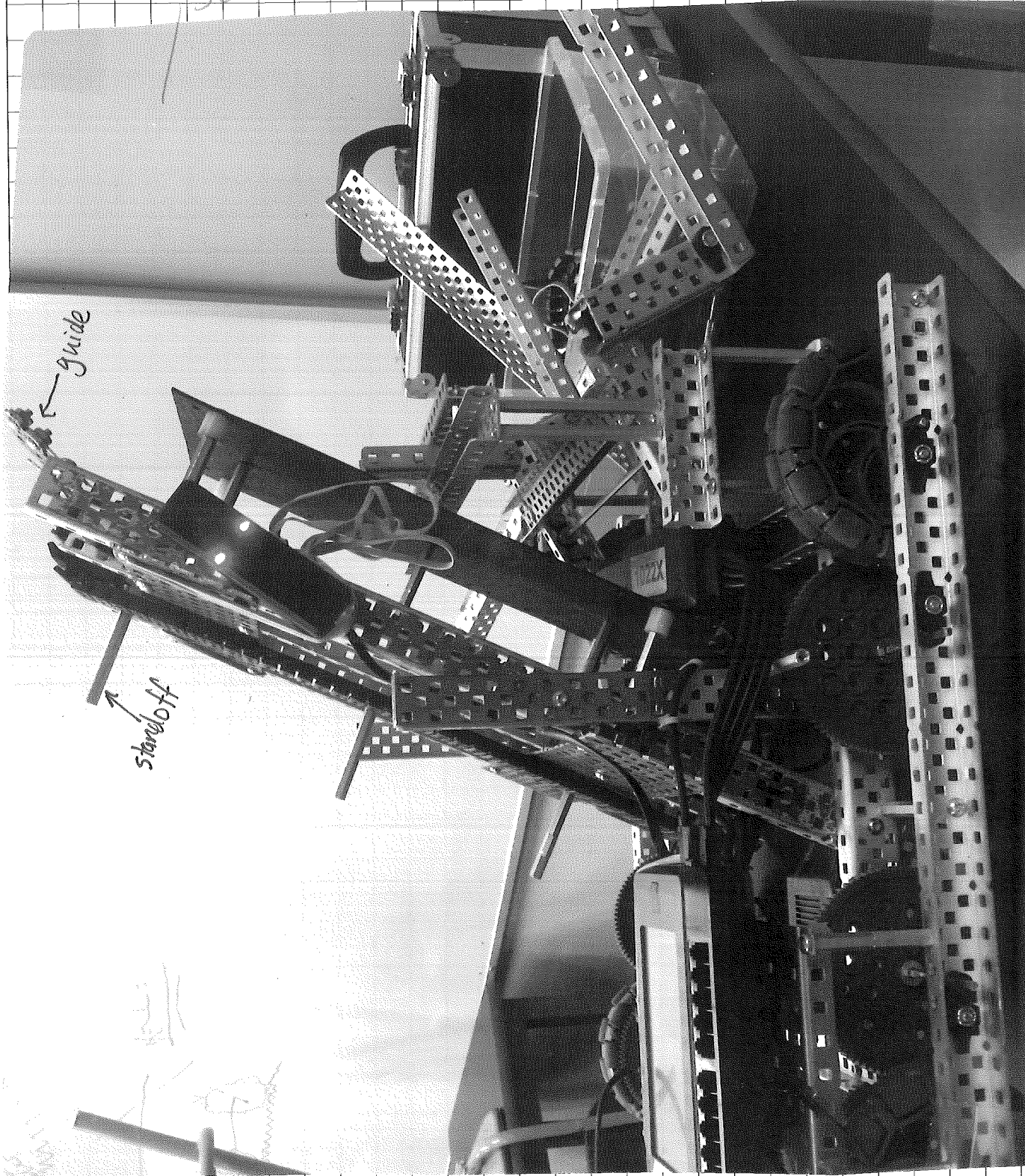
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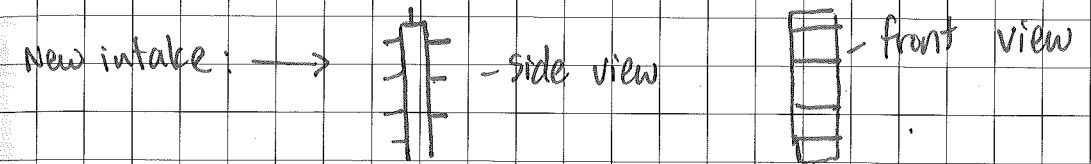
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Sept 24

We tested our bot in the arena. It is able to drive well. The plastic in the back helps a little, the guide at the top also helps. The rings still fly backward. Our bot is able to drive onto the platform. The lift is still a little weak, we might have to remove it and readjust again. We also shortened the standoffs and the intake chain a little too. We haven't rebuilt the base as it seems to work pretty well. We want to be able to lift two towers, one in the front, one in the back. The previous image's lift was attached in the back. We need another one for the front. Thomas has an idea to modify our intake that we originally brainstormed. It's basically the same as this, except with flaps instead of standoffs. It would look something like this:




I built the new intake today. We are going to change it next build day and see how it works. Hopefully it'll be more consistent.

Sept 28

We had a long weekend from the 25-27 and then the 30th will be the new holiday. This week will be a little odd. We removed our lift again so that it is easier to change the intake. We changed our intake to what was described last build day. I decided to use the long flaps to see how it works. We tested the intake again. The angling doesn't seem to be as consistent as we thought. The long flaps are also really bendy, which doesn't help a lot. We also removed our guides at the top. They didn't help as much as we thought. The whole thing would be so much easier with pneumatics, but we don't have any. The long flaps have been spaced out more. Instead of having 1 flap every 6 links, we have 1 every ten. The rings don't go as crazy now. We seem to be making a lot of progress. Hopefully we can get our lift to work consistently next.

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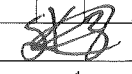
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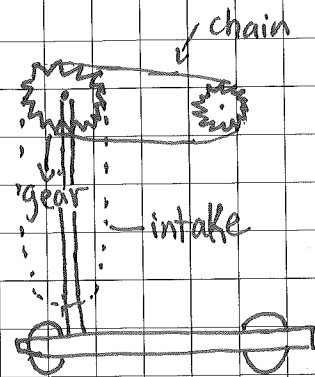
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Sept 29

We straightened our intake again. We also shortened the flaps. We need a guide at the top of our intake, as the rings are coming just short of the tower. We originally never thought of the issue of rings coming short of the tower. Shota came up with a good idea for the guide. It's two gears connected to our intake, so we only need 1 motor. I'll draw it below:



The rings would go up the intake, and then follow the chain. The tower will be right under the end of the chain, so the rings will fall on the pipe. The gears will be connected with an axle, it won't affect the rings.

Thomas and Shota just finished making the guide and attaching it on the bot. It seems to help and looks very hopeful. The next step is to attach the lift again and test with a goal. On the next two pages are bot images from today, the first one is front view and second is side view.

Oct 1:

Today we reattached our lift mechanism and moved the whole intake down 1 spot again. Have yet to test how well the bot works. We only tested the driving again. It still drives well. We tested lift and intaking separately, but we haven't tested them all together. Each part seems to work very well individually, so hopefully they all work well together. We have also started making our second lift for our bot that will be attached at the back. On page 22 is an image of our most recent bot as of today. Our first full prototype is almost complete.

52, 10/01/21

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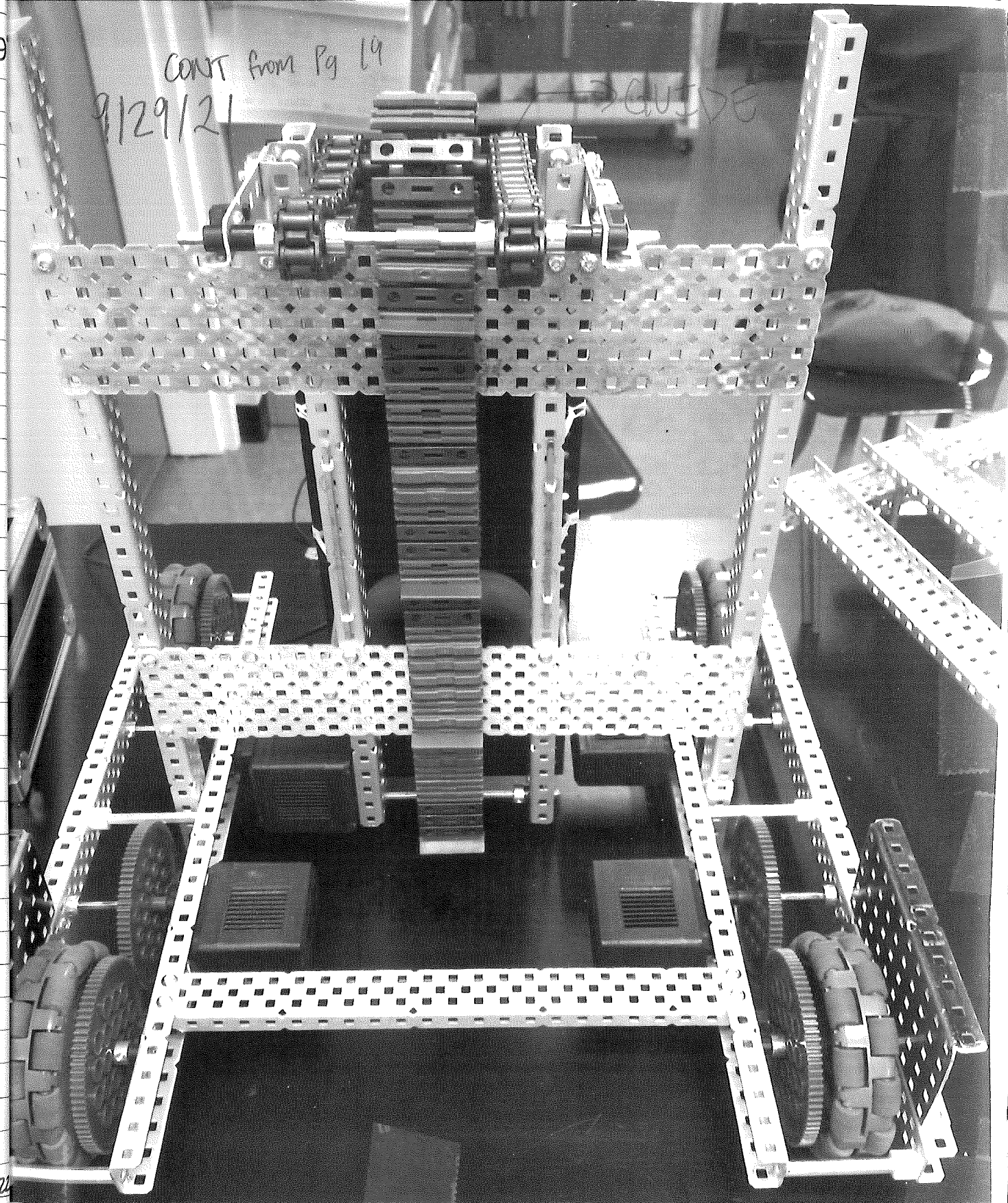
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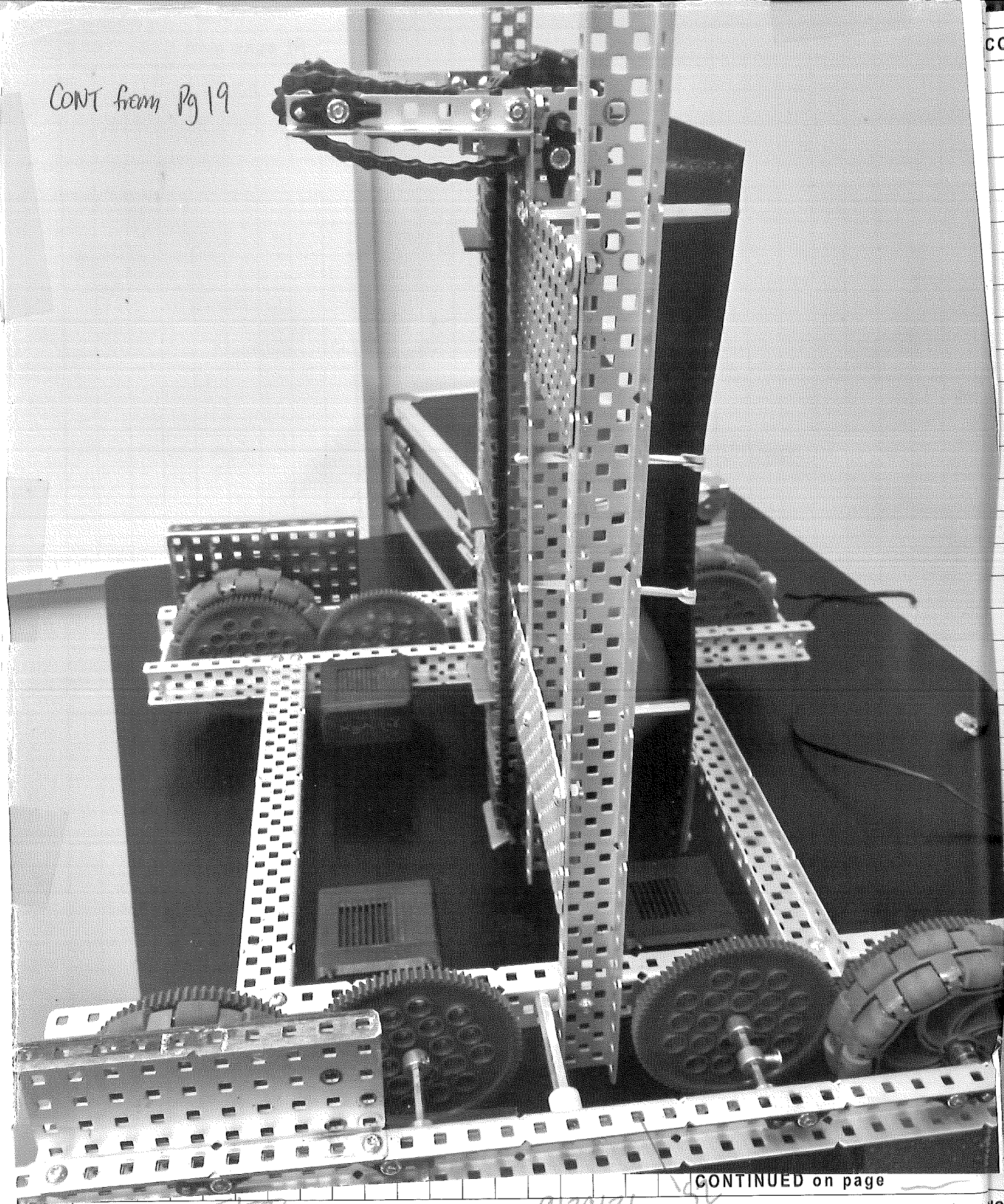
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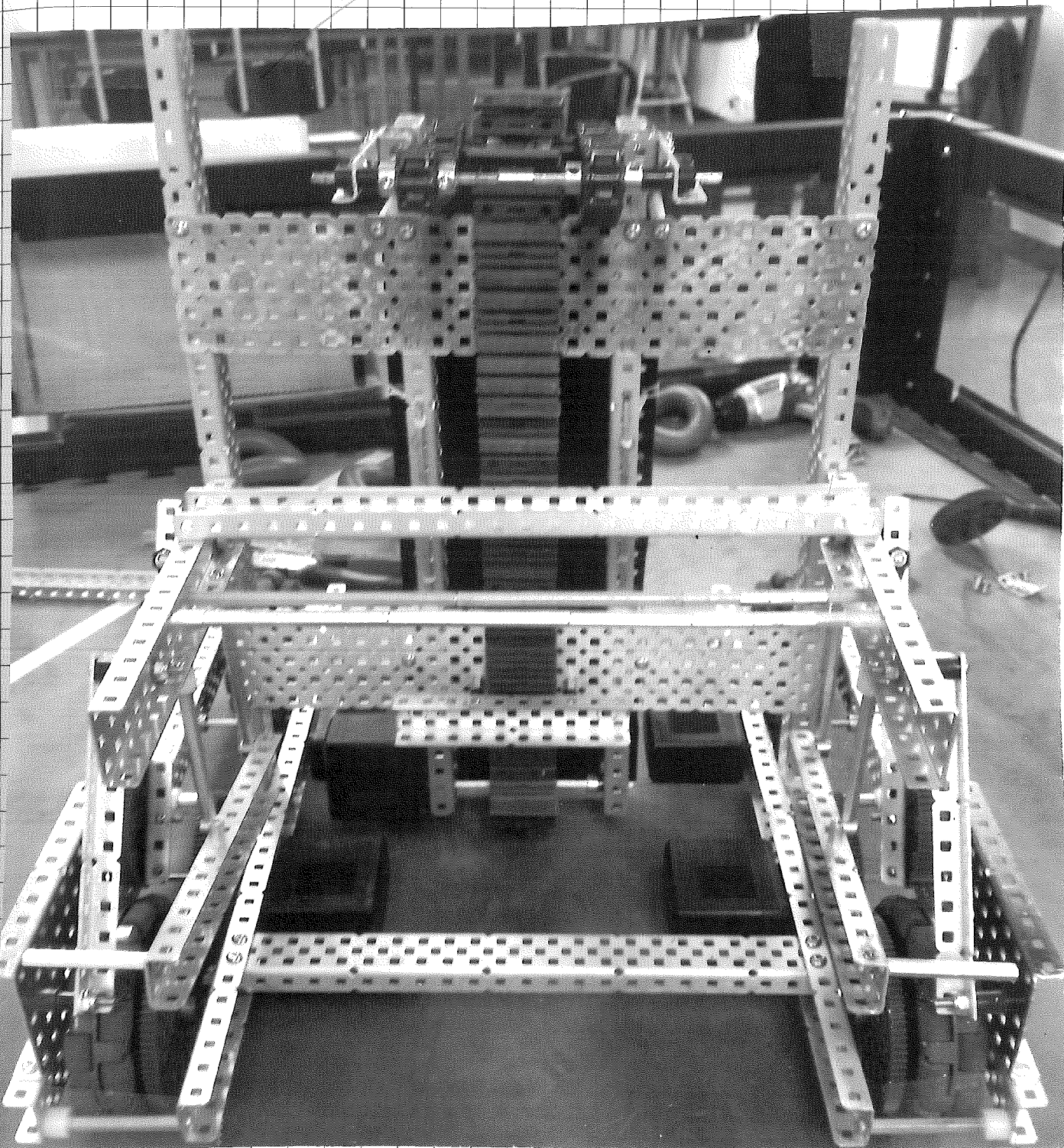
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52.10/01/21 Front view



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Thomas

DATE

10/01/21

BOOK NO. 1

Oct 4

We totally took apart the intake. We removed the intake and are totally going to remodel the whole thing. We remodelled the lift too and now it seems really effective. We're going to do an angled intake again. We can't seem to make up our mind right now, but that's what prototyping is for. The flinging got too out of control, so we decided to totally rebuild it. We're using standoffs again instead of the flaps, might slow the motors down too. Our intake is on. See image on next page.

Oct 5

Yesterday, Thomas and Shota stayed late to finish and test our bot. They told me it works so much better. We're going to try and reduce the friction between the rings and standoffs, as the occasional ring still gets stuck. We also took apart our old intake today. Thomas and Shota will add the back lift today.

Oct 6

Today we had a mini tournament in the class. I'm glad we did, as I realized there was a lot that didn't go as planned. Our record was 2-2. The games that we lost was because the tower fell off of our lift and that rings were getting under the chassis and getting stuck ^{under} on the wheel. Our lift also got stuck a few times. Since our bot got stuck, we couldn't do much for over 30 seconds. The competition really let us realize what we could improve on. We totally took apart and rebuilt the intakes. ^{again} See picture on page 25. We added C-channels to the underside of our base to prevent rings from getting stuck under our bot. We angled our intake again and changed to flaps rather than standoffs. We tested our new bot, works a lot better than our old one. I think the next goal is to be able to lift towers onto the platform, since 4 towers is 160 points. The results of our games were 65-115 loss (stuck) 110-86 victory, 73-103 loss (technically we won because of penalties, but we didn't know the rules, so it was recorded as a loss) and a 100-70 win. The B team had a good strategy of trying to capture as many towers as possible. The tank drive bots got up the platform really easily, X-drive bot struggled. We have a lot to improve on for next competition.

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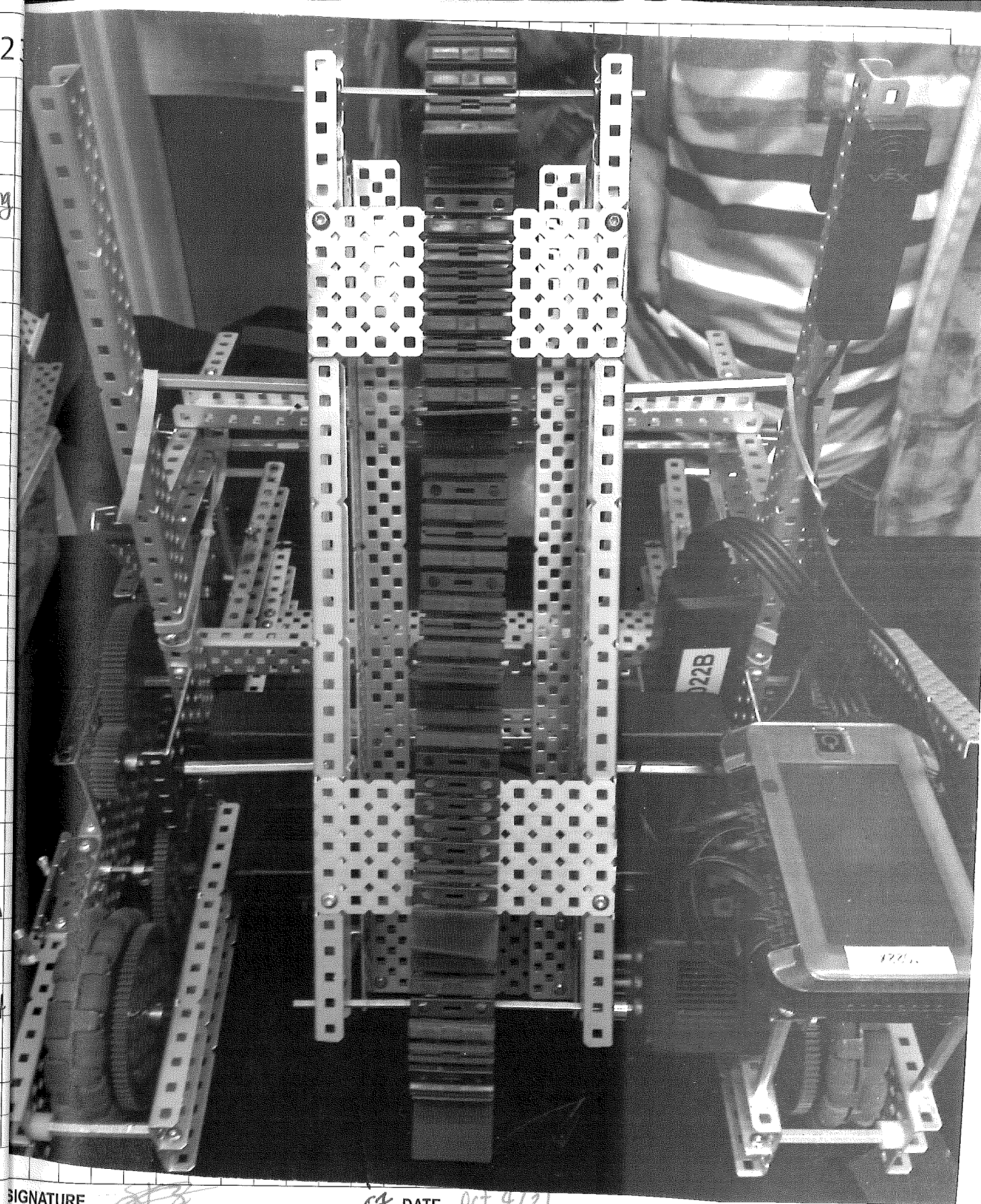
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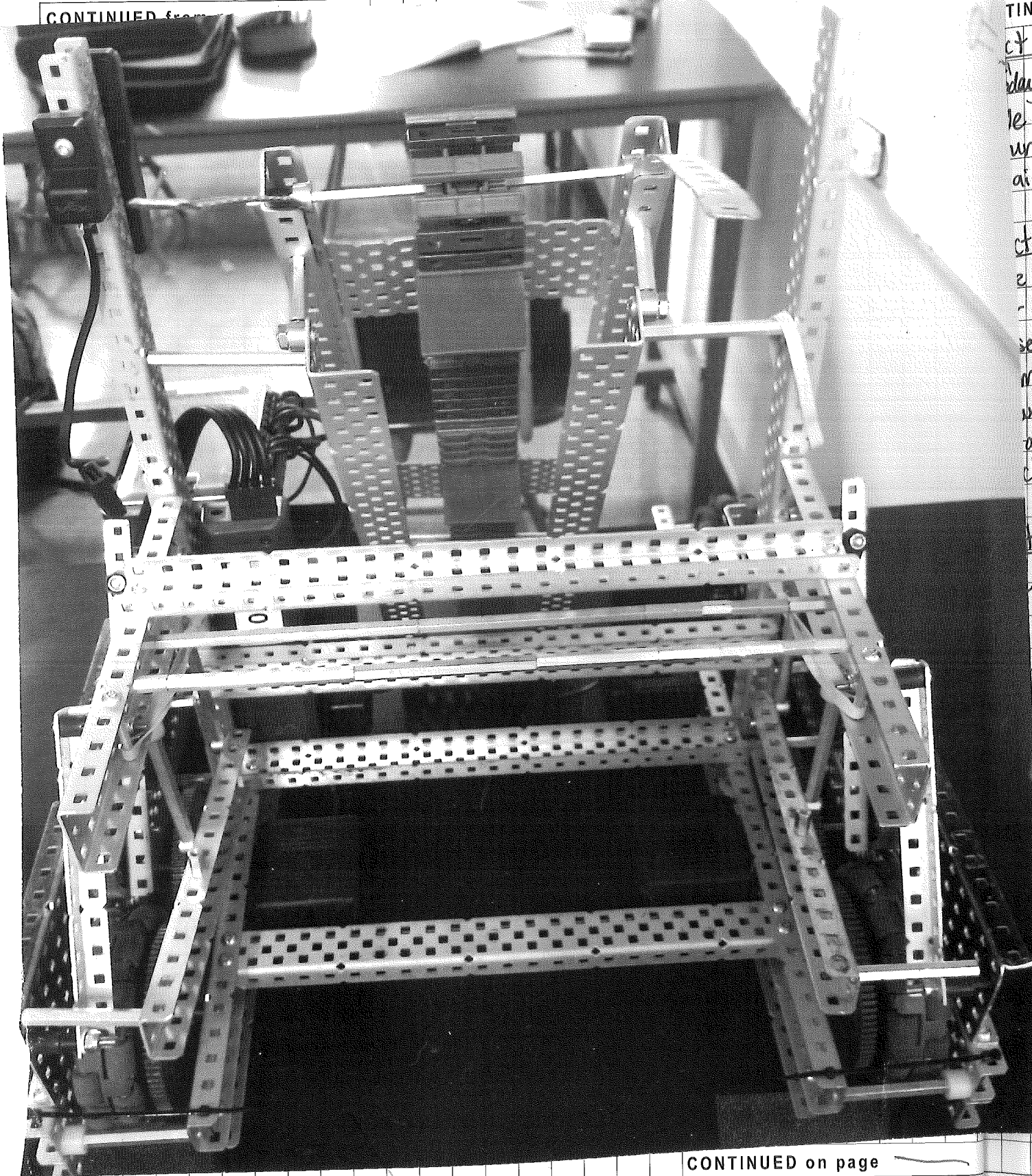
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DATE 10/11/21

BOOK NO. 1





ct 7

Today we added a guide for our intake. We added a metal plate as a guide. We didn't build much, just discussed strategy. We might totally redesign our bot, depending on our strategy. We might change the intake and lift again.

ct 8

We rebuilt our intake. We added two C-channels on each side of our intake for stability. We also lowered the intake and the lift. The gears of our base were also getting in the way of driving and lifting/intaking, so we moved all the gears in our base. The rings sometimes get stuck sideways in between the L brackets. We might add some plastic at the back of our intake to prevent that. Will attach image next time when we add our lift back on.

ct 12

We added the hook at the back. The hook isn't done yet, right now it's just a C-channel. We also moved our intake in from the sides, so now it's thinner.

We have reattached the lift to the front of our bot. The hook currently has a green motor, as there are no red cartridges, but once we get more cartridges, we will change it to red. We are also planning to shorten our base so we have more room for the lifts/hooks. Our team is faced with a tough decision right now. Do we sacrifice rings for another lift, or do we keep what we have? See bot pic on next page.

ct 13

We have decided to totally rebuild our bot. We never expected this to happen, but our bot just doesn't work as well as we hoped. It's not very consistent, doesn't work like we hoped, and we are out of motors. We have taken the whole bot apart and we're starting from scratch. We have found a reprint of the idea we want to do and we will start doing some building on our next build day.

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Oct 14

Today we started building the base of our bot. We used the medium sized omni-directional wheels, which is smaller than the standard sized wheels. 3" diameter wheels. The base is basically finished and Shota and Thomas built the lift. I took apart our old bot and organized our parts box. It looks kind of similar to our old bot's lift & base. Thomas also made a hook for our bot. See pictures on following pages. Pictures added Oct 15.

Oct 15

Today we secured the base and lifts. Shota started the intake, it's partially attached now. I don't know how I feel about the smaller wheels. We will give it a try and see from there. Maybe they'll be better.

Oct 18

Started building our intake today. Shota stayed after I left to modify our bot. The base and lift are more complex than our previous bot. Hopefully it'll work better than our old bot. Page 28 is the photo from Oct 14, 29th page will be the image at the end of the day today. We're going to have to change the bot a little from the photo, otherwise it might be oversized.

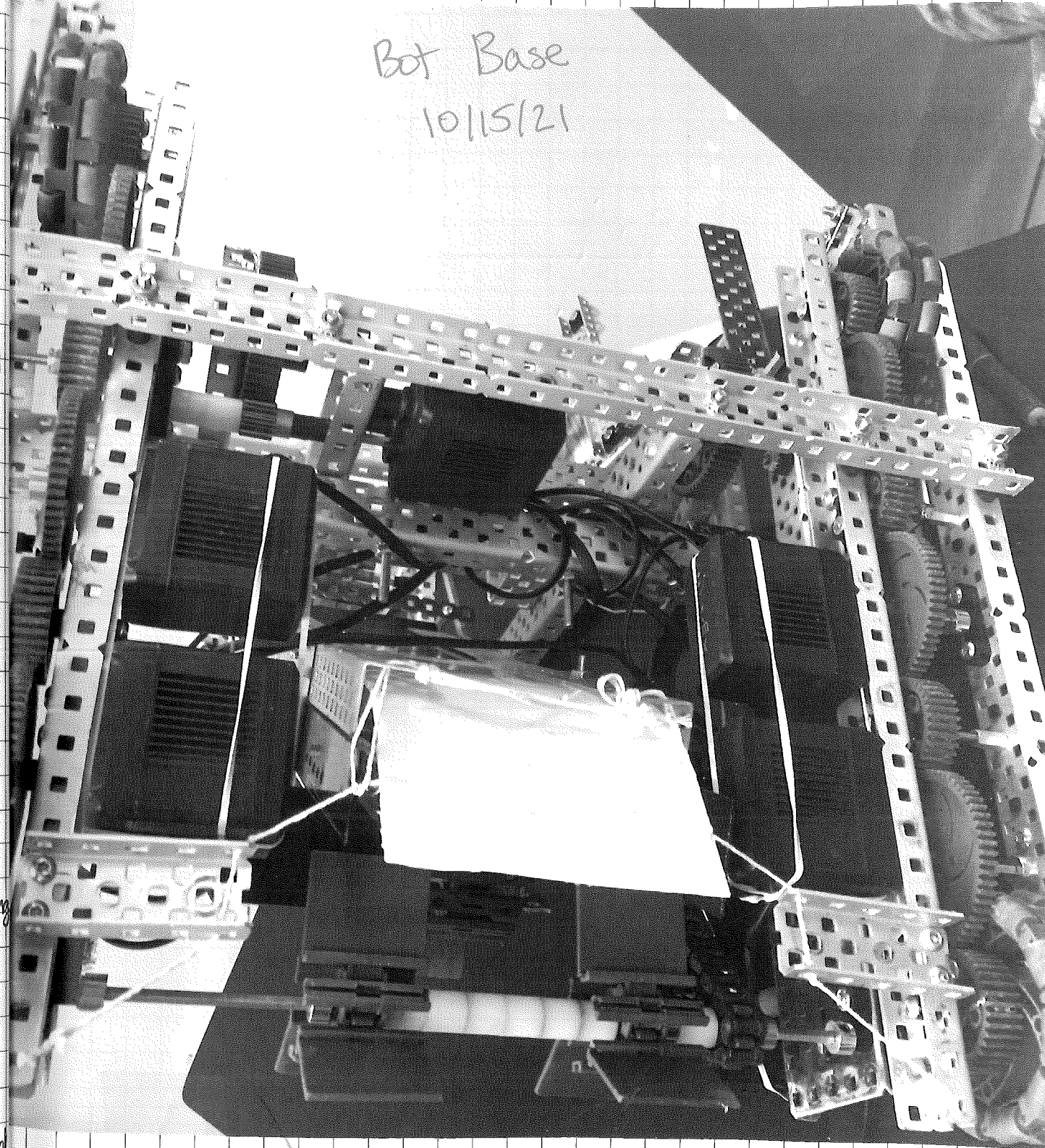
Oct 19

The intake was finished today. Added it onto our bot to see the spacing. Added a sheet of plastic near the bottom to make intaking easier. Also removed some unnecessary pieces so the bot doesn't fall apart. Might start making the guide tomorrow and then adding it on.

Oct 20

Finished the guide and added it on. Tested our bot's intakes, the guide needs more modification to score consistently. Started building the hook ⁱⁿ the back. We might add the hook to the side of our bot instead, depending on sizing and everything like that. At the moment, we are trying to build a hook that doesn't require a motor, so we can save our motor.

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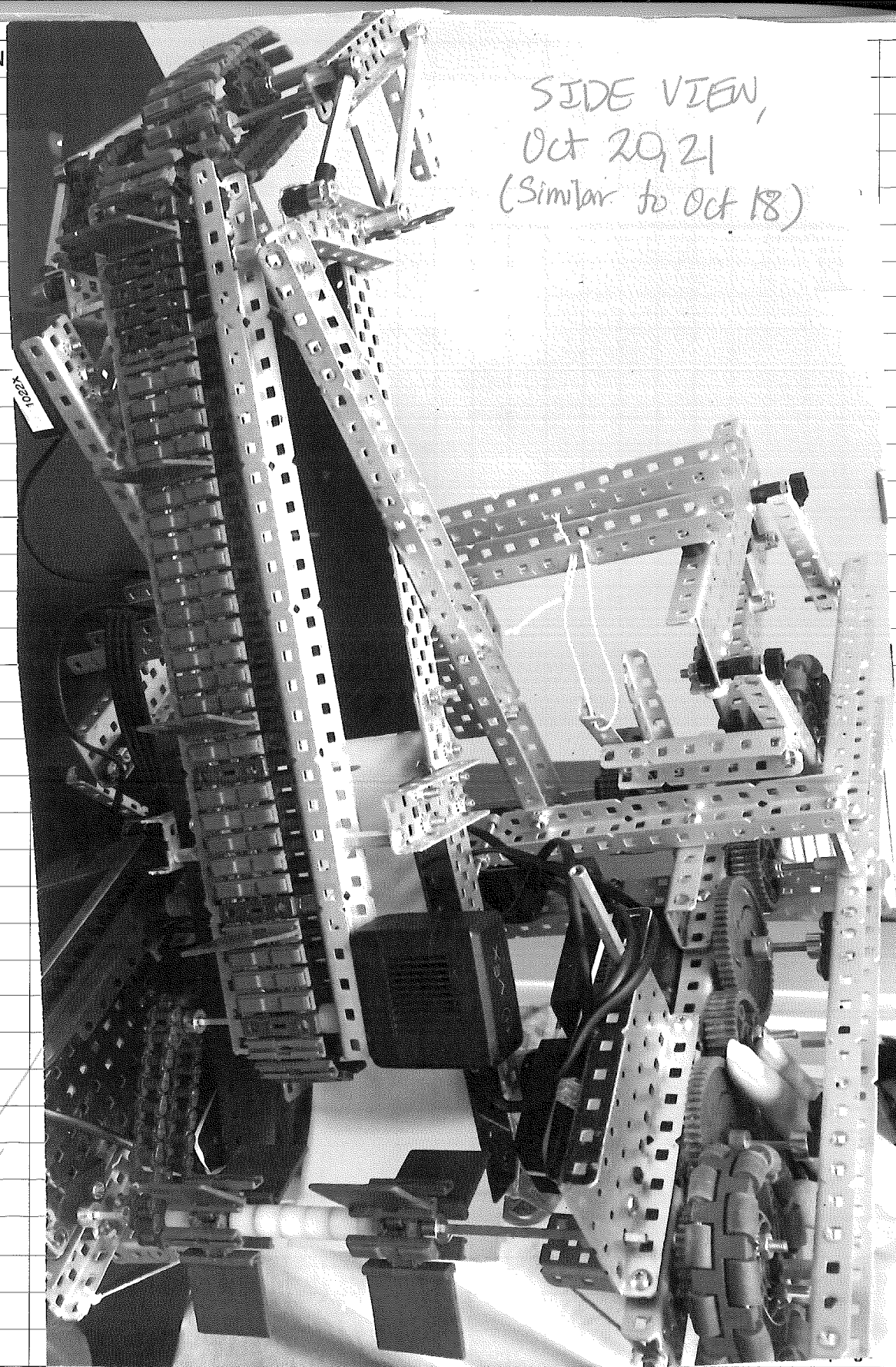
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BOOK NO. 1



SIDE VIEW,
Oct 20, 21
(Similar to Oct 18)

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BOOK NO. 1

Oct 21

Ran our first skills test today. Thomas scored 89 points by scoring 4 towers into alliance home zones and by scoring 9 rings in the bases of towers. Our lift still occasionally drops the tower, or the tower isn't secure enough. We also get stuck on the rings sometimes too. We also can't get up the platform that isn't angled. We are going to build an arm-like mechanism that will be able to push down on the platform and angle it so we can get up. I haven't done my skills score yet, as I feel I need a little more practice with driving first. Our bot can consistently score in bases, but it misses the pipe a lot of the time. We know what we can change to improve our bot. Thomas and Shota have started building the arm right now. Shota also did a skills run and got 60 points by pushing 3 towers into the home zones. We will do another skills run after the long weekend and our improvements.

Oct 25

Thomas did another skills run. He got 101 points by scoring 5 towers and 1 ring in the base. We made slight modifications to our lift by finding a way to secure the tower with two screws so it doesn't fall off. We added a flipper in the back to help with getting up the platform. We're going to start adding/building the tower hook for the side of our bot, so hopefully we can get two towers at a time now. Going to test the flipper later this week. We also shortened the guide by 1 link to see how well it works.

Oct 26

The shorter link definitely works better. Rings are very consistent now. The next goal is to think of a way to lift the towers onto the elevated platform. Our current "lift" system doesn't lift the towers high enough, rather it just helps bring the alliance mobile goal closer in. The hook is our temporary idea. It'll be a c-channel with a standoff & retainer attached to it to hook & drag the towers. It will be placed on the side of our bot. Maybe we'll think of a way to attach it to the spare motor we have and try to get it to lift the tower somehow.

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BOOK NO. 1

Oct 27

We finished the hook, added it on, tested it. The hook seems to work quite effectively, but we are unable to get up the platform with the lift ⁵² on the side. We might try adding a hook to the back and removing the current one we have. The flipper also doesn't help much as it requires a lot of accuracy. Image of flipper below. ⁵²

Our flipper is basically 3 c-channels connected together that flips down to help lower the platform. The first problem is that it doesn't flip low enough and it wastes a lot of time. We have taken it off of our bot. I think the best design of a bot would be to be able to score rings and lift towers, so essentially what we have, but with a 4-bar attached somehow.

Oct 28: We have removed the hook. It caused more issues than we expected it to. We removed the flipper too, might add it back on for 2 v 2, we'll see. Trying not to worry about the flipper too much right now. Our bot now has lower ground clearance than before, so it's not getting stuck on rings as much anymore. Thomas did a little bit of programming today while we decide what our next step is.

Oct 29

We told our teacher to order a few more 3" wheels. They work a lot better than expected, and we will add two more to help prevent stuck rings and for stability. Added plastic to the bottom of the intake. The intake can now successfully score rings when they're placed in different angles. There were some loose screws in the base that we tightened. Started to modify bot more.

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BOOK NO. 1

Nov 1

Today is Monday. We don't have class tomorrow, and then Wednesday is a mini class tournament. The 2 v 2 tournament will really help us further brainstorm about our robot. Today was just driving our bot around and seeing if everything works. We have decided to temporarily put our flipper back on for the competition ⁵² Wednesday. The program seems to be running fine. We don't have an autonomous yet, we want to wait until our bot is mostly complete before we start an auton.

Nov 3

Today was the class tournament. Below are the scores. Summary on next page.

MATCH RESULTS - November 3 Mini-Tournament

Red	Red			Blue	Blue
1022Z	1022A	41	161	1022C	1022X ①
1022Z	1022E	83	104	1022B	1022C
1022B	1022E	124	58	1022A	1022Q
1022X ②	1022C	67	103	1022Z	1022B
1022Z	1022X ③	122	66	1022E	1022A
1022Q	1022A	43	66	1022C	1022E
1022X ④	1022B	73	173	1022Z	1022Q
1022B	1022E	143	42	1022X ⑤	1022Q
1022A	1022C	82	83	1022Z	1022B
1022X ⑥	1022C	145	139	1022E	1022A
1022Q	1022Z	43	99	1022X ⑦	1022A
1022B	1022E	43	83	1022Q	1022Z
1022C	1022E	113	99	1022X ⑧	1022B
1022Z	1022A	134	43	1022C	1022Q
1022A	1022X ⑨	132	85	1022E	1022Z

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Nov 3

Nov 3

BOOK NO. 1

33

Match 1: We were paired with 1022 C against A, E. C team had a simple Meccanum drive bot with a hook for stealing towers. We worked really well together and won 161-41. We had our alliance towers on our side, plus all 3 mobile goals, an elevated bot, and 31 points in rings. We were responsible for scoring rings, while C played defence and climbed the platform. Our bot worked really well, scored 9 on the pipe and 4 in the base. Overall, a good match.

Match 2: This time, we were paired with C again, but against Z and B, a 4-bar lift and a hook bot. We lost this round for a few reasons: 1) We were stuck on the rings for about 30 seconds.

2) We couldn't beat Z to the towers. Z was very fast and aggressive on defence.

3) B team's 4-bar was able to score 80 from placing 2 towers on the platform and having 2 more in their home zone. Elevating towers is a huge point advantage, we might start building a 4-bar too.

We need a way to not get stuck on the rings. Lots of things to work on for next match.

Match 3: This match, we were paired with Z, who we lost to last time. We won this match 122-66. Z was able to balance on the platform with a tower, getting us 70 points for that. We also had 2 towers in our home zone, the rest of the points off rings. Z played great defence. We had trouble helping with the neutral mobile goals. Our flipper got in the way of pushing towers, or we could've gotten more points.

Match 4

We were paired with B again and we lost. B let one of their other teammates drive for fun. The driver accidentally flipped over and was stuck like that for the whole match, so it was basically a 1 v 2. Z (opponent) was able to balance 2 towers and their bot, resulting in 110 points already. We scored 33 points off rings and had 2 towers.

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Mason (the B team's driver) managed to unflip his bot and then he got stuck on the rings, which I thought was hilarious. Z played very well this match, they deserved the win.

Match 5:

We were paired with Q against B & E. Q's bot wasn't working until the last 30 seconds of the competition, so it was again a 1 v 2. Our bot struggled to lift/steal neutral goals because our flipper was blocking the back, making it hard to push. B was able to balance 2 towers and E managed to steal almost all the towers. We only had 1 tower with rings in our zone, causing us to lose the match. I don't blame Q for what happened. Q is a new team and everyone has technical difficulties. As an older team, we're supposed to help guide the newer team members, not blame them.

Match 6

We were paired with C again this time against A and E. It was a very well-matched game. Each team was able to elevate a bot. There was 1 non-scoring tower. It was very close, the winners were decided by rings. We were able to stack 39 points from rings (13 rings on pole), basically the same amount of points as a balanced tower. A had more towers, but we won by rings. C played great defence, the match could've gone either way.

Match 7

This match, we were paired with 1022 A, against B^{Qsz} and Z. Q's bot was experiencing difficulty again, and our lift stopped working and we were stuck for most of the competition. A managed to pull off a win by scoring lots of rings and balancing at the end. When we were unstuck, we helped play some defence. This was a low-scoring game on both ends, the scores being 99-43. After running into a similar bot to ours, we have decided to add a 4-bar to our bot to help with scoring and balancing the towers.

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Match 8

Paired with B again against C and E. B let their 3rd team member drive for fun. E's bot broke in the most perfect spot. Their bot broke down in a spot blocking our corner perfectly, so we couldn't score in that corner. B originally balanced a tower, but C was quick-thinking and knocked the tower off the platform. B was stuck on the rings for a bit too. It seems rings getting stuck under bots is a common issue for everyone. I wonder what we can do to help prevent that.

Match 9

In our last match, we were paired with A again. This time, our bot didn't get stuck, and we won 132-85. I realize how important scoring rings on alliance mobile goals is, since that 1 point could be the difference between a win and a loss. A's bot is very similar to ours, we have similar designs, though I would say my bot is more consistent scoring rings and theirs is more consistent getting up the platform.

Overall, the competition went well. We decided we are going to keep our current intake/lift system and add a 4-bar to it. From the event, we realized it is hard to avoid getting stuck on rings, so when the other wheels arrive, we will add them on to see if it helps. I think after the addition of the 4-bar, we will have a very strong and effective bot. We will also start programming autonomous, as nobody got any points off autonomous.

Nov 4

We started building our 4-bar today. I will add an image when it is complete. We have basically taken our old hook and attached it to the 4-bar. We are using a red cartridge for this motor, hopefully it'll help lift the tower high enough. Now our bot is able to score rings, lift, and carry towers all with 8 motors. The hook is attached to a hinge, thus it is able to bend in and out. Thomas also started programming the auton today and finished programming the rest of the bot.

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Thomas

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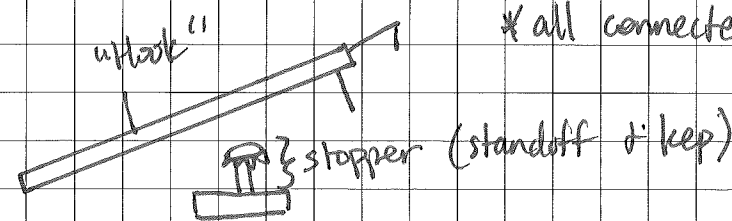
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Nov 5

The other wheels arrived today. We added them onto our bot. The hook/4-bar is also done and added onto the bot. See images on pg 37, 38. There is a black retainer that got added to the end of the standoff. We also tested the 4-bar lift system. It works! It's able to lift the towers up high with only 1 red cartridge. It is just shy of the platform, so for testing purposes, we gave it a hand. It's able to pick up the tower and put it down on the platform. A problem is that sometimes the 4-bar will lower too much and drag on the ground, preventing us from driving. After the photo was taken, I added a small standoff and keep below the hook to stop it from lowering too much. We need to add something to the bottom of the 4-bar so that it won't lower too far. Another problem is that the tower gets stuck on the lock and won't come off, so we might change that to be looser.

side view
DRAWINGS NOT TO SCALE



Right now, the 4-bar uses 20-long c-channels. I tried changing 1 of the bars to a 25. It didn't help with the lift, in fact it couldn't bend as far back, so it actually didn't lift as high. I changed it back to a 20 long.

Nov 8

Tested the bot again, now it doesn't even drive straight. The problem was that the brain was only registering 7 of the 8 motors and the left back drive motor wasn't working. Plugged it into a different port, it works fine now. I plugged a different motor into the old port, it seemed to work, but we're changing ports now. Changed the wire from port 1 to 5. The wire for the mini lift kept coming out. That motor had a broken clip, the wire slipped out effortlessly. We changed that motor. Added a stopper for the 4-bar. Moved the hook/hinge part of the 4-bar up one space. It seems to lift higher now. Changed tower lock, made it longer & removed the standoffs. Lift (4-bar) works better now, still needs improvement though.

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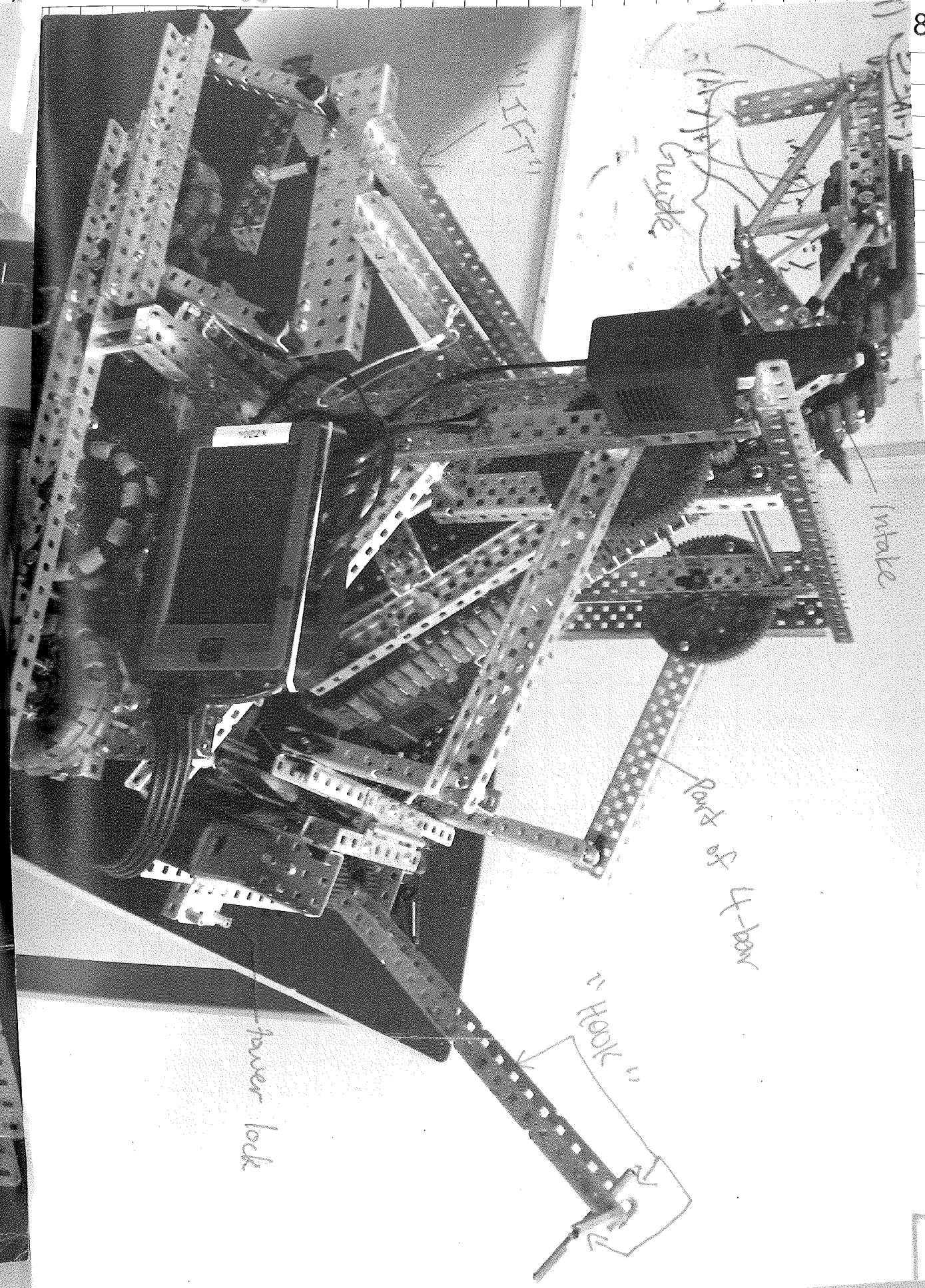
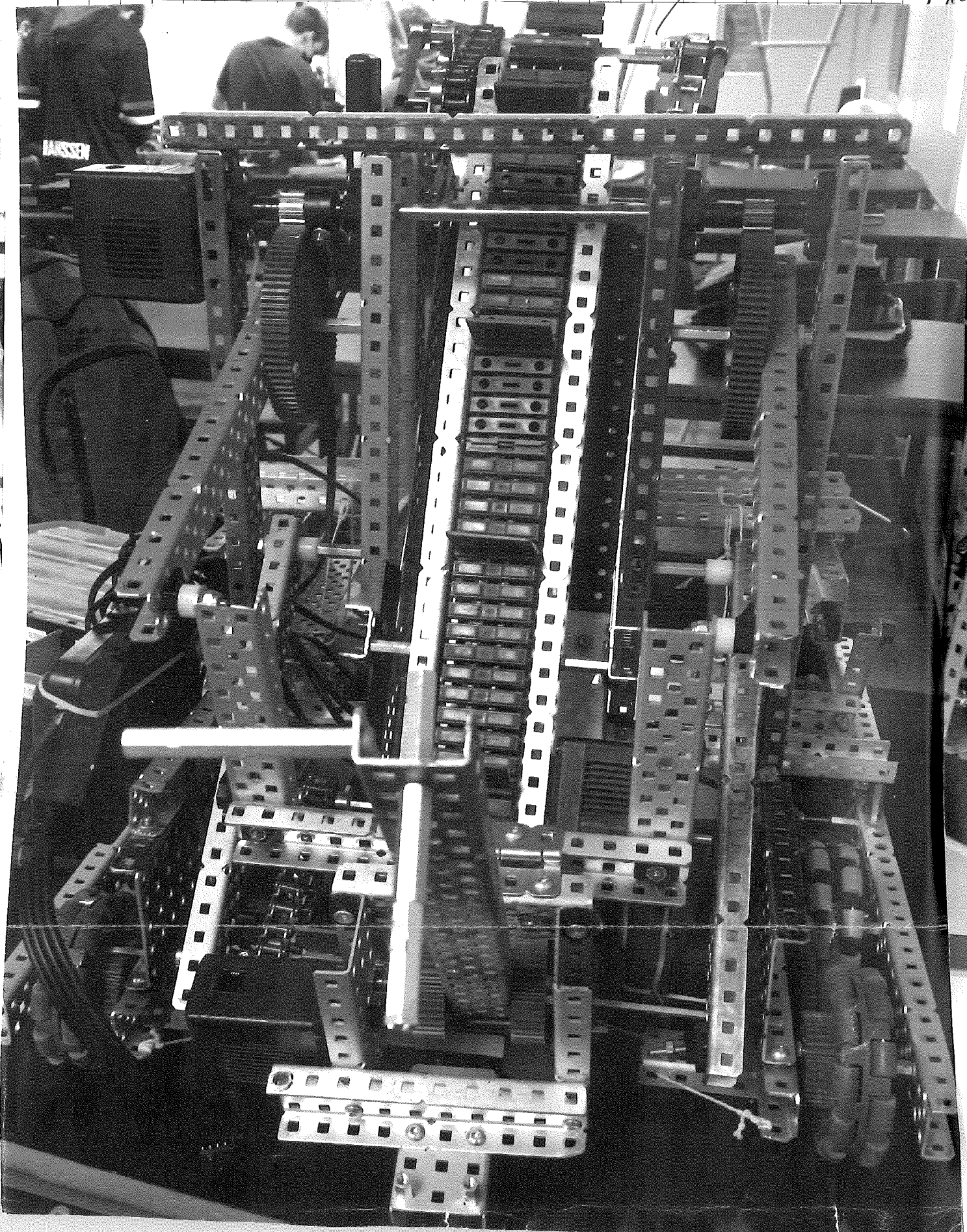
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Nov 9

Today we raised our 4-bar lift by 2 or 3 spaces. We are able to put the tower on the platform, but we have to slightly lower the platform before we can do that. We are going to have 2 controllers, 1 for me and 1 for Thomas. I will control the 4-bar and intake while Thomas does driving and the lift.

Nov 10

Today we tried connecting the two controllers and they're not connecting right now. We have found the wire and are trying to find a way to connect them. Thomas is programming the second controller. We managed to connect them, the wire was broken.

Nov 15

We worked on our autonomous program. We want to be able to get the autonomous program working prior to our school mini-tourney from the 22-24. We want to be able to get the win point too. The plan for auton is to start on the right side, take a neutral mobile goal, clear the ANP line, put a ring in it. The second controller is successful, I will operate the back of lift and claw while Thomas does the rest. Will test tomorrow.

Nov 16

Our auton is really off. We added an inertial sensor, so hopefully it will help our autonomous. We tested it again and it worked, but it missed the ring. We need to think of a way to get a ring easier. Our ring intake can't take 3 rings at once, and we don't want to waste a preload. Tomorrow we will think of a way to fix the problem.

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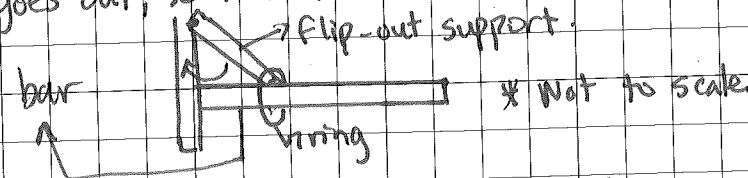
BOOK NO. 1

Nov 17

We added a bar at the front to hang a ring on. During the auton, the robot backed up too fast, the ring fell because of inertia. We hit the tower too hard and failed to grab it. The inertial sensor also is off. We have asked our teacher to bring a level for the sensor. Right now, we are trying to slow the bot down a little for grabbing the yellow tower.

Nov 18

We have added a flip-out support for the ring. It will flip in when the front lift goes out, so it doesn't affect us. It looks like this:



It now doesn't fall off. It works quite effectively now. Just need the level.

Nov 19

We didn't do much today. Just practiced driving. We don't have a level yet, so we just practiced driving together. We seem to be doing fine before the tourney. Lift works well too. We're all set.

Nov 22-24

Our teacher brought the level today. We fixed the inertial sensor and tested the auton. It's now very successful. The tournament also started today. Our first match was against B, Z. We are paired with E. For some reason, we go against B 3 times. We lost 76-106. Our problem was that I forgot to elevate the tower otherwise we would've won. Our auton didn't work this time either. There is also a problem with our ring system. It's not as consistent as before. Our second match, we paired with Z against C, Q. We won 102-68. We elevated a tower and stacked 12⁵² rings on the pole and 3 in base. Z played good defence. C got stuck to us for a little bit. Our auton worked for this match, we got the yellow tower and the ring and alliance goal.

On the 23, we continued the tourney. Our next match we were

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Paired with Q against B and E. Q's robot wasn't working well this time, and they basically broke down halfway through. Our ring system has also started having issues. We are unable to score as many rings as before and our robot is no longer as consistent as it is before. The stand offs on our hook keep coming loose. It also is a little hard for our 4-bar to aim at the tower quickly, so we will probably add a guide to help us with that. Performance this match wasn't as good as we hoped, will make more changes after playoffs. Our next match, we were paired with Z against B and C. We lost 87-89. We lost on auton. B and us went for the same tower. We accidentally got pulled over by B, our bot fell and ended up in their home zone. That resulted in the auton win for B and C. We ended up getting the goal back and elevating it on our platform. Had it not been the auton, we would've won the match. Our last match we paired with B against ~~Q~~^{SN} and C. We won 92-61. Our auton is now aimed to get the win point. We stole a neutral mobile goal, ~~and~~^{stole} the alliance goal (cleared the AWP line), and put a ring in our alliance goal. B also got a yellow goal. We won the auton. We balanced the goals a little too early; W22 C came and descored the goals. We did manage to balance them again in the last 30 seconds. Our ring scoring wasted too much time. Shota put the rings in too slowly, we wasted about 30 seconds trying to descore rings. We need a better strategy for that. Our old problem of having stuck rings has returned. It seems as if our bot has only downgraded from before. The playoffs will occur tomorrow. We ended up in the middle for standings; however B picked us to be their partners for playoffs. It will be exciting.

Playoffs was on the 24th Q withdrew from the competition, W took their place. It was a round robin playoff. ~~B~~^{SN} E beat C, W. We faced C, W next. We beat C, W. This time, we didn't balance towers until the last 30 seconds. We faced off against ZE next and we won. The finals was us facing off against ZE again. We lost the second time due to the ring issue I addressed before wasting too much time. We basically cost B the win. Thomas is insistent on not intaking rings from the arena, but I feel like our old strategy was better. Our front lift is very sturdy. When locked, nobody can take the tower from us. We will talk out strategy as a team before the Shawnigan tourney.

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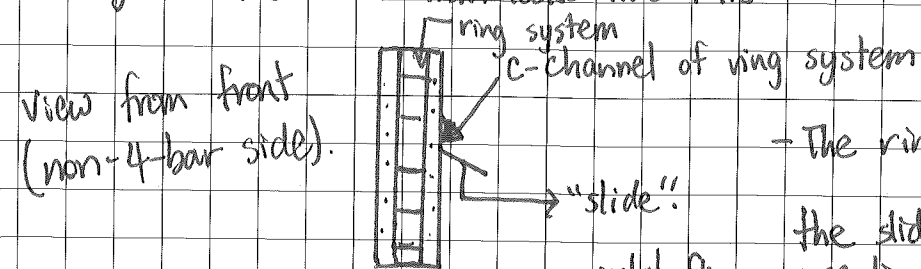
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BOOK NO. 1

Nov 25

Today, the auton for the other side of 2 v 2 (the side without the AWP line) was completed. We added a slide for the ring on the left side (ring intake is front, 4-bar is back). The bot drives backwards, the ring gets knocked into the base, and we drive back and use our 4-bar to steal a neutral mobile goal. The mechanism looks like this:



It is a lot like the ring bar we added at the front of our bot, similar setup, except the slide is a smaller metal plate. Now we have auton for both sides. Just need skills next.

Nov 26

Our ring system is still having issues. Some of the rings are totally missing, some are bouncing out the sides. The belt seems to be spinning too fast. We have lowered the speed to about 75% to see if that helps. Our rings are also occasionally getting stuck around our motors there. We're going to try to add some metal to help prevent that. Started skills auton programming.

Nov 29

Today we worked more on our skills autonomous. I'm wondering if for driver skills we're allowed our two controllers or only one. It doesn't specify in the rule book, but as a concern, we also have a driver skill for 1 controller. Thomas is continuing to do the programming while Shota and I drive the bot and see if there are any other issues with it. Ring intake seems a little better. It almost seems like the rings are getting caught on plastic, or are rebounding weirdly and going too far. The back 4-bar works well; the hook is also helpful for when the towers fall over. We can drag the goal back with the hook and also stand it back up so we can elevate it.

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BOOK NO. 1

Nov 30 and Dec 1

43

I was sick for these two days, therefore, I couldn't assist with the building. Thomas said that they worked more on the auton program today (Dec 1). I am writing from home while they are at school working. Shota has also been writing a code for our bot as well, using Python. They gave it ^{sz} a test in the arena and said it could use improvement. We will be using the old program for now, until we can come up with something better.

Dec 2

We tested the skills auton. There were other bots in the arena who were also testing, so we just tested positioning and speed. As of now, it seems to be working well. It goes to the spots we want it too. The speed is consistent too. There are a few bugs in the system, but it doesn't seem to be affecting us too much right now. Our bot sometimes hits the goal a bit too hard, accidentally knocking it away or just missing.

Dec 3

More modifications to our auton skills was done today. Slowed the speed down a bit more. The ring system is still having some issues and isn't as good as before we changed to the black plastic. Slowed the ring system down a little more to around 65-70%. Thomas and I also practiced driving and strategy together too.

Dec 6

This week is all tournament prep for us. Lots of practicing and slight modifications. Changed all the wheel and gear keps to nylocks as we were afraid that they would come loose as keps. The change took the whole day.

Dec 7

Finished changing keps to nylocks today. Did more driving and testing. Thomas and I swapped controllers to see how that is. I'm comfortable with both controllers; however, Thomas says he prefers the main controllers, ^{sz} so we will keep the same plan. We also practiced with Shota introducing rings into the arena. It seems to be a lot faster now, but I'm still not too sure.

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Dec 8

A new rule book was updated and released yesterday. I spent the whole class reading and clarifying rules. So now, the new rules state that we can't score 13 rings. If the rings are stacked too high, then none of the rings are considered scored. Lucky for us, our guide levels off any rings that are too tall, so we don't have to worry about that. A question I have is if another bot bumps my bot and causes it to drop the tower and spill rings, what happens? Are the rings that still fell off considered scored? Is there violation there? I'll have to ask about this at the tourney. Also decorated the team (1022) tool kit with stickers.

Dec 9

Went through the inspection checklist today. Our front lift is so sturdy, our tower is locked in. You can't even remove it with your hands, let alone with another bot. Our bot was slightly over, so we changed 2 front gear links to thinner ones, and we passed. That's the only problem for height. We removed the green wheels. They were slightly oversize and our bot doesn't tip as easily anymore. We can always add the anti-tip back on. Practiced more today. Really excited for the tourney.

Dec 10

Today was all packing and tournament prep. We packed our bot, tool kit, spare elastics, motors, and our tool kit. We changed to new elastics and made sure all the screws are properly tightened. I'm really looking forward to tomorrow. I think it'll be a great day.

Dec 11

Today was the day of the Shawnigan Lake Tournament. There is a lot to say about the tournament. Firstly, we passed tech inspection, but we didn't have a battery clip for some reason and we didn't have time to put one on, so we added a bolt on to secure our battery. ^{sz} The judge let us pass because it was the first tourney, but we need a battery clip for next time. After tech inspection, we went alliance hunting and saw a lot of really different and really unique bots. A lot of the 1842 teams had pneumatics along with 8 motors. CONTINUED on page 45

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giving them an advantage over the other teams. There was a lot of 4-bar lifts and a few unique bots. 7842 P had a bot that I was skeptical about at the start, but they proved me wrong in playoffs. From the start, I was intrigued by 7842 X and 6264 B's bots, as they looked quite promising and well built. A lot of the bots looked like what we had, except without the ring system. After that the competitions started.

Match 1:

This match we were paired with 1022C from my school. We were up against 6264 C and 1290 B. 1290 B was a ring bot from Brentwood with no 4-bar lift. 6264 C was a 4 bar from Shawnigan, but it was a small and not as effective 4-bar. We won that match 140-37. During the autonomous period of that match, red alliance (our alliance), won auton by stealing a neutral mobile goal and clearing the FWP line. During driver control, we got ~~40~~¹³⁴ points, elevated bot & tower, two towers in home zone & rings on pole. With the auton win we got 140 points. 1022C helped us steal mobile goals. In the end, the towers fell and became unbalanced so they climbed up with a tower. Our bot struggled a bit with lining up the lift and the tower so we'll see what changes are necessary to be made to help with that.

Match 2:

We were paired with 6264 B, an effective ^{4-bar} ~~climber~~ bot from Shawnigan Lake. We went up against 7842 C and 7842 J. We won 188-60. We won auton, stacked 4 towers on the platform, and got 22 points on rings. Our opponents had 3 towers in home zone. We worked really well together with 6264 B, they said they might pick us on alliance selection. We didn't get the winpoint, since our ring bounced out of the base. It was the first time that issue ever occurred, and we are wondering why it happened. I think it might be that we lined up our auton wrong or that the ring was too far out on our bot. The issue had never occurred during our testing, and we tested it about 5 times. We worked well with 6264 B, helping one another when we got stuck. They left an alliance tower for us so we can put rings on it.

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Contrary to the first match, this time for autonomous we were on the left side of the arena. On auton, we successfully stole a neutral mobile goal. The first match, we were on the right side. We cleared the line with a ring in the base, but our teammate missed, so no win point. We also possessed a neutral mobile goal. As of right now, we have had few issues with getting stuck, so hopefully that continues on.

Match 3:

This match we paired with 7842 H, against 1022C and ~~1022Z~~^{7842 X} sz, the eventual top team after round robin. This match, our alliance lost 73-90. The opposing alliance was able to get a win point. Our teammates weren't able to do a lot, but they did contribute to playing defence. This match was a lot of stealing towers and tipping the platform to prevent elevation. 1022C tried to tip our platform and so did 7842 X. We ended up also stealing the alliance towers of the opposing team. Even though the opposing alliance got the win point, our alliance won auton. Our bot dropped the neutral goal this time because we didn't ~~just~~ set it up properly. The opposing alliance was able to elevate 2 towers, get 4 points off rings, and have the ~~auton~~ auton win of 6 points. We had 1 tower elevated, 1 in home zone, and 23 points off rings. We weren't focused on rings this match. Only 4 of 7 towers scored because each alliance possessed at least 1 of the opposite alliance towers. It was a very good match against a strong alliance.

Match 4

This match, we were paired with 1022 W. We were up against 6264 E and 7842 E. We lost 31-80. Basically what happened was we got stuck under sz on rings for a majority of the match. Someone crashed into our bot and our bot tilted and a ring got lodged underneath. Our teammate was trying to steal towers and play defence. We had 1 tower and 11 points off rings before we got stuck. We did manage to get a win point in auton, but we lost autonomous because our bot and the opposing bot were both fighting over the neutral tower, and our bot got dragged to their home zone, resulting in them automatically winning auton. The opposite alliance had 43 goals in home zone and two towers not in any zone.

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When our bot finally became unstuck, we went to fight for neutral goals. There were 2 unscored neutral goals, one of our alliance goals in their home zone one of ours in our home zone, and they had 2 of their alliance goals. They also got 12 points off rings. I feel like if we hadn't gotten stuck and our motors hadn't overheated (from testing) then the match would've been a lot closer.

Match 5:

This time, we were paired up with 7842X against 7842A and 1290A. Our alliance won 168 to 40. This time, we managed to win auton and get the win point. We were both able to possess a neutral goal and score a ring in our alliance tower base. This match, our 4-bar and drive motors were starting to become overheated, so we had some difficulties with balancing towers. Even with overheated motors, we still managed to help stack towers. We had 3 elevated towers, 2 in home zone, 2 rings in base, and auton win for a total of 168. The opponents got 2 towers in their home zone. Our motors overheated because we were testing/driving in the practice arena just prior to our match. We worked well with 7842X. They had pneumatics, a 4-bar, and a front lift like we had. Our bot didn't focus on rings that match. There isn't a lot of benefit with the ring system for 2 v 2. It comes in handy sometimes, but it isn't our main focus. I think we worked well as an alliance and it was a good match.

Match 6:

This was a very crazy match. We were paired with ring bot 6264A from Shawnigan against 1022B and 6264D. Basically what happened was 6264D couldn't do a lot, and at about the 45 second mark, their battery pack fell out and their bot disconnected right in front of our platform. Our teammate accidentally pushed them into our platform where we had 2 elevated towers. The ref said that we had "forced our opponent into a penalty" therefore they touched our platform and the towers didn't count as elevated. We lost the match because of that call. Our teacher also agreed with us that the call was a little weird and that he was going to go speak with the refs about it. We lost 98-103 because of that call. If our towers had been counted as

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balanced, we would've won 128-103. We had 2 towers in our home zone, but because the 2 elevated ones didn't count, it counted as us having 4 towers in home zone for 80 points, 12 points off rings, and 16 points for auton win. We were also able to get the auton win point this time. 1022B had elevated 2 towers, 1 in zone, 3 points on rings. I personally count this as a win in my books because the rules were confusing. Our teammate was really good at playing defence. We ran into a lot of bad luck this tournament, so hopefully we'll be luckier next time.

Match 7:

In our final match, we paired with 6264E against 1022A and 7842D. This was a very close match, final score of our alliance winning 101-86. Our autonomous went funky, possibly due to lower battery percentage. The opponents got one elevated tower and 12 in home zone. We had 2 elevated and 1 in home zone with 1 ring from auton (our auton missed the yellow tower). Most of driver control was the alliances fighting for goals. After we stacked, we basically played defence and tried to not let the opponents score a lot. Not a lot to say this match. Besides auton, everything else went quite smoothly.

Our final record was 4 wins, 3 losses, placing 6th overall. 1st was 7842X, second was 1022B who went 7-0, then ~~1022~~ 6264 7842P, then 6264B, then 1022C, then us, then 1290B, then 1022A for top 8. Our girls team placed 20th out of 21 teams. Overall, it was great to be able to compete in person again after almost a year with no tournament (not counting school). I'll talk about Alliance selection after judging and skills.

In between matches we talked to other teams and drove around and fixed some issues. Some things were an easy fix and others weren't. We also got carried away testing sometimes that we forget to rest our motors, resulting in the overheated motors in those matches.

In between matches 3 and 4, we went to judging to avoid the long line. This was one of my first experiences with

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in-person judging. One judge was Stu, and the other was from Shawinigan Lake. The judges asked us some questions like "what are you most proud of" and other similar questions. The judges were presented with my notebook and I explained what I wrote and how my notebook was organized. They liked how I colour coded everything and how well organized my notebook was. They asked us whether our goals were established first or whether our bot was built first. I explained to them that our goals came first and we built our bot to fulfill the goals. I also showed them the brainstorming pages and the cost-benefit analysis pages, and I seem to have impressed them. Shota and Thomas talked about the coding and also talked about our bot a bit. Both judges seemed impressed by the build of our bot as well as its build quality. Stu complimented my notebook and said "this is excellent." I felt very accomplished that Stu used the word excellent. Both judges gave us things that we could improve on for next time. First, Stu and the other judge both said that I could add more data into my notebook. He explained that he wanted proof that our bot was 75% consistent. He suggested that I should add data tables and record the different trials. Stu also said for next time that I should let Thomas and Shota speak more next time. We spent a long time at judging that Tim said they waited in line, had a match, came back, and we were still talking. That concluded the judging session. I'll continue to improve on my notebook and listen to the judge's suggestions to do even better next time.

After judging, we went to skills. We got 3 driver and 2 auton runs in. Our first driver we got 130, second was 145, and third was 140. on the 145 run, we could've gotten 165, but I wasted a bit of time balancing towers and we missed home zone by about 3 cm. Sometimes there can be common issues like getting stuck that occur. Having 2 controllers can be a problem sometimes, as communication issues or other issues happen. We will probably switch to one controller for next tournament. For auton skills, we got 20 and then zero. The 20 was pushing a neutral goal. The 0 was the inertial sensor going all funky. Our total driving and auton skills added together was 165 points, putting us in second behind 7842 X, who got 200 driver, 40 auton.

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Earlier, I mentioned how 7842 P would prove me wrong. Their bot is able to balance on the platform with 3 towers, getting 150 points alone.


Alliance Selection:

This had to have been the funniest alliance selection ever so. what happened was our teacher told 1022 A to pick 1022 W, and told us all not to pick 1022 A, but it looks as if 1022 C didn't get the memo. 7842 X picked us as their teammate, and of course I said yes. Tim (1022 B), was next to pick and he was slightly confused. He thought that 7842 X was going to pick them, and his next choice was us. He then picked 1022 C, who said no. Poor Tim was very confused and ended up picking 1290 B, a Brentwood ring bot, over 6264 B. 6264 B got picked by 7842 P, and they formed an alliance. Victor (1022 C) was next to choose. He had just turned down 1022 B to pick... 1022 A. A said no and picked W, so Victor was confused and chose the 9th place bot. Picking continued until all but 1 team was picked. I'm just going to say that (Claremont) messed up on alliance selection. After, playoffs started.

Playoffs:

Playoffs went smoothly. Our alliance won easily and ended up meeting 1022 C in the semifinals. 1022 C had beat 1022 B in the quarterfinals because 1290 B got a penalty that resulted in a loss. 1022 X and 7842 X performed well, our score ranging from 140-200 points in the playoffs. We defeated 1022 C's alliance in the semifinals to face off against 6264 B and 7842 P in the finals. The finals was intense. Everyone was watching. Our alliance won autonomous. The match was super close up until when we got hooked on to 7842 P's robot. They had a screw sticking up on the front of their bot and we got hooked onto their screw. Both of our bots weren't able to do anything, so it was up to 6264 B and 7842 X. We ended up losing in the finals in a very close match. 6264 B and 7842 P got a very well-deserved win with us placing second. I didn't write down the scores in the last match (oops...) but I remember it being a close match. After was the awards ceremony, which I will talk about on the next page.

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Awards:

The final part of the tournament was the awards. 7842 X and our team were presented with the finalist trophies. 7842 X also won sportsmanship and design trophies. 7842 P and 6264 B got the first place trophies. 6264 B also won the Innovate award (previously the create award). 7842 X also won the skills trophy for their 200 driver and 40 programming. The Build Award was given to a 6264 team who had lots of data in their notebook. We were presented with the overall Excellence Award. Stu came up to me after and said two things. One was that I was a very good presenter, and the other was that he was originally going to give us the design award and give 7842 X the Excellence Award, but because we outperformed and outscored 7842 X in the playoffs, they gave us the Excellence Award. I was surprised that 1022 B didn't win anything. I was expecting them to get the create or the Build Award.

Overall, I am very pleased with our tournament results. I would've liked the champions trophy, but oh well, hopefully next time. I will continue to improve on my notebook so hopefully we can defend our Excellence Title. The tourney also let us realize we do want to make slight changes to our bot to make it even better for the Comex and Claremont tourneys.

Dec 13, Build day

We are making some changes after the Shawigan tourney. Firstly, we are improving our auton consistency. Next, Thomas and Shota are both making a skills auton code and we'll see who's works better. We are also shortening the claw, as it works better. We will also remove the hook standoff since we don't really need it anymore. Thomas will also start programming everything onto 1 controller to make things easier.

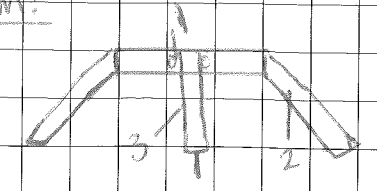
Dec 14, build day

Today we modified the 4-bar more. It was hard for us to properly align our bot with the tower sometimes to lift it, so we added/improved things on our claw. We got rid of the hook, modified the lift standoff a bit, and secured our claw guide. See diagram on following page.

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Claw Diagram:



Key: 1 - standoff to prevent getting too low
 2 - claw guide, helps with alignment
 3 - top of claw, clamps down on tower

Dec 15

Today we modified the bot a bit more and then ran some autonomous tests on both sides for 2v2. Data below.

Right auton (with AWP line). Results from 7 tests.

Trial Number	Success Y/N	What happened/went wrong?
1	Yes	- Everything worked great and lined up well. No issues.
2	Yes	- No issues.
3	No	- The ring didn't score this time and it didn't grab the alliance tower properly.
4	Yes	- Very fast now getting yellow tower. Ring almost missed.
5	No	- Didn't set up properly, missed both towers, angle off. (Our error).
6	Yes	- No issues.
7	Yes	- Worked fine, almost didn't clear line, but it worked.

Auton (right) worked 5/7 times. It is 71% consistent. If we hadn't aligned our bot wrong that time, it might have worked. Thomas will see if he can change the code to make it even better. Will test left auton on the 16th (after school).

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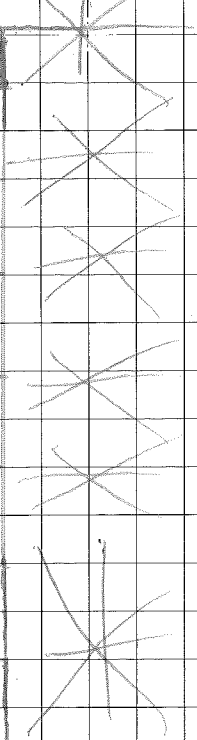
Dec 16

No further modifications were made to our bot. Images attached on pages 54 and 55. Did more programming for skills auton, ran left bot auton tests after school. Results below.

Left auton tests (7 trials).

Dec 17, SZ

Trial Number	Success? Y/N	What happened/went wrong?
1	Yes	-Almost dropped yellow goal
2	No	-Ring bounced out of tower base.
3	No	-Ring bounced out again, missed yellow goal.
4	Yes	-Nothing went wrong
5	Yes	-Everything went fine.
6	Yes	-Worked fine
7	No	-Ring bounced out again.



The left auton worked 4/7 times, or 57 percent of the time. We seem to have trouble with the ring bouncing out whenever we line the slide too close to the tower base. We will see if there is an easier way to make it consistent. Overall, our bot is 64% consistent in auton.

Dec 17

Not much was done today. We just had fun since it was the last day of school. Over the break the code will all be moved to 1 controller. After break, we will keep programming and running skills auton.

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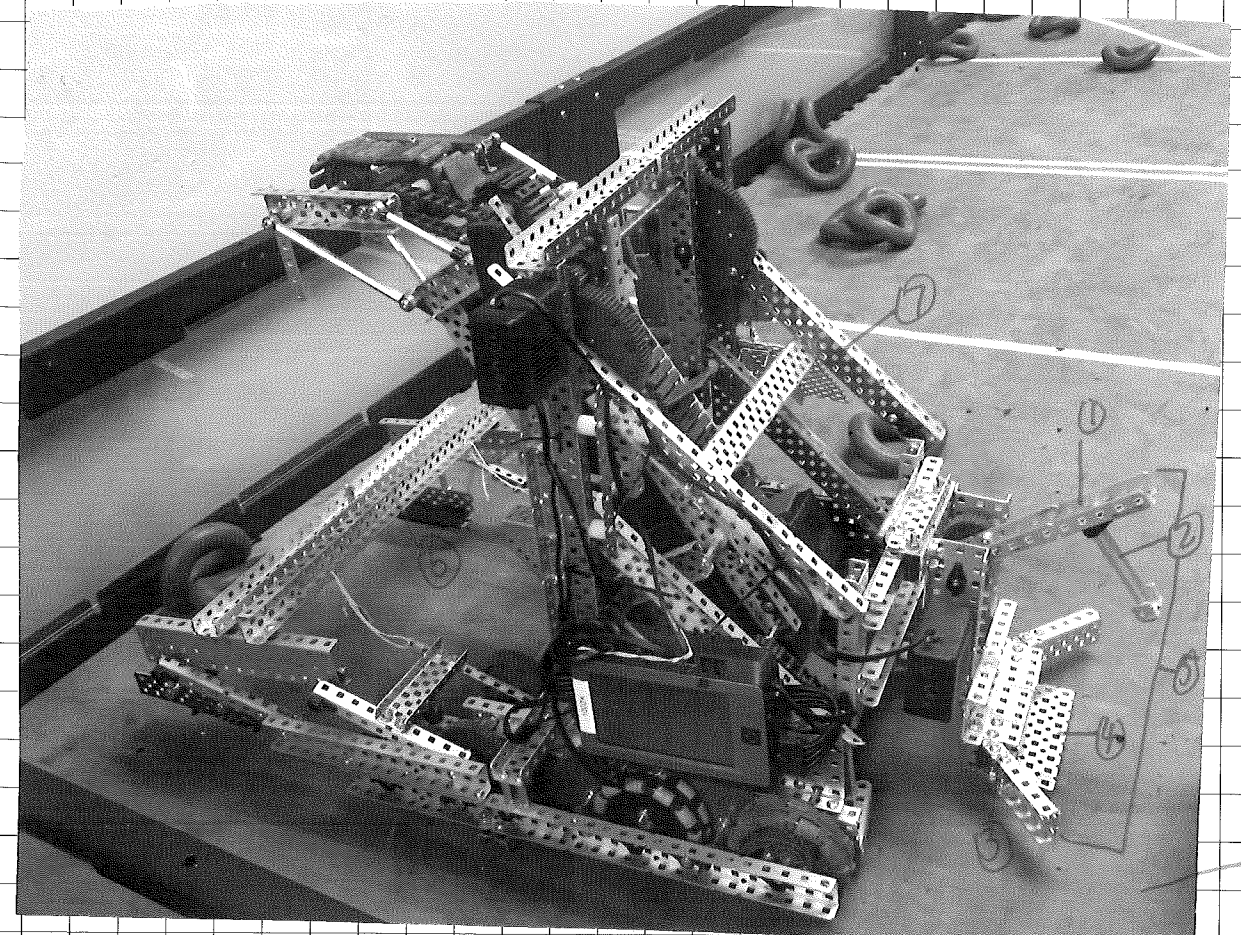
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Bot image, left view



- Key:
- ① - Clamps down on tower (upper claw)
 - ② - Standoff/claw support/hook (grabs tower so you don't drop it)
 - ③ - Lower claw/guide. Makes alignment easier.
 - ④ - Support plate, easier to grab tower, (prevent dropping).
 - ⑤ - Claw (grabs towers)
 - ⑥ - Front lift (for mobile goals and ring scoring)
 - ⑦ - 4 bar lift (lifts towers)

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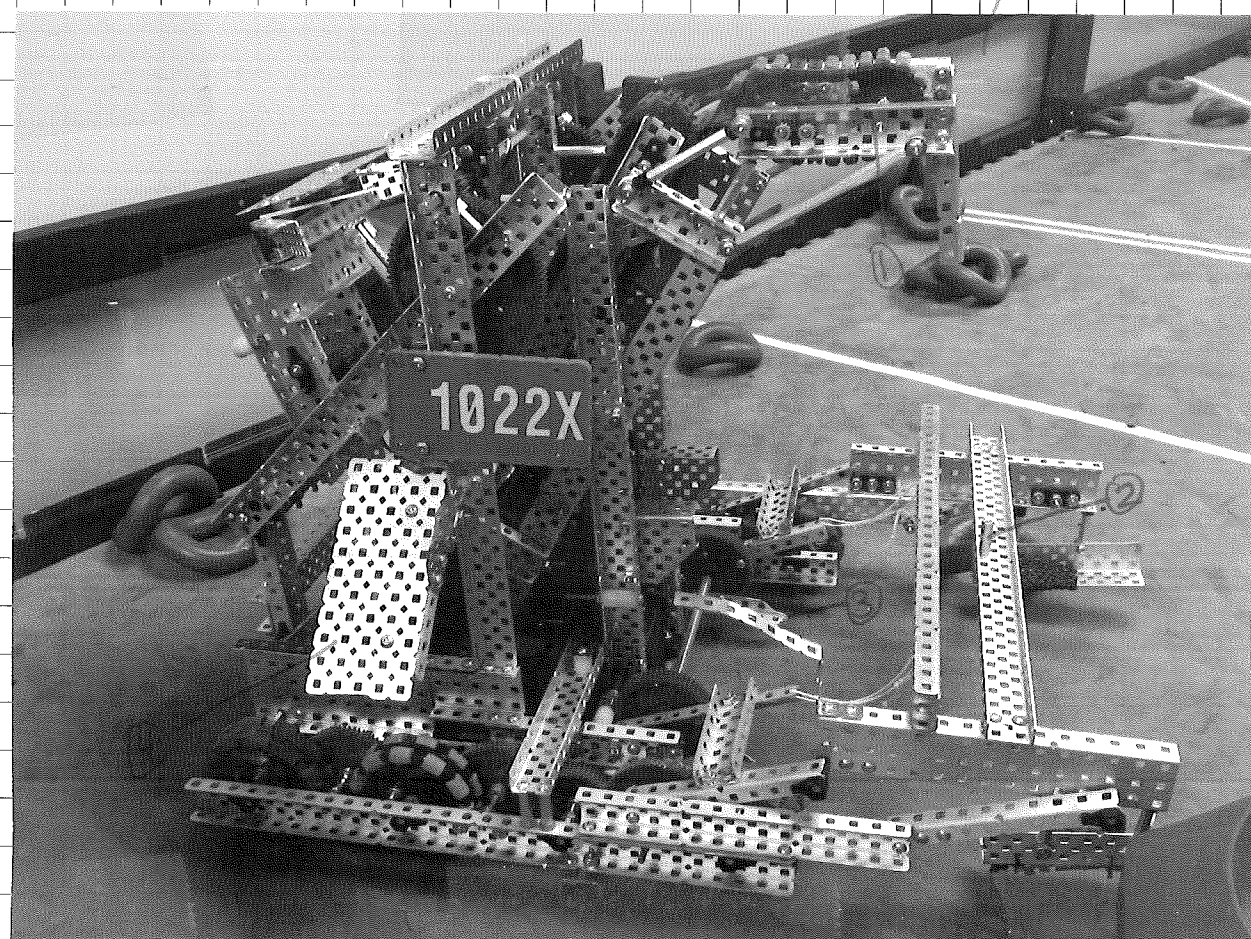
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Dec 17, Right view



- Key:
- ① - Ring guide (helps with scoring rings on post).
 - ② - standoff for ring to go on for right 2v2 autonomous.
 - ③ - tower hook, (hooks onto tower to make it hard to steal) or lock
 - ④ - "slide" for ring for left auton.

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Jan 11

First build day back. Our school has shifted temporarily to cooperman timetable, with alternating blocks on different days. 2.5 hours of building, and then back again on the 13th. Unfortunately, the Comox and Clonemo tournaments are both cancelled. There will be a live remote skills competition on the 29th, similar to what we had last year. Today, we drove the bot around to test the controls on the single controller, and honestly, I think it works better than 2 controllers. Also did more programming.

Jan 13

Thomas says our auton works beautifully now. He says out of all the times he tested, they all worked. We will have to run some again another day so I can record it. The whole class did skills runs today. We did it 3 times for driver, scoring 140, 145, 181. We ran programming skills once today too, but it only got 20. Thomas continued to program the rest of class.

Jan 17

More skills today. We added a second standoff for the front lift for the auton preload ring. Tried driver skills a few more times and still didn't beat 181. We scored 160 a few times. We tried skills auton and got 20, 40, 60. We are currently first for skills right now, total score of 241. Johnny somehow got 200 in driver skills; he's the highest driver score right now. We will continue programming for the URS on the 29th.

Jan 19

Final in class tourney started today. We had 6 matches today. Match 1 was with 1022 Z against 1022 B and Q. We won 103-63. We won auton and our right auton succeeded again. The other team had 1 elevated tower, 1 in base, 3 points off rings. We had 1 elevated tower, 2 in base, and 17 points off rings. Plus the 6 points from auton, it put us at 103. Z was very good at playing defence since their bot is very fast and they have a super skilled driver.

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Match 2:

This match, we were paired with E against Q and A. We won 133-20. We won auton again, this time with left auton. The ring somehow bounced out of the base again, but we got neutral goals. A and Q had 1 tower in home zone and we had one elevated, ~~one~~^{two} in home zone, 3 rings on pipe, 3 rings in base. 27 points total off rings. We work really well with E and their hook is very effective.

Match 3:

This match we paired with Q against E, C. Because the matches are back to back (with match 2), our motors were slightly overheated. We lost 66-85. At first, we stacked 2 towers, but Victor tipped the platform and they fell off. We spent a lot of time trying to tell Julia what to do, and we spent many attempts trying to stack a tower. At the last second, we managed to stack one, but Paan didn't count it as elevated because the platform was ever so slightly apart. If that tower was elevated, we would've won by 1. We won auton and had 3 in homezone for a total of 66, while the other team had 1 elevated, 1 ring, 2 in home zone. I personally think we definitely could've won this match, but oh well.

Match 4

This match we paired with Z against E, C. We won auton and had 2 goals in home zone. Our bot got stuck on rings for most of driver control, so it was up to Z to play defence. We lost 46-100. E, C had one elevated and 3 in homezone. Somehow, we got stuck. I think it's because we got hit, tipped slightly, and a ring got under.

Match 5:

Paired with A against Q, W. Our bot somehow got stuck again, but luckily Johnny was able to help us get unstuck. We won 85-66, winning auton again. W and Q both performed well this match and we didn't help A much due to getting stuck. We will need to fix that problem later.

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Match 6:

Last match of today, we paired with E against B, W. We won auton, had a ring that fell out, elevated 2 towers, one in home zone. B had 1 elevated and 2 in home zone. We won 106-80. Last few seconds while we were elevating towers, E was preventing W from getting up the ramp. We work well with E, hopefully can pair up for alliance selection.

Our record today is 4-2. Currently second, E in first. Tourney will continue on Friday.

Jan 21:

This morning, I had a spare, so I went to drive the bot around a bit. Mason was in the room too, recording and testing auton. B managed to get 40 in auton, and ~~then~~ then Tim got 180 driver to put them at 220 points. Our lead wasn't looking too good all of a sudden. A also got 20 in auton, putting them at 220 as well. During lunch break, Thomas got 200 driver, putting us at 260. Tim tried and almost got 220, but right at the end his bot arm dropped and a bolt was touching the platform, so the towers weren't elevated. He ended up with 180 again, but I let him write 220 on the scoreboard because he deserved it. We ended up securing our place on the 1022 cup for skills, defending our title from last year. This afternoon, we continued the tourney.

Match 7

This match we paired with A against E and Z. We won 87-82 because of auton. We had 1 ring, 1 elevated tower, 2 in zone and EZ had 4 in zone and 2 rings. Had it not been for auton, we would've lost that match. This match, we missed the yellow goal, but A got it and we still won auton. This proves how important autonomous really is to the score of the match.

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Match 8

We paired with B, against E, Z. We lost 100-87. We won auton and had 1 ring and 2 elevated goals. They had the other 5 goals. Our motors were overheating and we couldn't stack or drive straight. One of the gears on our tower ~~box~~ is chipped, so we have to replace that. I feel bad for causing B to ~~lose~~ ^{lose} 2. We basically made them lose, so hopefully we can make up for it next match with them.

Match 9

We paired with E against C, W. We won 157-20. We originally had 2 towers stacked until Victor tipped the platform. W was just driving around and almost ~~climbed~~ ^{climbed} up of E's bot (Mason was driving W's bot the whole day since Abby went home sick). E was able to make it up the ramp with 2 towers after Victor tipped the platform. E got us 110 points by balancing, and then we had 2 in zone, 1 ring, and auton win. It was a blowout and E performed really well this match. Hopefully they pick us for alliance selection.

Match 10

This match, we were with B again against W and Z. WZ got elevated bot and tower and one tower in base. We elevated 2 towers, had 2 in home zone, 8 points off rings, and auton win for a score of 134-90. Mason was a lot better this match (he tried driving on us and causing chaos). Tim also performed well this match, and hopefully we helped make up for the loss last time.

Match 11

Paired with Z against Q, C. Won 148-40. We won auton, scored 2 rings, elevated 2 towers and had 3 in base. Q, C had 2 goals in their alliance base (or zone). We also work quite well with 1022Z, they might even be an option for alliance selection. Q, C had two towers of their colour we had ours as well as the neutral goals. We have won auton for all of our matches, so it looks like Thomas was right.

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Match 12

Last match of round robin we paired with W against A, Z. We lost 73-81. We would've won, but Thomas tried to elevate a goal at the end and our front lift was outside the line, thus disqualifying our own goal. We would've won 93-81. We had 1 tower elevated, 2 ~~in~~ ⁱⁿ zone, 7 points on rings, 6 from auton. A, Z had 1 elevated and 2 in zone and 1 ring. Mason played great defence this match and we caused the loss this time.

Overall, we went on an 8-4 record, coming in second after E, who was 9-3. Alliance selection will occur on Tuesday. E said they would pick B, A, or X. We will pick B, A, Z or say yes to E. Our performance overall could've been better, I definitely don't think we did our best. We could've won the last match, but whatever, we'll see how alliance ~~selection~~ ^{selection} and playoffs go.

Jan 25

Alliance selection: E picked B, we picked Z, W picked A, C and Q were an alliance. We started with semis. Our alliance went against W and A. Everything was best 2 out of 3. We won in 3 matches, beating them 2-1. ~~EB~~ won 2-0. EB then faced us. They won 2-0. First match was close. Second match our bot broke and our brain died from all of the ramming. I didn't enjoy playoffs. There was a lot of cheating for other players. They continuously pinned us, didn't back off. It's not fun when people don't follow the rules. We'll focus on CRS this Saturday.

Jan 29

Things just haven't been going right lately. We placed 4th in CRS, missing the podium by 5 points. We got 240 total, 3rd got 244. B came second with 280 and then 7842X with 303 total (200 driver, 103 auton). Thomas hasn't been programming skills and it wasn't very well done since it was rushed. Driver was alright, few mistakes, but it was the programming that cost us. Getting stuck was also a slight problem, but not the main issue. We got 180 driver, which was alright. We have been encountering a lot of problems lately, will focus on Comix turnney.

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Feb 11

Preparing for the Comex journey tomorrow. Drove around a bit today. Ring system works great. 100% consistent (if the system is in optimal spot. If not about 80-95%). Tested auton. Data below. 7 tests.

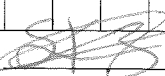
Right ^{SE} auton (AWP line) SE

Trial	Success?	What happened?
1	Yes	-Worked great
2	No	-Turned too early, missed yellow tower. -Ring scored
3	No	-Same problem. Turned too early, dropped yellow goal. -Ring scored.
4	No	-Angle wrong (human error) -Ring scored
5	Yes	-Set up a little more forward and worked
6	No	-Motors burnt, didn't pick up.
7	Yes	-Worked again

Analysis: Worked 3/7 times, less than 50% of the time. These issues occurred because we wanted to speed up the auton. It caused issues and turned too soon. We will need to do some code changes for the journey tomorrow. Right auton on next page.

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BOOK NO.

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continued:

Right auton (AWP line)

Trial	Success	What happened?
1	Yes	-Worked fine, almost dropped tower.
2	Yes	-As planned
3	Yes	-No issues
4	Yes	-No issues
5	Yes	-No issues
6	No	-Angle! stuck on ring.
7	Yes	-No issues

Analysis: Worked 6/7 times. This side is much more consistent than the left. We will do more left tests tomorrow. Worked 9/14 times total (both sides). Definitely can get the win point, it's just a matter of whether or not we can get the neutral goal.

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BOOK NO.

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Feb 12

Today was the tourney at Highland Secondary. I got so excited that I forgot write stuff down. The first match we paired with 7842 C and we got 227 points vs the opposing alliance. The opposing alliance got 40 points. We stacked one of their alliance towers on our side (sort of a joke). Right after I thought we got the highest score of the day, and then 7842 X got 235 points in the match immediately after, which I thought was really funny. We went allied with 7842 X for the whole tournament. We also went against them once and lost 101-69. That was the only match we lost. The match we had against B, their claw cartridge flew off and the 4-bar stopped working too. I also thought that was funny too. 7842 X already said they wanted to pick us for alliance selection, and we wanted to maximize those chances. 7842 X lost to C because they had a bad claw and accidentally dropped the tower out of play. 7842 P ended up going 8-0 and winning 1st overall in round robin. They picked 7842 C. 7842 X picked us. Our ring guards work super efficiently. We can ~~now~~ navigate a lot easier now and we don't get stuck on rings anymore. We ended up winning the tournament with 7842 X. They also won skills and excellence while we won build too. Claremont won 6/8 major awards (judged). 7842 X and us both went 7-1. They won Excellence because they created a programming journal. It was a digital website explaining everything about their program. It was very clever of them, they deserved the award. Overall, it was a really good tourney. We were very satisfied with our performance. This is basically what we want our bot to be like. Changes such as making the ring system more consistent will be goals for next time. We also hope to get 350 in skills. We almost got 260, but we were touching the platform at the end, which sucked a lot. We want to do our best to maximize our chances at world qualifiers in March. Also we somehow didn't run skills auton, which I thought was incredibly weird. I think we were cooling down our motors and then forget. Hopefully next tourney we'll remember.

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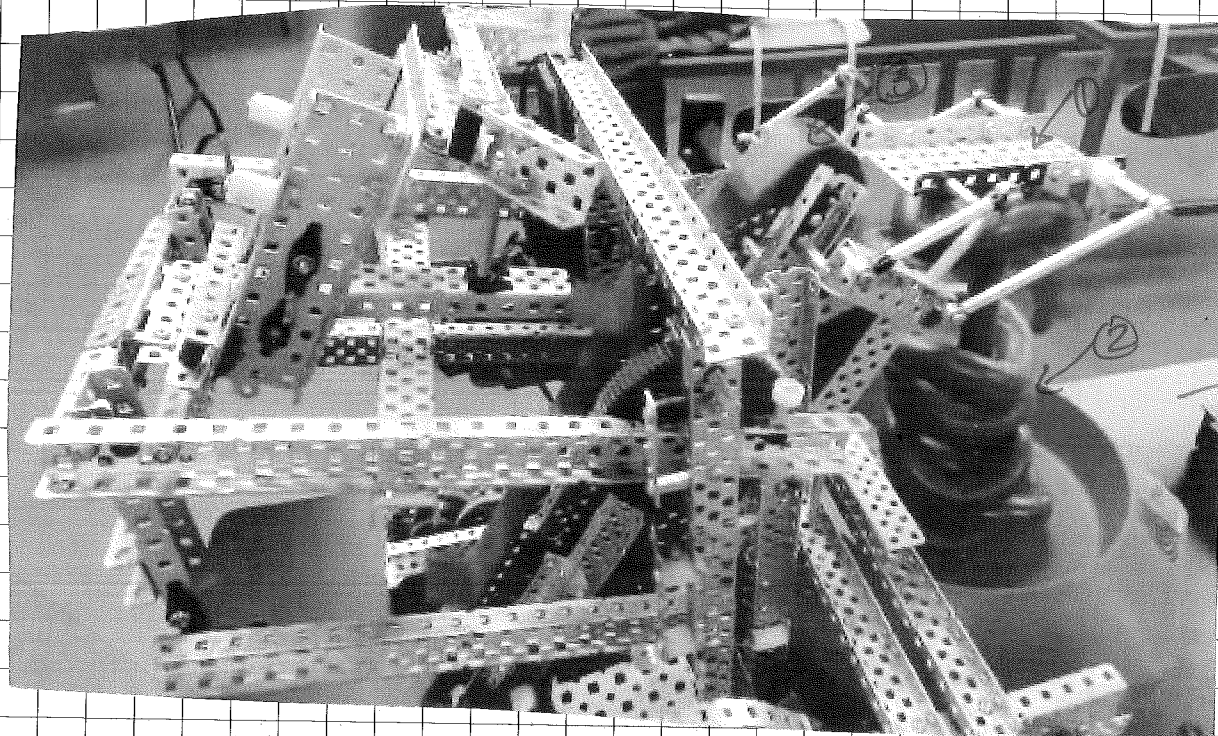
DATE Feb 12

BOOK NO. 1

Feb 15

Changed our guide. It's now more consistent and less reliant on proper direction of rings. Shortened slide slightly, a little over the size limit. See image below.

Note: printer out of colour ink



Bot, side view 2/15/22

- 1) New guide - guides the rings onto the post a lot quicker now also more tension added in chain.
- 2) The rings from the testing of our guide. Tested 10 rings, all scored.
- 3) Conveyor belt - intake for feeding rings to post.

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DATE Feb 15

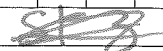
BOOK NO. 1

March 5

Today was the day of the provincials (worlds qualifiers) in Shawnigan and good news! We qualified for worlds! We won Design, but unfortunately we lost to 7842 P and C in semis. Andrew (7842X) made a mistake that cost us the match. I don't blame him though, as everyone makes mistakes. We also beat 7842X in the match we had against them. Our ring guards work incredibly well. We don't have to worry about getting stuck again. I had to leave the tourney early, but I was able to stay for 4 of 7 matches. The matches that I was able to watch went really well. We basically carried every single match and our bot performed better than ever. We finished round robin with a 7-0 record in first place, winning all of the match autons too. 1022 B was second, also 7-0, but 1 less auton win. 7842X finished in 6th, 5-2 record (lost to us and 1022C). We ended up picking 7842X in alliance selection again. 1022B ended up picking 1022A and they won the tournament together, beating 7842 C/P in the finals. 3 Claremont teams qualified for Worlds in Dallas this year. 7842X won Excellence and skills and 1022C won sportsmanship. So the 4 teams that qualified for worlds this year are 1022 A, B, X and 7842X. Claremont took 3 of 4 qualifying spots. This is unreal. Paan is quite happy. We are all hoping for some pneumatics for worlds. Apparently there will be an added journey in April as a "practice" for worlds. The date is April 23rd Location TBA. We're still unsure if we will actually go to Worlds. With testing restrictions and district approval, there's a chance the trip won't be approved. We are all crossing our fingers the trip will be approved. For skills, we got 262 driver and 80 auton. Andrew then got 318 driver along with 132 auton, putting them in first with 450 pts. Tim got 260 driver, 100 auton, putting him in second and us in third. We are now thinking about fundraising such as bottle drives and stuff. The cost would be between \$2000-2500, which is quite a lot. We will also start modifying our bot for worlds. Most likely 6 motor drive + pneumatics for claw/lift and ring system. Dallas, here we come!

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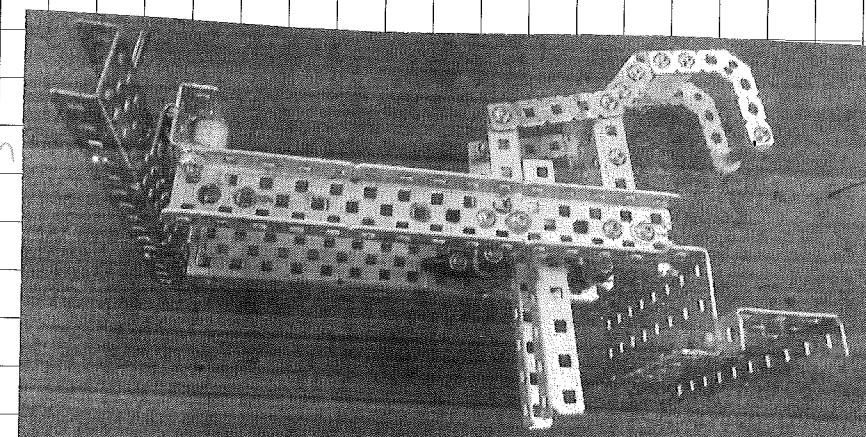
March 8

Took a few days off and now we are back to building. Our current goal is to keep the same bot, but add pneumatics and potentially be able to possess 3 towers. Waiting for pneumatics and approval. I got a new laptop too, as the old one had many issues. Starting to design a new claw for 3rd tower.

March 11

Thomas finished the claw today. It's also a locking claw and looks quite promising right now. See image below.

Mar 11, New locking claw.



*Printer ran out of colour cartridge.

The claw would likely go on either side of our bot, so we would be able to possess 3 towers. If we could platform with that, that would make an amazing skills and game auton. We will put the claw on our bot and test platforming with 3 towers to see how that goes. If this works, we could potentially get a 200 skills auton which would be insane. Just waiting for pneumatics now. We will for sure keep our base as it has been working incredibly for us right now. That will likely be the pneumatics claw. VEX is sold out right now, so we'll have to buy them elsewhere. Hoping trip is approved.

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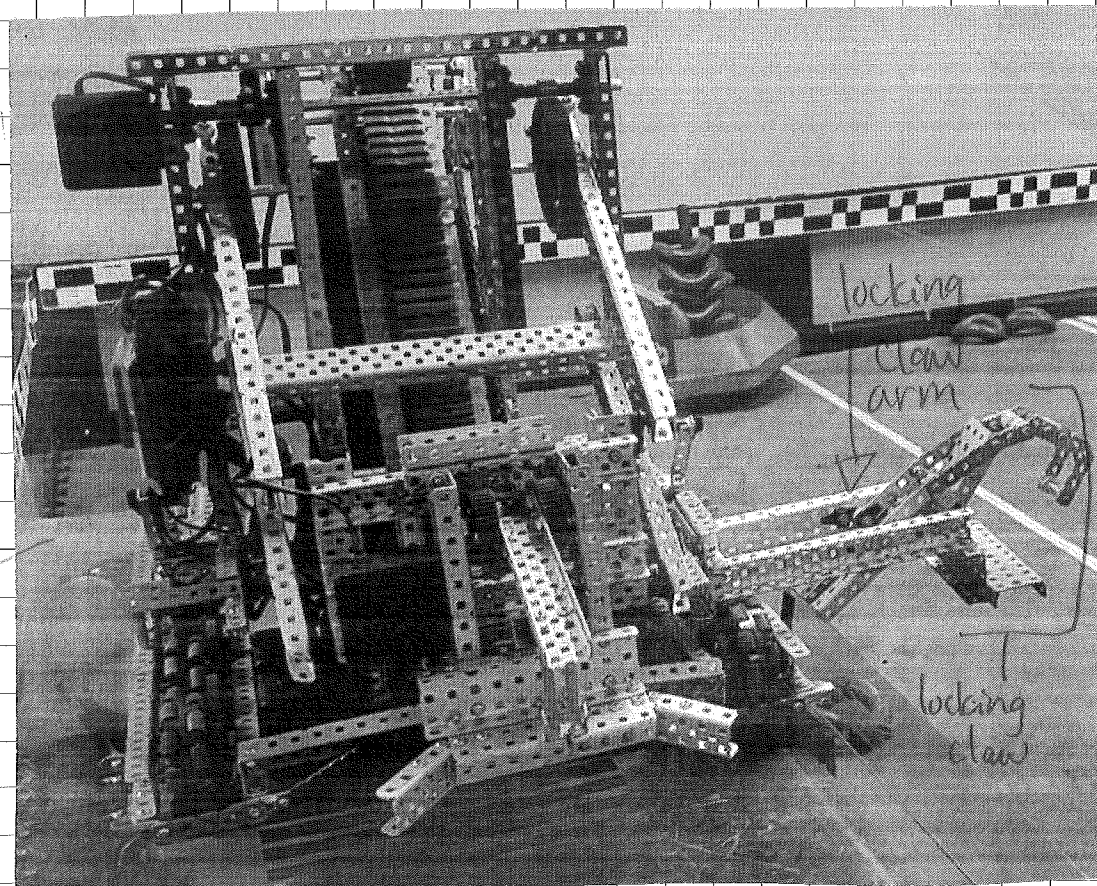
DATE 3/11/22

BOOK NO. 1

Mar 14

Our trip has been approved! Plane tickets & hotels have been bought too. We're going for sure. Talking about fundraising and other stuff now. The claw has been added to our bot. It flips out like our 4-bar claw. See image below

Bot image, Mar 14



Didn't get a chance to platform with 3 towers yet. That's our next goal. Maybe we can create a 3 tower game auton too...

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