

Software Engineering and Project Software Project Management Plan

Version 2.0 approved

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Revision History

| Name | Date | Reason For Changes | Version |
|--|-------------|-----------------------------|---------|
| Wang Yuzhu | 02/Sep/15 | Add section 1.1 & 1.2 | 0.1 |
| Wang Yuzhu | 03/Sep/15 | Add section 1.3 & 1.4 | 0.2 |
| Wang Yuzhu | 04/Sep/15 | Add section 2 & 3 | 0.3 |
| Wang Yuzhu | 05/Sep/15 | Add section 4.1 & 5.1 | 0.4 |
| Wang Yuzhu | 06/Sep/15 | Add section 5.2 & 5.3 & 5.4 | 0.5 |
| Wang Yuzhu | 07/Sep/15 | Add section 6 | 0.6 |
| Luo Yawen | 08/Sep/15 | Add section 7.1 & 7.2 | 0.7 |
| Luo Yawen | 09/Sep/15 | Add section 7.3 & 7.4 | 0.8 |
| Yang Jiajun | 09/Sep/15 | Add section 8 | 0.9 |
| Luo Yawen | 9/Oct/15 | Release | 1.0 |
| Wang Yuzhu | 05/Oct/2015 | Update section 1-3 | 1.3 |
| Wang Yuzhu | 07/Oct/2015 | Update section 4 | 1.4 |
| Wang Yuzhu | 08/Oct/2015 | Update section 5 | 1.5 |
| Wang Yuzhu | 09/Oct/2015 | Update section 6 | 1.6 |
| Yang Jiajun | 10/Oct/2015 | Update section 8 | 1.7 |
| Luo Yawen | 11/Oct/2015 | Update section 7 | 1.8 |
| Luo Yawen Wang Yuzhu Yang Jiajun | 15/Oct/15 | Review | 1.9 |
| Luo Yawen | 01/Nov/15 | Final release | 2.0 |

1 Introduction

1.1 Purpose and Scope

The purpose of this system is to design a Lego Mind storms EV3 robot which will be used to find markings in a survey area, a single A1 sized paper, and work from these markings to make a map to show the location of these markings. The system does not need to develop hardware (the robot) as it has been provided. In addition, the system needs to deliver documents, including SRS, SPMP, SDD, User Manual and Test Report to the client.

1.2 Assumptions and constraints

The development team works in a small company. The team will have a short meeting with the client each week to ask questions and work out the requirements. Also, the team will have group meetings without the client over the development process that discuss the develop schedule and unsolved problems. Requirement changes will constraint the progress of development.

1.3 Project deliverables

In this project there are 8 deliveries need to be derived, each delivery must be committed to the SVN before the due time. Any commits after the due time will not be considered.

| No. | Type | Delivery | Due Data | |
|-----|----------|--|--------------------|-------------------|
| | | | Draft | Final |
| 1 | Poster | Team Poster | - | 14 Aug 2015, 12am |
| 2 | Document | Software Requirements Specification (SRS) | 27 Aug 2015, 11am | Week12 |
| 3 | Document | Software Engineering and Project Software Project Management Plan (SPMP) | 10 Sep 2015, 11am | Week12 |
| 4 | Document | Software Design Document (SDD) | 6th Oct 2015, 11am | Week12 |
| 5 | Document | Testing Report | TBA | Week12 |
| 6 | Document | User Manual | TBA | Week12 |
| 7 | Hardware | EV3 Robot | - | Week12 |
| 8 | Software | Source | - | Week12 |

Figure 1: Project deliverable

1.4 Evolution of the plan

- **Initial Description**

The first sketch of the Mesa Mapping Robot was planned at the first group meeting in August 2015. Over the first group meeting, team members' roles and responsibilities were discussed. After the second meeting with the client the team made a development schedule based on the course plan and listed the requirements of the client that the robot will be used to find markings on a survey map to make map.

- **Develop Alternatives**

After the third time group meeting, two development alternatives were decided based on the client requirements, the provided hardware and team member's strength and weakness. The two alternatives are all focus on developing stable robot and making an accurate map. Each of the alternative is described below.

- **Alternative A - Wheels Driven Robot**

The robot will be designed to be driven by wheels. The distance sensor is designed on the top of the robot and the colour sensor is designed under the robot. Alternative A focuses on the flexibility of the robot.

- **Alternative B - Track Driven Robot**

The robot will be designed to be driven by track. The distance sensor and the colour sensor are designed on both arms of the robot. Alternative B focuses on the stability of the robot.

- **Final Draw**

Alternative B was chosen, designs and development process were determined, the reason why we choose alternative B is that after we tested both wheels driven robot and track driven robot, we found that track driven robot is more stable, this can increase the stability of the sensor and can help the robot control its body more accurately. In addition, alternative B is more personalised. The meeting will be held with the client weekly and the development schedule will be adjusted according to the requirements change.

2 References

Software Requirements Specification (SRS)

SVN: <https://version-control.adelaide.edu.au/svn/SEPADL15S2PG19/>

Software Engineering, 9th Edition, Ian Sommerville

Software Engineering and Project (2015)

https://forums.cs.adelaide.edu.au/pluginfile.php/46004/block_html/content/ProjectDescription_2015sem2.pdf

<https://www.tbs-sct.gc.ca/itp-pti/pog-spg/epd-tbdp/epd-tbdp08-eng.asp>

3 Definitions

- SRS - Software Requirements Specification
- SPMP - Software Project Management Plan
- SDD - Software Design Document
- GUI - Graphics Users Interface

4 Project organisation

4.1 Roles and responsibilities

The table describes the roles and responsibilities of each member, as well as rationale.

| No. | Member Name | Roles | Responsibilities | Rationale |
|-----|---------------------|--|--|---|
| 1 | Yun Zhang | Project management Programming Team | Managing the team. | Has work experiences in software development and management. |
| | | | Monitoring and controlling the process of the project. | |
| | | | Providing technical support to programming team. | |
| | | | System requirements analysis. | |
| 2 | Yawen Luo | Documentation Team | Resource and document management | Good at document management and expert in SVN. |
| | | | Documentation. | |
| | | | System requirements analysis. | |
| | | | System testing. | |
| 3 | Yuzhu Wang | Documentation Team | User requirements analysis. | Has work experiences in user requirements analysis and design. |
| | | | User Interface design. | |
| | | | Documentation. | |
| | | | Unit testing. | |
| 4 | Jiajun Yang | Documentation Team | Team poster design. | Good at art design and photoshop. |
| | | | Documentation. | |
| | | | User requirements analysis. | |
| | | | System testing. | |
| 5 | Jingwen Wei | Programming Team | Robot design. | Has work experiences in software and hardware development and has passion in programming. |
| | | | Software design and programming. | |
| | | | Unit testing. | |
| 6 | Zander Shaun Nathan | Documentation Team | Documentation. | Has excellent English skills and concluding abilities. |
| | | | Minutes of group meeting record. | |
| | | | Documents review. | |

Figure 2: Roles and responsibilities

5 Risk management plan

In this section the Risk management plan, including Risk Planning, Risk Identification and Risk Monitoring and Review in the Robot Mapping System will be described. Risk management plan is a very important part over the development process, as it may affect the project schedule or the quality.

5.1 Risk Planning

The project manager will ensure that risks are identified, analysed, monitoring and recorded during the whole project. All the risks should be identified and analysed as early as possible to minimise their impact to the project. Each member will be assigned a risk to monitoring that if the risk is becoming more or less possible.

Ways to prevent the risk from occurring or reduce its likelihood and impact will be identified by the project team. This may include adjusting project schedule, changing tasks, changing resources and so on.

5.2 Risk Identification and Analysis

Risk identification will involve the project team, client, and will include the human factors, technical factors and the project management plan. Project deliverables will be carefully assumed, constrained and estimated. Risk management log will be recorded for each risk. All the identified risk will be analysed to determine which risks are high likelihood, high impact and which risks can be prevented from occurring.

| Risk No. | Risk | Severity | Likelihood | Impact | Strategies |
|----------|---------------------------------|---|------------|--------|---|
| 1 | Human behavior | Likely to stop the development process, when the key member illness or not available. | High | High | Training other team member that can take over the key member' s work. |
| 2 | Management change | | Low | Hige | |
| 3 | Requirements change | Likely to delay the delivery time of the system. | High | High | Adjusting the development schedule timely and negotiate with the client about the final delivery time and the final function. |
| 4 | Technology and technical issues | Potential to delay the delivery time of the system. | High | High | Studying the skills required. |
| 5 | Size underestimate | | High | High | |
| 6 | Late delivery of the system | Likely to fail to get money from the client and lose reputation. | High | High | Making accurate development schedule and adjusting the schedule timely. |

Figure 3: Risk Identification and Analysis

| Impact (Consequence) | | Probability (Likelihood) | | |
|-------------------------|--------|--------------------------|--------|------|
| | | Low | Medium | High |
| | High | 0 | 2 | 1 |
| | Medium | 3 | 1 | 1 |
| | Low | 4 | 2 | 2 |

Figure 4: Risk Matrix

Likelihood

- High - More than 50% probability of occurrence.
- Medium - Between 25% and 50% probability of occurrence.
- Low - Less than 25% probability of occurrence

Impact

- High - Risk that will greatly impact project cost, project schedule and performance, if it occurs.
- Medium - Risk that will slightly impact project cost, project schedule and performance, if it occurs.
- Low - Risk that will little impact project cost, project schedule and performance, if it occurs.

5.3 Risk Monitoring and Review

Each identified risk will be monitoring and reviewed during the project scope. Risks will be listed top risks will be maintained by the project team. Requirements change may accompany with new risks, as a result, all the requirements change will be analysed for their possible to the project risks.

6 Process model

AS the Mesa Mapping Robot project has low requirements volatility, short time of development and short release schedule. The software process model used in this project is component-based development.

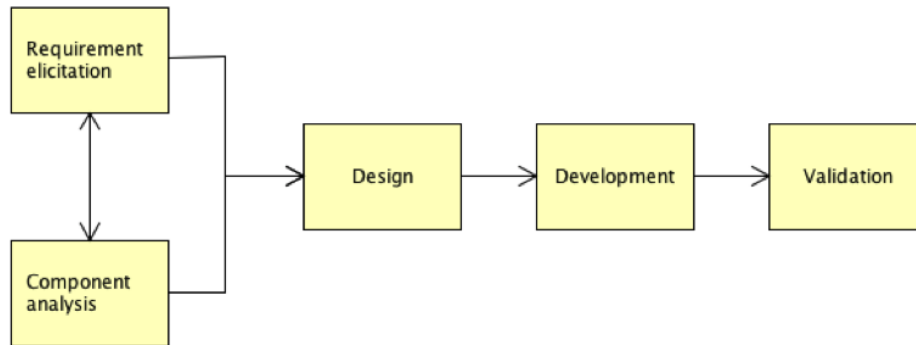


Figure 5: Component-based Process Model

Development Process

- Requirement elicitation and component analysis until week 5.
- System design until week 6.
- System development until week 10.
- System validation until week 12.

7 Work plan

7.1 Work activities

| Task No | Task Name | Start Date | End Date | Duration | Assign to |
|------------|---|-----------------|-----------------|------------|--------------------------|
| T1 | Intro to Project | 03/08/15 | 21/08/15 | 21d | All members |
| | Requirements Gathering | 03/08/15 | 14/08/15 | 14d | All members |
| T2 | Repository | 10/08/15 | 11/08/15 | 2d | Luo Yawen |
| | Google Drive | 10/08/15 | 10/08/15 | 1d | Luo Yawen |
| | Group SVN | 11/08/15 | 11/08/15 | 1d | Luo Yawen |
| T3 | Poster | 07/08/15 | 13/08/15 | 7d | Yang Jiajun |
| T4 | Week 3 Meeting - requirements elicitation | 10/08/15 | 14/08/15 | 3d | Zhang Yun |
| | Group Meeting | 10/08/15 | 10/08/15 | 1d | Zhang Yun |
| | Client Meeting | 11/08/15 | 11/08/15 | 1d | Zhang Yun |
| | Group Meeting | 14/08/15 | 14/08/15 | 1d | Zhang Yun |
| T5 | Week 4 Meeting - requirements elicitation & milestone | 17/08/15 | 21/08/15 | 3d | Luo Yawen |
| | Group Meeting | 17/08/15 | 17/08/15 | 1d | Luo Yawen |
| | Client Meeting | 18/08/15 | 18/08/15 | 1d | Luo Yawen |
| | Group Meeting | 21/08/15 | 21/08/15 | 1d | Luo Yawen |
| T6 | SRS First Draft | 17/08/15 | 26/08/15 | 11d | All members |
| | Introduction | 17/08/15 | 17/08/15 | 1d | Zander Shaun Nathan |
| | Overall Description | 18/08/15 | 18/08/15 | 1d | Zander Shaun Nathan |
| | User Requirement | 19/08/15 | 19/08/15 | 2d | Yang Jiajun & Wang Yuzhu |
| | System Feature | 21/08/15 | 21/08/15 | 2d | Luo Yawen & Zhang Yun |
| | External Interface Requirement | 22/08/15 | 22/08/15 | 1d | Wei Jingwen |
| | Other Nonfunctional Requirement | 23/08/15 | 23/08/15 | 1d | Wei Jingwen |
| | Other Requirements | 24/08/15 | 24/08/15 | 1d | Wei Jingwen |
| | Merging and Submission | 25/08/15 | 26/08/15 | 2d | Luo Yawen |
| T7 | GUI Prototype | 22/08/15 | 30/08/15 | 8d | Wang Yuzhu |
| | Design GUI Prototype | 22/08/15 | 30/08/15 | 8d | Wang Yuzhu |
| T8 | Week 5 Meeting - Present Poster & GUI & Milestone | 24/08/15 | 28/08/15 | 3d | Wang Yuzhu |
| | Group Meeting | 24/08/15 | 24/08/15 | 1d | Wang Yuzhu |
| | Client Meeting | 25/08/15 | 25/08/15 | 1d | Wang Yuzhu |
| | Group Meeting | 28/08/15 | 28/08/15 | 1d | Wang Yuzhu |
| T9 | Modify | 28/08/15 | 30/08/15 | 3d | Wang Yuzhu |
| T10 | Basic Movement Demo | 24/08/15 | 04/09/15 | 14d | Wei Jingwen |
| | Design Robot Movement Demo | 24/08/15 | 31/08/15 | 7d | Wei Jingwen |
| T11 | Week 6 Meeting - GUI Prototype & Basic Movement Demo | 31/08/15 | 04/09/15 | 3d | Wei Jingwen |
| | Group Meeting | 31/08/15 | 31/08/15 | 1d | Wei Jingwen |
| | Client Meeting | 01/09/15 | 01/09/15 | 1d | Wei Jingwen |
| | Group Meeting | 04/09/15 | 04/09/15 | 1d | Wei Jingwen |
| T12 | Test Communication Function | 31/08/15 | 04/09/15 | 5d | Zhang Yun |
| T13 | SPMP First Draft | 01/09/15 | 09/09/15 | 9d | All Members |
| | Introduction | 01/09/15 | 01/09/15 | 1d | Wang Yuzhu |
| | Project Organisation | 02/09/15 | 02/09/15 | 1d | Wang Yuzhu |
| | Risk management Plan | 04/09/15 | 05/09/15 | 2d | Wang Yuzhu |
| | Process Model | 05/09/15 | 05/09/15 | 1d | Wang Yuzhu |
| | Work Plan | 06/09/15 | 06/09/15 | 1d | Luo Yawen |
| | Supporting Plans | 07/09/15 | 07/09/15 | 1d | Yang Jiajun |
| | Merging and submission | 08/09/15 | 09/09/15 | 2d | Luo Yawen |

| | | | | | |
|------------|---|-----------------|-----------------|------------|---|
| T14 | Sensor Detection Function | 01/09/15 | 24/09/15 | 24d | Wei Jingwen & Zhang Yun |
| | Creating | 01/09/15 | 17/09/15 | 17d | Wei Jingwen & Zhang Yun |
| | Testing | 18/09/15 | 24/09/15 | 7d | Wei Jingwen & Zhang Yun |
| T15 | Manual Auto Switch Function | 01/09/15 | 24/09/15 | 24d | Wei Jingwen & Zhang Yun |
| | Creating | 01/09/15 | 17/09/15 | 17d | Wei Jingwen & Zhang Yun |
| | Testing | 18/09/15 | 24/09/15 | 7d | Wei Jingwen & Zhang Yun |
| T16 | Week 7 Meeting - SRS Critique & Milestone 1 Freeze | 07/09/15 | 11/09/15 | 3d | Yang Jiajun |
| | Group Meeting | 07/09/15 | 07/09/15 | 1d | Yang Jiajun |
| | Client Meeting | 08/09/15 | 08/09/15 | 1d | Yang Jiajun |
| | Group Meeting | 11/09/15 | 11/09/15 | 1d | Yang Jiajun |
| T17 | Week 8 Meeting - Milestone 2 Freeze | 14/09/15 | 18/09/15 | 3d | Zander Shaun Nathan |
| | Group Meeting | 14/09/15 | 14/09/15 | 1d | Zander Shaun Nathan |
| | Client Meeting | 15/09/15 | 15/09/15 | 1d | Zander Shaun Nathan |
| | Group Meeting | 18/09/15 | 19/09/15 | 1d | Zander Shaun Nathan |
| T18 | DTD | 14/09/15 | 01/10/15 | 19d | Wei Jingwen & Zhang Yun |
| | Creating | 14/09/15 | 18/09/15 | 10d | Wei Jingwen & Zhang Yun |
| | Testing | 19/09/15 | 01/10/15 | 9d | Wei Jingwen & Zhang Yun |
| T19 | Mapping | 14/09/15 | 02/10/15 | 20d | Wei Jingwen & Zhang Yun |
| | Mapping Loading | 14/09/15 | 18/09/15 | 10d | Wei Jingwen & Zhang Yun |
| | Testing | 19/09/15 | 02/10/15 | 10d | Wei Jingwen & Zhang Yun |
| T20 | SDD First Draft | 25/09/15 | 06/10/15 | 13d | All members |
| | Introduction | 25/09/15 | 25/09/15 | 1d | Luo Yawen |
| | System Overview | 26/09/15 | 26/09/15 | 1d | Luo Yawen |
| | System Architecture and Components | 27/09/15 | 29/09/15 | 3d | Yang Jiajun |
| | Data Design | 29/09/15 | 30/09/15 | 2d | Yang Jiajun |
| | Design Details | 30/09/15 | 02/10/15 | 3d | Wang Yuzhu |
| | Human Interface Design | 02/10/15 | 04/10/15 | 3d | Wang Yuzhu |
| | Merging and submission | 05/10/15 | 06/10/15 | 2d | Luo Yawen |
| T21 | Week 9 Meeting - SPMP Critique & Setting of mystery presentation topic & Progress report | 05/10/15 | 09/10/15 | 3d | Zhang Yun |
| | Group Meeting | 05/10/15 | 05/10/15 | 1d | Zhang Yun |
| | Client Meeting | 06/10/15 | 06/10/15 | 1d | Zhang Yun |
| | Group Meeting | 09/10/15 | 09/10/15 | 1d | Zhang Yun |
| T22 | Week 10 Meeting | 12/10/15 | 16/10/15 | 3d | Wei Jingwen |
| | Group Meeting | 12/10/15 | 12/10/15 | 1d | Wei Jingwen |
| | Client Meeting | 13/10/15 | 13/10/15 | 1d | Wei Jingwen |
| | Group Meeting | 16/10/15 | 16/10/15 | 1d | Wei Jingwen |
| T23 | Week 11 Meeting - SDD Critique & Mystery presentation topic & Progress report | 19/10/15 | 23/10/15 | 3d | Yang Jiajun |
| | Group Meeting | 19/10/15 | 19/10/15 | 1d | Yang Jiajun |
| | Client Meeting | 20/10/15 | 20/10/15 | 1d | Yang Jiajun |
| | Group Meeting | 23/10/15 | 23/10/15 | 1d | Yang Jiajun |
| T24 | Checking and Testing all Functions | 15/10/15 | 25/10/15 | 10d | All members |
| T25 | Software Freeze | 19/10/15 | 25/10/15 | 5d | All members |
| T26 | Final Presentation | 02/11/15 | 06/11/15 | 7d | All Members |
| T27 | Meeting Minutes | 11/08/15 | 20/10/15 | 32d | Zander Shaun Nathan Wang Yuzhu |
| T27 | Agenda | 11/08/15 | 20/10/15 | 32d | All members |

7.2 Milestones

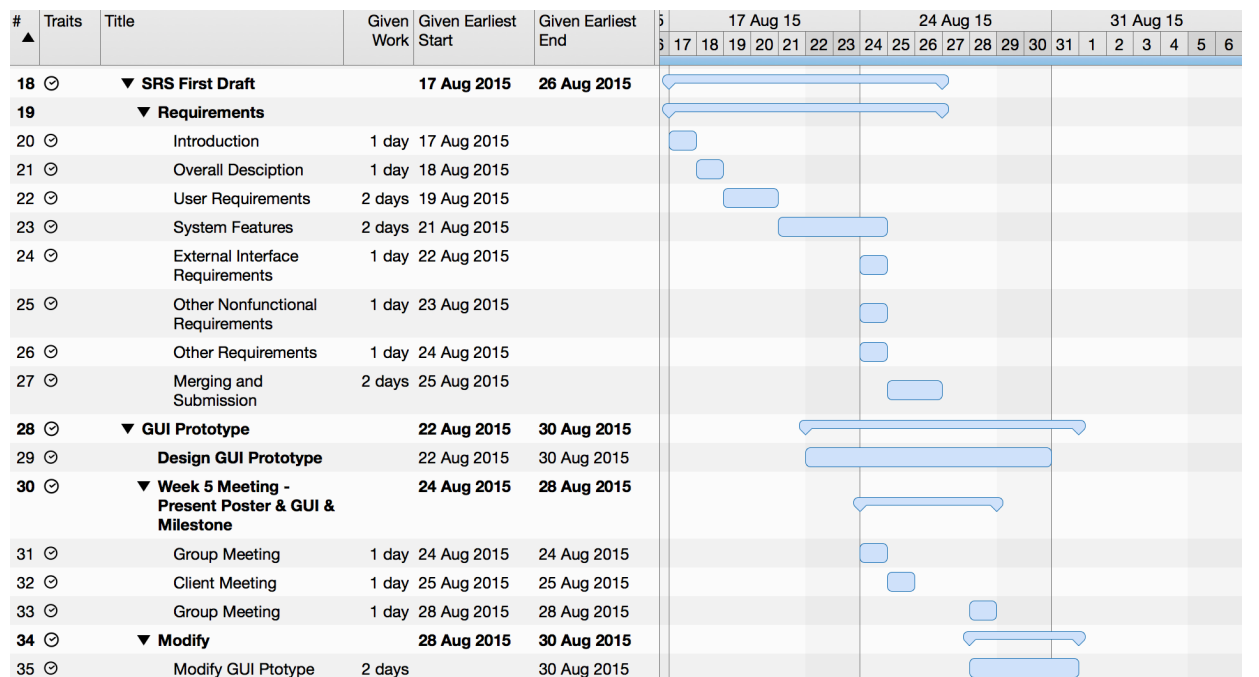
7.2.1 Group Milestones

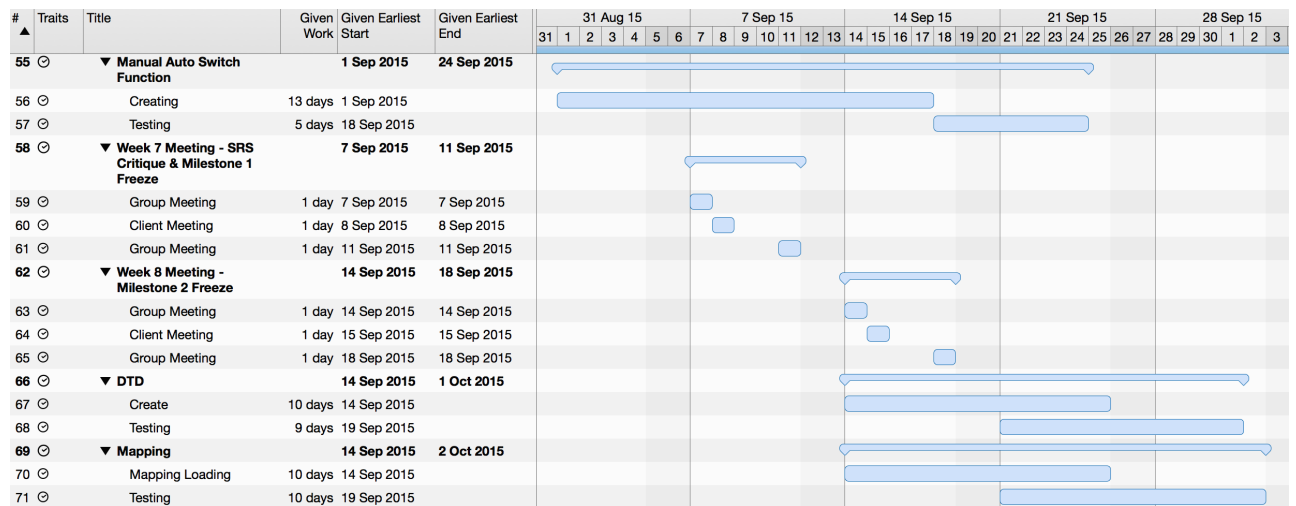
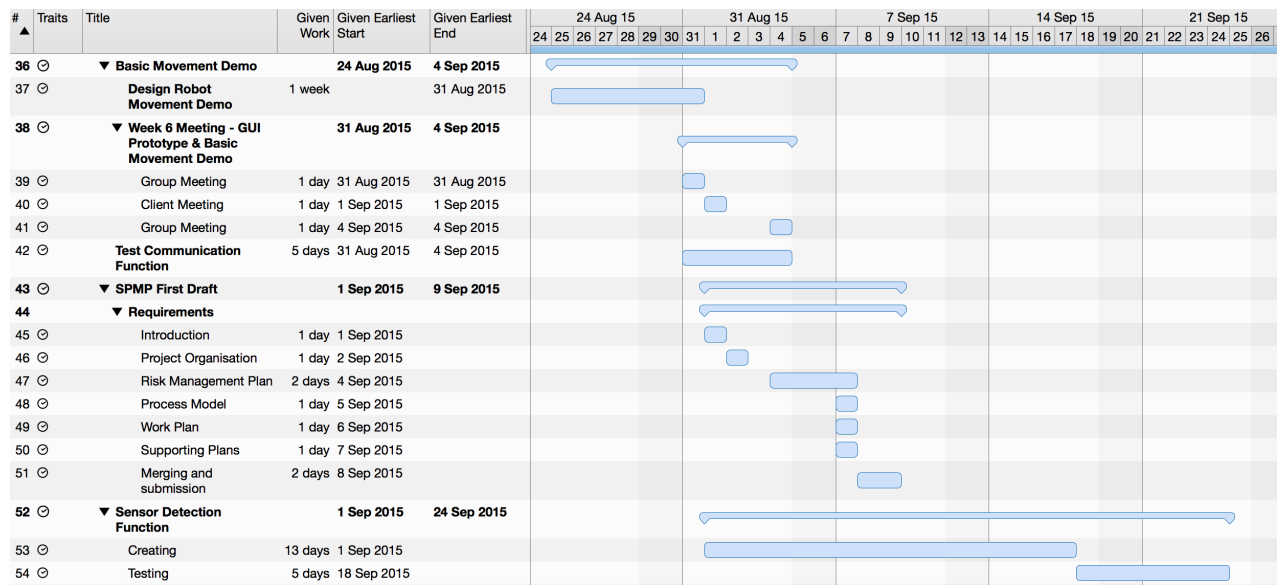
- **GM01 (due week 9)**
 - 1: Robot Movement - Forward, back, left and right
 - 2: Colour and distance sensor
 - 3: GUI Prototype
 - 4: Software Design Document (SDD) Draft
 - 5: Software Project Management Plan (SPMP) Draft
- **GM02 (due week 10)**
 - 1: The colour sensor, the movement range should be inside the boundary.
 - 2: Let robot knows where the boundary is.
 - 3: To combine the robot and GUI
 - 4: To build the coordinate system

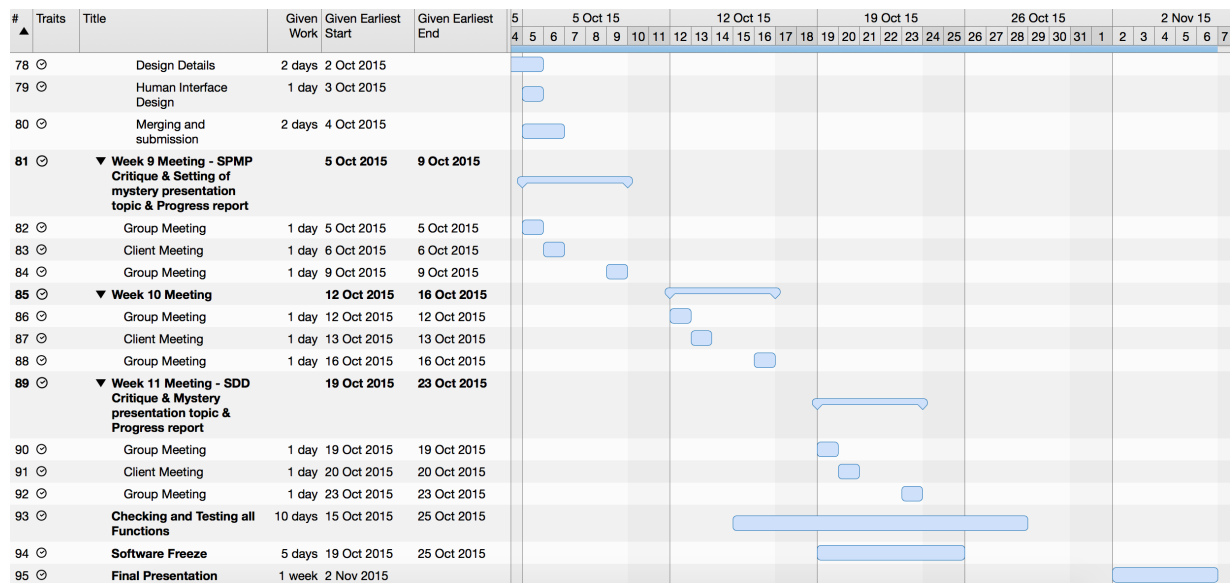
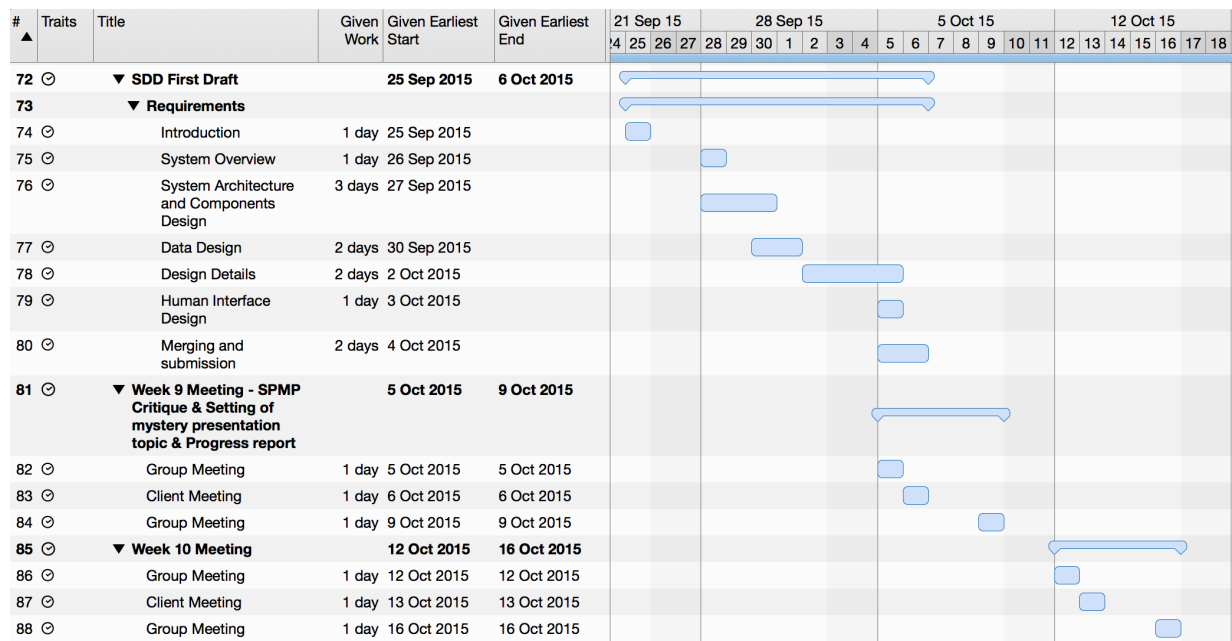
7.2.2 Other Internal Milestones

- **M1**
 - 1: GUI Design in paper- week 5
 - 2: Robot Movement Demo - week 6
 - 3: SRS draft - week 5 4: SPMP draft - week 7
- **M2**
 - 1: GUI Prototype in the robot
 - 2: Robot Movement accurate within one degree margin of error.
 - 3: SDD draft - week 9
 - 4: Through turning the arm, the robot can detect the boundary and stop emergency.
 - 5: The robot can detect the colour accurately.
 - 6: Through ultrasonic sensor, the robot can detect the obstacle.
- **M3**
 - 1: To initial the map, through the robot walks along the boundary one rotation and detects the origin of coordinate.
 - 2: Through scanning the map, the robot detects the coordinate of colours.
 - 3: The robot detects obstacles and avoids them.
 - 4: The robot detects NGZ and avoids it.
 - 5: User Manual
 - 6: Testing report
 - 7: Saving and Loading map.

This project is starting at the beginning of August and will be completed at the end of October. Form the schedule charts below, you can see details of our group process. Our group have a meeting with client and two meetings within group weekly. We do the task step by step and complete on time.







7.4 Resource allocation

We allocate all tasks evenly based on each member's skills and what they are good at, and each member should do their tasks on time based on the work activities (section 7.1). If there is any change they should let project manager know in advance.

8 Supporting Plans

For this project, there are three major supporting plans including configuration management plan, documentation plan and quality assurance plan.

8.1 Configuration management plan

In this project, the configuration items will uniquely be identified through three aspects, including product, document and develop tool. First, the product aspect contains the hardware, software and data. Second, the develop tools include the programming language and auxiliary tool. All detail of the product and develop tool would be described in several documents. In addition, the document part also contains risk management, user requirement etc. These documents would be identified by different titles. For different releases of a same document, they will be differentiated through version number.

For our team, Google drive and SVN are utilised to store all the project documents, source code, milestone, meeting minute and agenda throughout the project lifecycle.

Repository structure:

For the repository structure of the project, it contains tags and trunk directories. Among them, the trunk file is composed of several substructures as follows:

- **SRS:** including the drafts and final version of SRS.
- **SPMP:** including the drafts and final version of SPMP.
- **SDD:** including the drafts and final version of SDD.
- **User Manual:** including the drafts and final version of user manual.
- **Source code:** including all the source code of the project.
- **Meeting agenda:** including all the meeting agendas.
- **Meeting minutes:** including all the meeting minutes.
- **Milestone:** including drafts and final version of milestone.
- **Testing report:** including drafts and final version of milestone.
- **GUI-Prototype:** including several design prototypes of GUI.
- **Poster:** including the final deliverable poster.

8.2 Documentation Plan

For this project, it mainly contains five documents, namely SRS, SPMP, SDD, User Manual and Testing Report. In addition, meeting minutes and agenda are also important part during the project lifecycle. All the documents would be mainly completed and submitted by the document team. For each document, all members of document team will discuss and take responsibility for different parts. After completed, all contents will be collected and tidied. As for review part, each member of document team needs to review the whole document and then, discuss with other members for improving the documents.

- **Meeting minutes and agenda:**

For each meeting, one member will be nominated as the chair to supervise the whole meeting. What is more, the agenda should be prepared before the meeting by the chair. In addition, another member of our team will be the secretary to record then meeting minutes during the meeting. If necessary, video should be recorded by the secretary.

- **SRS:**

Identify the robot whose software requirements are specified in this document, including the revision or release number. Describe the scope of the project, such as overall description, system features and external interface requirements. The GUI prototype design was also provided in this document.

- **SPMP:**

The SPMP refers to the purpose and scope of the project to be delivered. Briefly summarise what is to be delivered, as well as what isn't going to be delivered. Project organisation and risk management are also provided in this document. In addition, it also identify the supporting plans such as configuration management plan and documentation plan to ensure the processing of the project.

- **SDD:**

Identify the context of the project; explain what the robot does (and what does not, if necessary). Describe data design, system architecture and components design. The description in this document should be consistent with the SRS.

- **User Manual:**

The user manual is designed for end users. All the functions of the robot will be identified in this document. Additionally, features, constraints and attentions of the robot will be displayed as well.

- **Testing report:**

The testing report should include the testing summary, assessment and result of the robot project. If possible, recommendations of any improvements in the design, operation, or future testing of the robot could be displayed.

8.3 Quality assurance plan

For this project, we combined the waterfall model with the spiral model for the whole development lifecycle. First, for the requirement analysis stage, each of members classifies each requirement as functional, nonfunctional and others. Then, according to the client meeting we endow these requirements with different priority in the SRS document. In addition, we linked these different priority requirements with the system design in SDD. In other word, any subsystem or component will be cited with one or several requirements. This measure is utilised for ensuring all requirements could be realised and the high priority requirement could be focused on first.

For this project, we have several strategies as follows to ensure the quality of the whole project.

- **Weekly review**

For each week all members will have an extra on Friday morning to review the progress and unsolved problem. In addition, we will generate a target outline of next week.

- **Verification and Validation Process**

For the robot project, all the requirement details will be identified through project specification and client meetings. After programming, several testing strategies will be conducted by lay people to ensure all the requirements are meet. Pertaining to the document aspect, all documents will be accomplished cooperatively. However, the review task will be approved separately for maximum improvement of the project.

- **Standards:**

All the document need to be write and submit in Latex, and the develop language is JAVA. In addition, the specific content of these documents should follow the template as provided in computer science forum.

- **Review and inspection process:**

For each function of the robot, if it is approved, all members will inspect and test it. If possible, the function will be displayed in the weekly client meeting for collecting suggestion from the client for further improvement.