1.0 Introduction and Justification

Risk management is a series of steps whose objectives are to identify, address and eliminate software risk items before they become either threats to successful software operation or a major source of expensive rework [1].
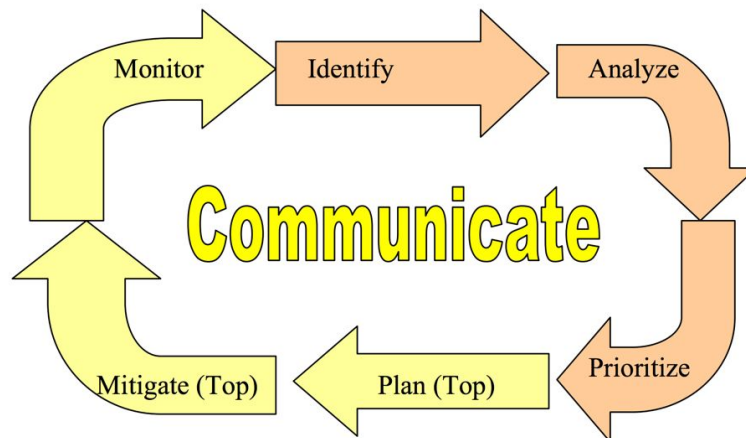

Figure 1: The Risk Management Cycle.

RISK MANAGEMENT CYCLE [1, p.2]

In order to identify risks to our project we followed a risk management cycle of identification, analysis, prioritisation, planning/mitigation and monitoring. As a team we decided to adopt the condition-transition-consequence (CTC) format [2] to allow a standardised systematic approach to defining risks as they arise. Initially, in order to identify risks we engaged in a team discussion and brainstormed as many risks as we could.

Next we categorised the risks into project risks and product risks by the definitions given in Laurie Williams' Risk management guide [3]. Product risks will be identified and monitored as the project is implemented.

Then we assessed the probability and impact of a loss occurring by modifying and utilizing a standardised scale to reflect the perceived likelihood of the risk and impact of the loss if it were to occur. As the original scale was too complex we simplified it to better suit the scope of our project. Each team member assessed each risk, then fed back their assessments to the group and debated their logic until a general consensus was reached. This process was modelled on the Delphi Technique [4] and aims to reduce the subjectivity of classifying a risk.

The team meets regularly to review progress and risks. We used a classification to give a rank to each risk, which is used to manage the mitigation process. We decided to rank risks numerically as it makes it easier to manage each member's top 10 list of risks as a whole, when the weekly review occurs. The Risks with a higher priority are shown at the top of the list.

We manage probability in a similar way, if the probability is rare it is deemed not important enough to be actively managed, and therefore is monitored.

Next the team decided on mitigation techniques for risk avoidance and reduction feeding back in a similar iterative style to categorisation. In order to monitor the risks each team member is keeping a list of their top 10 risks and is regularly communicating their concerns back to the Risk Manager and the team via Slack or any of the meetings during the week. Each team member was educated about the different types of risk mitigation (acceptance, avoidance, control, transfer and monitoring) in order to develop their ability to mitigate risks as they arise (without the help of the Risk Manager).

It is a requirement that the risk log should be maintained in a tabular form. This makes it easy to have access to a visual representation of risks that can be monitored. It should streamline the whole risk management process during the project by making updating the risks document easier. (See figure 2.0 below, which could also in the form of a spreadsheet)

2.0 Risk Table

Given that we may be over optimistic about deadlines there is a concern that tasks will overrun resulting in varying delays meaning we may have to reevaluate requirements.				
Impact	Probability	Rank	Previous Rank	Mitigation
Major	Likely	1	N/A	● Set artificial deadlines ● Frequent meetings ● Online communication

Given that throughout the project the customer requirements may change, there is a concern that we will not be able to fully satisfy all of the requested changes leaving the customer unsatisfied.				
Impact	Probability	Rank	Previous Rank	Mitigation
Major	Likely	2	N/A	● Frequent meetings between development team and customer ● Early artificial deadlines ● Online communication with the customer

Given that the team may have a varying skill sets there is a concern that individuals may be allocated tasks that they are not suited for meaning the quality of the product may suffer.				
Impact	Probability	Rank	Previous Rank	Mitigation
Major	Likely	3	N/A	● Implementation of pair programming ● Frequent communication between developers ● Regular peer reviews of work

Given that individuals have other commitments outside of the project there is a concern that there will be a conflict of interest meaning the quality of work may decrease or deadlines will have to be pushed back.				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Likely	4	N/A	● Compulsory meetings ● Artificial deadline ● Online communication

Given that there may be misunderstanding between the teams members there is a concern that tasks will be inadequately completed meaning extra time must be used to fix any issues.				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Almost Certain	5	N/A	● Regular meetings ● Short development cycles ● Communication channels for task assignment

Given that with the Agile methodology there is no clear hierarchy there is a concern that the decision making process will take longer than necessary.				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Likely	6	N/A	● Pick specialists for different tasks ● Voting / team discussions ● Go to customer if design decision

Given that the timeline for this projects spans over weekends and Christmas holidays there is a concern that team members will stop working during those periods and a such work may not be completed on time.				
Impact	Probability	Rank	Previous Rank	Mitigation
Major	Likely	7	N/A	● Regular meetings (online or in person) ● Progress reviews ● Artificial deadline

Given that engineers are keen to display their skills there is a concern that large amounts of time may be spent implementing unnecessary features meaning that core functionality may not be developed fully				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Likely	8	N/A	● Design reviews ● Strict task assignment ● Customer involvement

Given that there is a chance a team member may have mitigating circumstances and take a leave of absence from university there is a concern that the team will not have sufficient members to complete the project to the specified time period and quality				
Impact	Probability	Rank	Previous Rank	Mitigation
Severe	Rare	9	N/A	● Assigning more than one person per task ● Online communication ● Regular reviews by the group

Given that we are working as a team on the same project and documents there is a concern that work could be lost or damaged in the document exchange phase, leading to reduced productivity.				
Impact	Probability	Rank	Previous Rank	Mitigation
Major	Possible	10	N/A	● Version control systems ● Online backup tools such as Google Drive

Given that the client's requirements may change there is a concern that new or vastly different requirements may be introduced after the design phase leading to a large loss of work				
Impact	Probability	Rank	Previous Rank	Mitigation
Major	Possible	11	N/A	● Frequent meetings between development team and customer ● Early artificial deadlines ● Online communication with the customer

Given that the city of York lies on a floodplain there is a concern that hardware that we are using is either inaccessible or damaged which may lead to loss of work and/or work not being completed on time.				
Impact	Probability	Rank	Previous Rank	Mitigation
Major	Possible	12	N/A	● Online tools ● Early artificial deadlines ● Online communication with the customer

Given that engineers may lose motivation through the project there is a concern that the work will take longer than estimated meaning that some functionality may not be implemented.				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Possible	13	N/A	● Artificial deadline ● Team building activities ● Variety of tasks given to each team member

Given that team members have different personalities there is a concern that some of them may not get their say in group discussions meaning some ideas are never discovered.				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Possible	14	N/A	● Meetings with group participation techniques ● Brain showers ● Small group work & feeding back to the rest of the team

Given that we have to take on another team's product there is a concern that we may find it difficult to understand how their product works, due to the technology used or bad documentation, meaning more time is spent researching how it works.				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Possible	15	N/A	● Contact the team ● Review the project as a team ● Research the project before picking it

Given that contact with the client may not always be possible there is a concern that we may implement features that were not confirmed by the client or development may be delayed.				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Unlikely	16	N/A	● Frequent meetings with customer ● Online communication ● Implement only confirmed features

Given that the design stage is complex and time constrained there is a concern that there will be unnecessary compromises made meaning that the overall product may not be effectively designed to the specification				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Possible	17	N/A	● Talk to customer about design

Given that we are required to swap projects with another team there is a risk that the work taken will be lacking in quality or direction meaning that we may have to spend more time than is desirable to further develop the solution to a high standard				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Possible	18	N/A	● Contact the team ● Review the project as a team ● Research the project before picking it

Given that we may be working with different technologies such as operating systems there is a concern that software developed by one member may not be able to be used by another team member, leading to a disjointed and ineffective solution.				
Impact	Probability	Rank	Previous Rank	Mitigation
Moderate	Possible	19	N/A	● Pick platform independent technology ● Online tools such as google drive

Bibliography

[1] B. Boehm, "Software Risk Management," IEEE Computer Society Press, 1989.

[2] D. P. Glutch, "A Construct for Describing Software Development Risks," July 1994.

[3] L. Williams, "Risk Management", 2004

[4] U. Gupta and R. Clarke, "Theory and Applications of the Delphi Technique: A bibliography", Technological Forecasting and Social Change, pp. 185-211, 1996.