CISC 3415 **Maryam Kurbanova**
HW Assignment – 3 (3pts)

1. (**2-pt**) Recall from Homework 2 that you are the chief robot designer for U.S. Robots and Mechanical Men, Inc., and you are working on designs for the following robots:

   (a) A delivery robot that will carry supplies to different departments in a hospital.

   For this robot I will equip it with ultrasonic sensors which are cost effective and are used to detect obstacles and measure distance. I'd also put in cameras so that it can identify signs and navigate complex areas.

   (b) A supply robot that will carry heavy loads across loose soil and sand.

   For the supply robot I'd put in inclinometers which are affordable and important for maintaining stability. And pressure sensors to monitor the weight so that overload can be prevented. Lastly, I'd also add cameras which are always crucial for navigation.

   (c) A security robot that has to secure a wooded, hilly, area.

   For the security robot, I'd put in infrared sensors which are affordable and used to detect heat signatures. This is very useful since humans and animals emit a lot of heat. Another sensor to add is motion detectors which are used to monitor movement. And, of course, cameras are almost always essential/ recommended to add in order to detect obstacles, see movement and living things.

   (d) A butler robot that will greet guests in a home and bring them drinks.

   The first sensor to add in is a microphone for it to interact with guests. The robot needs to be able to recognize voices and speak. Other sensors to add are cameras and proximity sensors in order to navigate through the home and prevent collisions.

2. (**1-pt**) What problem do slides #41-42 (from lec3-Perception.pdf) show? Explain what the ambiguity is and how this could be fixed.

   The problem shown in those slides is that the camera doesn't know what angles the people are laid out in. The students may be behind one another or they can all be facing the professor at the front. A way to fix this is to add additional cameras positioned at different angles in order to gather different perspectives. A great solution is to use Lidar which gets information on distance through lasers. This is expensive but it is a great way to get more precise information about the environment. This way info about how far the people are from each other and from the camera can be used to see how the people are laid out in the room.