<table>
<thead>
<tr>
<th>ID</th>
<th>Risk Item</th>
<th>Effect</th>
<th>Cause</th>
<th>Likelihood</th>
<th>Severity</th>
<th>Importance</th>
<th>Action to Minimize Risk</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Budget is too small</td>
<td>Unable to purchase all the parts for the project</td>
<td>Parts required cost too much</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>Prove that we need an increase in budget</td>
<td>Team</td>
</tr>
<tr>
<td>2</td>
<td>Servos will not have enough torque</td>
<td>Robot will be unable to complete task</td>
<td>Incorrect measurements were made and wrong servo purchased</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>Over estimate torque on the servos</td>
<td>ME/EE</td>
</tr>
<tr>
<td>3</td>
<td>Speed of the servos will be hard to control</td>
<td>Robot will not move in a human like form</td>
<td>Unable to have fine control over the servos</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>Gain knowledge on control systems</td>
<td>EE</td>
</tr>
<tr>
<td>4</td>
<td>Battery life is too short</td>
<td>Robot cannot operate for a long period of time</td>
<td>Robot draws too much power</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Consult with advisor/customer</td>
<td>EE</td>
</tr>
<tr>
<td>5</td>
<td>Roboard has enough power to process information</td>
<td>The time to compute commands will take too long</td>
<td>Unable to estimate the computing power needed</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>Research capabilities</td>
<td>CE</td>
</tr>
<tr>
<td>6</td>
<td>Parts arriving on time</td>
<td>Push times tables back</td>
<td>Poor planning</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>Understand lead time</td>
<td>ME/EE</td>
</tr>
<tr>
<td>7</td>
<td>Ability to get donated material</td>
<td>Increase budget cost</td>
<td>Lack of time and availability</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>Give donor enough lead time on project</td>
<td>ME/ Graeme</td>
</tr>
<tr>
<td>8</td>
<td>Focusing on too many tasks/ Algorithms</td>
<td>Push times tables back and not finish main goals</td>
<td>Over ambition with the time given to the team.</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>The balancing and walking Algorithms are the most important functionality for this project.</td>
<td>Team</td>
</tr>
<tr>
<td>9</td>
<td>Unable to meet or prove engineering specs and expectations</td>
<td>Specs and customer needs not met</td>
<td>Improper information and product</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>Research parts and know expectations</td>
<td>Team</td>
</tr>
<tr>
<td>10</td>
<td>Heat issues</td>
<td>Poor performance for electronics</td>
<td>Bad ventilation</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>Prototype and test components</td>
<td>EE/ME</td>
</tr>
<tr>
<td>11</td>
<td>Getting fabrication of parts on time</td>
<td>Robot is delayed</td>
<td>Parts have long lead time</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>Allow proper lead time</td>
<td>ME</td>
</tr>
<tr>
<td>12</td>
<td>Team meeting times</td>
<td>Fewer team communications</td>
<td>Busy schedules for most of the team.</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>Plan well thought out meetings with set goals so time isn’t wasted.</td>
<td>Team</td>
</tr>
</tbody>
</table>
Understanding and implementing inverse kinematics for a humanoid

Tigerbot unable to move in a human like way

Late of time and understanding with the coding of the servos

Allow enough time for prototyping and testing of the inverse kinematics

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Hardware damage

Replacement parts need to be ordered

Careless handling of parts, faulty parts

Be careful with parts, buy high quality parts from reputable companies

Team

Interfacing old code and code structure for TigerBot V3

Increase time of coding

Unable to contact previous team about code

Make early effort to get in touch with last year's team and start using the new interface with the old code

CE

Team Communication

Cause unnecessary delays

Poor meeting structure/ and agenda

Have set goals at meetings and structure out each week

Graeme/Team

Custom PCB circuit for foot sensors is more complex then expected.

Increases the time it will take to interface the software to the sensors

Underestimate the difficulty of the circuit design.

Prototype circuit on a bread board to verify it works.

EE

Likelihood scale

1 - This cause is unlikely to happen

2 - This cause could conceivably happen

3 - This cause is very likely to happen

Severity scale

1 - The impact on the project is very minor. We will still meet deliverables on time and within budget, but it will cause extra work

2 - The impact on the project is noticeable. We will deliver reduced functionality, go over budget, or fail to meet some of our Engineering Specifications.

3 - The impact on the project is severe. We will not be able to deliver, or what we deliver will not meet the customer’s needs.

“Importance Score” (Likelihood x Severity) – use this to guide your preference for a risk management strategy

Prevent

Action will be taken to prevent the cause(s) from occurring in the first place.

Reduce

Action will be taken to reduce the likelihood of the cause and/or the severity of the effect on the project, should the cause occur

Transfer

Action will be taken to transfer the risk to something else. Insurance is an example of this. You purchase an insurance policy that contractually binds an insurance company to pay for your loss in the event of accident. This transfers the financial consequences of the accident to someone else. Your car is still a wreck, of course.

Accept

Low importance risks may not justify any action at all. If they happen, you simply accept the consequences.