

Project summary

Before I will consider taking on your project, you must fill in the following and be as detailed as possible. Note that by filling in this form does not guarantee that I will supervise your project.

Please see the next page for an example.

Project summary in own words:

The outcomes of the project:

The main question that will be answered:

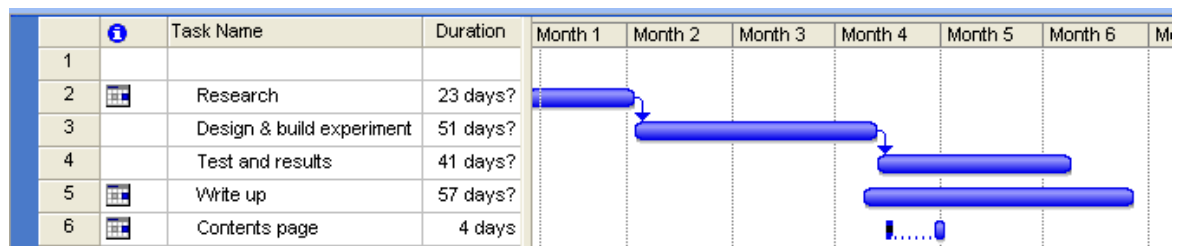
A summary of the mechanics, electronics and software that will be needed:

How this fits with my strengths:

What my weaknesses are and areas where I will need to study:

Brief research into this area and what papers have I read:

Gantt chart of progress



Example: A grass cutting robot

Project summary in own words:

This project is to build a grass cutting robot that is autonomous. The robot will have its own power and microcontroller. Once a user has pressed the 'cut' button, the robot will randomly move around the grass and cut it. If it bumps into a fence, it will rotate a random amount and continue cutting.

The outcomes of the project:

A tracked robot that can run on a grassy terrain. A cutting head that uses low power and will cut the grass. Two sensors that will detect when a collision with a fence has occurred. A battery low sensor to stop the robot. Current sensor on the wheels to detect if a wheel gets stuck.

A thesis describing the research, build process, testing and implementation of the above.

The main question that will be answered:

Is an autonomous grass cutting robot feasible with the current technology and what improvements would need to be made to make this a marketable product.

A summary of the mechanics, electronics and software that will be needed:

Use an existing tracked base available in D10. The electronics will consist of two motor driver ICs with current sensing (L298), and a single FET controlled motor for the cutter (with current sensing in case of it jamming). One microcontroller (possibly PIC 18F4550), two switch sensors or infrared sensors (SHARP GP2D12).

Software will be a C program to control the motion and detect if a front bumper has been pressed-in which case it will turn a random angle. Software will monitor the motor currents and reverse the motors and eventually stop if an over current is sensed.

How this fits with my strengths:

I have built a mobile robot using a STAMP microcontroller and used FETs to drive motors previously.

I am studying an electronics degree and so am used to circuit simulation and computer interfacing.

What my weaknesses are and areas where I will need to study:

My programming is weak but I have found an introductory course in C programming in the library. I am also taking the module (Integrated Robotics) which teaches embedded programming.

Brief research into this area and what papers have I read:

Robot lawnmowers are produced by MowBot (mowdirect.com), RoboMow(Friendly Robotics), AutoLawnMow (robotlawnmowers.co.uk), and Husqvarna's Robomow.

The improvement of my project would be to sense the terrain and adapt the cutting height to suit, in [1] a method is investigated that could be utilised in this project.

- [1] Huakun Wang, Li Zu, and Feng Yue, "Neural networks-based terrain acquisition of unmarked area for robot mowers," in *Control, Automation, Robotics and Vision Conference, 2004. ICARCV 2004 8th*, vol. 1, pp. 735-740 Vol. 1, 2004.