Name: _____ Date: _____ Class: _____

Automatic Floor Cleaner Computer Program Packet



Wikimedia Commons http://commons.wikimedia.org/

Define the following terms

Robot: _____

_____

_____

Robotics: _____

_____

_____

Computer engineering: _____

_____

_____

Construction

Use the NXT directions to build the “basic car” robot.

Programming

Use the LEGO software to create a program for each of the following tasks. Make sure each program has a clear title including your initials, such as*:* JQ SQUARE, JQ LINE, JQ CIRCLE.

1. Drive in a straight line for 2 feet.
2. Drive in a straight line for two feet, turn around and return.
3. Trace the square marked on the floor.
4. Follow the irregular line on the floor.
5. Drive in a smooth circle. (+10 bonus)

Introduction

You work as an engineering consultant for a major robotics and computer engineering company. Your newest job is to create the computer program to control the movements of their new assistive floor cleaner. Use the LEGO MINDSTORMS NXT "basic car" robot to test and demonstrate your program.

Client Statement

Many people develop vision problems as they age. With diminished eyesight, a number of problems can arise, such as keeping one's home clean. We have developed a small, self-contained floor cleaner. Our goal is to have the "robot cleaner" be able to move around the room in a random pattern, while using sensors to avoid running into furniture, pets and other obstacles in the room. This random pattern enables the robot to clean the entire floor if given enough time.

Problem Statement (Define the problem in detail)

_____

_____

_____

_____

_____

_____

Revised Problem Statement (Definition of the problem in detail including client modifications)

_____

_____

_____

_____

_____

_____

Functions (what the product <u>does</u>)

_____

_____

_____

_____

_____

_____

Objectives (What the product <u>is</u>)

_____

_____

_____

_____

_____

_____

Constraints (The product must or must not)

_____

_____

_____

_____

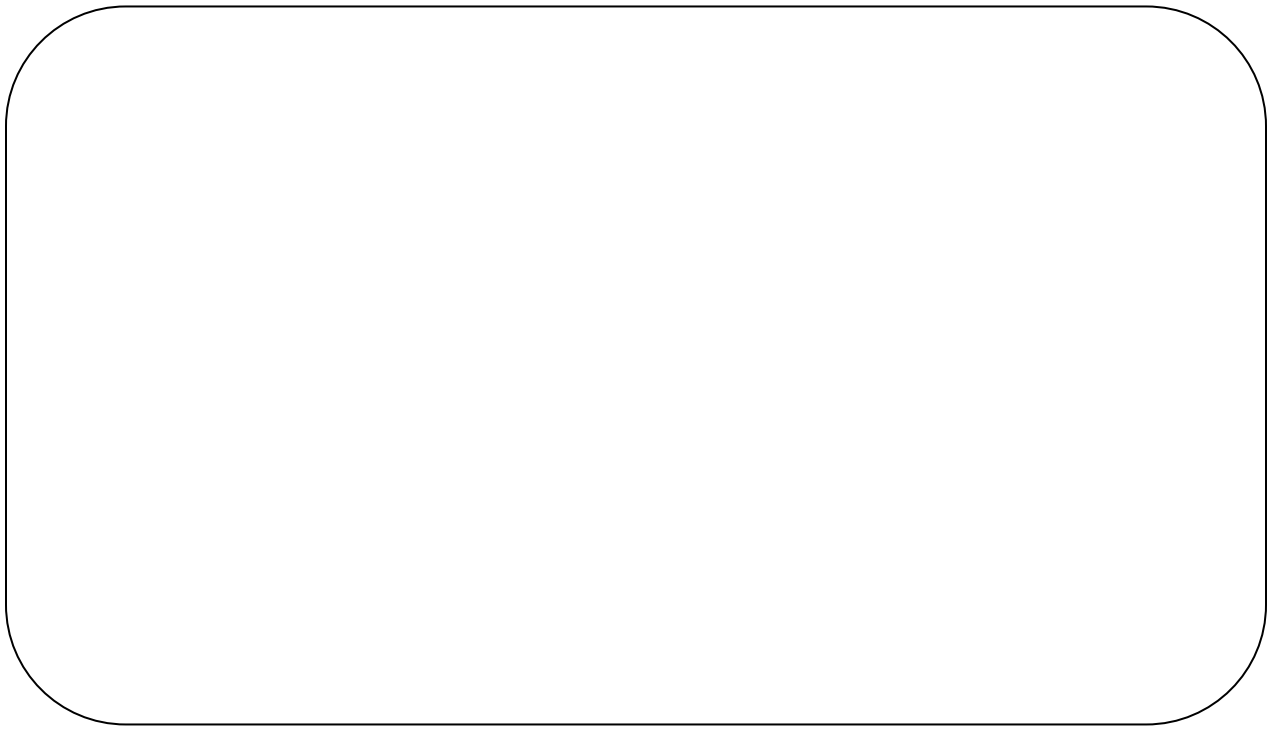
_____

_____

Background Research

As homework, use the internet to research robotics, computer programs, existing products that carry out similar functions, computer programs that control robot movements, robotic automation, and other related topics. Keep a record of relevant material and the source websites.

Design Solutions (describe/sketch 3 possible design solutions)



Design #1

_____

_____

_____

_____

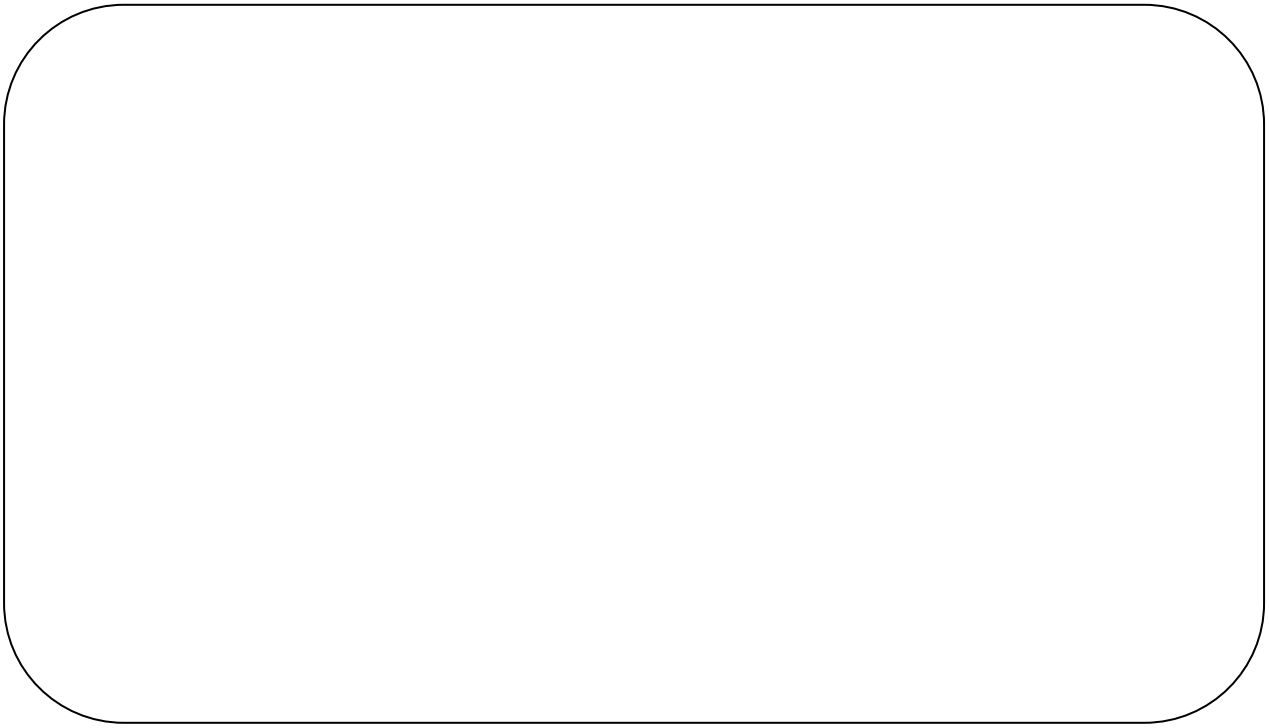
_____

_____

_____

_____

_____



Design #2

_____

_____

_____

_____

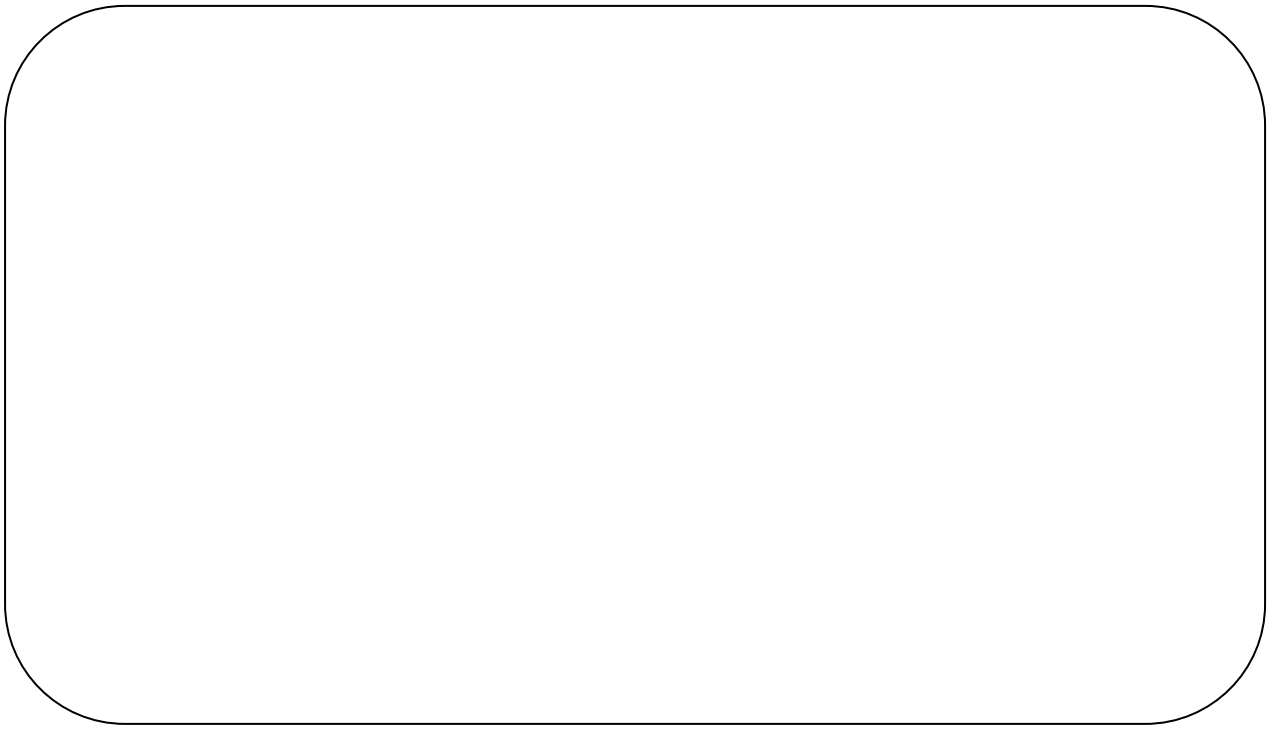
_____

_____

_____

_____

_____



Design #3

Prototype Creation (Describe each part of the program in detail)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Test Design (How you will test your program design)

_____

_____

_____

_____

_____

_____

Test Results (describe the test results in detail)

_____

_____

_____

_____

_____

_____

_____

_____

***Evaluation* of Results** (Based on the results; what worked, what did not work)

_____

_____

_____

_____

_____

_____

_____

_____

Future Recommendations (What you would recommend for future designs)

_____

_____

_____

_____

_____

_____

_____

_____

_____