Control Award Content Sheet

Team # 8365	Team Name: Gearmasters

Autonomous objectives:

1. Lowers robot from Lander to score Landing points (30)
2. Detects & Removes Gold Mineral using Tensor Flow Computer Vision to score Sampling points (25)
3. Pushes Gold Mineral into Depot (2)
4. Drops Team Marker to score Claiming Points (15)
5. Touches Crater (10)

Total Points = 82 points

Sensors used:

Sensor	Usage
Computer Vision (TensorFlow)	Allows robot to detect gold mineral using image recognization
Motor Encoders	Allows robot to move more precisely by measuring rotations.
Gyro Sensor	Allows robot to turn precisely by measuring degrees turned.
Range Sensors (3)	1 sensor to detects the height of the robot when hanging on lander 2 sensors to align robot against the perimeter

Key algorithms:

Our robot is built with an innovative **U Drive** system. The U Driver allows the robot to easily move in all direction using only 3 motors. However, sideway movement requires additional power from the back motor causing the robot to swerve. Algorithm is added to offset the side wheel to enable the robot to move accurately. We also implemented a **Direction Aware** drive for the driver control period utilizing the gyro sensor to allow drivers to control robot relative to themselves, so they do not have to consider the direction of the robot.

Engineering Notebook references:

Reference	Notebook Page #
U-Drive	24,25,41,46,63,64,85
Driving Aware Drive	44,73,76,77,78,79,81,82,83
Computer Vision / Tensor Flow	36,51,52,65,66,95,96,97
Drive Along Perimeter Algorithm	85,87
Gyro & Range Sensors	44,47

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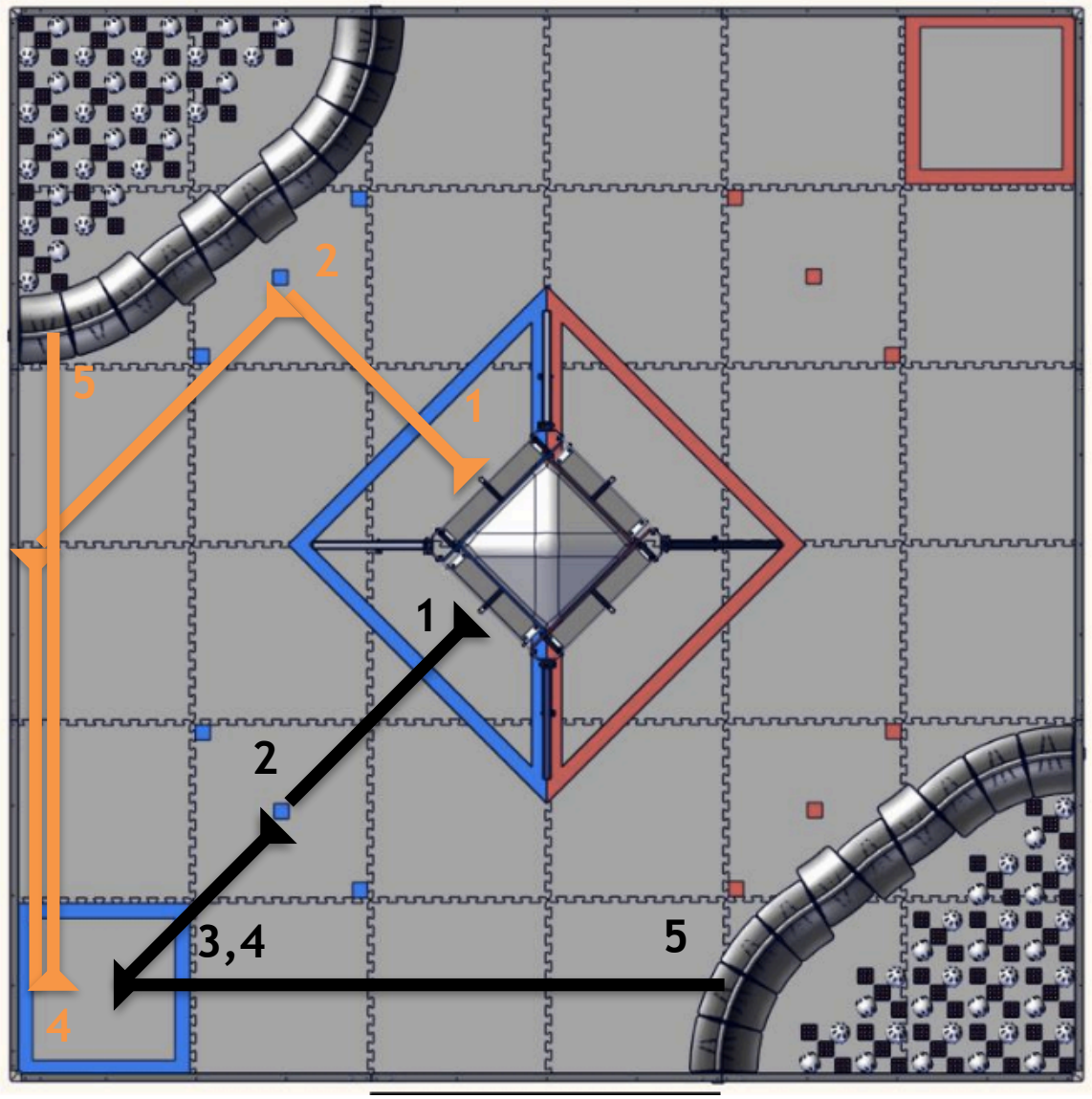
Autonomous program diagrams:



Steps (Blue Alliance):

1. **Robot lowers itself from lander using linear actuator and stops when a range sensor (located at the bottom of the robot) detects the ground, and finds gold mineral while lowering**
2. **Robot approaches gold mineral, and removes it from starting position**
3. **Scores gold mineral in depot**
4. **Using the outtake, the team marker is released in the depot**
5. **Robot goes to crater using Drive Along Perimeter alogrithm and parks.**