Engineering Project Proposal

Crescenta Valley High School

Introduction

The design project is a culmination of your time in the Introduction to Engineering class. You will be combining all of the knowledge you have gained and demonstrating it in one large scale project. This project will be used to demonstrate your knowledge in a set number of engineering disciplines. This project has an emphasis on good documentation, working with multiple constraints and limitations, developing project management skills and utilizing disciplined design techniques.

Project Proposal

Your proposal will be broken up into six sections described below.

Project Description

I want to make an Arduino car that is remote controlled. This would be used to go into the small space it will help to find people at small places where firefighters can not enter. This will be also used for children that want to play. This includes electronic engineering and software engineering.

Our team is going to learn how to program the arduino by watching the video on youtube or going into the website to find the way. Team would also be able to learn how to do bread boarding more deeply as our group does the breadboarding for the car.

This is going to lead our group to have better understanding with the Arduino which would help me later when I am living because coding is one of skills that is required by many job and many more places to use it than the past.

We are going to connect the arduino car to the phone and we will make it able to be controlled by the phone.

Project Research

http://www.energiazero.org/arduino/Choosing%20the%20Right%20Arduino%20Motor.pdf
We are going to use the DC motor where it is easy to use and very cheap and easy to get with these pros. We chose to use this motor.

https://forum.arduino.cc/t/possible-to-get-6v-output-from-arduino-uno/504889
Need separate power supply for the Arduino because Arduino does not supply the 6 volt.

https://forum.arduino.cc/t/how-to-rotate-a-car-by-90-degrees/600336
To turn the car by 90º the car with the differential drive which making 1 side of the wheel go forward and one side of the wheel move backward

https://maker.pro/arduino/tutorial/how-to-interface-the-ov7670-camera-module-with-arduino
Ov7670 is easy
https://www.youtube.com/watch?v=GPVC84D5ULw
How to connect DC motor to Arduino using the motor controller.

https://www.youtube.com/watch?v=eTe2ZmOmkAU
How to use DC motor in Arduino

https://forum.arduino.cc/t/powering-arduino-uno-and-servo-from-same-battery/456018
Connecting battery to the arduino

Design Constraints

The constraints that your device will need to adhere to. Not all constraints necessarily need to be met by the end of the semester as long as there is a clear understanding of a pathway to meet the constraint in the future. Constraints may include:

- Cost: low as possible and less than $100 dollars.
- Size(20in*20in max)
- safety
- Get device to receive the signal from the phone
- Sense obstacle if possible
- Attach a camera to see what is in front of the robot.
- Weight of the car(maximum 5kg)

These constraints may also have acceptable ranges which leads to a tradeoff space that must be analyzed.

Bill of Materials (BoM)

The table of materials that will be used in the design of your final project. Each item should have a part #, a short description, the price per unit, the quantity purchased and the total price for that item. The final row of the table should include the total price of the device which should fit within the allotted budget (Don't forget shipping costs). Any devices that you already possess should be indicated and their total price may be ignored (all other columns should be completed).

Part #	Description	Price per unit	Quantity	Total price	Links
Duracell coppertop 9 v battery	This will help power up the arduino car and just in case we mess up we have a second battery.	$3.045	2	$12.19	https://www.amazon.com/Duracell-Coppertop-Alkaline-Batteries-Count/dp/B000K2NW08?th=1
Bread board	We need the bread board because we can't connect anything. Also the one that we used in	$1.08	1	$1.08	https://campaign.aliexpress.com/wow/gcp/tesla-pc-new/index?UTABTest=aliabtest344316_486351&_randl_currency=USD&_randl_shipto=US&src

	class is suitable, but here is the one we saw online.				=google&aff_fcid=c48b3053c77740acae7669039aef55ef-1674773135419-07423-UneMJZVf&aff_fsk=UneMJZVf&aff_platform=aaf&sk=UneMJZVf&aff_trace_key=c48b3053c77740acae7669039aef55ef-1674773135419-07423-UneMJZVf&terminal_id=b196c16e32434b83a6b3202d9bc6a158&wh_weex=true&wx_navbar_hidden=true&wx_navbar_transparent=true&ignoreNavigationBar=true&wx_statusbar_hidden=true&bt_src=ppc_direct_lp&scenario=pcBridgePPC&productId=2251832704979457&OLP=1084300508_f_group2&o_s_id=1084300508
Arduino Uno Rev3 A000066	We need it also to connect the motor.	$27.60	1	$27.60	https://store-usa.arduino.cc/products/arduino-uno-rev3?srsltid=Ad5pg_GALZPHjluCg75POhsGSxHJSDfILhCNQRwgF8HENcQMHHXuw7FVOvs
dc motor	1.5-6 volt dc motor	$1.58	4	$6.32	https://www.amazon.com/Gikfun-Miniature-Motors-Arduino-Projects/dp/B07SQXRSNR/ref=sr_1_11?keywords=1.5+volt+motor&qid=1674861710&sr=8-11
wires	Wire for the Arduino	$0.06	120	$6.98	https://www.amazon.com/Elegoo-EL-CP-004-Multicolored-Breadboard-arduino/dp/B01EV70C78/ref=sr_1_1_sspa?keywords=Arduino+Wire&qid=1674775737&sr=8-1-spons&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUExTEU4U01MNk1DMktNJmVuY3J5cHRlZElkPUEwNDg1MzA3M0o3NlJSWIU4NFJHTCZlbmNyeXB0

					ZWRBZElkPUEwOTQ1MzIx MUVLUFZPSjk1OTFYOSZ3a WRnZXROYW1IPXNwX2F0Z iZhY3Rpb249Y2xpY2tSZWR pcmVjdCZkb05vdExvZ0Nsa WNrPXRydWU=
Philiphead screwdriver	For the bolts and nuts we need phillip head screw screwdriver	3.98	1	3.98	https://teachergeek.com/products/1-phillips-screwdriver
Bolts and nuts	We need to hold the small board that holds motor in place	7.82	24	1.96	https://www.amazon.com/Prime-Line-Products-GD-52103-Carriage/dp/B002YGJ0MM?source=ps-sl-shoppingads-lpcontext&ref_=fplfs&psc=1&smid=ATVPDKIKX0DER&region_id=373786
resistor					**E-Projects 10EP51422R0 22 Ohm Resistors, 1/4 W, 5% (Pack of 10)**
base	2WD Smart Car Robot Chassis Base Acrylic Plate Kit Arduino MCU DIY	$6.23	2	$12.46	https://www.eelectronicparts.com/products/2wd-smart-car-robot-chassis-base-acrylic-plate-kit-arduino-mcu-diy
wheel	For the car we need 4 wheels that can connect to the motor and move.	$8.55	4	$2.14	https://www.amazon.com/ApplianPar-Shaft-Gearbox-Plastic-Arduino/dp/B086D5M65M?source=ps-sl-shoppingads-lpcontext&ref_=fplfs&psc=1&smid=A3G0LER721T2S8&region_id=373786
Voltage	We need to divide	$1.07	3	$3.21	https://www.ebay.com/itm/182

divider	the voltage to make it go to the four motor				094058470?chn=ps&mkevt=1&mkcid=28&srsltid=Ad5pq_GBvjoJl3rp6iuDi6qF1hJr1LepMp8cFVgTC53WFh77HezKg6_t7Ms
Battery adapter	We need the adapter to connect the battery to the arduino uno.	$1.20	1	$5.99	https://www.amazon.com/5pack-Battery-2-1mm-Arduino-Corpco/dp/B01AXIEDX8
Battery holder	We need to place the battery and connect it to the arduino. We will try both adapter and holder.	$3.50	1	$3.50	https://www.amazon.com/LAMPVPATH-Pack-Battery-Holder-Switch/dp/B07HQ5RT7Z/ref=asc_df_B07HQ5RT7Z/?tag=hyprod-20&linkCode=df0&hvadid=241976930872&hvpos=&hvnetw=g&hvrand=1239008618463130386&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9031138&hvtargid=pla-1007713163466&psc=1&region_id=373786
USB type C	Connect Arduino and computer	$8.58	1	$8.58	https://www.amazon.com/Connect-Microcontroller-Arduino-ATmega328P-ATmega2560/dp/B09F5BJP3J
Motor controller board	Used to control motor and connect between motor and arduino	$6.99	2	$13.98	https://www.amazon.com/Qunqi-Controller-Module-Stepper-Arduino/dp/B014KMHSW6/ref=asc_df_B014KMHSW6/?tag=hyprod-20&linkCode=df0&hvadid=167139094796&hvpos=&hvnetw=g&hvrand=14274633520402295523&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9031138&hvtargid=pla-306436938191&psc=1

Schedule of Milestones

Over the course of the quarter you will be asked to demo **two significant milestones** on the development of your project, and then a final demonstration of your completed project. Each of

these milestones should constitute approximately ⅓ of the way through the implementation work. This can be in proof of full control using a driver with a generalized interface for given components or partial integration of a component into the entire system. You should have a subsection in this section for each of the two milestones which clearly indicates what will be completed for these milestones and what you intend to demo.

These are not binding agreements. As development progresses you will have a better idea as to where you will be at milestone demo days. If you are not going to make a milestone make sure that you speak with your engineering teacher and get permission to reduce the milestone load. This will only be approved if you have run into significant unforeseen development hurdles.

1st: Week Finish the Document for Project Proposal
Week 2-3:Work on CAD and find information when there is not enough information about how to connect the circuits.
Week 4-5:Start building if possible and do the circuiting in real life not in the CAD
Week6: Start learning about how to code the Arduino by researching. and testing the robot. Last week!!

Team Member Biographies
Each team member should have a biography of themselves. This should include their year, emphasis and any previous courses or extracurriculars that lend expertise relevant to the project.
Mingyu Jeong's Biographies:When I was in La Crescenta Elementary School I learned how to program using the Scratch at Lego Robotics which was an after school program. Second thing I did was learn Scratch again at the library during summer break after 6th grade. And when I was in 7th grade I got into Coding class that was going on after school and I learned how to program using the Python turtle. I used a few simple commands at the class and it got harder and faster , which was too hard to learn at the end so I left the class.
Brandon Kim's Biographies:In this class I learned about coding on the arduino and I learned how to wire. I also learned a bit of coding from a class I took. In 10th grade I took computer applications and I learned about computers and most of their functions. I passed the class with an A. For the coding class(extracurricular not a school class) I took it, but It ended because I guess my parents pulled me out for some reason.