# Executive summary

Very brief summary of the main findings/recommendations of the report with some justification.

# Introduction

Briefly describes the project (provides context for the report) and outlines what the reader can expect to find in the rest of the report.

# Requirements specification

General

Movement

Collection/Identification

Construction

Safety

You’ll need to develop the system requirements from the vague description you have received (the rules etc.) – this isn’t simply copying them down, but converting them into formal requirements that your design can ultimately be measured against (tested). For example:

“The robot actuator arm shall be able to lift an object weighing greater than 1.0kg”

Note: These requirements are those that are general to the project. There will be additional requirements depending on the strategy you eventually decide to follow, which you will develop later. For example, a robot designed primarily to prevent the competition gathering weights will have some shared and some different requirements to a robot designed to gather as many weights as possible while ignoring the competition.

# Design space and concept generation

Tactics and Navigation - Peter

* Collect weights as fast as possible, bring back to base (pathfinding) - flowchart
* Ignore base, pick up heaviest weights (random) - flowchart
* Follow the wall - flowchart

Navigation Sensors (discussion) - Ryan

* Camera
* Ultrasonic
* IR
* Collision sensor (limit switch)
* Colour sensor

Locomotion (discussion) - Jack

* Tracks
  + Environment
* Wheels
* Talk about chassis

You should describe the boundaries of your robot/solution in terms of hardware, different strategies to beat opponents, the competition environment, etc. You could mention/describe the equipment you have been provided. Very briefly describe how you came to these ideas – i.e. using methods that we spoke about in class (brainstorming, concept tables etc)

# Proposed concepts

-sketch each overall concept, plus any additional ones for picking up if required

Collect weights as fast as possible, bring back to base (pathfinding) - Ryan

* Arms/hard points (our magnets)
  + Hall effect to detect weight
* Cover other robot ’s base (Do we include this yet?)

Ignore base, pick up heaviest weights (random) - Jack

* Scoop
* Speed

Follow the wall - Peter

* Electromagnet
* Sensor interference

Present initial sketches, models, and descriptions etc of your 3 options. You need to show that you have thought through high-level system design of these concepts, using some techniques such as – Context diagrams, functional architecture diagrams, N2 charts, behavioural flow chart, FSM graphs. (Not all of these, but choose a couple that you think are appropriate to indicate how your concepts would work and be put together).

# Concept evaluation

- calculations

- ‘Merit table’ score chart

Need some basic/approximate calculations or estimates of costs, forces, power requirements, available computation and memory. Evaluate/compare the concepts – FOM table. This doesn’t need to be exquisitely detailed or accurate at this stage – just provide enough to be able to evaluate and compare the concepts in a relatively objective manner. Briefly discuss/comment on these 3 concepts in the context of the competition and specs – factors such as robustness, reliability, ease of build and maintenance between rounds, modularity, and cost.

# Conclusions and recommendations

Based on your evaluations, make a recommendation for one of the concepts to be developed – back this up by summarising its benefits or why you chose it. While we won’t hold you to this design, we would expect that your final form be based on what you present in this report.

# Contribution statement

Jack Hendrikz

Peter Nicholls

Ryan Taylor

Briefly describe the specific contributions of the team members in the project up to this point. For example:

Howard Wolowitz:

 Requirements specification

 FOM calculations for concept 1 and 2

Leonard Hofstadter:

 Sketching concepts

 FOM calculations for concept 3

 Report writing

Sheldon Cooper:

 Room-mate agreement

 Making tea

Parts List:

* DC Motor x2
* DC Motor driver x2
* High current driver ?
* IMU ?
* IR PhotoInterrupter x1
* IR Camera ?
* IR LED ?
* IR MR \ 1 of these ?
* IR SR /
* IR Variable distance x1 (or 3)
* LED ?
* Power Protection Circuit x1
* Relay x2
* Standard Servo x4
* Micro Servo x4
* Smart Servo x4
* Sonar x1
* Stepper Motor x2
* Stepper Motor Geared x2
* Toggle Switch x1
* Variable Resistor 10k
* Weight Sensor x1

Weight (kg)

* On flat: 15.4, 15.7, 16.1
* On curve: 12.5, 12.4, 13.4
* On edge: 8.6, 7.8, 8.8

Diagrams:

* State diagrams
* Flow diagrams
* Functional diagrams
* Context diagrams
* N2 charts
* Data flow diagrams