Team LEBOB's

Documentation

2025 Unearthed

Members:
Kingsley Wong
Sean Chan
Oliver Liu
Leven Shi
Subesh Sukumaran
Yuxin (Chris) Wang
Aaron Zhang
Andre Nijman

Overview

This is our team Lebob's documentation for FLL 2025. It shows what we did each week in each session. We usually have 1-hour sessions on Thursday, for working to compete in this year's FIRST Lego League. We started late, during late August, so we had limited time to get everything done.

It was reduced to about 15 weeks.

Week 1: Innovations Meeting and Brainstorming, while helping other teams in our school.

Week 2 & 3: Split into sub-teams to work on different aspects of the competition. Base robot work, base programming.

Week 4 & 5: Strategy for robot game. Start work on mechanisms for each of our runs. Innovation ideas chosen and started working on them.

Week 6: Coding robot runs. More on innovations project.

Week 7: Coding robot runs and making more mechanisms.

Week 8: Complete all mechanisms.

Week 9: Complete code. Testing for innovations project.

Week 10: Practice runs, finalise innovations project and documentations/PPT

Week 11: School camp

Week 12: Holidays

Week 13: Holidays

Week 14 (after regionals): We are planning to make all the mechanisms and split into teams to code as well assign innovation jobs to people to finish it on time

Week 15 (after regionals): We are planning to code all the mechanisms as well as put the innovations together

Week 1 27/8/25

This is when we were informed that we successfully signed up for FLL, so the building season starts here.

Programming

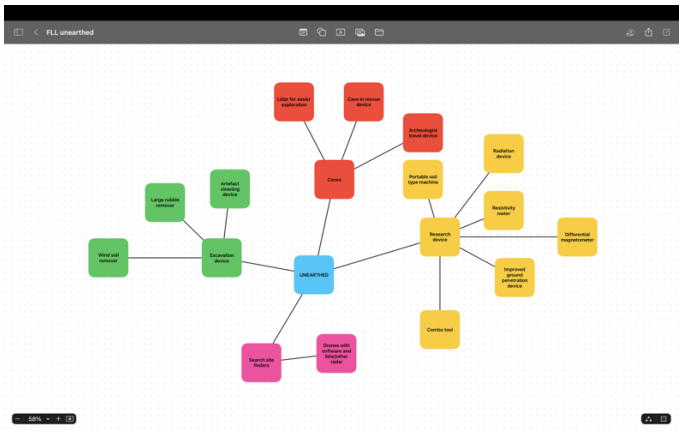
Installed Pybricks firmware onto our Spike so that we can code in Python, a coding language that provides more depth and control over our robot but still accessible to all our team members as it is taught at school.

Mechanical

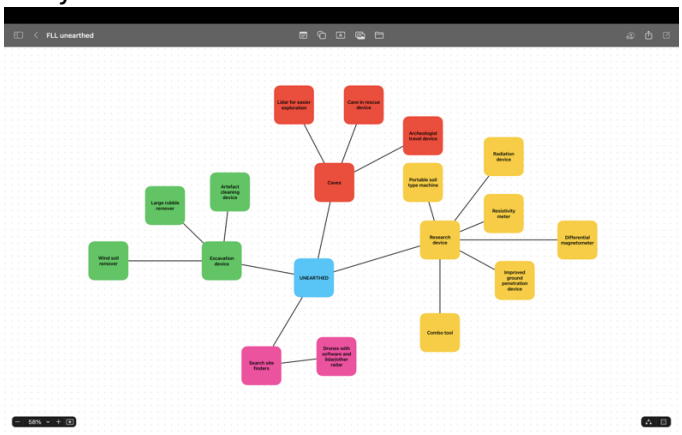
Worked on base robot and completed about 50% of robot, improvements still need to be made. The base robot is made with our improvements from last year in mind.

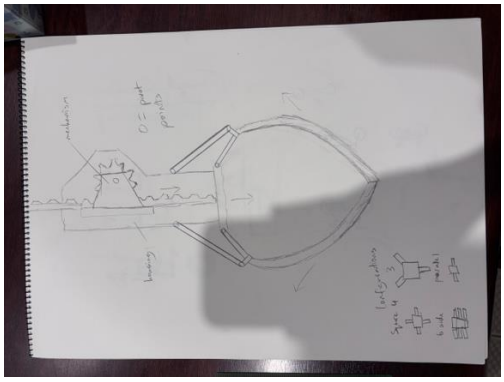
Innovations

Worked on a mind map/brainstorm of ideas for innovation project after a short innovation meeting/discussion about this year's topic.



Innovation Timeline

Term 3	What we need to do	Due dates
Week 1	Brainstorm ideas Early brainstorm: 	Confirm idea – week 4 ☒

Week 2	idea expand on: looked at doing a small remote controlled vehicle that could reach places that humans couldn't and map out the surrounding area	Sketch drawings – week 4 CANCELLED
Week 3	More brainstorms: NEW IDEAS: General: - Brush that changes stiffness/fine ness - Multitool, sort of like a swiss army knife except with tools like dental picks, trowel (maybe separately used), brushes Underwater/marine: - Pouch that holds tools - Box that has a sieve in it, can retract the sieve to fit the box under the sand/soil, then activate the sieve to lift the artifact out without collecting sand/soil with it - ROV manipulator arms, improve on the "hand" portion to make it better to grip, shape adapting material which uses radiation to harden? Arctic/Cold environment: - Permafrost remover Settled on early idea of improving manipulator arms	Permanent idea – week 4 ☒
Week 4	Permanent idea selected – improving on manipulator arms and grabbing mechanism	Sketch drawings – week 8 ☒
Week 5	Focused on idea of figuring out the best configuration of fingers to grip the largest variety of objects	Get list of total configs – T4 week 2 ☒
Week 6	Found a way of testing the various designs and how well they work to grip objects	Create grip objects – T4 week 4 ☒
Week 7	Finish basic mechanism for the sketch drawings: 	
Week 8	ROBOT MISSION MODELS	
Week 9	ROBOT MISSION MODELS	
Week 10	ROBOT MISSION MODELS	

Term 4	What we did	Due dates
Week 1	Start cad models	Cad models – week 4
Week 2	Decided on configurations: 4 in a square, 3 in a standard shape, 2 in a standard shape and 6 with 3 on each side	Finish creating the models by week 6 ☐
Week 3	Created 3 of the 4 test objects	

Week 4	Finished the last test object	Finish testing – week 7
Week 5	Start testing	
Week 6	Start script	
Week 7	Finish everything	

Other

Started the documentation process for our timeline of what we did. We were helping other teams as part of our school as we are considered seniors in FLL (Even though most of us have only done 1 competition)

Week 2 4/9/25

Programming

Started working on the base code for our robot this year, mainly used our last year's code as it is very versatile, and we just needed to change the motor ports and some battery tweaks.

Mechanical

Completed initial base robot.

Innovations

Idea to expand on: looked at doing a small remote-controlled vehicle that could reach places that humans couldn't and map out the surrounding area. Started 3d modelling of our project.

Week 3 11/9/25

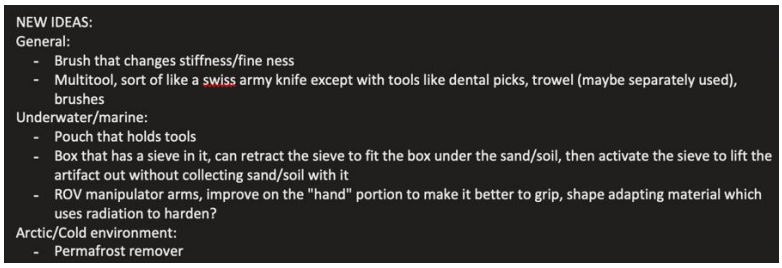
Programming

Added more code to create a more adaptive system, as a base. Adding things such as smart turn, which turns exact degrees using the robots gyro.

Mechanical

Started making some parts in preparation for completing missions in future weeks. We are planning to make parts for our first run which will hope to complete 2 missions on the left side of the board

Innovations



Settled on early idea of improving manipulator arms

Week 4 18/9/25

Mechanical

Made more parts for some runs. We are also improving the attachment for run 1, to complete the 2 missions. And we have started developing some for Run 2 which will transition to the other home base on the left side

Innovations

Permanent idea selected – improving on manipulator arms and grabbing mechanism

Week 5 25/9/25

Programming

We have started to code using our base code for Run 1, hoping to complete mission 1 and the mine rail.

Mechanical

Further development on the attachments for both week 1 and 2.

Innovations

Focused on idea of figuring out the best configuration of fingers to grip the largest variety of objects

Week 6 2/10/25

Programming

We have done more altering of run code for run 1. Managing to create a consistently working code for it.

Mechanical

We finished altering our mechanism for run 1.

Innovations

Found a way of testing the various designs and how well they work to grip objects.

Week 7 9/10/25

Programming

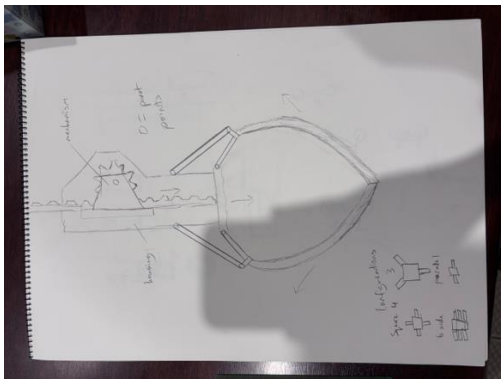
This week, we began to code for the mine rail.

Mechanical

One issue we faced was the weight of the thing we had to lift. Since the mechanism on our robot was too weak, and so was the motor, we had to find a solution, so we changed our gear ratio to increase the torque

Innovations

Finish basic mechanism for the sketch drawings:



Week 8 16/10/25

Programming

Finished coding for

Mechanical

We managed to finish run one this week, and have started making a mechanism for run three, which will complete some missions on the right side of the board.

Innovations

Improved cad models and simulated the connections.

Week 9 23/10/25

Mechanical

We ran run1 once this week, but it broke, so we have just moved on planning to come back to it with new insights in a week or two. We have started coding for run two though this week, and have done some more on the mechanism for run 3

Innovations

We tried a linear mechanism and a claw that moved with gears. We would use the gear mechanism for controlling the fingers and their grip strength

Week 10 6/11/25

Programming

This week, we started coding run 3 as well as run 2. We are almost finished with run 2, and everything is going smoothly for it.

Mechanical

The mechanism for run 3 was finished today

Innovations

We decided on the linear mechanism to control all the fingers because it would be the cheapest to assemble.

Week 11 13/11/25

Programming

This week we finished coding run 3, and made small adjustments to run 2s code although it is still incomplete.

Innovations

Completed the rack and pinion mechanism for the linear claw and 3d printed a prototype.

Week 12 20/11/25

Programming

This week we finished run 2s code

Mechanical

Our mechanism for run 3 has been lost, so we need to either find or rebuild it.

Innovations

Decided on configurations: 4 in a square, 3 in a standard shape, 2 in a standard shape and 6 with 3 on each side.

Week 13 29/11/25

Programming

Today we gathered at someone's house and made final alterations to all run codes, making sure they all consistently work.

Mechanical

Our mechanisms have not been altered this week.

Other:

Decided board members, for the 4 runs.

Week 14 4/12/25

Programming

Today we planned out some new mission routes to gain more points

Mechanical

We started designing new mechanisms for our new runs.

Week 14 6/12/25

Programming

Today we went to someone's house and made huge progress on the programming of the majority of the missions.

Mechanical

The mechanisms were changed slightly, but not to a great extent.

Other

We did a lot of script and presentation editing.

Week 14 7/12/25

Programming

Today we went to Kingsley's house and made a large chunk of progress in the code.

Mechanical

The mechanisms were changed slightly, but not to a great extent.

Week 15 11/12/25

Programming

Today we mostly made progress on mission 2, which has recently been proving extremely difficult and finicky.

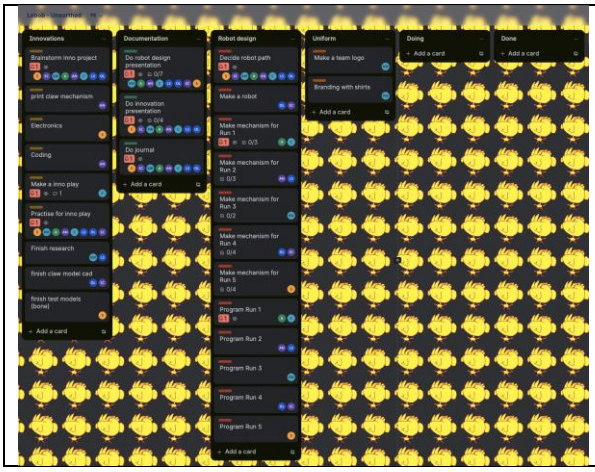
Mechanical

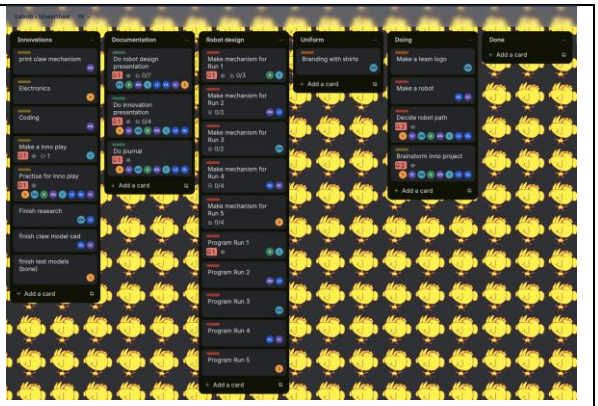
Our mechanisms have not been altered this week.

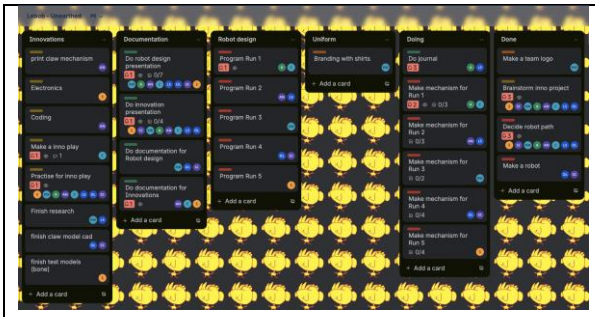
Trello

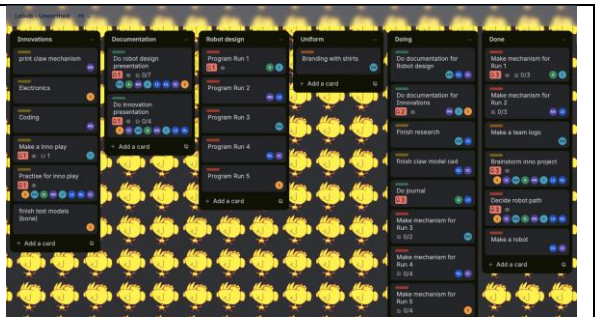
We used Trello for organisation and planning of what tasks needed to be done and when. These are some images of the Trello board that we had.

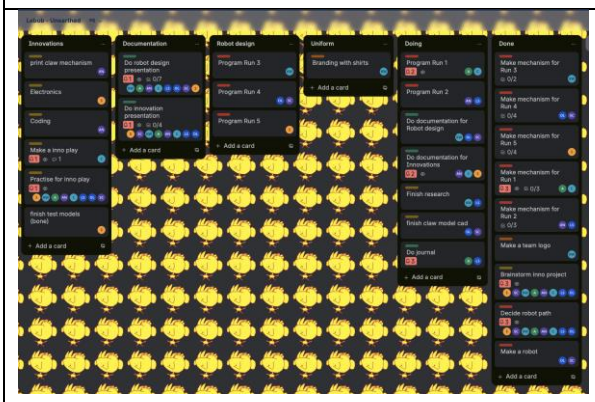
Trello link:
https://trello.com/invite/b/690ee01dcd2d2b103e6a91e6/ATTI1f00a3a48654a7352e8e3868baf20b71FDB3998D/lebob-unearthed

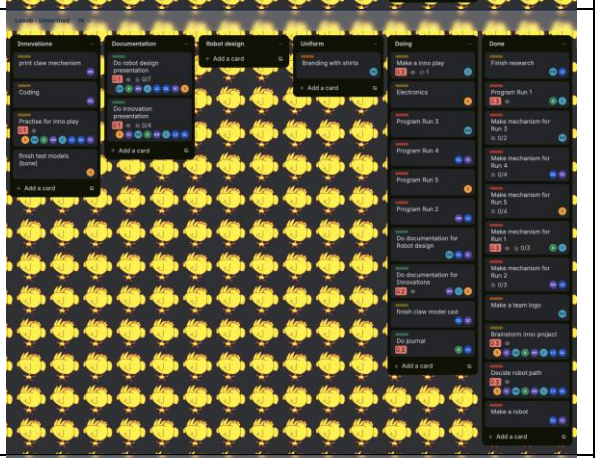


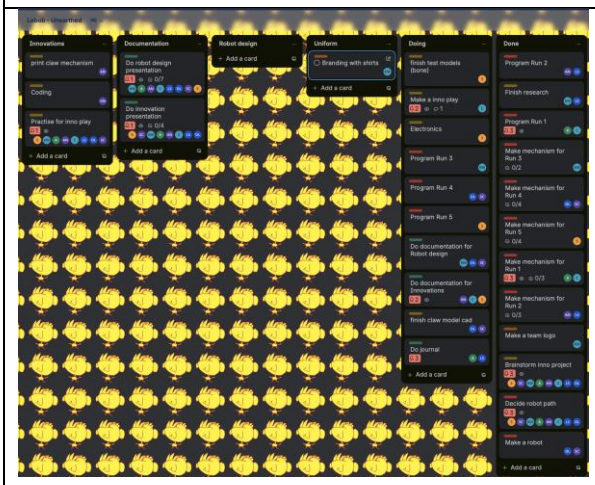


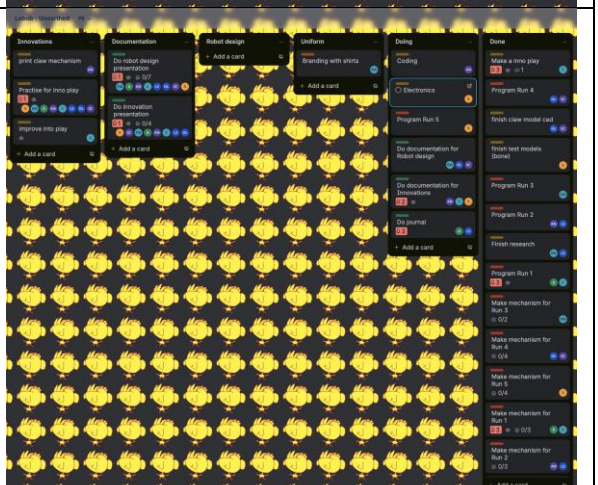


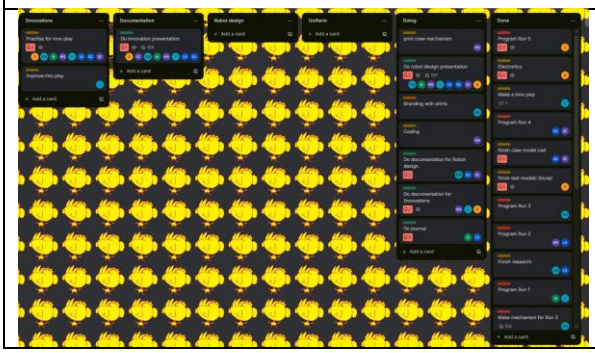


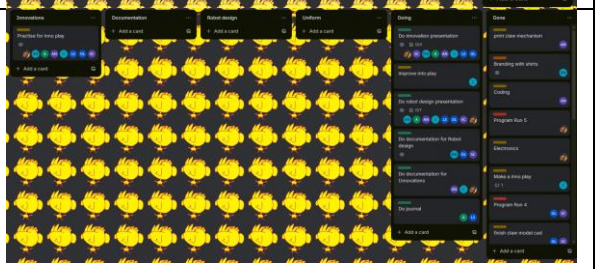


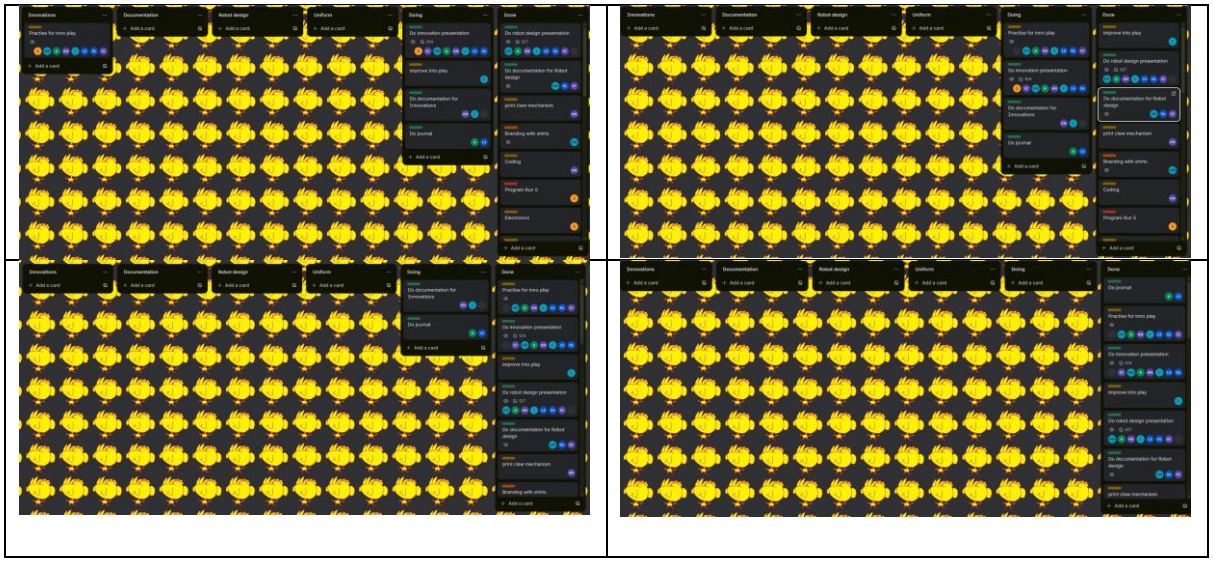












Log:

1st of December (one day after regionals) - Monday (run 1)

13:17:32 – run 1. Failed clearing the soil for the first time after building the mechanism
13:18:00 – run 1. Didn't go forward enough
13:18:28 – run 1. Didn't turn enough towards the soil
13:19:21 – run 1. Didn't turn enough towards the soil
13:20:39 – run 1. Turned too much towards the soil
13:21:20 – run 1. Turned perfectly but was too close to the soil so when the right arm came down it went too far across the soil
13:22:12 – run 1. Alignment issue
13:22:48 – run 1. Turned perfectly we are too far away from the soil, and the right arm came down it didn't touch
13:23:17 – run 1. Missed the brush for some reason so it ended up misaligning
13:23:51 – run 1. Alignment again
13:24:24 – run 1. Turned perfectly again but did not put the right arm down because the mechanism broke
13:26:08 – run 1. Didn't turn enough
13:27:30 – run 1. Raised the left arm too high so it missed the brush
13:27:58 – run 1. The right arm didn't go down enough
13:28:23 – run 1. The robot was too close to the soil again
13:29:01 – run 1. The robot went too far from the soil

2nd December – Tuesday (run 1/2)

13:16:07 – run 1. The robot is too close to the soil
13:16:49 – run 1. The robot put the right arm down perfectly and after aligning right but didn't go forward enough
13:17:35 – run 1. The robot got caught on one of the studs, so we are designing it again
13:18:58 – run 1. The robot got caught again so we are changing it again
13:20:44 – run 1. It worked but it did not pick up the soil piece
13:21:09 – run 1. It did the same thing as last run
13:21:57 – run 1. It did the same thing again
13:22:06 – run 1. It picked it up this time but did not move the red piece one
13:22:41 – run 1. It worked fully
13:23:15 – run 1. Retested it and we aligned it wrong
13:23:58 – run 1. It didn't pick the piece up
13:24:26 – run 1. It worked fully
13:25:03 – run 1. It worked fully again
13:25:47 – run 1. It worked fully again
13:26:14 – run 1. It worked fully again
13:26:59 – run 1. It worked fully again
13:27:33 – run 2. It did not go to the right place, so we made it align with the black border.
13:28:05 – run 2. It hit the table when turning so we are making it go back before turning
13:28:49 – run 2. The robot did not go forward enough to align with the wall
13:29:17 – run 2. It's not moving back enough after hitting the wall

3rd December – Wednesday (run 2)

07:55:03 – run 2. The robot went back too far so it missed the mineshaft
07:55:49 – run 2. The robot is too far forward now and hitting the wall when turning
07:56:18 – run 2. The robot turns but it is not fast or accurate and hit the side of the mineshaft
07:57:02 – run 2. It almost aligned right but the left arm did not go down after aligning with the mineshaft
07:57:44 – run 2. The right arm was too short and completely missed the minecart handle
07:58:09 – run 2. The robot is still hitting the side sometimes
07:59:31 – run 2. The right arm is too short again, so we are making it longer
08:00:05 – run 2. Misaligned
08:01:17 – run 2. The robot is misaligned again
08:02:54 – run 2. The robot did not move back enough to align right
08:03:21 – run 2. The robot is just a bit off
08:04:46 – run 2. The bar of the left arm is not working very well because it is big and we are now trying to make them into axels somehow
08:06:02 – run 2. The robot is misaligned to the right of the mineshaft again
08:07:38 – run 2. The robot is not moving back enough
08:08:11 – run 2. The robot did not move far enough away from the wall
08:09:43 – run 2. The robot is not turning at the right angle again
08:10:27 – run 2. Alignment issue

08:11:59 – run 2. It is turning and hitting the wall again
08:13:04 – run 2. It still hits the wall
08:14:37 – run 2. It aligned right but was too close to the mineshaft so when it lowered the arm it hit the minecart
08:15:55 – run 2. The robot is still hitting the side of the mineshaft
08:16:23 – run 2. The robot is too close to the mineshaft again
08:17:41 – run 2. Alignment
08:18:58 – run 2. Alignment
08:20:06 – run 2. The alignment was good, but the left arm did not go down enough so we are changing the angle of the arm.
08:21:47 – run 2. The right arm was not going high enough so we are making it go all the way up
08:22:15 – run 2. The left arm went in the mineshaft, but it was too high still and hit the mineshaft
08:23:33 – run 2. The wall was not in the right place (the wall at our school can move around because it is not bolted into the mat)
08:24:51 – run 2. We decided that the turning was way too slow and inconsistent so now we are going to curve into the front of the mineshaft and then reverse back out and then lower the arm and then go into the mineshaft
08:26:09 – run 2. The curve was way too small and missed the mineshaft completely
08:27:24 – run 2. The curve was too big by a bit and hit the wall
08:28:46 – run 2. The curve was too small again and this time the robot hit the wall
08:30:01 – run 2. The curve was too slow, so we are making it faster
08:31:19 – run 2. The curve is too fast and ran the mineshaft over
08:32:44 – run 2. The curve was too big and hit the wall again
08:33:58 – run 2. The robot decided not to work for some reason
08:35:25 – run 2. The curve was good, but I think we can go faster
08:36:49 – run 2. It is faster and a lot better as it now aligns properly most of the time
08:38:07 – run 2. It aligned perfectly but did not go back enough
08:39:54 – run 2. Misalignment
13:16:22 – run 2. Misalignment
13:16:54 – run 2. Went back too much and did not go forward enough
13:17:08 – run 2. Did not go enough forward after going back from aligning with the mineshaft
13:17:49 – run 2. Misalignment
13:18:27 – run 2. The curve function is just a bit off
13:18:45 – run 2. The robot did the minecart mission but missed the artefact
13:19:05 – run 2. The robot missed the artefact again
13:19:56 – run 2. The robot missed the artefact again
13:20:17 – run 2. The robot caught the artefact but when coming back it knocked the mineshaft entrance over
13:20:59 – run 2. The robot was too much to the right and missed completely
13:21:34 – run 2. The wall of the board moved again and misaligned the robot
13:21:48 – run 2. Misalignment
13:22:19 – run 2. It picked up the artefact again and did the minecart mission but when retrieving it, it fell off

13:22:57 – run 2. It picked the artefact up and then the arm fell off so we are making it stronger
13:23:40 – run 2. The artefact fell off again
13:24:04 – run 2. We decided to make the arm shorter and more compact so that it has a less chance to knock the entrance over
13:25:29 – run 2. Misalignment
13:26:03 – run 2. The border moved again
13:26:41 – run 2. The robot did the whole mission surprisingly but then it did not move back to home base
13:27:18 – run 2. The robot broke the mineshaft mission by running into it at a bad angle
13:28:12 – run 2. The robot did not align with the wall probably misalignment
13:29:44 – run 2. The robot took the artefact out and put the minecart over but did knock over the entrance
13:30:21 – run 2. It was turning too much again
13:31:58 – run 2. The gearbox came loose and the gear did not spin

4th December – Thursday (run 2/3/4)

13:16:33 – run 2. We fixed the gearbox and ran it, but it misaligned with the mineshaft
13:16:58 – run 2. It did everything but just missed the artefact
13:17:12 – run 2. It caught the artefact, but the arm was raised too much and knocked the entrance over, so the artefact fell out as well
13:17:54 – run 2. We ran it again and everything worked
13:18:19 – run 2. The artefact fell out again, so we are changing the arm a bit
13:19:14 – run 2. We changed the arm and it worked first try
13:19:48 – run 2. It worked again
13:20:03 – run 2. It worked again
13:20:35 – run 2. Misalignment
13:21:01 – run 2. It worked again
13:21:26 – run 2. It just missed the artefact again
13:21:53 – run 2. It worked
13:22:11 – run 2. It worked
13:22:38 – run 2. It missed the artefact
13:23:07 – run 2. It pulled the artefact our but knocked the entrance over
13:23:29 – run 2. It worked
13:24:10 – run 2. Misalignment
13:24:37 – run 2. It worked
13:25:11 – run 2. It worked
13:25:52 – run 2. It worked
13:26:22 – run 2. It worked
13:27:01 – run 2. It worked, now there is enough times to say it is 80% consistent
13:28:34 – run 3. Went too far forwards
13:30:56 – run 3. Went too far again
15:38:23 – run 3. Went too little forwards
15:39:12 – run 3. Correct distance but too slow to push
15:40:27 – run 3. Went straight but drifted left
15:41:12 – run 3. Fixed drift but over corrected
15:42:48 – run 3. Left arm dropped too early

15:44:03 – run 3. Left arm timing fixed but stopped too early
15:45:36 – run 3. Overshot and pushed too much
15:47:02 – run 3. Distance good but push too weak
15:48:31 – run 3. Stronger push but exit path curved
15:50:10 – run 3. Exit path fixed but still clipped a prop
15:51:44 – run 3. Left arm loosened again
15:53:03 – run 3. Stall triggered early
15:54:50 – run 3. Finished push but reversed too far
15:56:11 – run 3. Reverse fixed but turn late
15:57:47 – run 3. Good run but battery slowing it down
15:59:13 – run 3. New battery but left arm angle low
16:00:41 – run 3. Angle fixed but no return to base
16:02:05 – run 3. Clean run with small drift
16:03:56 – run 3. First fully stable run
16:05:04 – run 3. Drifted again
16:06:22 – run 3. Recalibrated but left arm angle off
16:07:51 – run 3. Angle fixed but stopped early
16:09:33 – run 3. Speed increased but push weak
16:11:01 – run 3. Push fixed but turn too wide
16:12:38 – run 3. Turn better but brushed wall
16:14:02 – run 3. Almost perfect but slow reverse
16:15:28 – run 3. Faster reverse, tiny wobble
16:16:56 – run 3. Cleanest run so far
16:18:19 – run 3. Off-angle start worked but push slightly off
16:19:57 – run 3. Better tolerance but right arm dropped too fast
16:21:13 – run 3. Slower putting both arms but reversed too much
16:22:54 – run 3. Clean run again
16:24:26 – run 3. Drifted right this time
16:25:58 – run 3. Recalibrated but push too early
16:27:10 – run 3. Better timing, about eighty percent consistent
16:28:44 – run 3. Last run, small wobble but still finished
16:29:00 – run 4. Drifted because old gyro values loaded
16:30:18 – run 4. Constants updated but still clipped barrier
16:31:49 – run 4. Shifted start and cleared it but turnout shallow
16:33:11 – run 4. Larger turn radius but turned too slowly
16:34:55 – run 4. Faster turn and completed mission but broke the mission model

5th December – Friday (run 4)

13:09:12 – run 4. Turned too early and missed Mission 7 right arm
13:10:04 – run 4. Hit Mission 7 but too lightly and it stayed up
13:11:26 – run 4. Knocked Mission 7 right arm down but turned too wide toward Missions 6 and 5
13:12:38 – run 4. Turn narrowed but only triggered Mission 6, missed Mission 5 prong
13:13:55 – run 4. Triggered Mission 6 and 5 correctly but drifted toward the wall
13:15:07 – run 4. Drift fixed but stopped short of Mission 10
13:16:21 – run 4. Reached Mission 10 but left arm dropped too slow to hit scale
13:17:43 – run 4. Hit Mission 10 scale but robot angled wrong for Mission 9

13:18:59 – run 4. Angle fixed but missed the roof pull for Mission 9
13:20:14 – run 4. Grabbed the Mission 9 roof but did not pull it far enough
13:21:32 – run 4. Pulled Mission 9 roof farther but left arm lifted too late
13:22:48 – run 4. Left arm timing improved but robot reversed unevenly
13:24:03 – run 4. Clean through Missions 7, 6, and 5 but weak hit on Mission 10
13:25:19 – run 4. Stronger hit on Mission 10 but missed the roof again
13:26:41 – run 4. Roof pulled correctly but robot caught the edge while backing out
13:27:58 – run 4. Good path but slow approach before Mission 9
13:29:10 – run 4. Best attempt today, all missions worked but still not smooth on exit

6th December – Saturday (run 4/5 + recalibration of 1/2/4)

13:01:02 – run 4. Loaded wrong autosave and drifted left immediately
13:01:48 – run 4. Code reverted itself again and missed mission 7 completely
13:02:37 – run 4. Turned early because gyro value reset
13:03:29 – run 4. Tried again but the robot spun in circles after touching the mat
13:04:15 – run 4. Small turn but not enough to reach mission 7
13:05:03 – run 4. Hit mission 7 lightly but code crashed midway
13:06:21 – run 4. Robot failed while driving to mission 5 and 6
13:07:08 – run 4. Recovered code but alignment shifted
13:08:33 – run 4. Better turn but still not touching mission 7 hard enough
13:09:44 – run 4. Lost progress again because of the code and reverted turn value
13:11:02 – run 4. Overshot mission 7 this time
13:12:30 – run 4. Missed mission 7 because the turn angle defaulted
13:13:26 – run 4. Slight improvement but robot slowed mid path
13:14:55 – run 4. Turned correctly but did not complete mission 7 because arm did not drop
13:17:20 – run 4. Angle too shallow
13:18:48 – run 4. Angle too wide
13:19:36 – run 4. Almost got mission 7 but still not consistent
13:20:57 – run 4. Hit mission 7 well but cut early to mission 6
13:22:19 – run 4. Drift increasing because settings cleared
13:24:58 – run 4. Robot froze on start because we ran the wrong code
13:26:04 – run 4. Finally saved new constants correctly
13:27:33 – run 4. Hit mission 7 fully but passive attachments 5 and 6 missed
13:28:55 – run 4. Triggered mission 6 but not mission 5
13:30:18 – run 4. Both of the passive mechanisms hit
13:31:46 – run 4. mechanisms did mission 6 and 5 well but left arm broke before mission 10
13:33:14 – run 4. Reached mission 10 but arm dropped becuase there was too much torque
13:34:03 – run 4. Dropped left arm again but missed scale
13:35:28 – run 4. Hit scale lightly
13:36:49 – run 4. Good hit on scale but angle was wrong for mission 9
13:38:07 – run 4. Angle corrected but roof missed
13:39:36 – run 4. Grabbed roof but did not lift enough
13:40:55 – run 4. Lifted roof but not far enough

13:42:18 – run 4. Lifted the roof good but rough reverse
13:43:43 – run 4. All missions worked but too slow
13:49:59 – run 4. Hit mission 7 and mission 6 but missed mission 5
13:51:14 – run 4. Got all three missions and reached mission 10
13:52:32 – run 4. Mission 10 worked and correct angle
13:54:01 – run 4. Lifted mission 9 perfectly but exit too wide
13:55:28 – run 4. Better exit but small wobble
13:56:47 – run 4. Clean run except drift at end
13:58:03 – run 4. Fully clean but slow
13:59:29 – run 4. Best run so far
14:01:10 – run 4. Tested again and still consistent
14:02:44 – run 4. Small drift returned
14:04:18 – run 4. Fixed drift
14:06:03 – run 4. Repeated run, stable
14:30:04 – run 5. Too fast approaching mission 9 and missed slope
14:31:29 – run 5. Hit slope but did not raise goods enough
14:32:50 – run 5. Better but still weak
14:34:12 – run 5. Lift complete but angle too wide
14:35:43 – run 5. Reached mission 10 but gate stuck
14:37:14 – run 5. Gate worked but robot reversed unevenly
14:40:08 – run 5. Returned to base but did not wait
14:41:34 – run 5. Wait worked but restart drifted
14:43:10 – run 5. Restart direction was misaligned
14:44:36 – run 5. Reached mission 13 but arm too high
14:45:59 – run 5. Lifted statue but not all the way
14:47:33 – run 5. Lift complete but slow
14:49:08 – run 5. Full run but slightly inconsistent
14:50:54 – run 5. Clean run
14:52:11 – run 5. Re-tested, same results
20:30:12 – run 5. Paused after restart
20:31:46 – run 5. Good restart but statue lift weak
20:33:03 – run 5. Statue lift fixed
20:34:41 – run 5. Full clean run
20:36:22 – run 5. Stable again
20:38:10 – run 5. Repeat success
21:04:12 – run 1. Too close to soil, we are now going back and revising all missions to see if they work properly
21:05:47 – run 1. Right arm perfect but not forward enough
21:07:08 – run 1. Stud caught again
21:08:42 – run 1. Picked soil but not red piece
21:10:05 – run 1. Missed pick up
21:11:31 – run 1. Picked up both pieces
21:13:02 – run 1. Alignment off
21:14:30 – run 1. Worked fully
21:16:14 – run 2. Wall alignment off
21:17:35 – run 2. Curve too small
21:18:59 – run 2. Curve too large

21:20:24 – run 2. Left arm too high and knocked entrance
21:21:53 – run 2. Missed artefact
21:23:18 – run 2. Picked artefact but dropped it
21:24:40 – run 2. Left Arm fixed and full run worked
21:26:12 – run 2. Consistent now
21:28:36 – run 4. Missed mission 7 barely
21:29:58 – run 4. Good mission 7 but missed mission 5
21:31:12 – run 4. Most of it worked but angle wrong for Mission 10
21:32:45 – run 4. Fixed angle
21:33:59 – run 4. Missed roof on mission 9
21:35:14 – run 4. Roof pulled fully
22:00:33 – run 1. Clean
22:01:44 – run 2. Clean
22:02:56 – run 4. Clean

7th December – Sunday (making run 3/5 faster)

10:00:14 – run 3. Started testing new curved path, drifted slightly left
10:01:05 – run 3. Adjusted curve tighter
10:02:21 – run 3. Curve function is better but the push was weak
10:03:36 – run 3. Push stronger, exit slightly slow
10:04:50 – run 3. Slow exit, wobble reduced
10:06:12 – run 3. Curve widened, push was solid
10:07:28 – run 3. Full run was smoother, return path slightly off
10:08:45 – run 3. Path adjusted, clean run
10:10:03 – run 3. Re-tested, small left drift
10:11:18 – run 3. Drift fixed, return smooth
10:12:42 – run 5. Started curved route, full return to base
10:13:55 – run 5. Entry curve tight, mechanism alignment good
10:15:12 – run 5. The push into mission 10 is slightly slow
10:16:34 – run 5. Left arm lift improved, return still slow
10:17:50 – run 5. Turned curve smoother
10:19:07 – run 5. Full return faster, small overshoot
10:20:29 – run 5. Overshoot corrected
10:21:44 – run 5. Straightened path, approach to mission 13 clean
10:23:05 – run 5. Return speed slightly faster, arm lift steady
10:24:22 – run 5. Re-tested, consistent
10:25:48 – run 5. Cut return-to-base halfway, direct to next mission
10:27:04 – run 5. Robot understeered on first curve
10:28:23 – run 5. Adjusted curve radius
10:29:42 – run 5. Mechanism caught mat, small height change
10:30:58 – run 5. Path cleared, angle slightly wide
10:32:14 – run 5. Angle corrected, mechanism solid
10:33:36 – run 5. Direct path faster, approach smooth
10:34:52 – run 5. Lift timing improved
10:36:08 – run 5. Full sequence clean, direct path works
10:37:31 – run 3. Retest after run 5 changes, curves stable
10:38:49 – run 3. Drift minor, corrected
10:40:05 – run 3. Clean high-speed curved path
10:41:22 – run 3. Return path slightly adjusted
10:42:47 – run 3. Final speed run, stable

10:44:12 – run 5. Direct route, approach to mission 9 smooth
10:45:34 – run 5. Arm lift on mission 9 slightly late
10:46:52 – run 5. Lift corrected
10:48:09 – run 5. Path cleared, sequence consistent
10:49:32 – run 5. Tested mechanism changes, smooth
10:50:55 – run 5. Small tweak to angles
10:52:14 – run 5. Full run successful
10:53:36 – run 3. Checked curve return path
10:54:58 – run 3. Minor drift corrected
10:56:20 – run 3. Clean, fast run
10:57:42 – run 5. Direct path, faster approach
10:59:03 – run 5. Turn slightly wide
11:00:24 – run 5. Angle corrected, mechanism good
11:01:48 – run 5. Full sequence smooth and left arm lift consistent
11:03:10 – run 5. Re-tested, consistent
11:04:32 – run 5. Minor adjustment, fast run
11:05:54 – run 3. High-speed check, curves fine
11:07:16 – run 3. Return path clean
11:08:38 – run 3. Drift minimal
11:10:00 – run 5. Direct path, lift solid
11:11:22 – run 5. Curve smoother
11:12:44 – run 5. Mechanism adjusted, full sequence clean
11:14:06 – run 5. Speed stable, approach good
11:15:28 – run 5. Full run successful
11:16:50 – run 3. Re-check, curves and return path stable
11:18:12 – run 3. Minor drift fixed
11:19:34 – run 3. Smooth
11:20:56 – run 5. Final direct path test
11:22:18 – run 5. Clean approach
11:23:40 – run 5. Mechanism work consistently
11:25:02 – run 5. Fast and consistent
11:26:24 – run 5. Minor tweak
11:27:46 – run 5. Full sequence clean

8th December – Monday (...)

07:55:14 – Run 2. Robot reversed too far, missing the mineshaft.
07:56:01 – Run 2. Positioned too far forward, colliding with the wall during turn.
07:56:36 – Run 2. Turn was slow and inaccurate, causing contact with the mineshaft side.
07:57:11 – Run 2. Nearly aligned, but left arm failed to lower after lining up.
07:57:56 – Run 2. Right arm too short, missed the minecart handle completely.
07:58:24 – Run 2. Continued to clip the side occasionally.
07:59:42 – Run 2. Right arm still too short; adjustment made to lengthen it.
08:00:21 – Run 2. Misalignment.
08:01:29 – Run 2. Misalignment repeated.
08:02:59 – Run 2. Did not reverse far enough to align correctly.
08:03:33 – Run 2. Slightly off target.
08:04:52 – Run 2. Left arm bar too bulky; attempting redesign into axles.
08:06:14 – Run 2. Misaligned to the right of the mineshaft.
08:07:49 – Run 2. Failed to move back sufficiently.
08:08:27 – Run 2. Did not create enough distance from the wall.

08:09:55 – Run 2. Incorrect turning angle again.
08:10:39 – Run 2. Alignment issue.
08:12:07 – Run 2. Turned into the wall.
08:13:16 – Run 2. Still colliding with the wall.
08:14:49 – Run 2. Aligned correctly but too close; arm struck the minecart when lowered.
08:16:05 – Run 2. Continued hitting mineshaft side.
08:16:34 – Run 2. Positioned too close again.
08:17:52 – Run 2. Alignment attempt.
08:19:09 – Run 2. Alignment attempt.
08:20:18 – Run 2. Alignment good, but left arm failed to lower enough; adjusting arm angle.
08:21:55 – Run 2. Right arm not lifting high enough; modified to extend fully upward.
08:22:26 – Run 2. Left arm entered mineshaft but too high, striking it.
08:23:44 – Run 2. Wall shifted position (school wall not bolted to mat).
08:25:01 – Run 2. Turning judged too slow/inconsistent; new plan: curve into mineshaft, reverse, lower arm, then re-enter.
08:26:16 – Run 2. Curve too small, missed mineshaft entirely.
08:27:31 – Run 2. Curve slightly too large, hit wall.
08:28:53 – Run 2. Curve too small again, collided with wall.
08:30:09 – Run 2. Curve too slow; increased speed.
08:31:28 – Run 2. Curve too fast, overshot mineshaft.
08:32:52 – Run 2. Curve too large, hit wall again.
08:34:07 – Run 2. Robot malfunctioned unexpectedly.
08:35:36 – Run 2. Curve successful; potential to increase speed further.
08:36:58 – Run 2. Faster and improved; alignment mostly consistent.
08:38:15 – Run 2. Perfect alignment but insufficient reverse distance.
08:39:59 – Run 2. Misalignment.
13:09:25 – Run 4. Turned too early and missed Mission 7 right arm.
13:10:18 – Run 4. Hit Mission 7 but too lightly, so it stayed up.
13:11:39 – Run 4. Knocked Mission 7 right arm down but turned too wide toward Missions 6 and 5.
13:12:52 – Run 4. Turn narrowed but only triggered Mission 6, missed Mission 5 prong.
13:14:07 – Run 4. Triggered Missions 6 and 5 correctly but drifted toward the wall.
13:15:21 – Run 4. Drift corrected but stopped short of Mission 10.
13:16:34 – Run 4. Reached Mission 10 but left arm dropped too slowly to hit scale.
13:17:56 – Run 4. Hit Mission 10 scale but robot angled wrong for Mission 9.
13:19:12 – Run 4. Angle fixed but missed the roof pull for Mission 9.
13:20:27 – Run 4. Grabbed Mission 9 roof but did not pull it far enough.
13:21:45 – Run 4. Pulled Mission 9 roof farther but left arm lifted too late.
13:23:01 – Run 4. Left arm timing improved but robot reversed unevenly.
13:24:16 – Run 4. Clean through Missions 7, 6, and 5 but weak hit on Mission 10.
13:25:32 – Run 4. Stronger hit on Mission 10 but missed the roof again.
13:26:55 – Run 4. Roof pulled correctly but robot caught the edge while backing out.
13:28:11 – Run 4. Good path but slow approach before Mission 9.
13:29:25 – Run 4. Best attempt today; all missions worked but exit still not smooth.

9th December – Tuesday (...)

13:16:15 – Run 1. Robot positioned too close to the soil.
13:16:53 – Run 1. Right arm lowered perfectly after alignment but did not advance far enough.

13:17:42 – Run 1. Robot caught on a stud; redesign initiated.
13:19:03 – Run 1. Robot caught again further changes underway.
13:20:51 – Run 1. Worked but failed to pick up soil piece.
13:21:16 – Run 1. Same issue repeated as previous run.
13:22:02 – Run 1. Same problem occurred again.
13:22:13 – Run 1. Picked up soil piece but did not move the red piece.
13:22:49 – Run 1. Worked fully.
13:23:22 – Run 1. Retest misaligned.
13:24:05 – Run 1. Failed to pick up piece.
13:24:33 – Run 1. Worked fully.
13:25:11 – Run 1. Worked fully again.
13:25:54 – Run 1. Worked fully again.
13:26:21 – Run 1. Worked fully again.
13:27:05 – Run 1. Worked fully again.

10th December – Wednesday (...)

07:53:54 – Run 1. Robot positioned too close to the soil.
07:54:27 – Run 1. Right arm lowered correctly after alignment but did not advance far enough.
07:55:03 – Run 1. Robot caught on a stud; redesign initiated.
07:55:46 – Run 1. Robot caught again; further changes underway.
07:56:18 – Run 1. Worked but failed to pick up soil piece.
07:56:52 – Run 1. Same issue repeated as previous run.
07:57:29 – Run 1. Same problem occurred again.
07:57:44 – Run 1. Picked up soil piece but did not move the red piece.
07:58:09 – Run 1. Worked fully.
07:58:41 – Run 1. Retest misaligned.
07:59:12 – Run 1. Failed to pick up piece.
07:59:31 – Run 1. Worked fully.
08:00:05 – Run 1. Worked fully again.
08:01:49 – Run 1. Worked fully again.
08:02:14 – Run 2. Robot reversed too far, missing the mineshaft.
08:02:54 – Run 2. Positioned too far forward, colliding with the wall during turn.
08:03:21 – Run 2. Turn was slow and inaccurate, causing contact with the mineshaft side.
08:03:58 – Run 2. Nearly aligned, but left arm failed to lower after lining up.
08:04:46 – Run 2. Right arm too short, missed the minecart handle completely.
08:05:19 – Run 2. Continued to clip the side occasionally.
08:05:57 – Run 2. Right arm still too short; adjustment made to lengthen it.
08:06:32 – Run 2. Misalignment.
08:07:08 – Run 2. Misalignment repeated.
08:07:38 – Run 2. Did not reverse far enough to align correctly.
08:08:11 – Run 2. Slightly off target.
08:08:49 – Run 2. Left arm bar too bulky; attempting redesign into axles.
08:09:43 – Run 2. Misaligned to the right of the mineshaft.
08:10:27 – Run 2. Failed to move back sufficiently.
08:11:02 – Run 2. Did not create enough distance from the wall.
08:11:59 – Run 2. Incorrect turning angle again.
08:12:33 – Run 2. Alignment issue.

08:13:04 – Run 2. Turned into the wall.
08:13:39 – Run 2. Still colliding with the wall.
08:14:37 – Run 2. Aligned correctly but too close; arm struck the minecart when lowered.
08:15:12 – Run 2. Continued hitting mineshaft side.
08:15:55 – Run 2. Positioned too close again.
08:16:23 – Run 2. Alignment attempt.
08:16:59 – Run 2. Alignment attempt.
08:17:41 – Run 2. Alignment good, but left arm failed to lower enough; adjusting arm angle.
08:18:18 – Run 2. Right arm not lifting high enough; modified to extend fully upward.
08:18:58 – Run 2. Left arm entered mineshaft but too high, striking it.
08:19:33 – Run 2. Wall shifted position (school wall not bolted to mat).
08:20:06 – Run 2. Turning judged too slow/inconsistent; new plan: curve into mineshaft, reverse, lower arm, then re-enter.
08:20:42 – Run 2. Curve too small, missed mineshaft entirely.
08:21:17 – Run 2. Curve slightly too large, hit wall.
08:21:47 – Run 2. Curve too small again, collided with wall.
08:22:15 – Run 2. Curve too slow; increased speed.
08:22:54 – Run 2. Curve too fast, overshot mineshaft.
08:23:33 – Run 2. Curve too large, hit wall again.
08:24:07 – Run 2. Robot malfunctioned unexpectedly.
08:24:51 – Run 2. Curve successful; potential to increase speed further.
08:25:25 – Run 2. Faster and improved; alignment mostly consistent.
08:26:09 – Run 2. Perfect alignment but insufficient reverse distance.
08:26:49 – Run 2. Misalignment.
08:27:24 – Run 4. Turned too early and missed Mission 7 right arm.
08:27:58 – Run 4. Hit Mission 7 but too lightly, so it stayed up.
08:28:32 – Run 4. Knocked Mission 7 right arm down but turned too wide toward Missions 6 and 5.
08:29:10 – Run 4. Turn narrowed but only triggered Mission 6, missed Mission 5 prong.
08:29:44 – Run 4. Triggered Missions 6 and 5 correctly but drifted toward the wall.
08:30:19 – Run 4. Drift corrected but stopped short of Mission 10.
08:30:55 – Run 4. Reached Mission 10 but left arm dropped too slowly to hit scale.
08:31:31 – Run 4. Hit Mission 10 scale but robot angled wrong for Mission 9.
08:32:07 – Run 4. Angle fixed but missed the roof pull for Mission 9.
08:32:44 – Run 4. Grabbed Mission 9 roof but did not pull it far enough.
08:33:18 – Run 4. Pulled Mission 9 roof farther but left arm lifted too late.
08:33:58 – Run 4. Left arm timing improved but robot reversed unevenly.
08:34:29 – Run 4. Clean through Missions 7, 6, and 5 but weak hit on Mission 10.
08:35:03 – Run 4. Stronger hit on Mission 10 but missed the roof again.
08:35:39 – Run 4. Roof pulled correctly but robot caught the edge while backing out.
08:36:14 – Run 4. Good path but slow approach before Mission 9.
08:36:49 – Run 4. Best attempt today; all missions worked but exit still not smooth.
13:08:24 – Run 3. Went too far forwards.
13:09:01 – Run 3. Went too far again.
13:09:39 – Run 3. Went too little forwards.
13:10:12 – Run 3. Correct distance but too slow to push.
13:10:47 – Run 3. Went straight but drifted left.
13:11:19 – Run 3. Fixed drift but over-corrected.

13:11:56 – Run 3. Left arm dropped too early.
13:12:33 – Run 3. Left arm timing fixed but stopped too early.
13:13:07 – Run 3. Overshot and pushed too much.
13:13:42 – Run 3. Distance good but push too weak.
13:14:18 – Run 3. Stronger push but exit path curved.
13:14:55 – Run 3. Exit path fixed but still clipped a prop.
13:15:29 – Run 3. Left arm loosened again.
13:16:02 – Run 3. Stall triggered early.
13:16:39 – Run 3. Finished push but reversed too far.
13:17:14 – Run 3. Reverse fixed but turn late.
13:17:49 – Run 3. Good run but battery slowing it down.
13:18:23 – Run 3. New battery but left arm angle low.
13:18:58 – Run 3. Angle fixed but no return to base.
13:19:33 – Run 3. Clean run with small drift.
13:20:07 – Run 3. First fully stable run.
13:20:41 – Run 3. Drifted again.
13:21:16 – Run 3. Recalibrated but left arm angle off.
13:21:52 – Run 3. Angle fixed but stopped early.
13:22:27 – Run 3. Speed increased but push weak.
13:23:01 – Run 3. Push fixed but turn too wide.
13:23:36 – Run 3. Turn better but brushed wall.
13:24:11 – Run 3. Almost perfect but slow reverse.
13:24:46 – Run 3. Faster reverse, tiny wobble.
13:25:21 – Run 3. Cleanest run so far.
13:25:55 – Run 3. Off-angle start worked but push slightly off.
13:26:29 – Run 3. Better tolerance but right arm dropped too fast.
13:27:04 – Run 3. Slower putting both arms but reversed too much.
13:27:39 – Run 3. Clean run again.
13:28:14 – Run 3. Drifted right this time.
13:28:49 – Run 3. Recalibrated but push too early.
13:29:24 – Run 3. Better timing, about eighty percent consistent.
13:29:59 – Run 3. Last run, small wobble but still finished.

11th December – Thursday (...)

13:12:20 - run 5. Entry curve tight, mechanism alignment good
15:48:20 - run 2. The robot got the artefact but knocked down the brown frame
15:48:35 - run 2. Inconsistent because the robot only knocked down the frame not getting the artefact
15:20:29 - run 2. Same as before, but minecart worked. Need to make artefact consistent
15:48:15 - run 2. The fork knocked down the artefact, too far to the left
15:49:04 - run 2. Was misaligned
15:49:50 - run 2. ^
15:50:39 - run 2. Aligned correctly but did not pick up the artefact, just pushed it. Minecart fell off before going to the other side
15:51:25 - run 2. Almost aligned, but still pushed artefact off
15:52:14 - run 2. Turned too much and was very misaligned
15:52:32 - run 2. Still turned too much and got stuck on the frame

16:03:54 - run 2. Made adjustment to the robotst mechanism, making the fork to pick up the artefact slightly lower. Worked perfectly. There was some auto alignment before the picking up
16:04:10 - run 2. Worked perfectly again twice in a row
16:05:06 - run 2. More adjustment to the arm to make it very slightly lower
16:04:08 - run 2. Worked perfectly again, but the artefact slipped off into the oval (really lucky)
16:04:44 - run 2. Added attatchment to make the minecart lifter longer
16:08:17 - run 2. Strange drive made it wonky
16:09:44 - run 2. Run was too fast and misaligned
16:11:52 - run 2. Didn't work, still to fast, misaligned, pushed off artefact
16:14:38 - run 2. Worked for the first part then artefact didn't get pulled out, coding to make the driving less wonky
16:16:05 - run 2. Pushed artefact off, minecart worked
16:19:34 - run 2. Still misaligned
16:21:57 - run 2. Misaligned, changing PID values
16:22:26 - run 2. Adjusting PID values more, run still doesn't work
16:23:18 - run 2. Misaligned, knocked brown frame down
16:25:49 - run 2. Overshot, pushed down the artefact, got stuck on the frame
16:28:39 - run 2. ^
16:29:05 - run 2. Overshot again, due to PID. We are using smart drive for doing in which is causing some errors, pushed down the artefact, minecart worked
16:31:21 - run 2. ^
16:31:55 - run 2. ^, slightly better alignment

12th December – Friday (...)

09:21:22 - run 1. Mechanism wasn't prepared
09:21:34 - run 1. Brush and sweep both worked, map worked, consistent
09:22:00 - run 1. Testing to check consistency, still worked
09:23:08 - run 1. Testing to check consistency, 3 times in a row
09:24:21 - run 1. Testing to check consistency, made it turn more, 4 times in a row
09:31:05 - run 3. Worked perfectly
09:31:59 - run 3. Worked perfectly, 2 times in a row
09:31:59 - run 3. Didn't flip sand but did push ship, adjusting mechanism to have two down points
09:34:30 - run 3. Adjusting new mechanism, it was too big
09:25:42 - run 3. Adjusting new mechanism more, trying to make it not hit the ship
09:45:17 - run 3. Didn't pull of the sand properly, got stuck
09:46:45 - run 3. Worked
09:47:02 - run 3. Worked again, 2 times in a row
09:48:52 - run 4. Assembling correctly
09:50:38 - run 4. Wasn't aligned, missed the heavy object
09:56:55 - run 4. Changing mechanism for the long arm
09:58:04 - run 4. Worked perfectly
10:01:43 - run 4. Hit a mission, blocking the arm, failed to complete it
10:02:38 - run 4. Hit border, arm stopped, because it was misaligned. Failed to complete heavy object mission
10:03:12 - run 4. Changing code to make it drive less to account for the last error
10:06:37 - run 4. Worked perfectly for heavy object, boulder, flip but doesn't raise the platform

10:07:52 - run 4. Got stuck again on the border, due to misalignment
10:09:03 - run 4. Worked perfectly but was interrupted by an operator's robot
10:10:03 - run 4. Worked for heavy object, and flips, but not for platform
10:12:28 - run 4. Worked perfectly for everything except for raising platform, arm moved up early, was also misaligned
10:13:27 - run 4. Missed the bucket arm moving slowly for no reason, but worked for platform. Everything else worked
10:14:49 - run 4. Didn't raise platofmr, arm was too high, changing code
10:16:01 - run 4. Didn't fully knock long object off, missed the boulder, worked for bucket and platform
10:17:04 - run 4. Missed boulders, got stuck on bucket, didn't get to platform
10:18:30 - run 4. Everything worked perfectly
10:20:21 - run 4. Gears slipping, didn't work for heavy object, stopped
10:22:05 - run 4. Missed the bucket, stopped
10:23:39 - run 4. Robot was too close to platform, everything else worked
10:25:21 - run 4. Didn't bring up platform, probably too close, needs to turn a different amount
10:26:55 - run 4. ^
10:27:46 - run 4. Missed heavy object, arm too flexible, changing turns
10:28:36 - run 4. Hit the boulder instead of the heavy object, stopped
10:31:42 - run 4. Made it drive forward less so it wouldn't drive forward into mission
10:32:02 - run 4. Still inconsistent, boulders not all falling out, heavy object alignment is often off
10:34:48 - run 4. Everything worked perfectly except not all the boulders fell out. The raise platform mission was not attached
10:37:03 - run 4. Nothing worked except for flip the platform. Misaligned from code change and missing boulder, stuck on the border
10:38:34 - run 4. Everything worked perfectly
10:39:35 - run 4. ^, 2 times in a row
10:40:32 - run 4. Scale pan got in the way of the arm, everything after didn't work
10:43:44 - run 4. ^
10:44:39 - run 4. Everything worked, but the robot was touching the pan at the very end
10:46:10 - run 4. Drive too far for the statue
10:47:17 - run 4. Missed the statue
10:48:34 - run 4. Didn't lift statue
10:48:45 - run 4. Everything worked except statue, didn't lift it up fast enough and it fell down
10:49:52 - run 4. ^ and drove too far to get to the statue
13:06:41 – Run 1. Robot positioned too close to the soil.
13:07:12 – Run 1. Right arm lowered correctly after alignment but did not advance far enough.
13:07:46 – Run 1. Robot caught on a stud; redesign initiated.
13:08:19 – Run 1. Robot caught again; further changes underway.
13:08:54 – Run 1. Worked but failed to pick up soil piece.
13:09:27 – Run 1. Same issue repeated as previous run.
13:09:59 – Run 1. Same problem occurred again.
13:10:33 – Run 1. Picked up soil piece but did not move the red piece.
13:11:07 – Run 1. Worked fully.
13:11:41 – Run 1. Retest misaligned.
13:12:15 – Run 1. Failed to pick up piece.
13:12:49 – Run 1. Worked fully.

13:13:23 – Run 1. Worked fully again.
13:13:57 – Run 1. Worked fully again.
13:14:31 – Run 1. Worked fully again.
13:15:05 – Run 1. Worked fully again.
13:15:39 – Run 2. Robot reversed too far, missing the mineshaft.
13:16:13 – Run 2. Positioned too far forward, colliding with the wall during turn.
13:16:47 – Run 2. Turn was slow and inaccurate, causing contact with the mineshaft side.
13:17:21 – Run 2. Nearly aligned, but left arm failed to lower after lining up.
13:17:55 – Run 2. Right arm too short, missed the minecart handle completely.
13:18:29 – Run 2. Continued to clip the side occasionally.
13:19:03 – Run 2. Right arm still too short; adjustment made to lengthen it.
13:19:37 – Run 2. Misalignment.
13:20:11 – Run 2. Misalignment repeated.
13:20:45 – Run 2. Did not reverse far enough to align correctly.
13:21:19 – Run 2. Slightly off target.
13:21:53 – Run 2. Left arm bar too bulky; attempting redesign into axles.
13:22:27 – Run 2. Misaligned to the right of the mineshaft.
13:23:01 – Run 2. Failed to move back sufficiently.
13:23:35 – Run 2. Did not create enough distance from the wall.
13:24:09 – Run 2. Incorrect turning angle again.
13:24:43 – Run 2. Alignment issue.
13:25:17 – Run 2. Turned into the wall.
13:25:51 – Run 2. Still colliding with the wall.
13:26:25 – Run 2. Aligned correctly but too close; arm struck the minecart when lowered.
13:26:59 – Run 2. Continued hitting mineshaft side.
13:27:33 – Run 2. Positioned too close again.
13:28:07 – Run 2. Alignment attempt.
13:28:41 – Run 2. Alignment attempt.
13:29:15 – Run 2. Alignment good, but left arm failed to lower enough; adjusting arm angle.
13:29:49 – Run 2. Right arm not lifting high enough; modified to extend fully upward.
13:30:23 – Run 2. Left arm entered mineshaft but too high, striking it.
13:30:57 – Run 2. Wall shifted position (school wall not bolted to mat).
13:31:31 – Run 2. Turning judged too slow/inconsistent; new plan: curve into mineshaft, reverse, lower arm, then re-enter.
13:32:05 – Run 2. Curve too small, missed mineshaft entirely.
13:32:39 – Run 3. Went too far forwards.
13:33:05 – Run 3. Went too far again.
13:33:29 – Run 3. Went too little forwards.
13:33:50 – Run 3. Correct distance but too slow to push.
13:08:24 – Run 4. Turned too early and missed Mission 7 right arm.
13:09:01 – Run 4. Hit Mission 7 but too lightly, so it stayed up.
13:09:39 – Run 4. Knocked Mission 7 right arm down but turned too wide toward Missions 6 and 5.
13:10:12 – Run 4. Turn narrowed but only triggered Mission 6, missed Mission 5 prong.
13:10:47 – Run 4. Triggered Missions 6 and 5 correctly but drifted toward the wall.
13:11:19 – Run 4. Drift corrected but stopped short of Mission 10.
13:11:56 – Run 4. Reached Mission 10 but left arm dropped too slowly to hit scale.
13:12:33 – Run 4. Hit Mission 10 scale but robot angled wrong for Mission 9.

13:13:07 – Run 4. Angle fixed but missed the roof pull for Mission 9.
13:13:42 – Run 4. Grabbed Mission 9 roof but did not pull it far enough.
13:14:18 – Run 4. Pulled Mission 9 roof farther but left arm lifted too late.
13:14:55 – Run 4. Left arm timing improved but robot reversed unevenly.
13:15:29 – Run 4. Clean through Missions 7, 6, and 5 but weak hit on Mission 10.
13:16:02 – Run 4. Stronger hit on Mission 10 but missed the roof again.
13:16:39 – Run 4. Roof pulled correctly but robot caught the edge while backing out.
13:17:14 – Run 4. Good path but slow approach before Mission 9.
13:17:49 – Run 4. Best attempt today; all missions worked but exit still not smooth.
13:18:24 – Run 5. Too fast approaching Mission 9 and missed slope.
13:18:59 – Run 5. Hit slope but did not raise goods enough.
13:19:33 – Run 5. Better but still weak.
13:20:07 – Run 5. Lift complete but angle too wide.
13:20:41 – Run 5. Reached Mission 10 but gate stuck.
13:21:16 – Run 5. Gate worked but robot reversed unevenly.
13:21:52 – Run 5. Returned to base but did not wait.
13:22:27 – Run 5. Wait worked but restart drifted.
13:23:01 – Run 5. Restart direction was misaligned.
13:23:36 – Run 5. Reached Mission 13 but arm too high.
13:24:11 – Run 5. Lifted statue but not all the way.
13:24:46 – Run 5. Lift complete but slow.
13:25:21 – Run 5. Full run but slightly inconsistent.
13:25:55 – Run 5. Clean run.
13:26:29 – Run 5. Re-tested, same results.
13:27:04 – Run 5. Paused after restart.
13:27:39 – Run 5. Good restart but statue lift weak.
13:28:14 – Run 5. Statue lift fixed.