

EE518 Advanced Microcontroller Applications

Assessed Project

23rd January, 2013

Project Description

Create a programmable autonomous vehicle by refitting a radio controlled toy.

The aim of this project is to design and build an embedded system which will allow an off-the-shelf remote controlled toy to be converted into a vehicle capable of operating independently. The vehicle will be placed at a specified starting point and must be able to:

- travel for a specified distance,
- reach a specified end point,
- cover the distance specified in less than a specified time,
- avoid an obstacle between the start point and the end point by turning, and
- not require any user input while travelling.

An example test run is shown in Figure 1.

Total (minimum) distance travelled is 6 metres. This distance must be covered in 30 seconds or less. Values for d and θ will be unknown until two minutes before an attempt at travelling the distance is made. Two journeys—with different values of d and θ —must be made in order to complete the project.

Marks for the project will be calculated on a group basis. 400 marks are available. Vehicles which have the shortest distance overall from the end point will gain an additional 40 marks, vehicles which come within 25 centimetres of the end point will gain an additional 10 marks, and vehicles which fail to come within 2 metres of the end point will lose 10 marks.

A Technical Documentation File must be produced for the design. This file must include:

- the specification of the design,
- a description of the hardware including circuit diagram and test points/instructions,
- a description of the software including a functional description, and
- usage instructions.

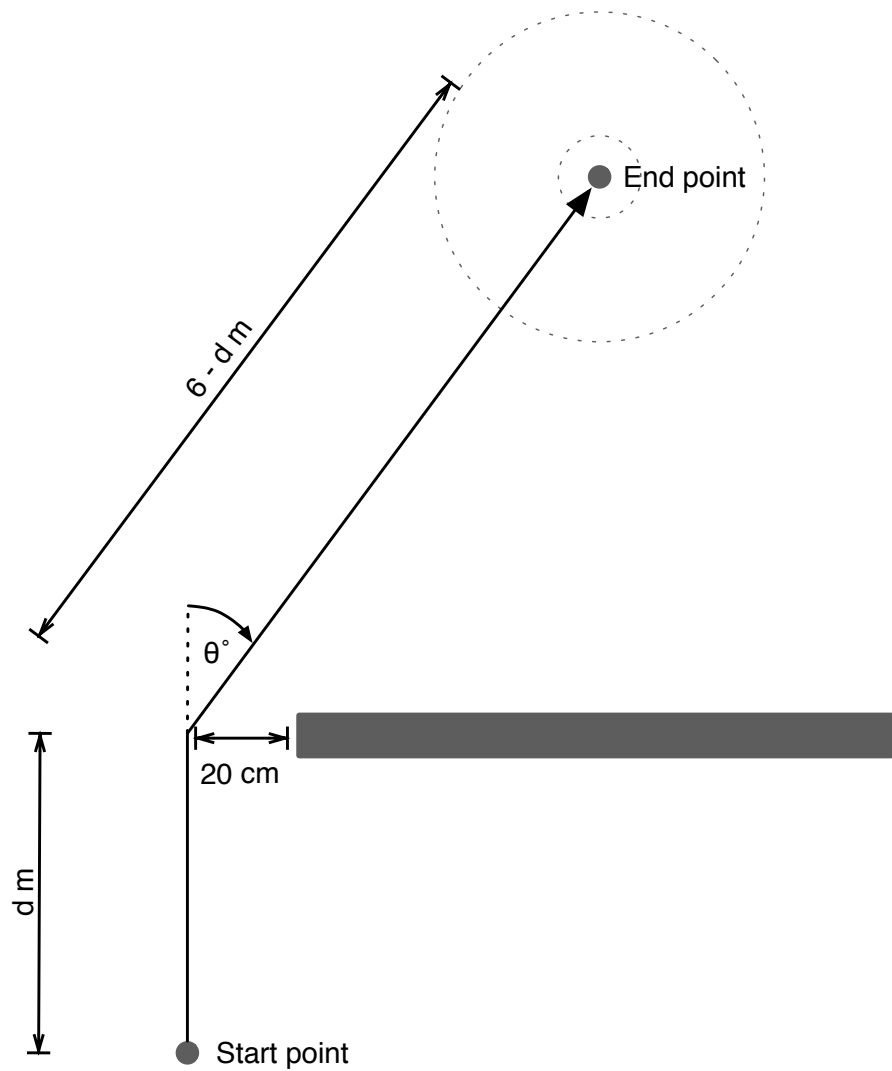


Figure 1: An example test run (not to scale). The minimum distance between the start point and the end point is exactly six metres. A tolerance of 20 centimetres will be given between the edge of the obstacle and the shortest route between the start and end points.

A descriptive report on the project is not required. However, the log books of each project member must be returned with the Technical Documentation File and it is expected that these log books will describe the design and debugging process.

By default, the group mark will be divided equally between all group members. However, group members may ask for a different proportional assignment of marks between group members at the time the project is submitted. It is up to group members themselves to make decisions regarding which group member should undertake which part of the design. The project is due to be demonstrated at some mutually agreed time during Week 10 of the Second Semester, and the Technical Documentation File must be submitted on or before the Thursday of Week 10 of the Second Semester (28th March). The mark allocated to each student will be considered to be a percentage, 80% of which will go towards the final course mark. The remaining 20% of the final mark will come from the log book.

Components can be requested from the workshop and will be available from Week 2 of the second semester. Laboratory space and equipment will be made available in GH7.02 for the duration of the project.

Project Groups

Name	Reg. Number	Degree	Group Number
CHAN CHEE WAH	200807087	CES	1
LEE VICTOR	200816191	CES	1
MCCONNELL GLENN	200808847	CES	1
SINGH AMARJEET	200912701	CES	1
DAY MICHAEL	200815860	CES	2
MACIVER MARTIN	200813339	CES	2
MACKINNON CALUM	200817383	CES	2
NORTON PETER BLAISE	200619264	CES	2
BERTRAND STANISLAS	201229274	EEE ES	3
GALZIN XAVIER	201229305	EEE ES	3
UMAR ADEEB	200914567	CES	3
MORRISON CHRISTOPHER	200805572	CES	3
AMJAD WALEED	200947104	CES	4
CORR JAMIE	200835111	CES	4
JOHNSTONE MARK	200834911	CES	4
LOGAN ROSS DAVID	200813606	CES	4
DOYLE BRYAN	200943401	EEE	5
BOUDIER DIMITRI EDWIN CHARLEY	201229266	EEE ES	5
LE MENN MARIE-ANNE	201229290	EEE ES	5
RIOU PAUL	201229282	EEE ES	5
MCVEAN STUART	200905322	EEE	6
BROWN LAURIE	200805158	EME	6
DOLAN IAIN PETER	200812189	EME	6
GILLESPIE JONATHAN	200816832	EME	6
SINCLAIR DANIEL	200817820	EEE	7
HARRIS SAM	200940461	EEE	7
BROWN ROY HUTTON	200804607	EME	7
DUNNE MARK SAMUEL RYAN	200839319	EME	7
HAMMOND PAUL ALEXANDER	200939004	EEE	8
REILLY ANDREW	200905259	EEE	8
HUGHES BAZIL	200906988	EEE	8
CAO JIANLIN	201119720	EEE	8
PAUL GREIG	200904075	EEE	9
MILNE NEIL LEWIS	200838020	EEE	9
CHUNG NICK	200939062	EEE	9
YE MINXIANG	201118588	EEE	9