* being able to reach all locations on the table (are there any shots we wont be able to reach?

Pre-shot Ball Interference

In order to strike the cue ball according to specifications (no spins or trick shots) the end effector needs to be at the same level than the cue ball to hit it at the center. This arises dificulties due to the fact that some other balls may be at that same position or near enough so that the end effector wouldn't fit without moving it. Also, the rails consist of another fixed physical obstacle that would interfere in the same way.

This problem will be tackled by software. The system will take the position of all the balls and the spacing available to place the end effector. Using this information, the system will only shoose a shot that doesn't have any interference.

There could be the case when there wouldn't be any space to place the end effector in striking position due to lack of space. In this cases the system will make a concesion from the pool rules and pass on its turn, giving the human player the chance to play again. A specific signal will be used to let the human player know that such event has occured either by the use of an led or a sound.

* providing power supplies to all the necessary components

Power Supplies

Due to the characteristics of the system, different components have different voltage and current requirements, therefore different power supplies need to used of each of this components. The PC come with its own power supply and therefore another one is not needed. For the microcontroller (arduino mega) it requires a 7-15 V DC power supply, we will use a transformer that connects to regular power outlet and outputs a 12 V DC. In the microcontroller's case current is not a limiting factor since it requires relativelly low current compared with the 5 amp output of the transformer. The other components that need its own power supply are the actuators. For this case we will use another power supply depending on the power requirements of the actuators. We will use a controller for the actuators in order to protect the microcontroller. In the case that we use NEMA 17 stepper motors then a good choise is A4988 Stepper Motor Driver For Arduino. In the case that we other higher power steppers or different actuators then other controllers will be used. There is many power supplies available as well as actuator controllers so we are confident that will be able to find one that meets our needs.