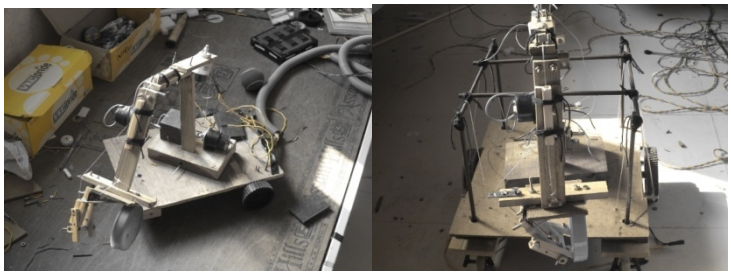
MANUALROBOTICS

(SHAASTRA2014 IITMadras)



ROBOTICS - GOLD MINER

Team Name: Machine Enchanters

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City : NUZVID

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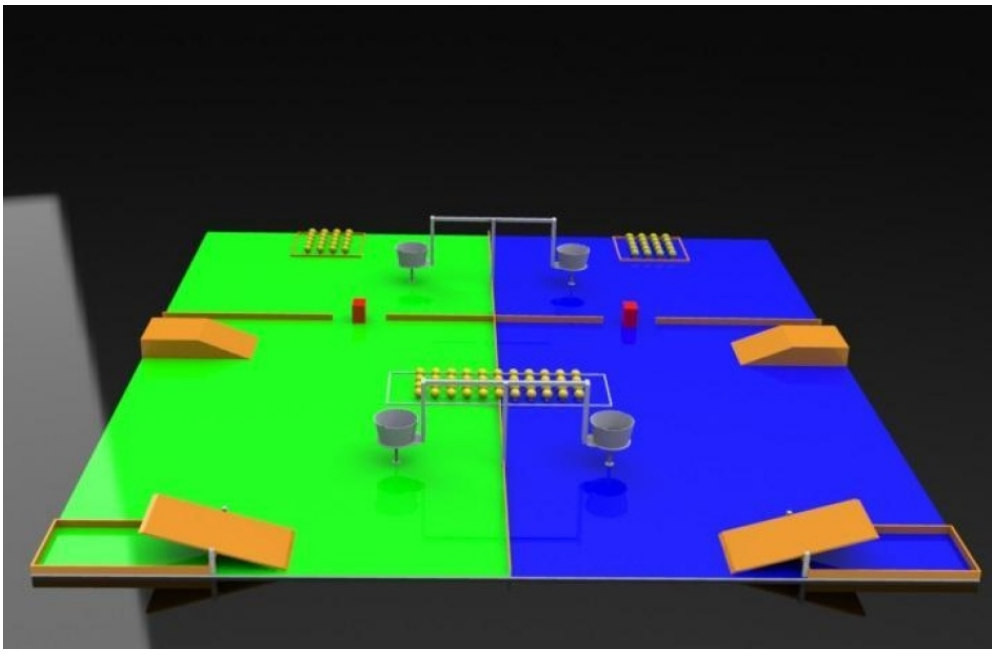

1. **Briefly explain the strategy that will be employed by your team to complete the mission right from start of the game to its end.**

Here each team is given five minutes to fill the basket with minimum of 17 balls. From the starting point where the robot stands before enter into the game zone itself we tilt the sea-saw mechanism. After crossing the sea-saw we place the robot where the bot can pick the balls from its extreme position. We designed the mechanism in such a way that it can pick max of four balls. By this we can save the time to drop the balls into the basket as well as picking up the balls from ball zone. So, we can reach the basket in minimum time and pullout the support from it, In case, if the opponent pullout the stand first our picking up mechanism can rise to the extreme position of the basket to fill the balls.

2. **Give a detailed description of the working mechanism of Bot A (Picking and dropping mechanism for the balls add every mechanism separately with proper divisions)**

MECHANSIM FOR TILTING SEE-SAW :

For the bot-A to tilt the see-saw we would like to use the same mechanism and parts used for dropping and picking the balls. An arm comes from the robot's top which has another link connected to it through a revolute pair.

MECHANISM FOR PICKING AND DROPPING BALLS :

The main mechanism that picks the balls is connected to a slotted square plate. This plate has slots on 4 sides. The mechanism has four jaws hinged in the four slots through revolute pairs. Each jaw is 'V' shaped. The V edge of each jaw is connected with a spring to the square plate so that the four jaws are wide open before picking the balls. Each jaw is extended from the slots under the plate. A circular disc is placed in between the extended jaws such that if the disc is dragged away from the plate it pushes the extended jaws to bring the four jaws above the plate come closer to pick the balls.

MECHANISM TO LIFT THE BALLS :

There is an arm placed on the top of the bot's body by a revolute pair. This arm

is connected to the picking mechanism by another link through revolute pairs. This arm can rotate 360 degrees on the horizontal plane so that it can traverse the picking mechanism to where ever needed.

MECHANISM TO REMOVE THE STAND UNDER THE BASKET :

To remove the stand we place a link at the center of the front part of bot by a revolute pair. It can rotate to the front to remove the stand.

3 Give a detailed description of the working mechanism of the Bot B(mechanism for crossing over the hurdle and also for picking and dropping balls)

MECHANISM FOR CROSSING OVER THE HURDLE :

To cross the hurdle we are going to lift the chassis to a desired height. For lifting the chassis we are using two pairs of sliders each on either side and below the chassis body. Two pairs of wheels are each supported individually with a wheel track on both side and the pair of sliders slide on each of the wheel track. The back slider is connected to the front bottom of chassis and vice versa through a revolute link which on rotation moves the slider. Due to the movement of the sliders to the middle the links raise the chassis to the desired height. By this we can cross the hurdle.

MECHANISM FOR PICKING AND DROPPING BALLS :

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MECHANISM TO LIFT THE BALLS :

There is an arm placed on the top of the bot’s body by a revolute pair. This arm is connected to the picking mechanism by another link through revolute pairs. This arm can rotate 360 degrees on the horizontal plane so that it can traverse the picking mechanism to where ever needed.

MECHANISM TO REMOVE THE STAND UNDER THE BASKET :

To remove the stand we place a link at the center of the front part of bot by a revolute pair. It can rotate to the front to remove the stand.

4 Give a brief account of your game plan, If possible; also post the link to videos demonstrating the mechanisms you have built until now. Post your videos on You-Tube and attach the link in the TDP

The Bots (Bot A & Bot B) are initially placed in their respective positions.

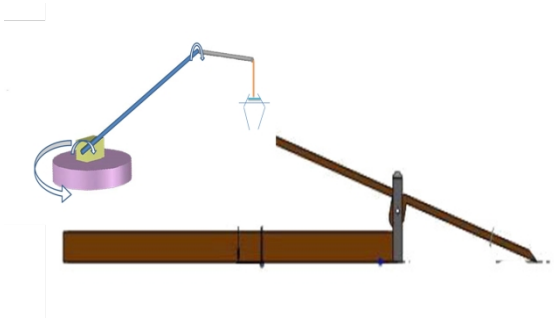
Bot A:

The see saw will be tilted by using the tilting mechanism which consist of two revolute pairs. After tilting the see saw, the Bot will move onto that and then it will cross the see saw by controlling its motion. Then it will take the turn and move towards the balls. It will pick the balls using picking up mechanism. The bot will move again to the basket and the picked balls will be placed in the basket carefully. The support under the basket will be removed using the striking mechanism. The bot will move back again to the balls and the process will continue until all the balls will be placed in the basket.

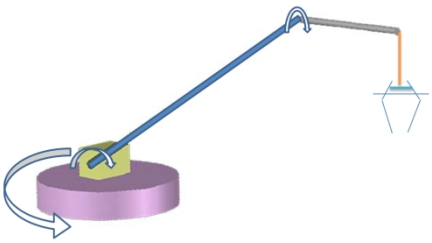
Bot B:

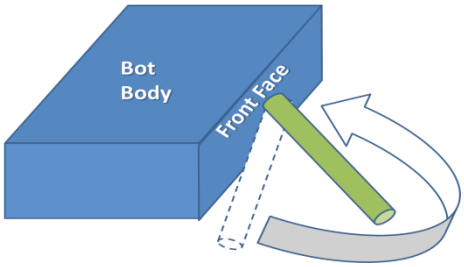
The Bot B will be descending from the ramp by controlling its motion. The bot will move forward and then will take a turn. It will move toward the hurdle and moves into the zone B from Zone A by crossing the hurdle. It will move towards the balls and pick them using the picking up mechanism and then it moves towards the basket and place the picked balls in the basket. The support under the basket will be pushed using the striking mechanism. The bot will move back again to the balls and the process will continue until all the balls will be placed in the basket.

5. Attach the images and drawings for Bot A to give us a better idea of the proposed mechanisms



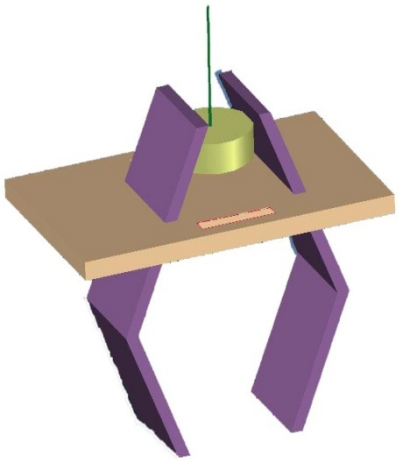
MECHANISM FOR TILTING SEE-SAW

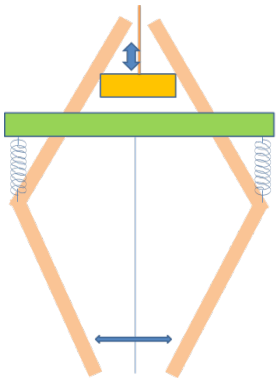




MECHANISM FOR LIFTING REMOVE THE STAND

MECHANISM FOR

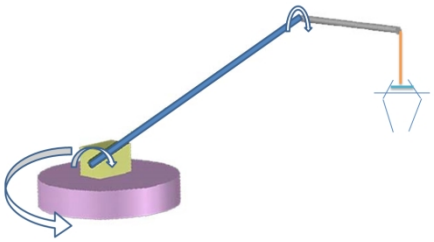




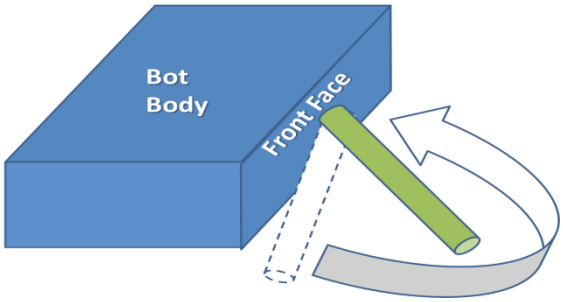
BALL PICKING AND DROPPING MECHANISM

In order to reduce complexity of understanding the mechanism only two opposite jaws are shown in figure. The other two jaws are not shown in the figure.

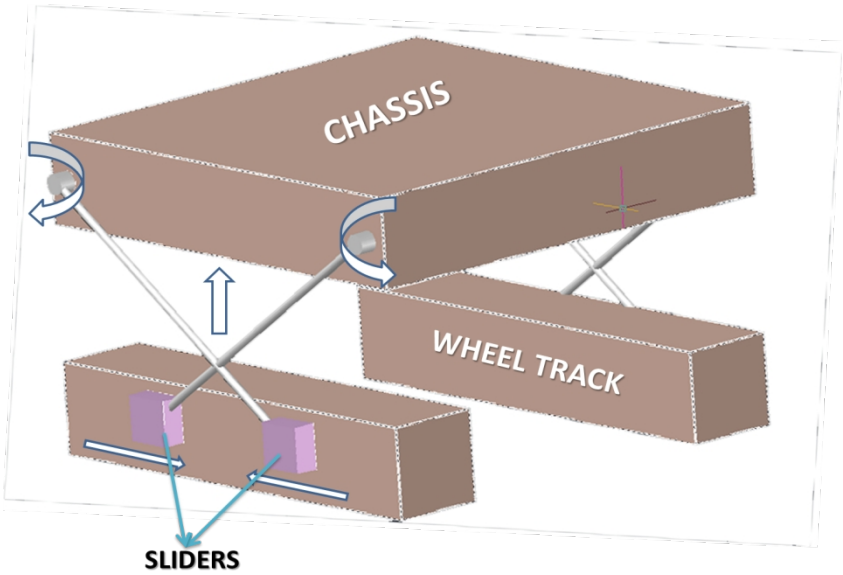
3 Attach the images and drawings for Bot B to give us a better idea of the proposed mechanisms



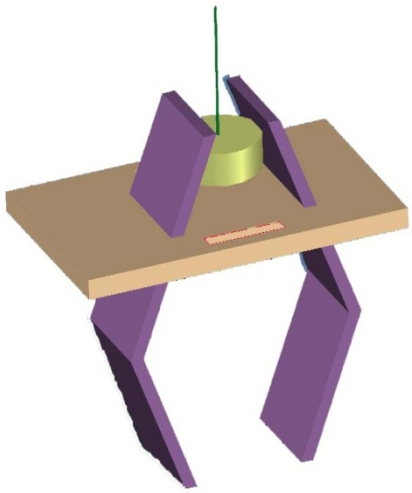
MECHANISM FOR LIFTING

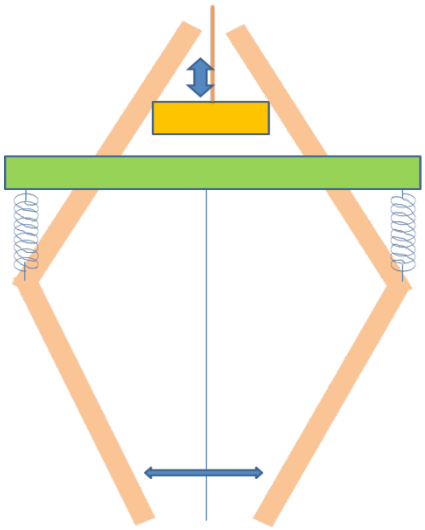


MECHANISM FOR REMOVING STAND



MECHANISM FOR LIFTING CHASSIS

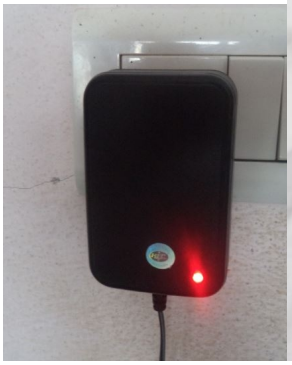
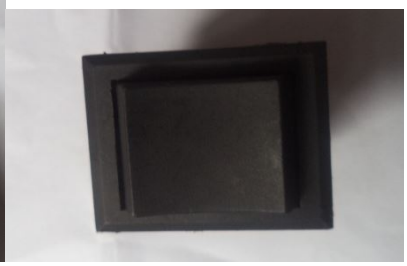




BALL PICKING AND DROPPING MECHANISM

In order to reduce complexity of understanding the mechanism only two opposite jaws are shown in figure. The other two jaws are not shown in the figure.

7 **Give a brief account of the power supply and the controls being used?**

As it was mentioned in the rules that the power supply must not exceed 12V DC we are going to use 9V or less DC power battery.

Each motor is controlled by either switch or knob which is having 3 positions. Each switch comprises three positions for forward, backward motions and neutral position.