Design Considerations

Writing up the second element of your portfolio

***Be sure to update your Description document and add it to the beginning of your Design Consideration Document***

Description

(written in week 3, rewritten in weeks 5, 7, and 9)

• Write a one paragraph description of the robot you would like to design and build.
• What would you like it to do?
• What GOALS will it achieve?
• What environment would it work in?
• Try to be specific if you can, but expect to change the description as you learn more
• Begin researching solutions to this sort of problem.

How you will build your portfolio

Week 1 2 3 4 5 6 7 8 9

Describe Design Considerations Implementation Behavior

Design Consideration Elements of your Writeup

• The Robot
  – Robot components
  – Processing tasks
  – Control Architecture
  – Representation
• Parts List
• Annotated Reading List
Design Consideration
Robot Components

• What components will your robot have?
  – Search for components at Sparkfun.com, Adafruit Industries, Parallax.com and other sites.
  – Research the capabilities of components
  – Think about what you can build yourself.
• Keep it simple to start!

Design Consideration
Robot Components

• What sensors will your robot have?
  – Describe the conditions that the sensors will measure
  – Describe the signals generated by the sensors in different relevant conditions
• What effectors and actuators?
  – Consider and describe what effects the effectors will have on the world
  – What sort of signal will be required to control the effector? (E.g. Pulse-width modulation for a servo)

Design Consideration
Chassis and Power

• Chassis or body: What will the sensors and effectors be mounted on?
• Power source
  – Batteries (almost certainly)
  – Which type?
  – Where located?
  – Wiring requirements

Design Consideration
Processing

• Describe how information from the sensors will be transformed into information that can is useful to your robot.
  – Make decisions
  – Control the effectors
  – What levels of processing will be required
• Try to express this as pseudo code
  – For example pseudo code see TRP, pg 197

Pseudo-Code
(TRP pg. 26, 197)

• pseudocode (from the Greek pseudo meaning “false” and code meaning “program”)
• An intuitive way of describing the controller, not any particular robot programming language

if dist-sensor <= near_limit
  then stop
else go

Design Consideration
Robot Control Architecture

• What kind of control architecture will your robot use?
  – See Ch 11 of TRP
Design Consideration
Robot’s Representation

• Will your robot use a representation of its world?
  – If so, what kind of representation will it use?
  – See Chapter 12 of TRP

Shopping for Sensors

• Sparkfun = https://www.sparkfun.com/categories/23
• Adafruit = http://www.adafruit.com/category/35

• By Week 3: Specify a parts list and give/send it to the professor or the TA.

Design Considerations
Annotated Reading List

• Include an annotated reading list
  – Assemble a short (3-5 items) list of similar projects you have discovered (online or offline) to be relevant to your robot
  – For each project, provide a full citation and a few sentences saying what it is about this project that makes it relevant to your robot

How you will build your portfolio