The Game

Our task, assigned to us by anonymous, consists of building a robot which can launch modified footballs, also known as game pieces, at various targets. Initially, the robot can have a width and length of three feet with a height of four feet. Once the heat has begun, the robot can expand to four feet in width and length. The game is played in teams of two, who begin on either side of the board, each pre-loaded with 5 footballs. Teams have an additional possible 30 game pieces located on the upper and lower levels of the game board in various dispensers. The objective of each team is to gain as many points as possible in the span of five minutes.

Teams gain points by throwing game pieces through a V shaped target corresponding to their teams’ assigned colors in order to obtain 20 points per ball. These V targets are located at each end of the board on an upper level platform reached by climbing a 30o ramp. In front of each V shaped target is a 3 level multiplier on the upper platform. Once a game piece is placed in this multiplier, no more footballs can be launched into the V shaped target. If no game pieces are placed in the multiplier, then their score is multiplied by zero. If one football is placed in the first level then their score achieved by the V shape is multiplied by one, two footballs in the second level multiplies their score by two and three game pieces… you can figure it out. Different levels are accessed by opening the latches found on the side of the multipliers.

At the center of the field lies the quad-core which contains two compartments for each team. The quad-core is constantly rotating and is used as a multiplier for all points. The multiplied score is calculated based on a ratio of the number of game pieces placed into the quad-core by each team with a maximum of a multiplier of two.

Located on the board are two prisms, each assigned a different color. Within each prism is a cylinder corresponding to the other team’s color. Each team receives 10 points for placing a football in their team’s prism and 30 points for the cylinder.

In order to obtain points during a heat, a robot must contribute to their team’s score by placing a minimum of one game piece into either the V shaped target or any of the multipliers. If a robot fails to do so, they are deemed as an inactive robot. If a robot is paired with an inactive robot, that team is rewarded a multiplier of 1.5 to compensate for their team’s incompetence.

The preliminary rounds decide the ranking for playoffs. The lowest two scores from the preliminary rounds are dropped when calculating each team’s ranking.

**ADD DIAGRAMS AND PICTURES**\*

Our Lair

Located at 4873 Westmount Avenue in Westmount, our hacker group consists of over 2000 students. With more than 150 clubs, Marianopolis is a private, English Cegep.

D.E.N.N.I.S.

Our aspiring hackers have been working tirelessly for weeks to complete the seemingly difficult task assigned to them by anonymous. Named D.E.N.N.I.S., our hackers designed a robot that can pick up footballs and launch them at various targets.

The first step consisted of determining the type and size of wheels used for the drive train. The result of these heated deliberations was to use mechanism (??) wheels. Following this decision, our hackers began building the frame of the robot out of aluminum.

The next step was to decide the launching mechanism of the game pieces. After a long thought process, our ambitious hackers determined that the most consistent and accurate method would be to use two wheels. Mounted 18 inches above the ground, both wheels spin at a fast speed in order to be able to shoot the game pieces roughly 5 meters in distance. After successfully shooting the football through both wheels, the next task was to determine a method for loading the launcher. By creating a path with multiple small wheels leading to the launcher wheels, our hackers designed a robot that will be able to shoot the footballs regardless of their orientation.

The most difficult task our hackers faced was inventing a method to pick up the game pieces. Ideally, the mechanism would be able to load more than one ball at a time to maximize their scoring potential. Using two buckets fused together, our hackers designed a scooping method attached to a pulley system. Once the game pieces have been obtained by D.E.N.N.I.S., the pickup mechanism is lifted and places the footballs into a sorter for the launcher.

During this gruelling process, our hackers faced several challenges such as creating a mechanism that will lift the footballs regardless of their orientation on the ground in order to minimize the amount of time required during this process. Moreover, the ramp at the ends of the game board also proved to be difficult for D.E.N.N.I.S., primarily determining the center of mass. Lastly, it was crucial to our hackers that the launching of the footballs be consistent. In order to accomplish this, the shooter had to be stable on the robot.

Despite these various challenges, our hackers persevered and came up with solutions to accomplish the task set by anonymous. *Make big claw* (Solution 1). *Place counterweights and arm solves all our problems* (Solution 2). Lastly, our team built custom mounts in order to stabilize the drills used for the shooting mechanism.