

Have you ever been hard at work on a robot and suddenly get told to clean your room? You cannot leave what you are doing or you will lose your concentration! What should you do? Get out the Room Cleaner.

Description

The Room Cleaner is designed to autonomously clean a room by picking up small objects on the floor. It has a high power claw (150 Lbs of force at axel, see picture below) for picking up objects and a trailer to bring them back to you. It utilizes four motors, one ultrasonic sensor, and one bumper sensor. The pictures show it with a AA battery pack but it can also use a rechargeable battery. The Room Cleaner cleans the room by driving forward until it senses an object with its ultrasonic sensor. It then checks its bumper sensor. If it is pressed it assumes the object is a wall or an object to large to be picked up. If the object is a wall the robot backs up and then does a pivot turn. If the object is something to be picked up, however, the Room Cleaner grabs it then flips the claw all the way over and drops it into the trailer. If the Room Cleaner detects an object while it is turning it checks the bumper sensor. If it is pressed, the Room Cleaner stops driving and beeps to indicate "cannot continue driving" then turns off. If it is not pressed it picks it up and continues what it was doing. It repeats this process making passes like a lawn mower. It can also be remote controlled to get something for you.

Brainstorming and Designing

When I decided to enter this challenge I started brainstorming and asking my family members for ideas. I finally settled on the Room Cleaner. The first step I took in designing the Room Cleaner was to sketch it in a notebook. I decided to draw it in three modules to make construction easier and making changes to the finished robot simpler. The three modules were the drive base, the trailer, and the claw. I then began designing them in Autodesk Inventor starting with the claw and ending with the trailer. All of the screws are on the model because I thought they are an important part of the design. The screws also helped me verify that the Room Cleaner was realistic and buildable. Last, I assembled all three modules into one robot. Pictures of the three modules, their sketches, and the construction of the claw module can be seen below.

Inventor 2010

My favorite feature of Inventor was the controls for moving the viewpoint. I also found the scroller on the mouse very useful for zooming in on screws to get them positioned correctly.