Project Management Plan
For Dynamic Food Management

Group-11

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I. OVERVIEW

Introduction

The following document represent Project management plan for the E-commerce website called “foodinfo.com”. Our start-up company is planning to promote food business online, with a team of 8 members who have relevant experience in developing ecommerce websites. E-commerce is been main area for developing the food industry. The website developed by the team will help in developing food enterprises through e-commerce and improve the supply chain of food[1].

Project Summary

The website developed will provide information about the perishable foods available in the market. Milk, meat and vegetables are considered as perishable foods. These goods will have certain amount of time period and thrown after the expiry. The main motivation of developing website is to provide information about perishable food availability in the market. We have chosen limited supermarkets namely Willys, ICA and LIDL, where every year huge amount of money is being spent on perishable goods. If the goods are not sold out, there is no other alternative from throwing away the product. In order to save money and food, our company is planning to develop a platform for both customers and retailers.

The information about the goods and their respective expiry dates are gathered by the company. Our website displays the product availability in supermarket where the customer can be benefited by the offers and purchases the goods according to their requirements and save money.

In this way the retailers are able to sell out most of the perishable goods and customers are benefited by the offer. Markets specified are restricted to Karlskrona. The company also does NGO services by collecting rest over goods and distributes to the orphanage and old age homes.

Scope of project

A. Project goals

- To improve food management through e-commerce.
- Saving food and resources.
- Service

B. Features

- Offers on perishable foods are displayed on the website.
- Location and quantity of the product.
- Availability of product in specified store.
- Reserve option for customer. (Cart and timer)
- Feedback channel.

- Search box.
- Offers to privilege customers.
- Donor and NGO services.

C. Function and task

- The team has 8 resources, who has relevant experience in website development. The functions and task are divided according to their skill and knowledge in specified area.
- Whole project planning is divided in to 3 sprints and each sprint has its own task which is distributed among resources.

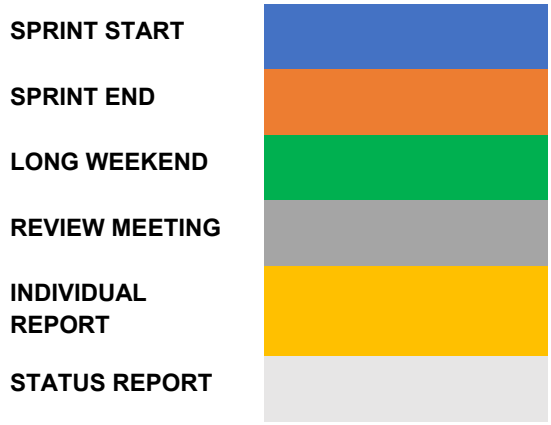
D. DEADLINE

NOVEMBER 2015						
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
						1
2	3	4	5	6	7	8
9 **STATUS REPORT**	10	11	12 **SPRINT 1**	13	14	15
16 **STATUS REPORT**	17 **PROJECT PLAN**	18	19	20	21	22
23 **STATUS REPORT**	24 **REVIEW MEETING**	25 **SPRINT 1**	26	27	28	29
30 **STATUS REPORT**	DECEMBER 2015					

SPRINT 2						
	1	2	3	4	5	6
7 STATUS REPORT	8	9	10	11 SPRINT 2	12	13
14 STATUS REPORT	15 REVIEW MEETING	16	17	18	19	20
21 STATUS REPORT	22 SPRINT 3	23	24	25	26	27
28	29	30	31			

JANUARY 2016

				1	2	3
4 STATUS REPORT	5	6 SPRINT 3	7	8	9	10
11 STATUS REPORT	12 REVIEW MEETING	13 PROJECT PRESENTATION	14	15	16	17 INDIVIDUAL REPORT



ASSUMPTIONS

AS1. Everyone in team has relevant knowledge in website development.
AS2. Five-day week.
AS3. Everyone participated in the project.
AS4. There will be change of requirements in the project.
AS5. Product new to the market.
AS6. Restricted to specific markets in Karlskrona.
AS7. Mutual cooperation between Stores and company.
AS8. There was no security breached, while accessing database.
AS9. Team members has required skill and technical support.
AS10. Team cohesion and trust is maintained throughout the project.
AS11. Website can be used by all type of users.
AS12. The company is NGO registered.
AS13. The company is led by two expertise.

CONSTRAINTS

1. Time

Table 1.Time availability for resources

Project Deadline	JAN 12th ‘16
Time given for each resource	170 hrs
No. of resources	8
Total human effort	1360 hrs

2. Budget

The company has no issues on budget, investor takes care of it.

3. Resources

The start-up company has only eight human resources and each member contributes 170 hrs human effort for project.

4. Open source code and free tools are used.

Company uses only open source tools in development process.

II. PROCESS

Methodology

The software can be developed through different methodologies. Selecting a suitable methodology is a key factor for success of project. The agile methodology is selected for this project. The reason behind selection of agile methodology is, there is a lot of flexibility for change in requirements, and less time need to be allocated for documentation as main concentration is on working software, cross functional roles for the team members[2]. As our project is a start-up idea so the change in requirements are more, lack of standards in the company as the CMM level will be 1, so there need to be a design oriented development which consists of iterations. Also the skilled team members are there who can have group autonomy. The project is divided into sub-tasks where these implemented in iterations so a feedback can be collected from customer or stakeholders and improve in next iteration. Also technology or latest changes in industry can be easily incorporated in agile development. The selected framework for our project in agile is scrum because of following factors[2][3]:

- As our project is a start-up idea there are no static requirements available. In order to handle the change in requirements scrum helps to review at the end of each sprint by conducting retrospective meeting.
- Quality is easily measured by using scrum methodology as there is continuous tracking is done by scrum master.
- Deliverable expected dates can be easily met by comparing daily how much work done and how much work lag behind through daily scrum meeting.
- Scrum development methodology consists a review in each and every phase of the sprint. Usually the scrum meetings are conducted at regular intervals and discuss the project sprints, necessary changes when needed can be made, this help to review the scope whenever required and change the direction of the project in right way. Team members have the ability to distribute the task among themselves with respect to their capabilities.

The reasons for not selecting traditional method are fault requirements may lead to failure of project, less quality in the product as it takes more time, documentation requires more time, modification in requirements and scope change in this methodology is not flexible as our project is not static so there are frequent changes as start-up idea this methodology is not selected.

Roles and responsibilities of the members of the team:

The given members for the project are eight and we have to utilize them for 170 hours each to complete the project. Among eight members we divided into product owner, scrum master and development team, where product owner and scrum master also acts as developers. In our project the members are self-organized to perform tasks and management of project. As each individual have previous experience with web development so training is not provided among team members. The eight members are divided into four pairs for pair programming and work is assigned to them.

Table 2. Resource and Pair ID's for team members

Pair ID for coding	Resource ID	Names
P1	**R1**	CHARLA, SHIVA BHAVANI REDDY
	R3	MADALA, ANVITHA
P2	**R4**	MAGAPU, AKSHAY KUMAR
	R7	VARANASI, PANCHAJANYA
P3	**R2**	CHILLA, KARTHEEK ARUN SAI RAM
	R6	NEKKANTI, HARINI
P4	**R5**	MANDA, SAI NARAYANA SAMHITH
	R8	YARLAGADDA, NIKHIL

Table 3. Roles of team members in each sprint

Sprints	Phase	Roles of members
Sprint 1	Analysis	R5,R8 as analysts
	Design	R2,R6 as designers
	Development	R4,R7 as developers
	Testing	R4,R7 as testers
Sprint 2	Analysis	R5,R8 as analysts
	Design	R2,R6 as designers
	Development	R1,R2,R3,R6 as developers
	Testing	R4,R7 as testers
Sprint 3	Analysis	R5,R8 as analysts
	Design	R2,R6 as designers
	Development	R1,R3,R5,R8 as developers
	Testing	R4,R7 as testers

Responsibilities of the team members

As selected methodology is agile for development each member plays multiple roles in the project. So in our project six members are assigned as analysts, designers, developers and testers in three sprints and two members are scrum master and product owner who are also acts as developers.

1. Product owner: In our project the product owner responsibility is to have an interaction with customers (team members) to get the user stories and also to prioritize the product backlog, plans the release. The product owner plans the product based on situation of market, so that he/she can set goals to the sprint. The product owner in our team is R1.
2. Scrum master: Scrum master in our project acts as the communicator between product owner and the team members. Also facilitates the things needed by the team for development of the product. Scrum master monitors the progress of the sprint activity and also clears the obstacles for the team, conducts daily scrum. The scrum master in our team is R3.
3. Analysts: The analyst's responsibility in our project is to gather the data from customers and stakeholder's requirements. Mainly the requirements of stores as the product displays the offers of the stores. Then analysts made a list of requirement which can done as selected list, which cannot be done as not- selected list and requirement specification. These three have to be specified in a requirement document (RD) for traceability. The analysts in our team R5, R8.
4. Designers: The designer responsibility in our project is to design the database and interface for the web pages through using UML design tool Visio. The designers in our team are R2, R6.
5. Developers: The developer's responsibility in our project is to develop webpages, style these webpages, create database and retrieve the data in webpages. So each member in the team acts as developers in our project where not all are experts, so pair programming concept is used to improve the quality of coding. The pair programmers are selected based on the similar skills so that one can code and other can review the code and also the ideas can be shared by both the coders.
6. Testers: The tester's responsibility is to test the web application so that accessibility, usability, maintainability, portability levels in web application are tested to decrease the level of bugs and improve the quality of the application. The testers in our team are R4, R7.

III. Effort Estimation

A list of requirements

In this the requirements needed to identify tasks and effort estimation are listed. The selected requirements are:

Functional Requirements

These requirements define the functionality of the system and the function consists of the needed inputs and what outputs are desired.

The functional requirements in our project are:

- View stores: This feature is about selecting a store and location of that particular from the different stores available.
- View products and offers: This feature is about providing the offers and selecting different categories of products.
- Access to user profile: This feature is to create a user profile and access it through respective usernames.
- Access to change personal data and email in user profile: This feature is to add, edit, or modify the user profile.
- Incorrect or successful login: This feature is regarding usernames length, incorrect usernames and characters required for password.
- Reserve the products: This feature is about the reserving the selected products.
- Wish list for users: This feature is about having a wish list for user in their profile so that they can easily select the feature.
- Access to edit, add, and delete wish list: This feature is to add, edit or modify the wish list.
- NGO service: This feature is about providing NGO service and having donor option.
- Update about offers: This feature is about displaying the daily updates in the offers.

Non-Functional Requirements

The non-functional requirements in our project are usability, maintainability, efficiency, portability, reliability and functionality. These are effectively discussed in the quality plan in section VI.

Product Backlog

The product backlog consists of features/user stories to be developed in our project. They are as follows:

Store selection: In this feature, the user can select a store from given number of different stores.

Product selection: In this feature, the user can select a product from given different type of products.

Reserve product: The product can be reserved by the user so that it can received from the store.

Subscription: The user can subscribe to different products where the availability of products will be e-mailed to user.

Search option: the search option is feature to search any store, product, in the search bar.

Homepage: Homepage feature consists of all the menus and options.

Database connectivity: The database connectivity feature consists of user information, product updates, offer updates so it is also important feature.

NGO service: this feature is about the service provided by the organization through this website.

Login/signup: this feature consists of forms in which a user can login or create a new account in the webpage.

About us: This feature represents the main motive about the website so the new users can why this is established and purpose regarding the website.

Pay option: Pay option is for buying a product from the website.

Delivery option: delivery feature is about delivering the product which user bought so the delivery mode can cash on delivery, card payment.

Live chat: This feature is about the chatting the problems between customer support and user.

Customer service: Customer service feature is about the problems faced by users can be solved through talking or if any payment issues came these can be solved by customer service.

Feedback mechanism: Feedback mechanism is a feature in which feedback is collected from the users so that what changes need to be done to improve the Quality of the website can be known.

Availability of product: The availability of the product feature says about the how many products are available in a particular store.

Offers: this feature is about the offers in store are displayed in the homepage so that deals can be seen by users and select what they like.

Contact us: this feature gives the information regarding the address or email address of the website company.

Product quantity: The feature is to add the quantity in cart page to reserve or buy the product.

Social connectivity: The feature adds the connectivity with users by providing the social links to the user about websites.

Privacy policy: This feature is about the policy regarding privacy of the user so the data and personal information use can be known by the user whether it is safe to provide the data or not.

Donor button: Any donors who wish to contribute for NGO service can be done through this feature.

Sprint Backlog

The project is divided into three sprints. So the features are selected based on the customer value criteria. To prioritize the product backlog t-shirt sizing method is used, for every feature a certain value is given by the team such as S, M, L, and XL. So features are selected to each sprints based on the prioritization. Customer value criteria is selected because the product is a start-up idea so we need to know how much a feature is valued by the customer as we are the customers in our project this method gets legitimate and riskless information. Each sprint lasts for two weeks i.e. 10 working days. So based on that, the sprint 1 consists of features that are necessary for other sprint features. The list of features in every sprint are given below.

Table 4. Sprint backlog

Sprint	Features
Sprint 1	Homepage
	About Us
	Stores and offers
	Database connection
	Donor Button
Sprint 2	Store selection
	Product selection
	Availability of product
	Login/Signup/Profile
	Reserve, cart, time countdown
	Feedback
	Database connection
Sprint 3	Subscription(E-mail)
	Quantity of product
	Search bar
	Social connectivity
	Coupons, offers, Ads
	Database connection

	Privacy policy

The other features which are not involved in above table are considered as future development due to limited effort.

Work Breakdown Structure

Work breakdown structure is used to breakdown the tasks into sub-tasks so that a hierarchy structure forms to get a simple idea about the overall project process. The work breakdown structure is shown after table 5.

As the work breakdown structure is in a graphical representation, to understand more clearly a WBS dictionary is provided in table 5.

Table 5. WBS dictionary

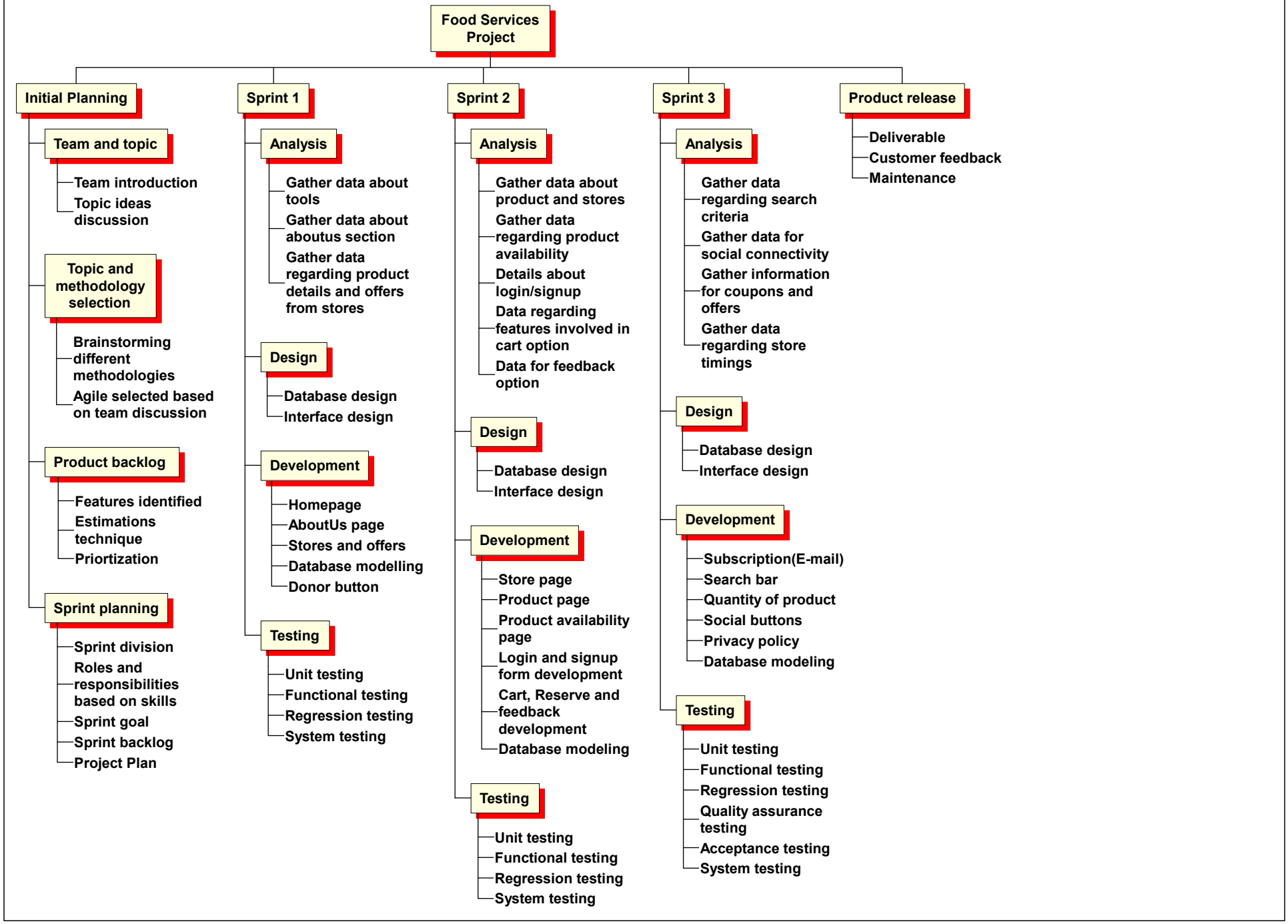
Level	WBS Code	Task	Task Description
0	0	Food services project	
1	1	Initial Planning	
2	1.1	Team and topic	
3	1.1.1	Team Introduction	Members in the team introduce themselves to each other
3	1.1.2	Topic ideas discussion	Ideas regarding the topic for project are shared and discussed
2	1.2	Topic and methodology selection	One topic is selected from all the available ideas based on the pros and cons
3	1.2.1	Brainstorming different methodologies	Different methodologies that are used in the present industry are identified and discussed
3	1.2.2	Agile selected based on team discussion	Individual perspective regarding the methodologies are provided. Methodology is finalized when all the team members came to consensus
2	1.3	Product backlog	Gathering required features from the stakeholders
3	1.3.1	Features identified	The required and useful functions that are helpful to the user
3	1.3.2	Estimation techniques	Techniques identified to estimate effort
3	1.3.3	Prioritization	Features are prioritized based on the customer value
2	1.4	Sprint planning	
3	1.4.1	Sprint division	Sprints are divided based on time and features

3	1.4.2	Roles and responsibilities based on skills	Distributing the work based on the skills acquired by the team members
3	1.4.3	Sprint goal	To achieve the completeness of the tasks that are performed in that sprint
3	1.4.4	Sprint backlog	Features are divided for each sprint
3	1.4.5	Project plan	Documentation of project plan
1	2	Sprint1	
2	2.1	Analysis	Gathering the necessary requirements to accomplish the sprint
3	2.1.1	Gather data about tools	Information regarding the open source tools are gathered which are suitable to the project
3	2.1.2	Gather data for about us section	Information regarding the organization goals and the members of the organization
3	2.1.3	Regarding product details and offers from stores	Data collected for offers on the products
2	2.2	Design	designing the architecture or the blueprint of the requirements
3	2.2.1	Database design	Designing of database models
3	2.2.2	Interface design	Designing of user interfaces
2	2.3	Development	Implementing the activities using the resources
3	2.3.1	homepage	Implementing the features required for the home page
3	2.3.2	Aboutus page	Development of aboutus page
3	2.3.3	Stores and offers	Development of stores and offers page
3	2.3.4	Database modelling	Structuring the gathered information in database
3	2.3.5	Donor button	Developing the donor button
2	2.4	Testing	Test planning and test execution
3	2.4.1	Unit testing	
3	2.4.2	Functional testing	
3	2.4.3	Regression testing	
3	2.4.4	System testing	
1	3	Sprint2	
2	3.1	Analysis	

3	3.1.1	Gather data about products and stores	Information gathering about products and stores
3	3.1.2	Gather data regarding product availability	Information about the availability of product
3	3.1.3	Details about login/signup	Characteristics are analysed for user name and password
3	3.1.4	Data regarding features involved in signup	Information required to sign up for a new user
3	3.1.5	Data for feedback option	Information regarding the options to be included in the feedback
2	3.2	Design	Designing the architecture or the blueprint of the requirements
3	3.2.1	Database design	Designing of database models
3	3.2.2	Interface design	Designing of user interfaces
2	3.3	Development	Implementing the activities using the resources
3	3.3.1	Store page	Page development about the stores and their locations
3	3.3.2	Product page	Page development regarding the products types in each store
3	3.3.3	Product availability page	Page development regarding the availability of products in each store
3	3.3.4	Login and signup form development	Development of forms
3	3.3.5	Cart, reserve and feedback development	Developing the functionalities of cart
3	3.3.6	Database modelling	Structuring the gathered information in database
2	3.4	Testing	Test planning and test execution
3	3.4.1	Unit testing	
3	3.4.2	Functional testing	
3	3.4.3	Regression testing	
3	3.4.4	System testing	
1	4	Sprint3	
2	4.1	Analysis	
3	4.1.1	Gather data regarding search criteria	Information is analysed regarding the functionalities to be involved in search criteria

3	4.1.2	Gather data for social connectivity	Information is gathered regarding the social connectivity options
3	4.1.3	Gather information for coupons and offers	Information regarding when coupons need to be added and offers need to be provided
3	4.1.4	Gather data regarding store timings	Information regarding the timings of store and reserve function capability
2	4.2	Design	Designing the architecture or the blueprint of the requirements
3	4.2.1	Database design	Designing of database models
3	4.2.2	Interface design	Designing of user interfaces
2	4.3	Development	Implementing the activities using the resources
3	4.3.1	Subscription(e-mail)	Implementing the subscription option in profile page of users
3	4.3.2	Search bar	Implementing the search criteria for webpage with filters
3	4.3.3	Quantity of product	Implementing the addition of product quantity to wish list or reserve option
3	4.3.4	Social buttons	Implementing the social buttons and linkage to the external links
3	4.3.5	Privacy policy	Implementing the privacy policy of the website
3	4.3.6	Database modelling	Implementing the activities using the resources
2	4.4	Testing	Test planning and test execution
3	4.4.1	Unit testing	
3	4.4.2	Functional testing	
3	4.4.3	Regression testing	
3	4.4.4	Quality assurance testing	
3	4.4.5	Acceptance testing	
3	4.4.6	System testing	
1	5	Project Release	
2	5.1	Deliverables	Final product is released into the market
2	5.2	Customer Feedback	Continuous feedback is gathered
2	5.3	Maintenance	Maintenance phase for the developed product starts

Work Breakdown Structure



Effort Estimation

The effort for this project is estimated by using COCOMO-II model. Other models are not considered because the present project is a start-up idea so no previous data regarding this project is available, for this reason human-expert based models are not considered as these models requires some previous data to predict the estimates[4][5].

So our team consists of two experienced web developers (AS11) who can estimate the source lines of code (SLOC) for a webpage, so based on them we collected the SLOC data for each feature and make an average SLOC as two are experts. So we used average of their estimates and these presented in table 6.

Table 6. Source lines of code for features

S.No	Features	Expert 1	Expert 2	SLOC (average)
Sprint 1				
1	Home Page	330	270	300
2	About us / Information	140	160	150
3	Displaying the store and offers	170	130	150
4	Database management	240	260	250
5	Donor Button and NGO services	100	100	100
Sprint 2				
6	Store selection	100	140	120
7	Product selection	100	140	120
8	Availability duration of the product	60	60	60
9	Login/ Sign up/ profile page, wish list	350	250	300
10	Feedback channel	100	80	90
11	Reserve button, Cart page and timer	200	300	250
12	Database Management	300	400	350

Sprint 3				
13	Subscription	190	150	170
14	Privacy Policy	110	90	100
15	Social media	90	90	90
16	Search Box	180	220	200
17	Coupons/ offers / Reserve button enabling/ disabling	140	160	150
18	Database Management	370	330	350
19	Displaying the Quantity of the product	60	60	60
Total		3,330	3,390	**3,360**

The COCOMO-II consists of scale drivers and cost drivers in which we have taken all five attributes of scale drivers and some attributes of cost drivers which are suitable for our project are selected[6]. The effort is estimated based on these values, clear representation of these values and calculation of effort is given below,

$$\text{Effort} = a \times (\text{KLOC})^{sf} \times \Pi\, EM_I \qquad \text{---------- EQ (1)}$$

sf is sum of scale factors which is, sf = b + 0.01 x (sum of estimated scale drivers value)

There are two constant values which are, a is 2.94, b is 0.91.

The scale driver's parameters are given in below table 7.

Table 7. Scale driver parameters

Scale drivers/ Scale factors	Very Low	Low	Nominal	High	Very High	Extra High	Our estimated value
PREC	6.2	4.96	3.72	2.48	1.24	0	6.2
FLEX	5.07	4.05	3.04	2.03	1.01	0	1.01
RESL	7.07	5.62	4.24	2.83	1.41	0	2.83
TEAM	5.48	4.38	3.29	2.19	1.1	0	1.1
PMAT	7.8	6.24	4.68	3.12	1.56	0	6.24

There are total five number of scale drivers as shown in above table.

1. Precedentedness (PREC):

It describes about any previous precedent for the developing product, as our project is a start-up idea there are no previous websites (AS5) available for food management. So the level of precedentedness for our project is very low (6.2).

2. Development Flexibility (FLEX):

It describes about the flexibility for modifying the product while developing. In our project the selected methodology is agile and change in requirements is suitable in this methodology and the conformity between team members is good, so the level of development flexibility is very high (1.01).

3. Architecture / Risk Resolution (RESL):

It describes about handling the risks and uncertainties in the project. As there are skilled people in the team and also two experienced members, the risks and uncertainties can be handled at a certain level so the level of architecture and risk resolution is high (2.83).

4. Team Cohesion (TEAM):

It describes about the cohesion and trust between the team members. As there are no language and cultural barriers, team members can easily understand other opinions and highly cooperative. So level of team cohesion in our project is very high (1.1).

5. Process Maturity (PMAT):

It describes the maturity level of team members and organization in the process of development. As this is a start-up project the level of standards in development are less. So for our project there is no repeat capability. So the level of process maturity is taken as low (6.24).

$$sf = B + 0.01 \times (PREC + FLEX + RESL + TEAM + PMAT)$$
$$= 0.91 + 0.01 \times (6.2 + 1.01 + 2.83 + 1.1 + 6.24)$$
$$= 1.0838.$$

The cost drivers considered for our project are listed below:

Product factors

1. Required software reliability (RELY):

It describes the reliability level of developed software product and impact if there is a failure in functioning. As our developing product is food service there is less loss and less effect on human life if it fails to function. So the level of RELY is taken as low (0.92).

2. Software product complexity (CPLX):

It describes the level of complexity in writing the code during the development. As the complexities like the functions, loops, database queries, operations categorize from low level to extreme level so the use of these in our project is not that extreme as we are using

only basic level code structure to develop the web application and mainly concentrated on functioning of the website. So level of software product complexity is very low (0.73).

3. Required Reusability (RUSE):

It describes the reuse capability of the code and additional effort needed to construct, as our developing product is done through agile methodology, adding features is the main task in our project so there is nominal use of code in the project. So level of RUSE is nominal (1).

Personnel factors

1. Analyst Capability (ACAP):

It describes the capability of analysts and designer by their abilities and efficiency. In our project there is much cooperation and communication between team members so the requirements and designing can be easily done. The level of Analyst capability in our project is very high (0.71).

2. Programmer Capability (PCAP):

It describes the capability of programmer in coding level. In our project the two experts will communicate with other team members so the understanding about the solving problems can easily done and coordination increases between team. The level of programmer capability in our project is high (0.88).

3. Applications Experience (AEXP):

It describes the experience level in the developing the system application. In our project each individual is experienced in developing a web application in their past so the level of application experience in our project is nominal (1).

4. Platform Experience (PEXP):

It describes the experience level of developing under same platform. In our project as said each individual has some experience in the web project so here we use the same experience for our web application development. So the level of platform experience is nominal (1).

5. Language and Tool Experience (LTEX):

It describes the experience in developing a system application with a language and usage of tools to develop the application. So the level of language and tool experience in our project is nominal (1).

Project factors

1. Use of Software Tools (TOOL):

It describes the usage of tools in system development. In our project, the tools are used in every phase and as agile is selected the tools like daily updates and issues trackers are also used to know the problems in the development. So the level of use of software tool sin our project is high (0.90).

2. Required Development Schedule (SCED):

It describes the schedule plan constraint for the development of product. As in our project there is a well –defined schedule and daily scrum meeting held daily to know the status and problems faced by the team members during the development. So the level of required development schedule in our project is nominal (1).

Table 8. Attributes of cost drivers

Cost Drivers/ Scale factors	Very Low	Low	Nominal	High	Very High	Extra High	Our estimated value
Product Factors							
RELY	0.82	0.92	1	1.10	1.26		0.92
CPLX	0.73	0.87	1	1.17	1.34	1.74	0.73
RUSE		0.95	1	1.07	1.15	1.24	1
Personnel Factors							
ACAP	1.42	1.19	1	0.85	0.71		0.71
PCAP	1.34	1.15	1	0.88	0.76		0.88
AEXP	1.22	1.10	1	0.88	0.81		1
PEXP	1.19	1.09	1	0.91	0.85		1
LTEX	1.20	1.09	1	0.91	0.84		1
Project Factors							
TOOL	1.17	1.09	1	0.90	0.78		0.90
SCED	1.43	1.14	1	1	1		1

Based on the above equation 1, effort is calculated as,

Effort = $2.94 \times (3.36)^{1.0838} \times (0.92 \times 0.73 \times 1 \times 0.71 \times 0.88 \times 1 \times 1 \times 1 \times 0.9 \times 1)$

= 4.12941 PM.

~ 113 Person hours.

Each resource contributes 113 person hours to complete the sprints.

Estimate allocation of time

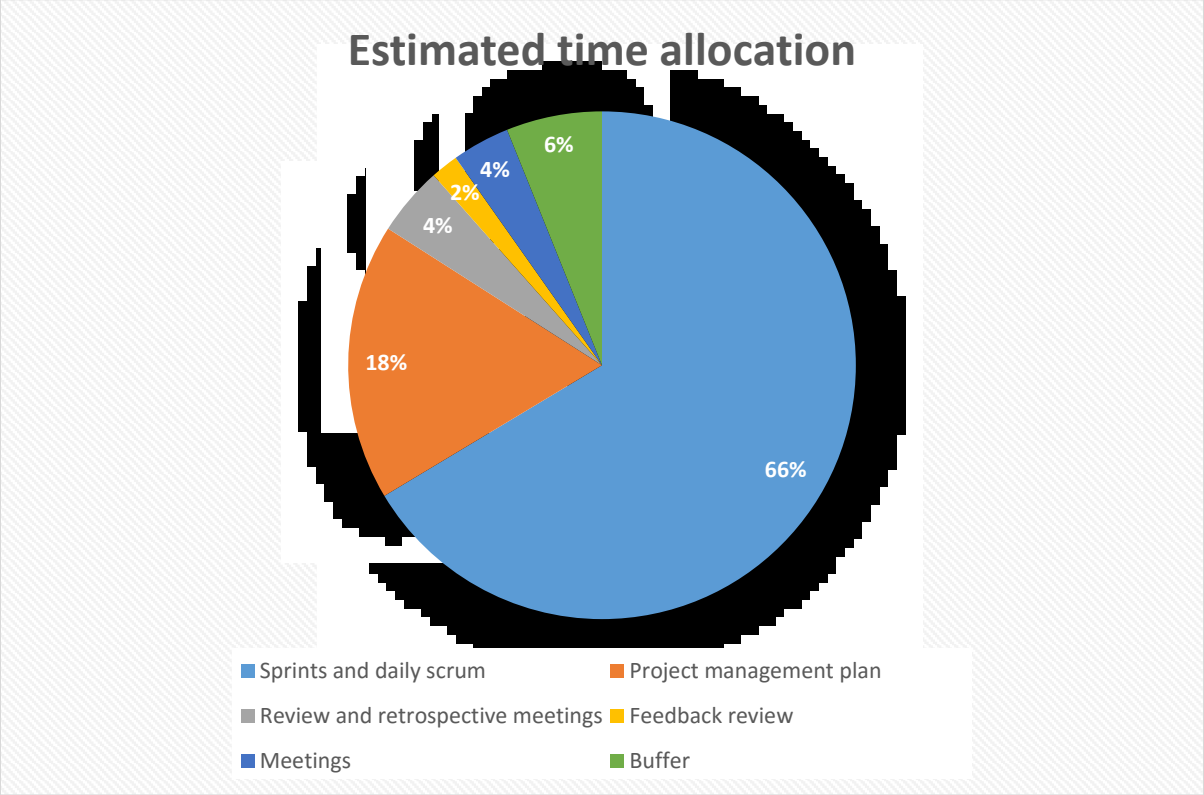


Figure 1.Estimated time allocation

Table 9. Distribution of working hours

Tasks	Working hours
Meetings	50
Project Management Plan (PMP)	240
Sprints(Including daily scrum)	903
Review and retrospective meetings	60
Feedback review	24
Buffer	83
Total	**1360**

IV. Initial Work Plan

The following Table 10 describes about the task divided by the team in the project. The detail explanation of resource allocation and task distribution are given in Gantt chart in appendix 1. Daily scrum meetings are included in every sprint but not separately shown in Gantt chart as it complexes the view of chart.

Table 10. Task duration and resource allocation

Task	Duration (working days)	Resource Allocation
Project	**48**	**All Resources**
Planning	**06**	**All Resources**
Sprint 1	**12**	**All Resources**
Sprint 2	**12**	**All Resources**
Feedback	**03**	**All Resources**
Sprint 3	**12**	**All Resources**
Product release	**01**	**All Resources**
Holidays(Christmas and New year)	**02**	**All Resources**

According to assumptions, weekends are not considered as working days. Christmas (Dec 25th) and new year (Jan 1st'16) is also given off for the team.

Tools/ Resources

Table 11. Tools and resources used

Task	Tools/Resources used
Meetings	Group rooms
Communication	WhatsApp, Google drive
Project plan	Internet, research articles
Documentation	Microsoft word, project, Visio
Analysis	Eclipse UML
Design	Visio, Eclipse UML
Development	Xampp, Notepad++, Java, Team viewer.
Testing	Htmlunit, Test Complete, Selenium
Project management	Taiga

List of Major Deliverables

This part consists of list of major deliverables for our project:

1. **Project plan document**

This document consists of overall plan of the project. That is scope of the project, team member roles and selected methodology for the project, effort estimation, work breakdown structure, quality and risk management plan. This document is provided to investor on November 17th.

2. **Project plan presentation**

The presentation is given by all team members to the investor of the project and explain the plan. The PowerPoint presentation is given on November 24th.

3. **Food service module**

In this the application developed until second sprint is released into market and collect feedback from the customers to improve the quality for the next sprint. This will be released on December 16th.

4. **Food service web application**

This is the final product of the project with improved quality and it is basically the website developed by the team and it will be released on January 8th.

5. **Project final presentation**

The final presentation is given to explain the product details and how to use the product and collect certain feedback. This presentation will be on January 12th.

6. **Individual report**

A report is provided by each individual in the team about how the project went on and what are lessons learned in the project. This will be submitted on January 17th.

Tracking work and Measure the progress

The plan consists of estimated duration of each task and their sub-tasks. So there is a need of tracking the work, to track the work a burndown chart is used so that how much work is finished and how much work is left can be known. So that daily estimated work is compared with daily completed work and remaining effort is calculated. The burndown cart for each sprint is shown in status reports for detail tracking.

Scrum master measures the progress of all the team members and the project. There are several properties in a project to measure. The key indicators in our project are measuring stakeholder satisfaction, measuring the defects or bugs in our project, measuring the issues arise during requirements or coding phases, measuring the planned deliverables. This way we can know whether the project is going in a planned way or is there extra overhead in the project in terms of effort and time.

Stakeholder satisfaction measure: The important measure is to know the level of stakeholder satisfaction, as stakeholder are key persons in the project these need to be satisfied by delivering a quality product. So to perform it we need to validate the developed product with given requirements so it directly reflects whether stakeholder satisfies or not.

Stakeholders are the candidates who provides requirements for product development. All requirements are not developed because some may consist redundant requirements so a care should be taken to prioritize the requirements and satisfy the stakeholders.

- ***Stakeholder identification****:* identifying stakeholder is the main requirement as there are many stakeholders involved in the project. So the stakeholders are categorized in two ways: Internal and External. The stakeholders identified for our project are as follows: Internal Stakeholders:

- Project team: The team members are the important stakeholders in our project. These members coordinate and develop the software product. The team needs are safety to their job, salary, and recognition of work.
- Sponsor: Sponsor is the investor of our project so main stakeholder is sponsor. Sponsor needs are to get a product with a value of the invested money.
- Stores: Stores are one of the stakeholder in our project, as there are three stores involved their needs are to sell their products within time and not to get losses.
  External Stakeholders:

- Customers: Customer are the external stakeholders who visit the product so their needs are to get the information regarding products offers and discounts easily.
- NGO's: This service is provided by our product so the needs of donors is to know that their money is spent in a good way for charities.

Defects measure: In this the number of defects are measured so that the effort and time required by the team can be known and also it reflects the quality of the code. A benchmark is set for minimum number of defects, by measuring the actual defects and comparing it with benchmark data we can know the progress[7].

Issues measure: In this the time taken for solving or closing the issues arisen in the project are measured so that time used for non-development activities can be known.

Planned deliverables measure: In this the deliverables which are planned are measured with number of deliverables actually delivered so that remaining deliverables work can be calculated. Also the tasks days are also measured to know how many tasks are completed on date and how many are lagged behind to complete. These can be performed by using Gantt chart as it contains each sub-task finish date so by comparing actual progress with estimated Gantt-chart progress leads to know the remaining effort data.

These measures help us to know the progress of the project and by having good measures it can ensure the project success.

V. Risk Management Plan

These are some of the identified potential risks[8] which are related to our project and the mitigation strategies are detailed in the table 12.

Table 12. Identified risks and their mitigation strategies

ID.	Risk	Probability	Impact	Risk assessment	Mitigation	Responsible member
R1	Broad scope	Medium	High	Mitigate	By reducing certain features in the current release of the product and adding them in the future work will minimize the level of the scope.	Product owner (R1)
R2	Missing scrum meetings	Low	Low	Avoid	By informing prior, meeting can be rescheduled.	Scrum master(R3)
R3	Inaccurate time and effort estimation	- High	High	Mitigate	By using a project management tool the progress of work can be known and effort can be recalculated if needed.	Expert1-R2 and expert-2 R8
R4	Misunderstood domain specific terminology	Low	Low	Avoid	Care is taken by the developers to use user-friendly terms while developing	Developers(All team members)
R5	Data loss	High	Low	Avoid	Backup of data is done	Scrum master(R3)

					daily through repositories	

Probability-Impact Matrix for Risks

The impact and probability are divided into four categories, which are low, medium, significant and high. Each category are assigned with a scale value of 1-4. The red indicates that the risks are in danger level, yellow indicates risks are in moderate level and green indicates the risks are safe.

Table 13. Probability-impact matrix

Impact	**High**		**R1**		**R3**
	Significant				
	Medium				
	low	**R2,R4**			**R5**
		Low	**Medium**	**Significant**	**High**
		Probability			

VI. Quality Plan

The action plan has done to analyse and evaluate the quality of the product which is the website, it can be viewed in different perspectives i.e product quality, system as a product, service quality of provider, software product quality and system design[9]. Hence the website is assessed with the support of ISO 9126 “Software Quality Characteristics”. These are taken to analyse the quality criteria which is suitable for the features of the product as stated below in the table.

Table 14. Quality Characteristics

Characteristic	Sub-Characteristic	Related Features in Website	Description
	Suitability	User friendly	Simple user interface displaying important and frequent categories.
		Dashboard	Offers and new products are on the home page.

Functionality	Accurateness	Genuine information	Providing information from valid resources and displaying the products with the help of images.
	Interoperability	Daily offers	Website is connected to the database where every day offers and product updates are known and displayed in the home page
	Security	User logins	Providing secured access to authorised users
Reliability	Fault tolerance	Fail over server	Develop our websites fault tolerantly and also place a fail over server in standby to maintain website availability at any time.
	Recoverability	Cloud storage	Every day data is stored in the cloud backup as a database.
Usability	Understand ability	Utilize large, professional photos of the product and fonts	HD images, flash videos if required to make the customer to get a clear idea of the product and variation in fonts to have a clear visibility
	Learnability	Help option	Help option provides the new users to learn and how to do a particular task in a website
	Operability	Search box	Searching for a product of their choice with the help of search box. Add to cart option on every page.
		Add to Reserve cart	
Efficiency	Time behaviour	Response time	Care is taken while coding so the complexity levels decrease and response of a page increases
	Resource behaviour	characterizing resource usage	website consist of images and data which does not need much bandwidth and storage data

Maintainability	Changeability	Extra features	our product can be changed according to user requirements
Portability	Adaptability	User interface	our product is adaptable for both mobile and desktop interface

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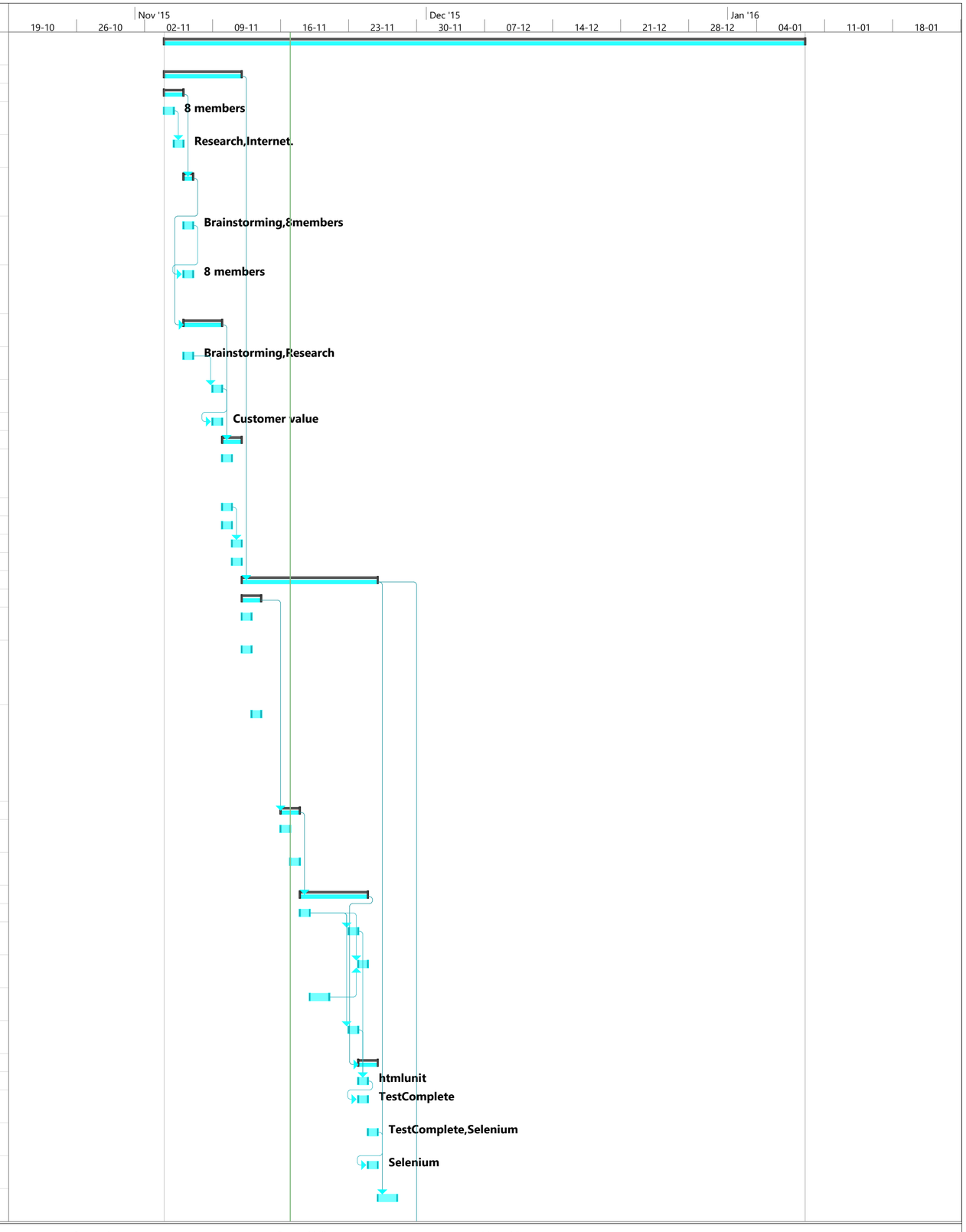
APPENDIX

1. Gantt chart

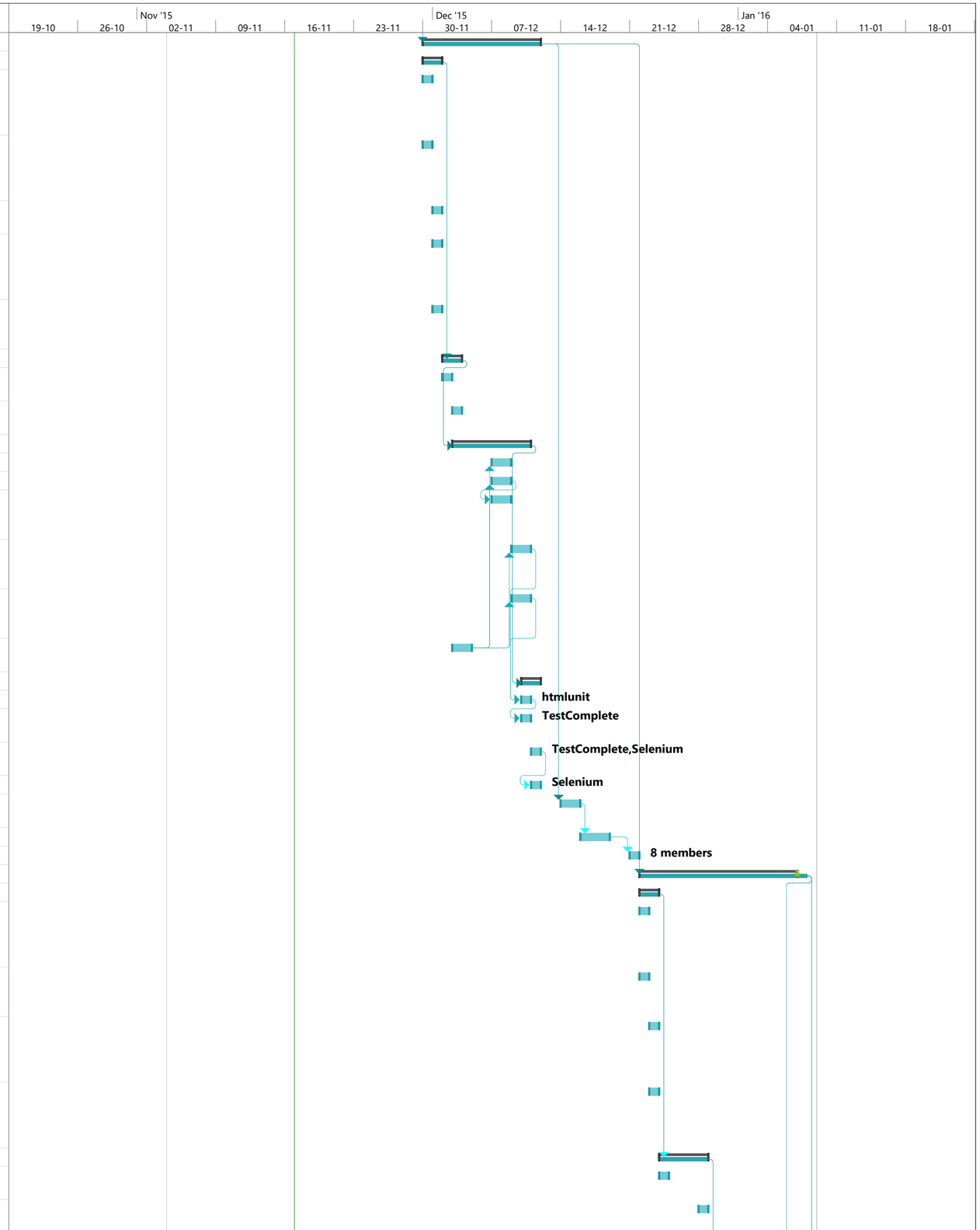
ID	WBS	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1	**0**	**Food Services Project**	**48 days**	**Wed 04-11-15**	**Fri 08-01-16**		**8 members**
2	**1**	**Initial Planning**	**6 days**	**Wed 04-11-1**	**Wed 11-11-1**		**Microsoft project,word document,8 members**
3	**1.1**	**Team and topic**	**2 days**	**Wed 04-11-1**	**Thu 05-11-15**		**8 members**
4	1.1.1	Team introduction	1 day	Wed 04-11-15	Wed 04-11-15		8 members
5	1.1.2	Topic ideas discussion	1 day	Thu 05-11-15	Thu 05-11-15	4	Research,Internet.
6	**1.2**	**Topic and methodology selection**	**1 day**	**Fri 06-11-15**	**Fri 06-11-15**	**3**	**8 members**
7	1.2.1	Brainstorming different methodologies	1 day	Fri 06-11-15	Fri 06-11-15		Brainstorming,8members
8	1.2.2	Agile selected based on team	1 day	Fri 06-11-15	Fri 06-11-15	7	8 members
9	**1.3**	**Product backlog**	**2 days**	**Fri 06-11-15**	**Mon 09-11-15**	**6**	
10	1.3.1	Features identified	1 day	Fri 06-11-15	Fri 06-11-15		Brainstorming,Research
11	1.3.2	Estimations technique	1 day	Mon 09-11-15	Mon 09-11-15	10	
12	1.3.3	Priortization	1 day	Mon 09-11-1	Mon 09-11-1	11	Customer value
13	**1.4**	**Sprint planning**	**2 days**	**Tue 10-11-15**	**Wed 11-11-1**	**9**	
14	1.4.1	Team division and roles	1 day	Tue 10-11-15	Tue 10-11-15		
15	1.4.2	Sprint division	1 day	Tue 10-11-15	Tue 10-11-15		
16	1.4.3	Sprint goal	1 day	Tue 10-11-15	Tue 10-11-15		
17	1.4.4	Sprint backlog	1 day	Wed 11-11-1	Wed 11-11-1	15	
18	1.4.5	Project Plan	1 day	Wed 11-11-1	Wed 11-11-1		
19	**2**	**Sprint 1**	**10 days**	**Thu 12-11-15**	**Wed 25-11-1**	**2**	**8 members,Taiga**
20	**2.1**	**Analysis**	**2 days**	**Thu 12-11-15**	**Fri 13-11-15**		**R4,R7,Eclipse UML**
21	2.1.1	Gather data about tools	1 day	Thu 12-11-15	Thu 12-11-15		
22	2.1.2	Gather data about aboutus section	1 day	Thu 12-11-15	Thu 12-11-15		
23	2.1.3	Gather data regarding product details and offers from stores	1 day	Fri 13-11-15	Fri 13-11-15		
24	**2.2**	**Design**	**2 days**	**Mon 16-11-1**	**Tue 17-11-15**	**20**	**R2,R6,Visio,Eclipse UML**
25	2.2.1	Database design	1 day	Mon 16-11-15	Mon 16-11-15		
26	2.2.2	Interface design	1 day	Tue 17-11-15	Tue 17-11-15		
27	**2.3**	**Development**	**5 days**	**Wed 18-11-1**	**Tue 24-11-15**	**24**	**R4,R7,Xampp,Notepad++,Java,Github,Team viewer.**
28	2.3.1	Homepage	1 day	Wed 18-11-1	Wed 18-11-1		
29	2.3.2	AboutUs page	1 day	Mon 23-11-15	Mon 23-11-15	28	
30	2.3.3	Stores and offers	1 day	Tue 24-11-15	Tue 24-11-15	31,28	
31	2.3.4	Database modelling	2 days	Thu 19-11-15	Fri 20-11-15		
32	2.3.5	Donor button	1 day	Mon 23-11-15	Mon 23-11-15	28	
33	**2.4**	**Testing**	**2 days**	**Tue 24-11-15**	**Wed 25-11-1**	**27**	**R5,R8**
34	2.4.1	Unit testing	1 day	Tue 24-11-15	Tue 24-11-15	29,32	htmlunit
35	2.4.2	Functional testing	1 day	Tue 24-11-15	Tue 24-11-15	34	TestComplete
36	2.4.3	Regression testing	1 day	Wed 25-11-15	Wed 25-11-15		TestComplete,Selenium
37	2.4.4	System testing	1 day	Wed 25-11-15	Wed 25-11-15	36	Selenium
38	2.5	Sprint review and retrospective	2 days	Thu 26-11-15	Fri 27-11-15	19	



Project: Work Breakdown Struc
Date: Tue 17-11-15

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

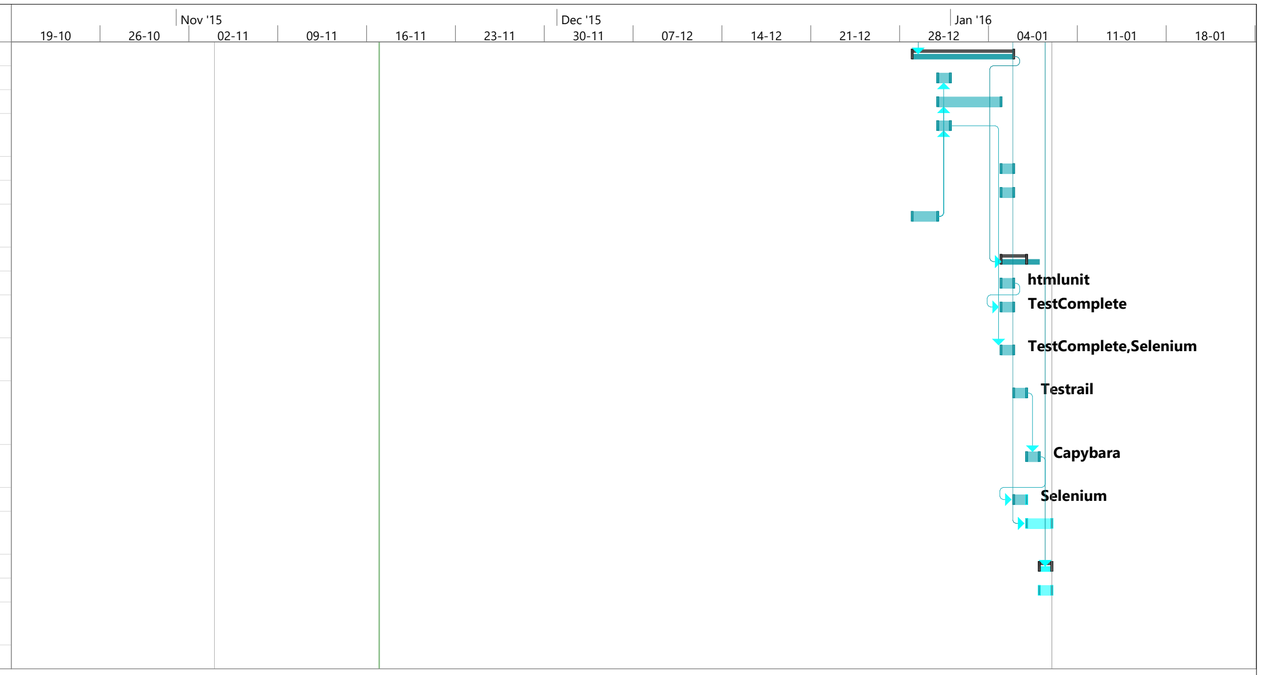
ID	WBS	Task Name	Duration	Start	Finish	Predecessors	Resource Names
39	**3**	**Sprint 2**	**10 days**	**Mon 30-11-1**	**Fri 11-12-15**	**19**	**8 members,Taiga**
40	**3.1**	**Analysis**	**2 days**	**Mon 30-11-1**	**Tue 01-12-15**		**R2,R6,Eclipse UML**
41	3.1.1	Gather data about product and stores	1 day	Mon 30-11-15	Mon 30-11-15		
42	3.1.2	Gather data regarding product availability	1 day	Mon 30-11-15	Mon 30-11-15		
43	3.1.3	Details about login/signup	1 day	Tue 01-12-15	Tue 01-12-15		
44	3.1.4	Data regarding features involved in	1 day	Tue 01-12-15	Tue 01-12-15		
45	3.1.5	Data for feedback option	1 day	Tue 01-12-15	Tue 01-12-15		
46	**3.2**	**Design**	**2 days**	**Wed 02-12-1**	**Thu 03-12-15**	**40**	**R2,R6,Visio,Eclipse UML**
47	3.2.1	Database design	1 day	Wed 02-12-15	Wed 02-12-15		
48	3.2.2	Interface design	1 day	Thu 03-12-15	Thu 03-12-15		
49	**3.3**	**Development**	**6 days**	**Thu 03-12-15**	**Thu 10-12-15**	**46**	**R1,R2,R3,R6,Xampp,Notepad++,Java,Github,Team viewer.**
50	3.3.1	Store page	2 days	Mon 07-12-1	Tue 08-12-15	55	
51	3.3.2	Product page	2 days	Mon 07-12-1	Tue 08-12-15	55	
52	3.3.3	Product availability page	2 days	Mon 07-12-15	Tue 08-12-15	51	
53	3.3.4	Login and signup form development	2 days	Wed 09-12-15	Thu 10-12-15	55	
54	3.3.5	Cart, Reserve and feedback development	2 days	Wed 09-12-15	Thu 10-12-15	55	
55	3.3.6	Database modeling	2 days	Thu 03-12-15	Fri 04-12-15		
56	**3.4**	**Testing**	**2 days**	**Thu 10-12-15**	**Fri 11-12-15**	**49**	**R4,R7**
57	3.4.1	Unit testing	1 day	Thu 10-12-15	Thu 10-12-15	53,54	htmlunit
58	3.4.2	Functional testing	1 day	Thu 10-12-15	Thu 10-12-15	57	TestComplete
59	3.4.3	Regression testing	1 day	Fri 11-12-15	Fri 11-12-15		TestComplete,Selenium
60	3.4.4	System testing	1 day	Fri 11-12-15	Fri 11-12-15	59	Selenium
61	3.5	Sprint review and retrospective	2 days	Mon 14-12-15	Tue 15-12-15	39	
62	3.6	Feedback	3 days	Wed 16-12-1	Fri 18-12-15	61	
63	3.7	Feedback analysis	1 day	Mon 21-12-1	Mon 21-12-1	62	8 members
64	**4**	**Sprint 3**	**12 days**	**Tue 22-12-15**	**Wed 06-01-1**	**39**	**8 members,Taiga**
65	**4.1**	**Analysis**	**2 days**	**Tue 22-12-15**	**Wed 23-12-1**		**R5,R8,Eclipse UML**
66	4.1.1	Gather data regarding search criteria	1 day	Tue 22-12-15	Tue 22-12-15		
67	4.1.2	Gather data for social connectivity	1 day	Tue 22-12-15	Tue 22-12-15		
68	4.1.3	Gather information for coupons and offers	1 day	Wed 23-12-15	Wed 23-12-15		
69	4.1.4	Gather data regarding store timings	1 day	Wed 23-12-15	Wed 23-12-15		
70	**4.2**	**Design**	**3 days**	**Thu 24-12-15**	**Mon 28-12-1**	**65**	**R4,R7,Eclipse UML,Visio**
71	4.2.1	Database design	1 day	Thu 24-12-15	Thu 24-12-15		
72	4.2.2	Interface design	1 day	Mon 28-12-15	Mon 28-12-15		



Project: Work Breakdown Struc
Date: Tue 17-11-15

Task	Summary	Inactive Milestone	Duration-only	Start-only	External Milestone	Manual Progress
Split	Project Summary	Inactive Summary	Manual Summary Rollup	Finish-only	Deadline	
Milestone	Inactive Task	Manual Task	Manual Summary	External Tasks	Progress	

ID	WBS	Task Name	Duration	Start	Finish	Predecessors	Resource Names
73	**4.3**	**Development**	**6 days**	**Tue 29-12-15**	**Tue 05-01-16**	**70**	**R1,R3,R5,R8,Xampp,Notepad++,Java,Github,Team viewer.**
74	4.3.1	Subscription(E	1 day	Thu 31-12-15	Thu 31-12-15	79	
75	4.3.2	Search bar	3 days	Thu 31-12-15	Mon 04-01-1	79	
76	4.3.3	Quantity of product	1 day	Thu 31-12-15	Thu 31-12-15	79	
77	4.3.4	Social buttons	1 day	Tue 05-01-16	Tue 05-01-16		
78	4.3.5	Privacy policy	1 day	Tue 05-01-16	Tue 05-01-16		
79	4.3.6	Database modeling	2 days	Tue 29-12-15	Wed 30-12-15		
80	**4.4**	**Testing**	**2 days**	**Tue 05-01-16**	**Wed 06-01-1**	**73**	**R2,R6**
81	4.4.1	Unit testing	1 day	Tue 05-01-16	Tue 05-01-16		htmlunit
82	4.4.2	Functional testing	1 day	Tue 05-01-16	Tue 05-01-16	81	TestComplete
83	4.4.3	Regression testing	1 day	Tue 05-01-16	Tue 05-01-16	76	TestComplete,Selenium
84	4.4.4	Quality assurance testing	1 day	Wed 06-01-16	Wed 06-01-16		Testrail
85	4.4.5	Acceptance testing	1 day	Thu 07-01-16	Thu 07-01-16	84	Capybara
86	4.4.6	System testing	1 day	Wed 06-01-1	Wed 06-01-1	85	Selenium
87	4.5	Sprint review and retrospective	2 days	Thu 07-01-16	Fri 08-01-16	64	
88	**5**	**Product release**	**1 day**	**Fri 08-01-16**	**Fri 08-01-16**	**64**	
89	5.1	Deliverable	1 day	Fri 08-01-16	Fri 08-01-16		
90	5.2	Customer feedback					
91	5.3	Maintenance					



Project: Work Breakdown Struc
Date: Tue 17-11-15

Task		Summary		Inactive Milestone		Duration-only		Start-only		External Milestone		Manual Progress	
Split		Project Summary		Inactive Summary		Manual Summary Rollup		Finish-only		Deadline			
Milestone		Inactive Task		Manual Task		Manual Summary		External Tasks		Progress			