

**Computer Science and Engineering**

**Software Engineering Standards**

**Software Project Management Plan**

**Version 1.0**

Document Number: SPMP-001

**Project Number A10**

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**REVIEW AND APPROVALS**

|  |  |  |  |
| --- | --- | --- | --- |
| **Printer Name and Title** | **Function (Author, Reviewer, Approval)** | **Date** | **Signature** |
| Fred Strauss | Approval |  |  |
| Alan Huang | Author |  |  |
| Kevin Han | Author |  |  |
| Kostaq Papa | Author |  |  |
| Patrick Gryczka | Author |  |  |

**REVISION LEVEL**

|  |  |  |
| --- | --- | --- |
| **Date** | **Revision Number** | **Purpose** |
| 04/03/2014 | Version 1.0 | Initial Release |
|  |  |  |

**1. OVERVIEW**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**1.1 Project Summary**

The system will provide a friendly web-based platform where a seller can store inventory for its customers, and the customer can purchase these items. The places that students look to purchase items are pricier than others, and most students look for used products which are sold for a cheaper price. Our system allows students to shop for all the resources they need for the academic year.

The project management plan document is used as a guide for the development team to be aware which artifacts will be completed, and when they will be completed. The document also details a schedule for the life cycle. The intended audience of this document is for the development team, which includes programmers, quality assurance team and the business analysts.

**1.2 Purpose, Scope & Objectives**

The purpose of the bidding system is to bring the NYU community together through a business aspect of buying and selling a variety of goods. During the four years in college, students will accumulate a variety of goods such as textbooks, electronics, clothing, school equipment, furniture and other miscellaneous products. Students typically use Facebook group pages, eBay, Amazon marketplace, and Craigslist for sell and purchase of used items. However, the bidding system focuses on the combination of auction and localization.

The purpose of this document is to specify the business and user requirements for the bidding system, which include the function and non-functional requirements, and the system requirements. The requirements are analyzed, and test cases are derived for the system. The intended audience of this document is the client, the business analysts, the quality assurance team and the developers.

**1.3 Assumptions and Constraints**

All users of this system have to be an NYU student, faculty member or alumni. Users should have a basic understanding of using a computer such as navigating through a website using any of the following browsers: Internet Explorer, FireFox, Google Chrome and Safari.

It is assumed that all members of the team will be able to contribute to the development of the project. All members of the team should have a strong programming background. It is assumed that the client has agreed to the requirements document as a contract between the development team and themselves. All the technologies are available in order to complete the project.

**1.4 Project Deliverables**

|  |  |  |
| --- | --- | --- |
| **Project Deliverables** | **Date** | **Format** |
| Project Proposal | October 9, 2013 | Word Document |
| Software Requirement Specification (SRS) | October 25, 2013 | Word Document |
| Software Project Management Plan (SPMP) | November 8, 2013 | Word Document |
| Software Analysis Specification (SAS) | November 18, 2013 | Word Document |
| Software Design Document (SDD) | December 2, 2013 | Word Document |
| Final Design Document | December 4, 2013 | Word Document |
| Implementation and Demo | May 5, 2014 | Live Demo |
| Final Presentation | May 5, 2014 | PowerPoint |

**1.5 Schedule and Budget Summary**

The following is a brief top-level summary of each major work activity:

|  |  |  |
| --- | --- | --- |
| **Activity** | **Duration (Days)** | **Members** |
| **Project Proposal** | **1** | **All** |
| **System Requirements Specification** | **2** | **All** |
| **Software Project Management Plan** | **3** | **All** |
| **Requirements/Analysis Document** | **2** | **All** |
| **Design Document** | **4** | **All** |
| **Final Design w/code** | **21** | **All** |
| **Implementation Demo** | **1** | **All** |

|  |  |
| --- | --- |
| **Item** | **Price** |
| **Salary** | **$100 per hour** |
| **Testing** | **N/A** |
| **Software** | **N/A** |
| **Hardware Equipment** | **N/A** |

**1.6 Evolution of the Plan**

The evolution of the plan will evolve throughout the life cycle if with regards to the schedule of deliverables and tasks. All changes to the document will need to be approved by the team before it is documented. The client may call of the project at any time, thus suspending the project.

**2. REFERENCES**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

SRS Document SRS-001; Team A4; Version 2.0; 10/25/2013

**3. DEFINITIONS**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |
| --- | --- |
| **Terms** | **Definition** |
| User | A user is a buyer or seller of the system |
| Life Cycle Model | A description of steps that should be performed when building a software product |
| Life Cycle | The actual series of steps performed on a specific software product from concept exploration through final retirement |
| Workflow | Activities performed over the entire life cycle |

**4. PROJECT ORGANIZATION**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**4.1 External Interfaces**

The seller will have to create an account in which they can post items for sale, manage their inventory, and view current auction status of their items. The customer will also have to create an account to participate in the auction. During the sign-up process, the system will verify that the seller and buyer are currently NYU students. A product will be priced based on a bidding auction. Customers will be able to bid on the product, and the highest bid will be the sealed price. The seller will set the duration of the bid, as well as the minimum price. The buyer and the seller will meet for the trade of the product and the cash. The platform doesn’t provide any form of payment module, and we encourage students to meet each other for the trade since it’s only focused on the NYU community.

**4.2 Internal Structure**

There will be a database management system, which will store information such as login credentials, user information, and the auctions with bidding prices. The database will securely access information, download and upload relevant information from and to a web browser. The internet browsers that will be targeted are Firefox, Safari, Google Chrome and IE 9.0 and up. The database software that will be used to store the data will use my Microsoft SQL Server. The system will be programmed in a Windows environment. The user interface will be programmed in HTML, CSS and JavaScript. The Application Server will be programmed in C++. The back-end tier will use SQL.

**4.3 Roles and Responsibilities**

All members of the team will be contributing to the documentation, code, and testing phases of the project. Each team member brings in a specialty such as front-end development, back-end development, database design, and user experience design. All team members will communicate with each other regarding any changes, and status updates.

**5. MANAGEMENT PROCESS**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**5.1 Start-Up Plan**

**5.1.1 Estimation Plan**

Microsoft Project is used to keep track of the milestones, the deliverables of each iteration, and the team meetings. Microsoft Word is used to document and modify the requirement specifications, and the project management plan. The cost of the project is determined when the client signs off on the requirements specifications document. The requirements specification document is a contract between the development team and the client.

**5.1.2 Staffing Plan**

Currently the development team includes one project manager, four developers who will be programming the project and performing quality assurance. If a team member were to withdraw from the project for any reason, a new person will added to the team through an interview process. All members of the team must have a strong programming background. They must be familiar with one or more object oriented programming languages such as Java, C++, and C#. They must be familiar with database concepts, and web development technologies such as HTML, CSS, and JavaScript.

**5.1.3 Resource Acquisition Plan**

Currently, there is no need to hire any new members to the team.

All the software and hardware is provided by NYU Polytechnic School of Engineering. The lab stations will hold the code, database, and web servers needed for the project. If any additional resources are needed, Professor Fred Strauss will be contacted.

Personal information such as the emails of all the current NYU students will need to be obtained from the university registrar.

**5.1.4 Training Plan**

Necessary courses will be available to members of the team if they are not familiar with any concepts. Courses in Java, C++, object oriented programming, data structures, databases, and web development will be available. As a result, everyone in the team will be able to utilize the concepts involved in a three-tier architecture (user interface, application server, database).

**5.2 Work Plan**

**5.2.1 Work Activities**

1.Project Proposal

1.1 Write and Review Proposal

1.2 Submit Proposal

2. Requirements Specification Document

2.1. Initial SRS

2.2 Review and correct SRS

2.3 Final SRS

2.4 Submit SRS

3. Software Project Management Plan

3.1 Initial SPMP

3.2 Review and Correct SPMP

3.3 Submit SPMP

4. Requirements/Analysis Document

4.1 Initial Requirements/Analysis Document

4.2 Review and Correct RAS

4.3 Submit RAS

5. Design Document

5.1 Initial Design Document

5.3 Review Design Document

5.4 Submit Design Document

6. Final Design

6.1 Correct and modify initial design document

6.2 Review Design Document

6.3 Submit final design

7. Implementation

7.1 Implement all components of the system

7.2 Conduct unit and product testing

7.3 Submit source code

8. Implementation Demo

8.1 Practice implementation demo

8.2 Conduct demo

**5.2.2 Schedule Allocation**



**5.2.3 Resource Allocation**

|  |  |  |  |
| --- | --- | --- | --- |
| **WBS** | **Task Name** | **Resource** | **Team Member** |
| **1** | **Project Proposal** |  |  |
| 1.1 | Write and Review Proposal | Microsoft Word | All members |
| 1.2 | Submit Proposal |  | Any member |
| **2** | **Requirements Specification Document** |  |  |
| 2.1 | Initial SRS | Microsoft Word | All members |
| 2.2 | Review and correct SRS | Microsoft Word | All members |
| 2.3 | Final SRS | Microsoft Word | All members |
| 2.4 | Submit SRS |  | Any member |
| **3** | **Software Project Management Plan** |  |  |
| 3.1 | Initial SPMP | Microsoft Word  Microsoft Project | All members |
| 3.2 | Review and Correct SPMP | Microsoft Word  Microsoft Project | All members |
| 3.3 | Submit SPMP |  | Any member |
| **4** | **Requirements/Analysis Document** |  |  |
| 4.1 | Initial Requirements/Analysis Document | Microsoft Word | All members |
| 4.2 | Review and Correct RAS | Microsoft Word | All members |
| 4.3 | Submit RAS |  | Any member |
| **5** | **Design Document** |  |  |
| 5.1 | Initial Design Document | Microsoft Word  UML Tool  E-R Diagram Tool | All members |
| 5.2 | Review Design Document | Microsoft Word  UML Tool  E-R Diagram Tool | All members |
| 5.3 | Submit Initial Design |  | Any member |
| **6** | **Final Design** |  |  |
| 6.1 | Correct and modify initial design document | Microsoft Word  UML Tool  E-R Diagram Tool | All members |
| 6.2 | Review Design Document | Microsoft Word  UML Tool  E-R Diagram Tool | All members |
| 6.3 | Submit Final Design |  | Any Member |
| **7** | **Implementation** |  |  |
| 7.1 | Implement all components of the system | MS SQL Server  Eclipse IDE  Visual Studio | All members |
| 7.2 | Conduct unit and product testing | MS SQL Server  Eclipse IDE  Visual Studio | All members |
| 7.3 | Submit source code |  | All members |
| **8** | **Implementation Demo** |  |  |
| 8.1 | Practice Implementation Demo |  | All members |
| 8.2 | Conduct Demo |  | All members |

**5.3 Control Plan**

**5.3.1 Requirement Control and Traceability**

Any changes that affect the schedule of the project have to be reviewed and approved by all members of the development team and documented in the NOTES section of this document, as well as trace back any related changes to the SRS. The traceability mentioned before will be accomplished by numbering all requirements.

**5.3.2 Schedule Tracking and Adjustment**

During meetings, team members will discuss their status and any issues that they encountered in order to resolve them. In addition, members must alert one another of any addition problems through email. All team members are responsible for staying on schedule. The overall progress of the team will be measured against the schedule elaborated in the SPMP. Also, the work produced will be evaluated for its compatibility with the defined requirements. If the initial duration of a task is prolonged from the predicted schedule, the entire team will be responsible for finding reasons for the prolonged duration and adjust early on by either reassigning tasks to other programmers or modifying the predicted schedule. The schedule tracking will be performed thoroughly during the entire development of the product including after each milestone is completed.

**5.3.3 Quality Control**

The quality of the product will be maintained by having peer and group reviews. During group reviews, the item (not including code) being reviewed will be read out loud, and the team will find faults and correct them. Code will be reviewed as a group as well as self reviewed. Faults will be discovered during reviews, but they will be fixed at a later date.

**5.3.4 Metrics Collection Plan**

Metrics for the assessment of the project will be collected after each task has been completed and after a milestone has been reached and analyzed by the entire team. Those metrics include the duration of a task or milestone. The duration of the task or milestone will be constantly checked against initial projections. The efforts put into the task or milestone will be another collected metrics. The last metric collected will be the quality of the task or milestone. This quality will be evaluated relatively to the number of faults per line of code.

**5.4 Risk Management Plan**

Throughout the software development process many risks may arise. One risk is that a team member may withdraw from the class before the withdrawal deadline. This may lead to a resource acquisition plan. Another risk is having a fellow team member get sick for a prolonged duration, resulting in one of the active members taking the workload of that team member. Hardware failure is also a risk to consider; therefore, frequent backups should be conducted.

**5.5 Post Implementation Plan**

The project’s materials, including documents and codes, will be archived and made available to the team for maintenance. The post implementation review will take place once the project goes live. The review will include an assessment of the overall project as well as an assessment of the effectiveness of the project team, duration tracking, and the communication mechanisms; in addition, lessons will be learned from the assessment for future projects.

**6. TECHNICAL PROCESS**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**6.1 Process Model**

The project will follow the Unified Process Model. Additionally, the object-oriented paradigm will be followed with iteration and incrementation. There will be five workflows: requirements workflow, analysis workflow, design workflow, implementation workflow, and test workflow. Each workflow consists of a number of steps, and to carry out that workflow, the steps of the workflow are repeatedly performed until the members of team are satisfied.

The requirements workflow will involve determining what the client needs. Basic understanding of the application domain will be acquired. There will be at least five to seven functional requirements and their corresponding use cases. The requirements document will be in natural language for the client to understand. During this workflow, the team will continuously check to see if they are in fact what the client needs and document any defects.

During the analysis workflow, more details are added which are not relevant to the client's understanding of the project, but essential to the development team. The specifications will be reviewed by the team to check for completeness, contradiction and ambiguity.

During the design workflow, the database will be designed using the Entity-Relationship Model and converted to a relational schema using SQL. The Unified Modeling Language will be used to design the classes, attributes of the classes and the methods.

During the implementation workflow, the application server will be coded using C++. The front-end will be coded using PHP, JavaScript, HTML and CSS.

During the test workflow, continuous testing of the artifacts will be conducted. They will be tested for the functionality corresponding to the requirements. Integration testing will be conducted to check that the components combine correctly.

**6.2 Methods, Tools, and Techniques**

The team will have meetings three times a week to discuss the progress of the assigned tasks. These meetings will be conducted in person, through phone conversations, and email.

The project will be using the object-oriented paradigm. The Unified Modeling Language will be used to derive the classes, their attributes, methods, and cardinality. The application server will be coded using C++. The front-end will be coded using PHP, CSS, HTML, and JavaScript. The database for the system will use Microsoft SQL Server.

**6.3 Infrastructure Plan**

All team members will be coding in a Microsoft Windows environment. The project schedule will be maintained in Microsoft Project. Programming will be done in Visual Studio for C++, Eclipse IDE for HTML, CSS and JavaScript. Web frameworks will be utilized for the project. The database will be in Microsoft SQL Server.

**6.4 Product Acceptance and Migration Plan**

The quality assurance team will create test cases for the system. The test cases will be documented and conducted. Defects will be recorded and discussed during a walkthrough. The defects will be corrected and verified through a second round of testing. Integration testing will be conducted to check that the components combine correctly to achieve a product that satisfies its specifications. When the integration testing has been completed, the quality assurance team will conduct product testing. The functionality of the product as a whole is checked against the specifications. The project will be accepted only if the requirements and specifications are met and if there are little or no faults. Currently, there is no migration plan.

**7. SUPPORTING PROCESSES PLANS**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**7.1 Configuration Management Plan**

Changes to the software will be documented in the system requirements specification. A change of requirement may come from the client who wants additional functionality. To avoid the moving target problem, the client will be told to bring the requirement up in the next iteration taking consideration of the time and cost. The changes will be approved by the team and integrated in the system. If defects occur due to the change, the defect will be traced to determine the root cause of the problem.

**7.2 Qualification (Verification and Validation) Plan**

The software will be verified and validated by the development team. Verification will be conducted by reviewing the system requirements specification. The validation will be conducted by the quality assurance team. Each component will be tested separately to determine if it meets the requirements and functionality. Components will be put together to continue the verification and validation. Finally the system as a whole will be tested. Any defects determined will be resolved by tracing them to the root problem.

**7.3 Documentation (Library) Plan**

All members of the team will contribute to writing the documentation of the requirements, design, analysis and implementation. The documents will get approval from Professor Fred Strauss. All documents will be reviewed by each team member for defects. A document may be modified due to changes in requirements, client’s needs and design. Therefore, each document should have a version number. All documents will be given to each team member to store in their personal computers.

**7.4 Quality Assurance Plan**

The quality assurance group will be responsible for conducting the unit testing and integration testing. Test cases will be drawn up from the requirement specifications document. These test cases will be conducted and defects will be recorded in a document. After recording the defects, they will be discussed in a walkthrough with the development team. Resolutions to fix the problem will be addressed and later implemented. Another round of testing will be conducted to ensure that the problem is fixed.

**7.5 Reviews and Audits**

Walkthroughs will be conducted on the completion of a product deliverable. The client and development team will be available. The project manager will not be present. The review will be conducted virtually through one computer where all participants will be able to view the screen. The client may ask questions and decide to add additional functionality. The client will be told that it will be integrated in the next iteration. The goal of the review will be to detect faults, but not correct them. Resolutions to correct the faults will be conducted in separate meeting with only the development team. Those who implemented the particular component will be asked to fix the issue. Documentation issues will be corrected by those who found it after they have discussed it with the team.

**7.6 Problem Resolution Plans**

Problems related to writing documents will be stated in the defect tracking section of the given document. As a democratic team, all developers will contribute in the analysis and resolution of software related problems and the developer who is responsible for the defective task will work on the implementation upon the team’s agreement.

**7.7 Environment Management Plans**

The project will be implemented at the labs provided at NYU Poly. User account credentials to use software such as Microsoft SQL Server will be given to the team. Therefore all user privileges are given by the institution. The maintenance of the environment is the responsibility of the institution.

**7.8 Process Improvement Plan**

During each walkthrough in the meetings, if a member feels that a particular component should be implemented more efficiently, it will be discussed by the team as a whole. The change should be discussed in terms of cost, and the duration of creating it. If the change were to delay the project, there will be a discussion with the client.

**8. ADDITIONAL PLANS**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

N/A

**9. INDEX**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

N/A

**10. RATIONALE**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

N/A

**11. NOTES**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

N/A

**12. APPENDICES**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**12.1 Schedule Tracking**

Everyone on the team worked on the initial SRS simultaneously using Google docs:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Artifact or  Deliverable | Who (individual or Team) | Estimated (hr) | Actual (hr) | Differences (hr) |
| SPMP | Abdul Goffar | 3 | 2 | -1 |
| SPMP | Danbee Jung | 2 | 3 | 1 |
| SPMP | Jose Colindres | 2.5 | 2 | -.5 |
| SPMP | Reem Hassan | 3 | 2.5 | -.5 |

**Cumulative**

|  |  |  |  |
| --- | --- | --- | --- |
| Who (individual  or Team) | Estimated | Actual | Difference |
| Abdul Goffar | 3 | 2 | -1 |
| Danbee Jung | 2 | 3 | 1 |
| Reem Hassan | 2.5 | 2 | -.5 |
| Jose Colindres | 2.5 | 2 | -.5 |

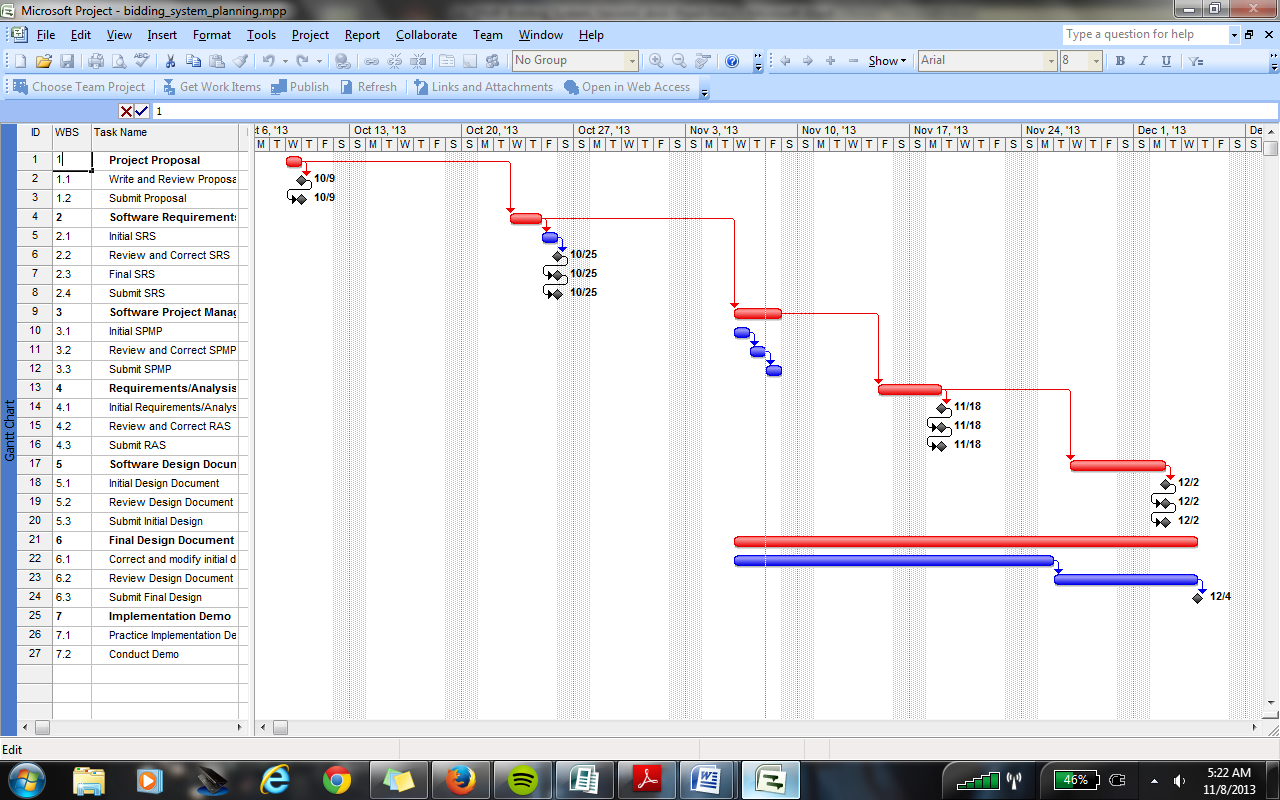
**12.2 Defect Tracking**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Artifact or  Deliverable | Who (individual or Team) | Estimated (hr) | Actual (hr) | Differences (hr) | Number of Defects Detected |
| SPMP | Abdul Goffar | 1 | .5 | -.5 | 5 |
| SPMP | Danbee Jung | 1 | 1 | 0 | 7 |
| SPMP | Jose Colindres | 1 | 1.5 | .5 | 10 |
| SPMP | Reem Hassan | 1 | 1.5 | .5 | 7 |
| Total Defects |  |  |  |  | 29 |

Notes: Most of these defects detected were grammar and content pertaining to the template provided

**Cumulative**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Artifact or  Deliverable | Who (Individual or Team) | Estimated (hr) | Actual (hr) | Differences (hr) | Number of Defects Detected |
| SPMP | Abdul Goffar | 1 | .5 | -.5 | 5 |
| SPMP | Danbee Jung | 1 | 1 | 0 | 7 |
| SPMP | Jose Colindres | 1 | 1.5 | .5 | 10 |
| SPMP | Reem Hassan | 1 | 1.5 | .5 | 7 |
| Total Defects |  |  |  |  | 29 |

**12.2 Gantt Chart/Microsoft Project Schedule**