Requirements and Design Alternatives

The following is a listing of design requirements and possible solutions:

1. The vehicle must be able to sense objects/obstacles (i.e. walls) in proximity to itself.
   Alternatives Include:
   Distance Sensors:
   1.1 Phototype
      (e.g. SICK DS 60 range 100mm to 6000mm)
   1.2 Laser
   1.3 Echolocation (look into interference problems)

2. The vehicle must have a self steering mechanism and be able to navigate around obstacles.
   Alternatives Include:
   Steering Options:
   2.1 Rack and pinion (front and rear) (e.g. car)
   2.2 Individual wheel speed control (e.g. Toro lawnmower)

3. The vehicle must start from user input.
   Alternatives Include:
   Starting procedure:
   3.1 Push button start
      3.1.1 Button on car
      3.1.2 Remote button start

4. The vehicle must possess the ability to stop in response to an emergency-kill switch, or in response to the detection of objects in proximity to the front and sides.
   Alternatives Include:
   Stopping procedure:
   4.1 Push button stop
      4.1.1 Button on car
      4.1.2 Remote button start
      4.2 Stop in response to objects -meaning that the front and side sensors on car report a minimum distance.

5. The vehicle must possess a drive system.
   Alternatives Include:
   5.1 Four-wheel drive
   5.2 Front-wheel drive
   5.3 Rear-wheel Drive

6. The vehicle should operate on DC battery power
   Alternatives Include:
   6.1 At what voltage will it operate?
6.2 How many batteries will it use?

7. The drive and steering of the vehicle will operate on DC motors
   Alternatives Include: types and sizes of motors

OVERALL REQUIREMENT:
The vehicle must possess the ability to navigate through an indoor maze. This means that sensors on the sides and front will sense when a wall is present and when an opening appears for a turn. This maze will have no false ends so the vehicle will not be required to have the ability to reverse directions. The vehicle will then sense the end of the maze, meaning that both sensors on the front and sides send data that an object is present and the hardware will receive this information and signal the stop.