



IT Project and Quality Management

COMP1305 Coursework

Student Name: Duong Bui Dinh

Student Roll Number: GT00010

Instructor: Thang Hoang Viet

## Contents

Introduction .....	3
Current Problem.....	3
Problem Solving.....	5
Project Strategies .....	6
Result of project .....	8
Appendix A-Spread sheet Model .....	9
Weighted Scoring Model (WSM).....	9
Test Requirement.....	19
Test Plan.....	20
Test log.....	23
Appendix B- Presentation .....	32
Appendix C- WBS.....	42
Project Roles & Responsibilities .....	42
Work Breakdown Structure Dictionary.....	43
WBS Scenario .....	49
WBS Details .....	50
WBS Network Diagram.....	52
WBS Critical Path.....	53
Project Resource Cost.....	55
References .....	57

## Introduction

### Current Problem

An international company, staffs currently use many types of phone, so it is difficult to manage. Many types of phone do not meet the needs of company. It is *constant contact* with head office.

*Constant Contact* means: All staffs can contact with Head Office every time and everywhere they want via network using Email, MMS, SMS, Internet, Video conferences ...

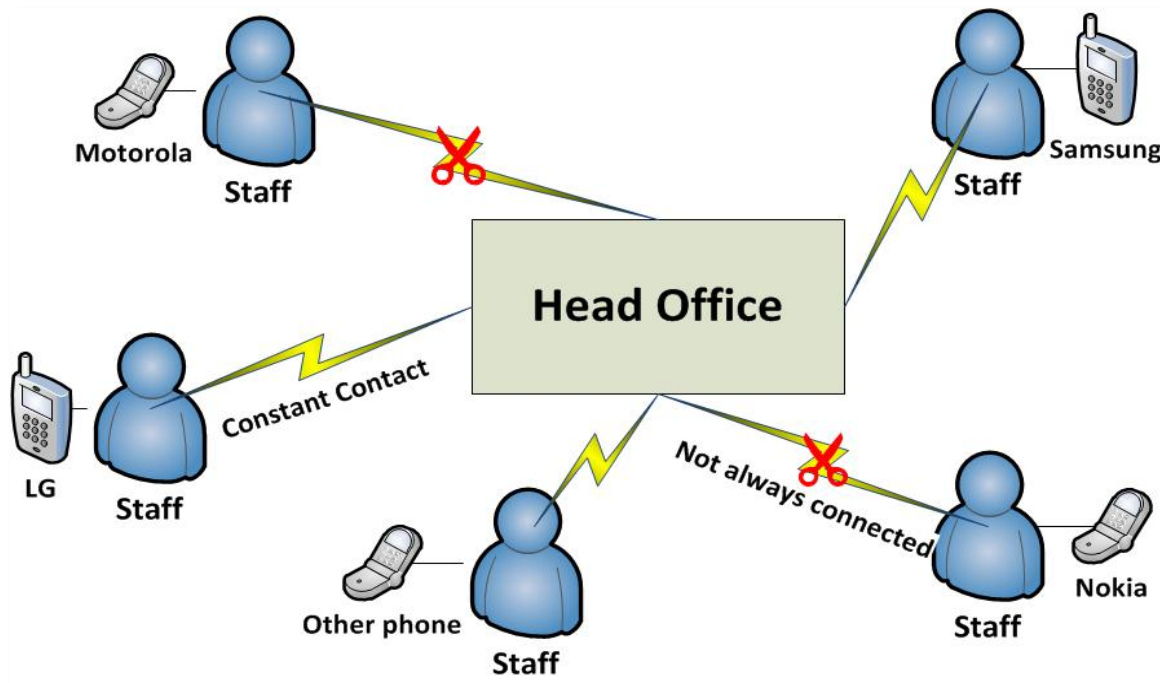


Figure 1: Current problem scenario in company

### Problem Solving

A Manager has been tasked to select a type of smartphone and implement for all four hundred staffs in the company over the period of month. This project has to solve the current problems of company: *Constant Contact* and *Synchronization* of phone for all staffs.

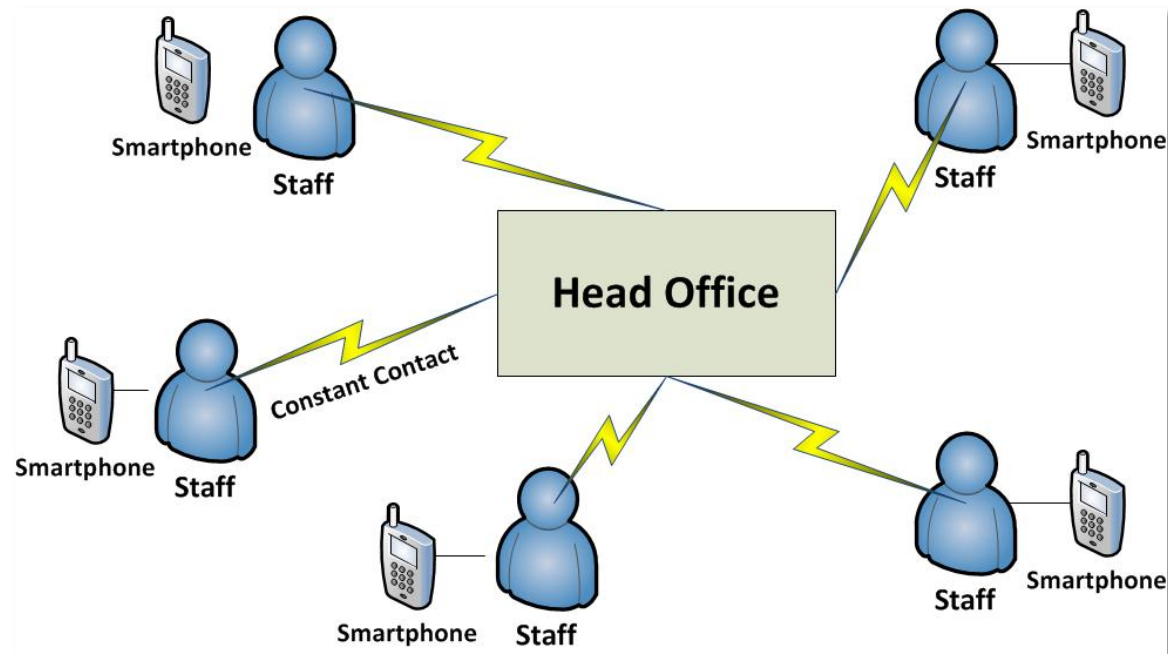


Figure 2: Problems are solved

## Project Strategies

### What must be achieved in the project?

The Manager in this project should think about this question before starting the project. This project will be successful if it meets the following requirements

1. A smartphone type meets needs of functionality (company requirement)
  - The smart phone type has to provides enough functionalities in order to keep *constant contact* between all staffs and Head Office
2. A smartphone type is the best of finance
  - The selected smart phone takes minimum money to maintained and upgrade
3. A smartphone type pleases most of all staffs
  - Staffs will directly use this smart phone , so make sure that it meets staff requirements

### How to achieve the requirements?

- A smartphone type meets needs of functionality.

In order to solve this requirement, the project manager has to know what functions smart phone has to have to keep constant contact between Staffs and Head Office. Based on these functions, he/she will determine the hardware and software requirement for smart phone.

- A smartphone type is the best of finance.

The smart phone will be selected must be the answer for:

- a. Is it the best choice with minimum cost to maintain?
- b. Is it the best choice with minimum cost to upgrade?

The manager must identify all things that affect to cost for maintaining and upgrading.

Maintaining can be understood with mean: cost to use, repair. Maintaining can be understood with mean: cost to upgrade both hardware and software. So, the project manager must calculate Total Cost of Ownership to select a phone.

- A smartphone type pleases most of all staffs

Why the smart phone will be selected has to please most of all staff?

The staffs directly use this smart phone 24/7. So, the project manager should imagine he/she is a staff too.

What do the staffs want from the smart phone?

Why the project manager must care this question! The answer is “Make the smart phone more useful”. The reason is here, staffs usually work eight hours per day and adding the time they really contact with the Head Office outside the working time, assume that is one more hour.

What about other free time? The staffs have fifteen hours which is not for work (in fact it is bigger)

So, the staffs can use smart phone at that time. For example, they want to play games, record videos, capture photos....so, the smart phone should support some multimedia functions. After reducing stress, staffs works better.

The project manager should make survey to get ideas from staffs when selecting smart phone.

## Result of project

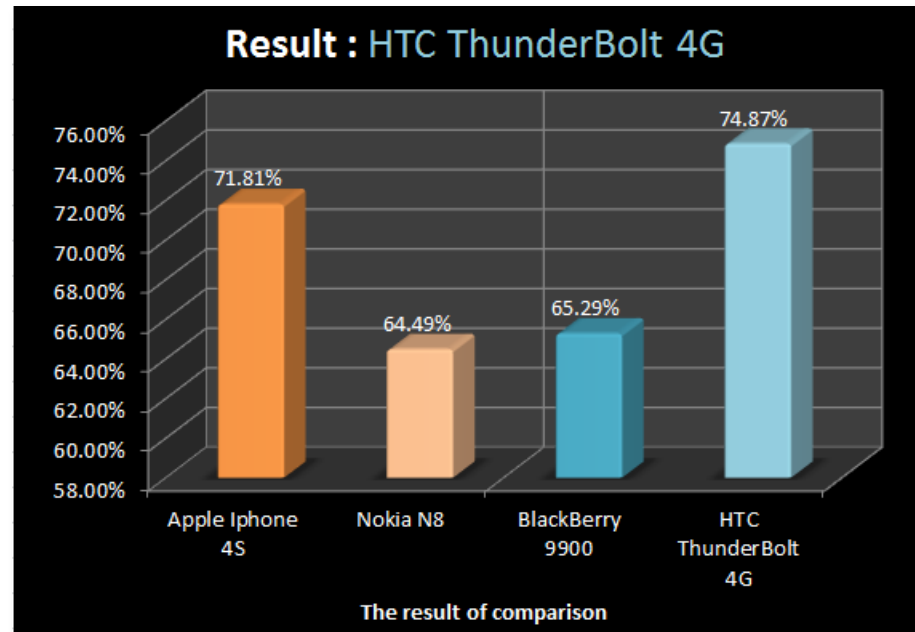


Figure 3: HTC Thunderbolt 4G will be selected

**Recommended Phones:** These four smartphone types in this comparison is the result after doing survey from all staffs in company.

After executing the project plan (see [Appendix C](#)) and doing WSM (see [Appendix A](#) Appendix A), HTC Thunderbolt 4G is the result of Smart Phone Selection Project.



HTC Thunderbolt 4G is the best choice because:

- ✓ It met requirement of functionality
- ✓ The total cost of ownership is the best.
  - Cheap cost for upgrading software and easy to upgrade
    - ✓ The HTC Thunderbolt 4G use Android OS, which is the most popular smart phone OS.
    - ✓ The software market is the biggest
    - ✓ Free trend of software development
  - Cheap cost for upgrading hardware
    - ✓ Price of hardware peripheral is cheap

## Appendix A-Spread sheet Model

### Weighted Scoring Model (WSM)

Requirement	Factor	Criteria	Description
Hardware requirement	Design	Phone Style	The phone needs a nice design, easy to use with many colours type to chose
		Display Revolution	The revolution should be a high level
		Screen size	The screen size should be between 3-4 inches
		Weight	the phone should not weighted
		Height	The phone should not too high
	Multimedia	Camera	The camera should have a good quality , it

			is about 5MP or above
		Video recorder & Quality	The phone has to support video recorder with good quality
		Email	The phone has to support using email
		Digital Player	The phone should support digital player
		Sound Quality	the phone must have good quality
	Call Features & Quality	3 way calling	The phone has can converse between the cell phone user and two other parties
		Cold holder	The phone can place a call on hold without losing the connection.
		Signal capturing	the ability of capturing the signal from signal service provider
	Battery Life & Memory & Processor	Installed Memory	The phone should have at least 8Gb of Memory
		RAM	The phone should have at least 512Mb of Ram
		Extendable	The phone should have Extendable

		Memory	memory
		Standby Time	The phone should have a long standby time.
		Talk time	The phone should has long talk time
		Processor speed	The phone has to have a strong processor, it is about 1Ghz
	Connectivity	Wifi	The phone has to support Wifi
		GPRS	The phone has to support GPRS
		4G	The phone has to support 3G,4G
		Bluetooth	The phone should support Bluetooth
		EDGE	The phone should support EDGE
	Software requirement	Software & Applications	free software market
		commercial software market	The phone should be developed in most popular software market
		Office softwares	The phone support many office softwares
		Internet browser	The phone has to support internet browser
		Total Cost of	Additional Cost
			Additional cost includes : Guarantee cost, Upgrade Software cost, Upgrade Hardware

	Ownership		cost
		One-Time Cost	The cost which has to pay only one time. For example : Purchase cost
		Monthly Cost	Cost to maintain phone in a month

Table 1: describes all Factors and Criteria

**Notes:** Smart phones Information is used to support for WSM (see [References](#))

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1																	
2																	
3																	
4																	
5																	
6																	
7	Smartphones Selection Project																
8	Factor	Criteria															
9	Design		7	Weight													
10		Phone Style	9														
11		Display Resolution	8														
12		Screen Size	9														
13		Weight	6														
14		Height	5														
15																	
16	Multimedia		8														
17		Camera	7														
18		Video recorder & Quality	6														
19		Email	9														
20		Digital Player	5														
21		Sound Quality	7														
22																	
23	Call Features & Quality		9														
24		3 way calling	5														
25		Cold holder	6														

Figure 4: Details of spread sheet model for WSM – part 1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
26		Signal capturing	9		8	72		8	72		7	63		9	81		90
27						128	64%		111	56%		113	57%		137	69%	200
28	Battery Life & Memory & Processor	9															
29		Installed Memory	7		8	56		5	35		7	49		7	49		70
30		RAM	8		8	64		5	40		8	64		8	64		80
31		Extendable memory	8		4	32		4	32		4	32		4	32		80
32		Standby Time	9		7	63		6	54		5	45		8	72		90
33		Talk time	8		7	56		6	48		6	48		7	56		80
34		Processor speed	9		8	72		7	63		8	72		8	72		90
35						343	70%		272	56%		310	63%		345	70%	490
36	Connectivity	9															
37		Wifi	8		8	64		8	64		8	64		9	72		80
38		GPS	9		8	72		6	54		7	63		7	63		90
39		4G	8		7	56		7	56		6	48		6	48		80
40		Bluetooth	5		6	30		7	35		7	35		9	45		50
41		EDGE	4		8	32		6	24		6	24		8	32		40
42						254	75%		233	69%		234	69%		260	76%	340
43	Software & Applications	9															
44		free software market	8		6	48		5	40		6	48		9	72		80
45		commercial software market	5		8	40		6	30		5	25		8	40		50
46		Office softwares	8		8	64		7	56		7	56		8	64		80
47		Internet browser	9		9	81		8	72		8	72		8	72		90
48						233	78%		198	66%		201	67%		248	83%	300

Figure 5: Details of spread sheet model for WSM – part 2

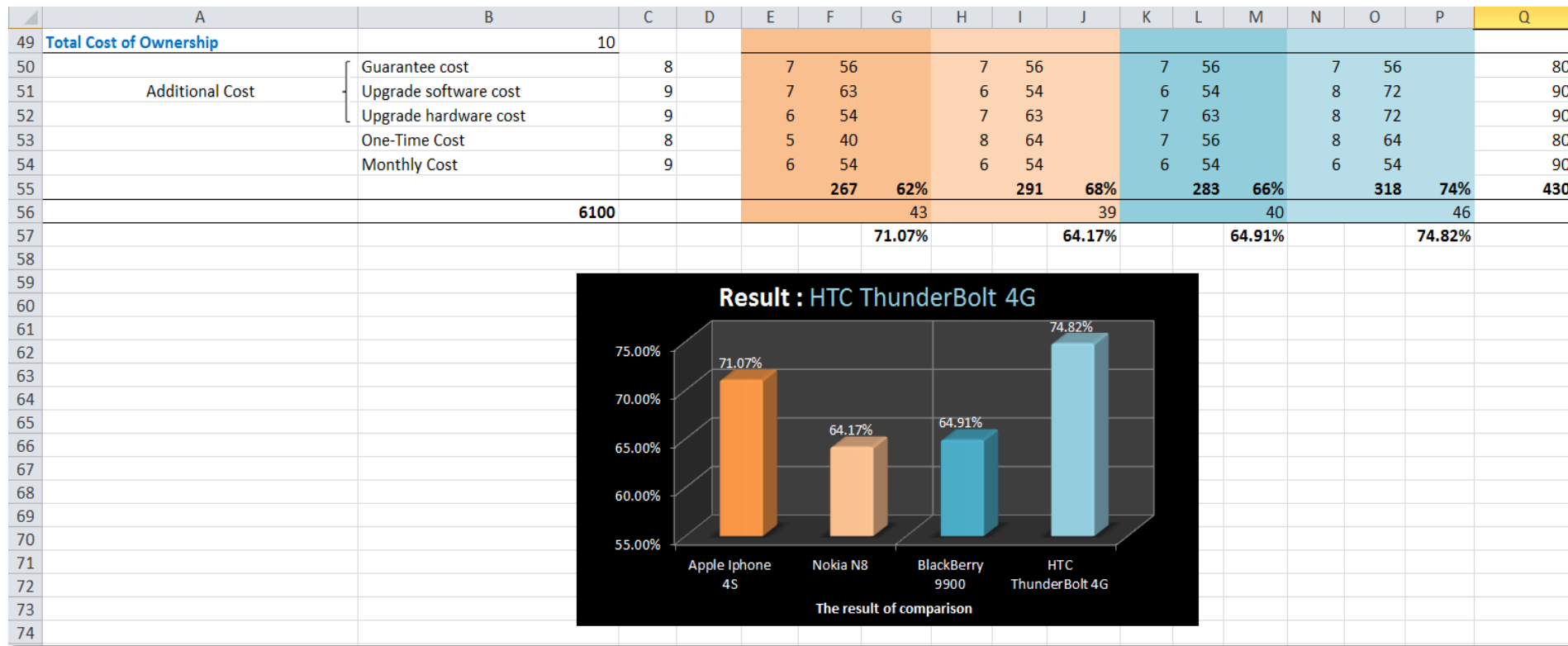


Figure 6: Details of spread sheet model for WSM – part 3

	A	B	C	D	E	F
1	<b>Total Cost of Ownership</b>	<b>without Additional Cost (1-year term)</b>				
2	One-Time Cost		Apple iPhone 4s	Nokia N8	BlackBerry 9900	HTC ThunderBolt 4G
3		Purchase price(Discounted)	\$680	\$371.00	\$604.98	\$440
4		Shipping	\$10	\$10	\$10	\$10
5		Tax	\$68	\$37	\$60	\$44
6			\$758	\$418	\$675	\$494
7	Monthly Cost					
8		Unlimited Internet Service	\$15	\$15	\$15	\$15
9		Talk	\$50	\$50	\$50	\$50
10		SMS message	\$10	\$10	\$10	\$10
11			\$75	\$75	\$75	\$75
12			\$900	\$900	\$900	\$900
13						
14			\$1,658	\$1,318	\$1,575	\$1,394
15						

Figure 7: TCO in one year term calculation (without Additional Cost)

In the TCO above, the project manager don't put Additional Cost because it is very difficult to calculate exactly. So, the Project manager wants to analyse Additional Cost in order to determine the final smart phone to buy.

If we look at TCO above, it is not really true if we select a smart phone right now, because the total prices are nearly the same.

- Additional Cost Analysis

Additional Cost is a part of Total Cost of Ownership, it includes: Guarantee cost, Hardware upgrade and Software upgrade.



Firstly, we focus on Guarantee Cost. Guarantee Cost depends on how often the smart phone breaks down, in other word; it is quality of the product. The Guarantee Cost also depends on the Guarantee price of the smart phone vendor. In fact, all vendors are providing very good services for customer. The quality of each smart phone here are also similar each other because all manufacturers have checked the quality for each product. Therefore, in this Guarantee Cost Criteria, we can assume that all smart phones are similar.

Secondly, we move to Hardware upgrade. We can see the price of iPhone 4 and BlackBerry are expensive. As a result, we can determine the level of cost when upgrading hardware peripheral for each smart phone. The most expensive is iPhone, then BlackBerry 9900, HTC Thunderbolt 4G and Nokia N8. But the different between HTC Thunderbolt 4G and Nokia N8 is very small.

Apple iPhone 4s	Nokia N8	BlackBerry 9900	HTC ThunderBolt 4G
\$680	\$371.00	\$604.98	\$440

Figure 8 Price of each Smart Phone

Finally, we will analyse the Software Upgrade criteria. Each type of smart phone here uses a different Operating System. Each of OS has particular software market of its own.

We should research the application market for each type of smart phone in order to know what the best software market is.

The software market relates to Software Upgrading of smart phone in the future. When upgrading software, we want the software market is big, especially for free software.

Apple iPhone 4S	Nokia N8	Back Berry 9900	HT Thunderbolt 4G
iOS	Symbian	BlackBerry 6 OS	Android

Figure 9: OS of each Smart Phone

As we can see the figure 10, the Android OS is most popular OS for smartphone.

There are many manufacturers combine their smart phone products with Android OS.

The android software market is free trend. It is very good.

After Android that is Symbian OS, Apple iOS.BlackBerry6 OS has very small market.

Now, we will research the free software market for each smart phone.

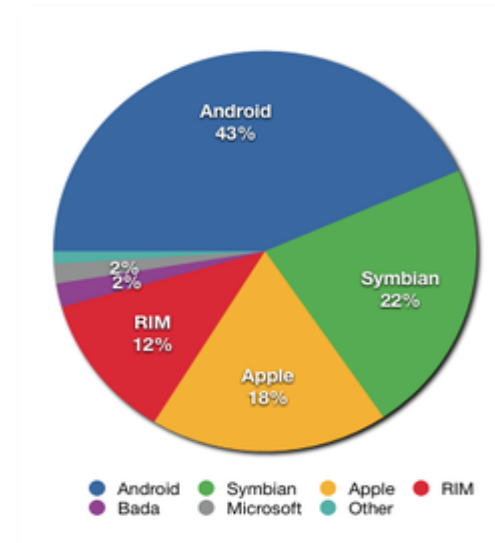


Figure 10: Smart Phone OS Market Share  
(Wikipedia 2011)

Application Store	Percent Free Applications
Android Market (HTC Thunderbolt 4G)	67%
BlackBerry App World( BlackBerry 9900)	26%
Nokia Ovi Store (Nokia N8)	26%
Apple App Store(iPhone 4S)	37%

Table 2: Comparison free software market for each OS (Wikipedia, 2011)

As we can see in the table, the free software market of Android is also the biggest market.

This one is the profit of Android software market. If we want to upgrade software of smart phone, the cost will be reduced.

**Total Cost of Ownership conclusion**

Now, we can summarise for Total Cost of Ownership. The TCO for **HTC Thunderbolt 4G** is the best. We decide base on One-Time Cost, Monthly Cost, and Additional Cost. Four types of smartphone have One-Time-Cost and Monthly Cost similar. But HTC Thunderbolt 4G Additional Cost is the best.

**Test Requirement**

This WSM spread sheet model has some requirements

Code	Requirement Name	Description
1	<b>Name:</b> Cell validation, with appropriate instructions and error messages	This requirement applies for columns : <b>B,C,E,H,K,N</b> where the cell value can change by input value .the input value must be a whole number which is between 1 and 10  When user begin editing cell, show information about cell
2	Cell formatting	Many cell need to be formatted (Colour, border...);
3	Cell calculation	Values in some columns must be calculated from other columns or cells by following the WSM rule.
4	Automatic graphs	A graph is used to show comparison between four total score of each smartphone.
5	Cell protection with sheet password = “Q”	Some columns are editable by putting value (B, C, E, H, K, and N). Others are not editable because they are calculation column

<b>6</b>	Comments	Some cells has comment

### Test Plan

This is test plan to check the WSM spread sheet meets the requirements or not.

Code	Requirement Name	Test case		Expect result
		Case number	Description	
1	Cell validation, with appropriate instructions and error messages	1	Input Value >10	Show error
		2	Input value <1	Show error
		3	When user begin editing cell	Show information about cell
		4	Input text value	Show error
		5	Input float value	Show error

Code	Requirement Name	Test case		Expect result
		Case number	Description	
2	Cell formatting	1	Check if The WSM contains at least one cell formatted	The WSM contains at least one cell formatted

Code	Requirement Name	Test case		Expect result
		Case Number	Description	
3	Cell calculation (Check expression)	1	Input value in two or more parameter cells, then check the value in target calculation cell is true or not by following calculation rule of WSM	Value in target calculation cell is true

Code	Requirement Name	Test case		Expect result
		Case Number	Description	
4	Automatic graphs	1	<p>Check if WSM spread sheet has an Automatic graphs.</p> <p>The graph show total score in percentage of each smartphone to compare</p>	The WSM spread sheet has an Automatic graphs show comparison between four smartphone

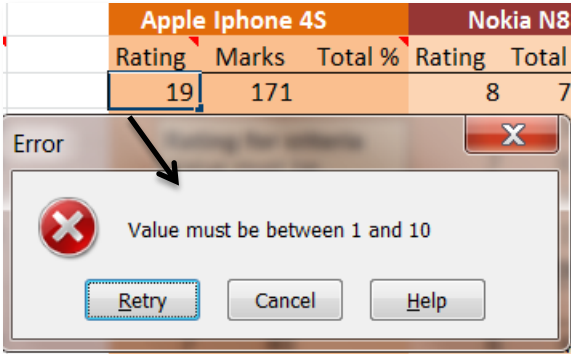
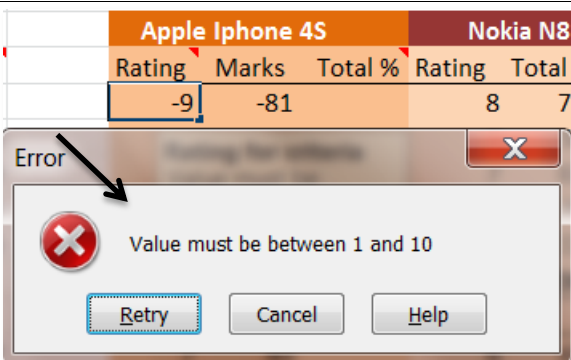
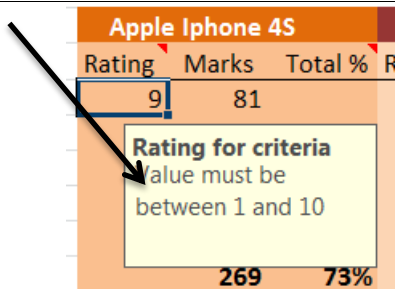
Code	Requirement Name	Test case		Expect result
		Case Number	Description	
5	Cell protection with sheet password = "Q"	1	Try to edit some non-editable cell or columns	Cannot edit
		2	Check password to unprotect sheet equal "Q"	The "Q" character is the password

Code	Requirement Name	Test case		Expect result
		Case Number	Description	
6	Comments	1	Check if the WSM spread sheet has at least one comment	The WSM sheet contains at least one comment

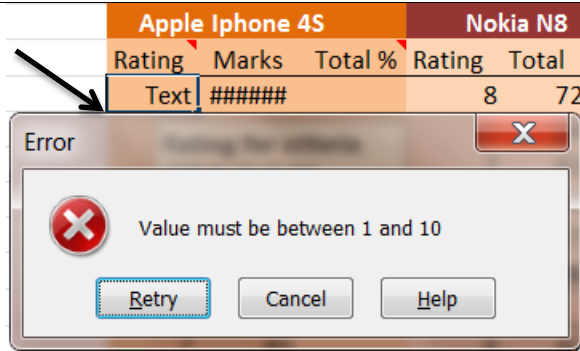
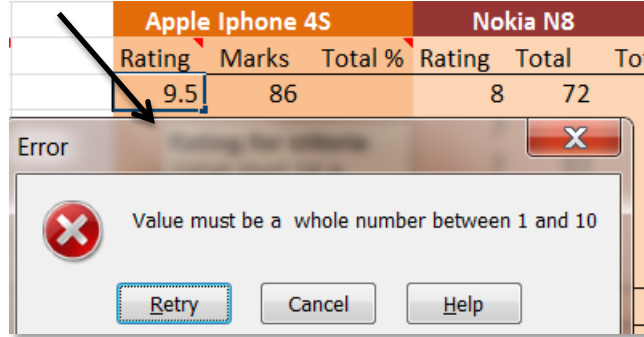
### Test log

This test log checks result for the test plan, proves the WSM has met requirement.

Code	Requirement Name	Test case		Status
		Case number	Test result	

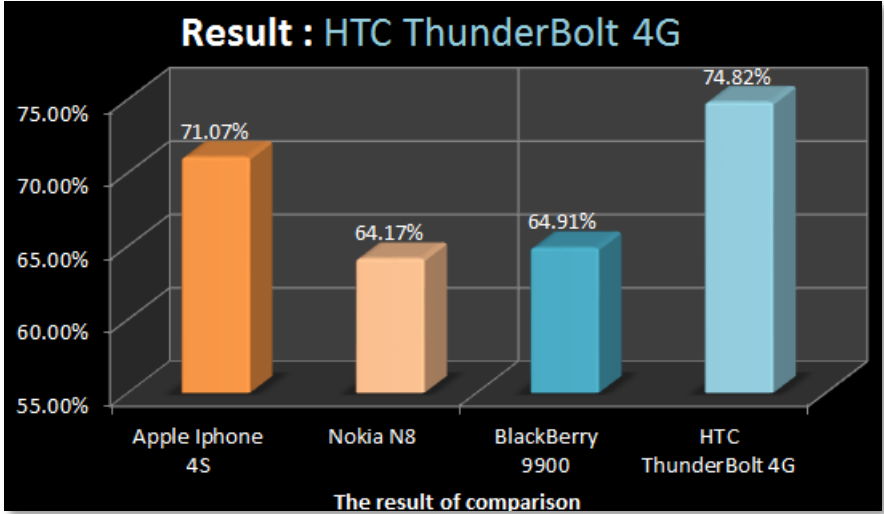
1	Cell validation, with appropriate instructions and error messages	1		OK
		2		OK
		3		OK



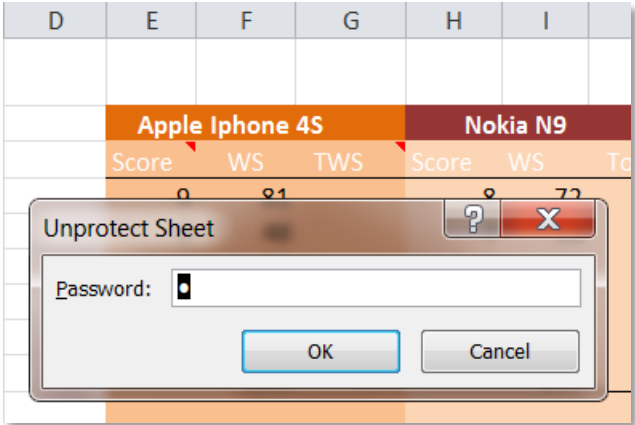
		4	 <p>Apple iPhone 4S      Nokia N8</p> <table><tr><th>Rating</th><th>Marks</th><th>Total %</th><th>Rating</th><th>Total</th></tr><tr><td>Text: #####</td><td></td><td></td><td>8</td><td>72</td></tr></table> <p>Error: Value must be between 1 and 10</p>	Rating	Marks	Total %	Rating	Total	Text: #####			8	72	OK		
Rating	Marks	Total %	Rating	Total												
Text: #####			8	72												
		5	 <p>Apple iPhone 4S      Nokia N8</p> <table><tr><th>Rating</th><th>Marks</th><th>Total %</th><th>Rating</th><th>Total</th><th>Tot</th></tr><tr><td>9.5</td><td>86</td><td></td><td>8</td><td>72</td><td></td></tr></table> <p>Error: Value must be a whole number between 1 and 10</p>	Rating	Marks	Total %	Rating	Total	Tot	9.5	86		8	72		OK
Rating	Marks	Total %	Rating	Total	Tot											
9.5	86		8	72												

Code	Requirement Name	Test case						Status																																																	
		Case number	Test result																																																						
2	Cell formatting	1	<table><tr><th colspan="3">Apple Iphone 4S</th><th colspan="3">Nokia N8</th></tr><tr><th>Rating</th><th>Marks</th><th>Total %</th><th>Rating</th><th>Total</th><th>Total %</th></tr><tr><td>9</td><td>81</td><td></td><td>8</td><td>72</td><td></td></tr><tr><td>6</td><td>48</td><td></td><td>7</td><td>56</td><td></td></tr><tr><td>9</td><td>81</td><td></td><td>7</td><td>63</td><td></td></tr><tr><td>4</td><td>24</td><td></td><td>5</td><td>30</td><td></td></tr><tr><td>7</td><td>35</td><td></td><td>3</td><td>15</td><td></td></tr><tr><td colspan="2">269</td><td>73%</td><td colspan="2">236</td><td>64%</td></tr></table>						Apple Iphone 4S			Nokia N8			Rating	Marks	Total %	Rating	Total	Total %	9	81		8	72		6	48		7	56		9	81		7	63		4	24		5	30		7	35		3	15		269		73%	236		64%	OK
Apple Iphone 4S			Nokia N8																																																						
Rating	Marks	Total %	Rating	Total	Total %																																																				
9	81		8	72																																																					
6	48		7	56																																																					
9	81		7	63																																																					
4	24		5	30																																																					
7	35		3	15																																																					
269		73%	236		64%																																																				
			Formatted cell with color, border																																																						

[illegible]

Code	Requirement Name	Test case		Status
		Case Number	Test Result	
4	Automatic graphs	1	 <p>The result of comparison</p> <p>Graph shows comparison between four smartphone types</p>	OK

To create Auto Graph, just select a series of data by selecting some Cell, then go to tab Insert => select any type of Graph.

Code	Requirement Name	Test case		Status
		Case Number	Test Result	
5	Cell protection with sheet password = "Q"	1	Cannot edit calculation cells	OK
		2		OK

Steps to do Cell Protection:

1. Select whole Sheet by pressing Ctrl+Shift+A

2. Right Click -> Format Cells-> Protection Tab => UnCheck Locked

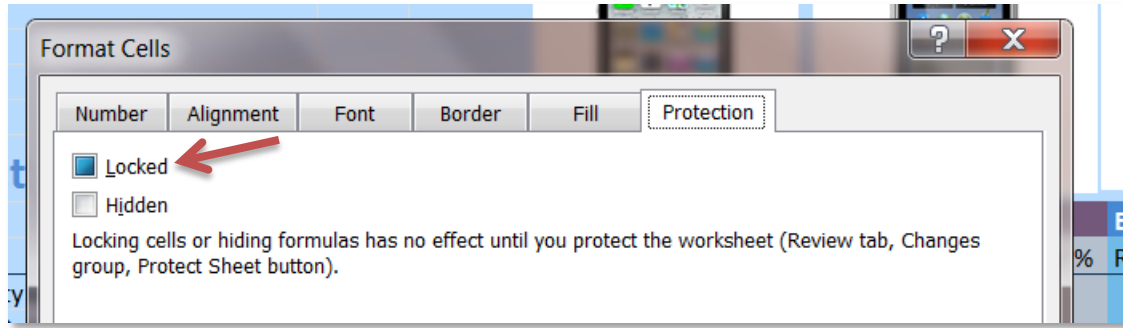


Figure 11: Cell Protection

3. Select any Cell which will be locked, then Right Click=>Format Cell=>Protection Tab=> Check Locked
4. Finally, go to table Review=> Protect Sheet=>, enter Password and Confirm Password, then click OK.

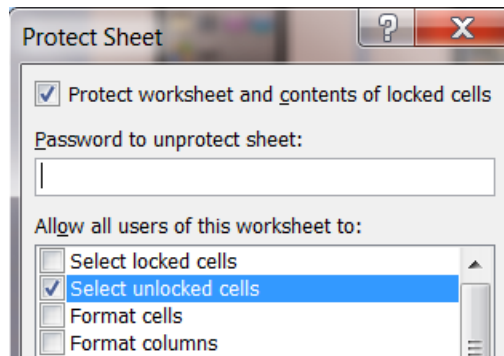
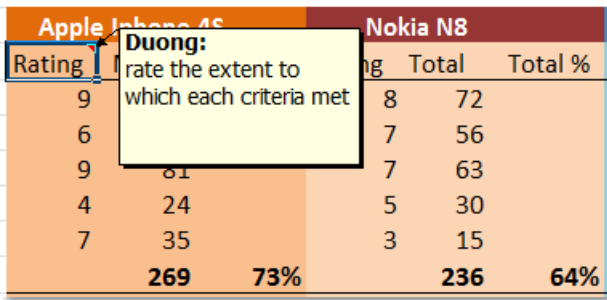


Figure 12: Cell projection

Code	Requirement Name	Test case		Status
		Case Number	Description	
6	Comments	1	 <p>Figure 13: Comment</p>	OK

To create cell comment, select a Cell, Right Click => Insert Comment

## Appendix B- Presentation



Figure 14: Slide 1



## CURRENT PROBLEM

- Difficult to manage
- Not constant contact between Staffs and Head Office

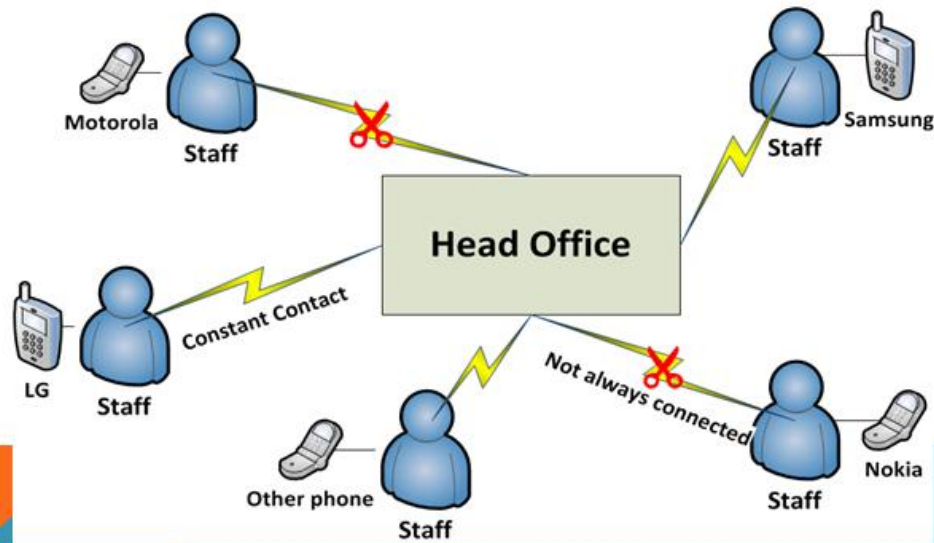


Figure 15: Slide 2

## PROBLEM SOLVING

- ~~Difficult to manage~~ Easy to manage, Synchronization
- ~~Not constant contact between Staffs and Head Office~~ Constant Contact

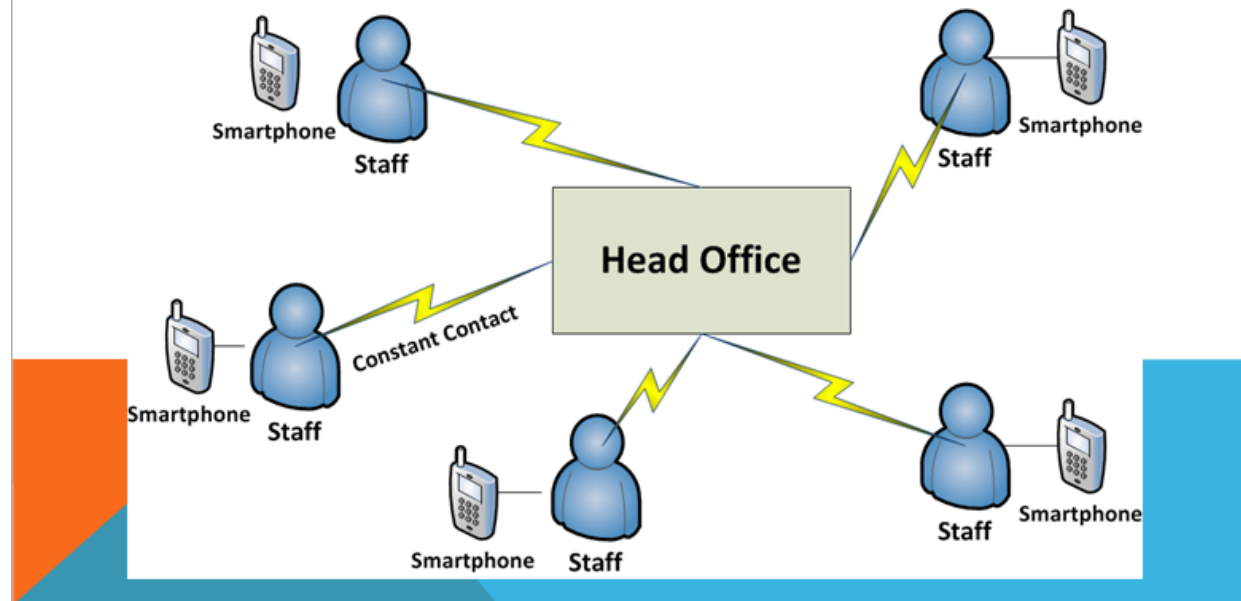


Figure 16: Slide 3

## PROJECT STRATEGY

**What must be achieved in the project?**

- Smartphone meets requirement of functionality
- Smartphone is best for finance

**How to achieve?**

- Weighted Scoring Model
- Total Cost of Ownership

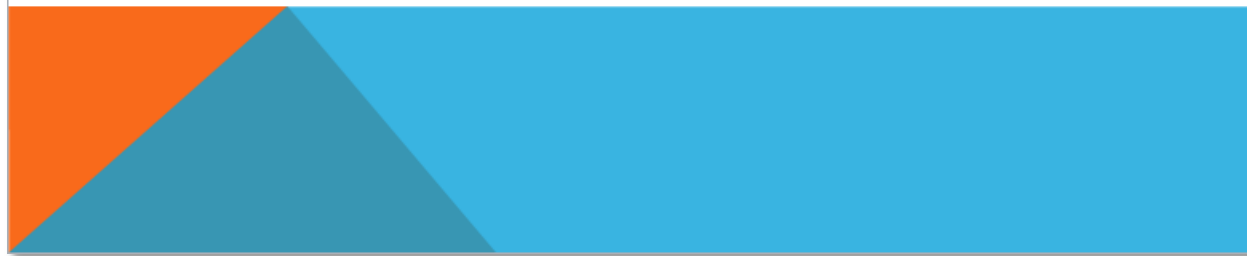


Figure 17: Slide 4

## EXECUTING PROJECT

**How does the Project Manager get four type of smart phone to make comparison?**

- Make survey from all staffs, sum up ideas !

**Why did he has to do that?**

- Because the staffs will directly use the smart phone.

**What are four smart phones?**



iPhone 4s



Nokia N8



Black Berry 9900



HTC Thunderbolt 4G

Figure 18: Slide 5

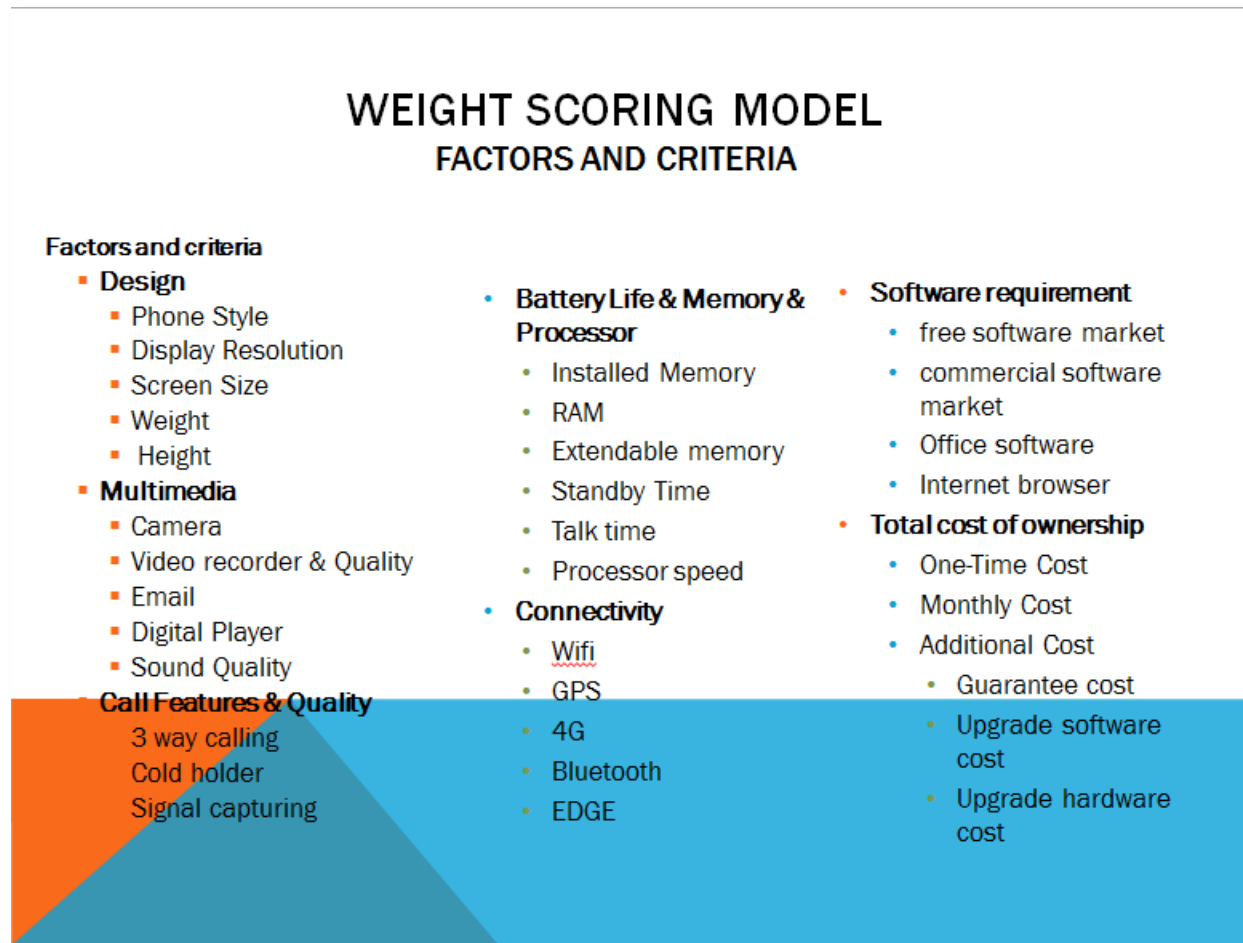


Figure 19: Slide 6

# WEIGHT SCORING MODEL MARKS

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1																	
2																	
3																	
4																	
5																	
6																	
7	Smartphones Selection Project																
8	Factor	Criteria															
9	Design		7	Weight													
10		Phone Style		9													
11		Display Resolution		8													
12		Screen Size		9													
13		Weight		6													
14		Height		5													
15																	
16	Multimedia		8														
17		Camera		7													
18		Video recorder & Quality		6													
19		Email		9													
20		Digital Player		5													
21		Sound Quality		7													
22																	
23	Call Features & Quality		9														
24		3 way calling		5													
25		Cold holder		6													

Figure 20: Slide 7

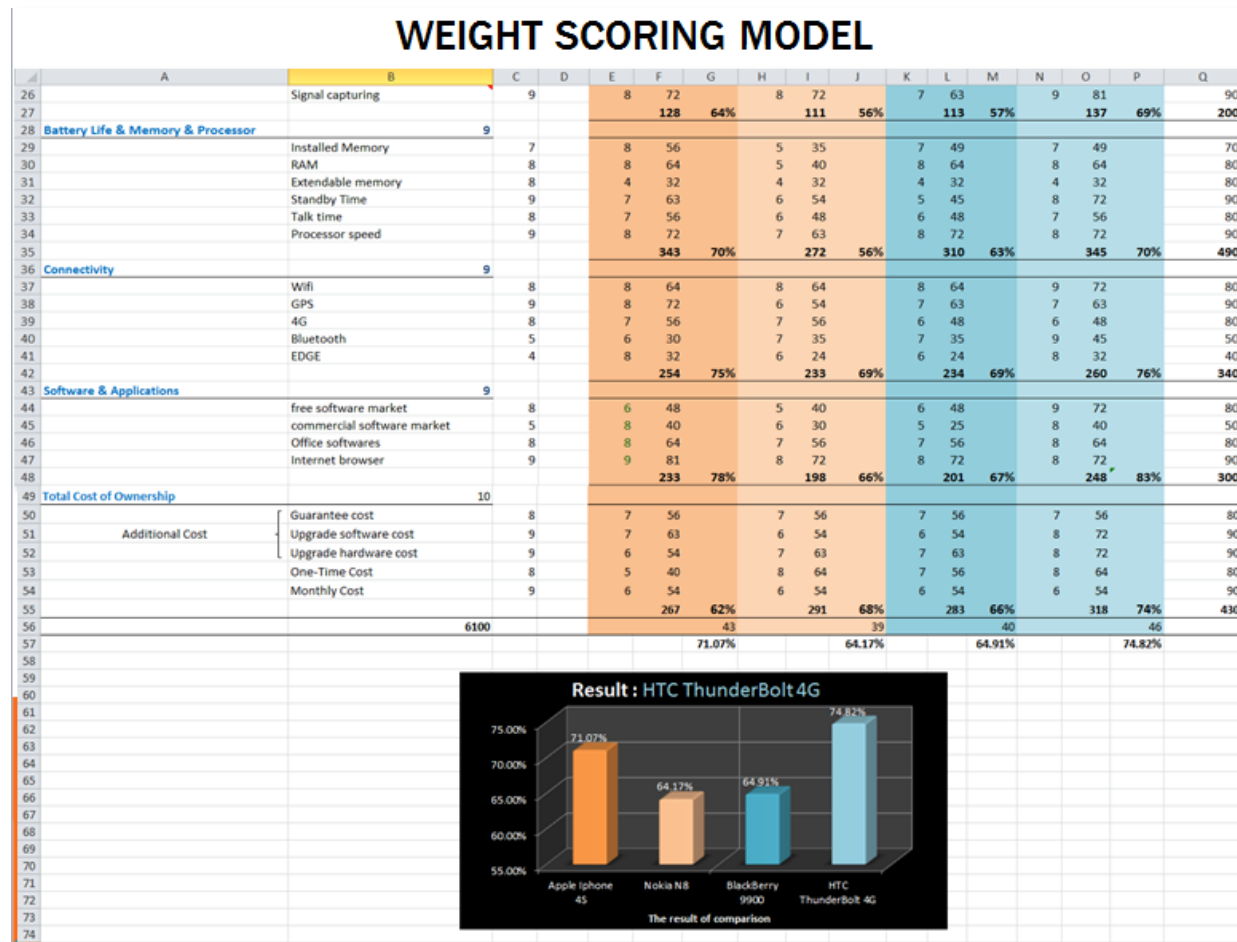


Figure 21: Slide 8

## FINAL RESULT

### Why the project manager selected HTC Thunderbolt 4G?

- ✓ It met requirement of functionality
- ✓ The total cost of ownership is the best.
  - Cheap cost for upgrading software and easy to upgrade
    - The HTC Thunderbolt 4G use Android OS, which is the most popular smart phone OS.
    - The software market is the biggest
    - Free trend of software development
  - Cheap cost for upgrading hardware
    - Price of hardware peripheral is cheap



Figure 22: Slide 9



Thank you !

Figure 23: Slide 10

## Appendix C- WBS

### Project Roles & Responsibilities

Project team has five members. This following table describes roles and responsibilities.

Name	Roles	Responsibilities
Manager	Manager of project	Project manager is the person who makes project plan, manages scope of project, and assigns work for team members and lead team members. He/she also has to do some important works.
Member 1	Team Member	Member 1 is a Team member who executes some tasks
Member 2	Team Member	Member 2 is a Team member who executes some tasks
Member 3	Team Member	Member 3 is a Team member who executes some tasks
Member 4	Team Member	Member 4 is a Team member who executes some tasks

### Work Breakdown Structure Dictionary

This WBS Dictionary describes work details for items which are not clearly.

WBS Item Number	WBS Item Name	Description
3	Identify Problems	The Manager has to identify all existent problems in company.
4	Identify stakeholders	Stakeholders are very important. The Manager must identify stakeholders related to project then ask them all necessary question before starting project
5	Stakeholder Expectations	The manager gets all expectations of stakeholders
6	Create Project Team	Project Manager decides how many resources in order to finish the project, and then make a project team.
7	Kick-off meeting	Project team discuss together. The manager tells all problems to team members
9	Requirement for selection	In the first time of project, Project Manager has to define requirement to do selecting of smartphone type.

		<p>The requirement includes of software requirement (WBS Item 10), hardware requirement (WBS Item 11) for the smartphone.</p> <p>The smartphone has to meet needs of company for functionality.</p> <p>Requirement are define in Weight Scoring Model</p>
10	Hardware requirement	This task is subtask of <i>WBS Item Summary 9</i> , the manager has to define all requirements for hardware of smartphone.
11	Software requirement	This task is subtask of <i>WBS Item Summary 9</i> , the manager has to define all requirements for software of smartphone.
12	Write requirement documentation	After define requirement for smartphone, Project Manager has to write documentation for details of requirement. This document will be sent to all staffs in company to get all ideas. Because the project is smartphone selection and staff will use this selected smartphone. So, Project Manager makes sure that staffs want to use this phone

13	Sum up ideas of all staff	After writing requirement document, and sending it to all staff, the project manager has to sum up all staff ideas. After that, the manager will decide some type of smartphone to compare.
14	Get ideas of all staffs	In order to sum up ideas of staffs, the manager has to get all ideas from staffs. The manager can use Email or other ways, then send a document for all staffs.
16	Decide four types of smartphone	After sup up all ideas from staffs. The manager will decide four types of smartphone to make comparison in order to select one of them.
17	Write a test plan	The comparison between smartphones needs a clear plan. Each member of team can follow this plan to do the test for each smartphone. The manager will prepare for this test plan.
18	Write check list	The test plan also needs a Check List. Check list document will help the manager and team member manage, track test plan.
19	Check All Things	This is a milestone in project plan. The project team need time to summary what has been done and what will be done.
21	Buy four demo phones for	After deciding four types of smartphone, the

	testing function	manager will buy four demo phones for each type of smartphone in order to make comparison between them.
24	Do a Weighted Scoring Model	WSM is used to compare four smartphones type by defining Factors and Criteria. The project team will test four demo smartphone and mark them.  Finally, Manager calculates total mark for each smartphone. A smartphone type is selected if it has highest mark.
26	Test hardware	Project team has to test hardware of each smartphone. This is one of Factors in WSM.
27	Test software	Project team has to test software of each smartphone. This is one of Factors in WSM also.
28	Calculate the Total Cost of Ownership	Total Cost of Ownership is also one of factor in WSM.  TCO means all cost to maintains smartphone after buy them.
29	Research software market	The manager has to research the software market for each type of smartphone. For example: free software, commercial software. Because it relate to TCO of each smartphone

		type.
30	Research all related service	The manager has to research for all services for each type of smartphone. For example: Guarantee service. Because it also relate to TCO of each smartphone type.
31	Decide a smartphone type to buy	After doing WSM , the Manager decide a smartphone type to buy for all staff
32	Check All Things	This is the second milestone in project plan.
33	Buy completed smartphone package	After doing WSM and finally select a smartphone type. The project team will buy a completed smartphone package and implement for all staffs in company.
36	Testing and find mistake phones	<p>After receiving smartphone package, the project team has to test and find mistake phones.</p> <p>If there are any mistake smartphones, all of them will be changed by others by resending to the vendor.</p>
37	Deliver phone for each staff	Each staff in company will receive a smartphone to use. The project team will deliver to all of staffs

38	Training	The manager will write a training document and send to all staffs in company.
40	Report Performance	The project manager reports to the project steering committee what has been done in order to check if there is anything change or not
42	Documenting Lessons Learned	The project manager writes a summary for this project



## WBS Scenario

Task Name	Duration	Start	Finish
[-] Smartphone Selection Project	36 days	Fri 10/21/11	Fri 12/9/11
+ Initiating	5 days	Fri 10/21/11	Thu 10/27/11
+ Planning	7 days	Fri 10/28/11	Mon 11/7/11
+ Executing	22 days	Tue 11/8/11	Wed 12/7/11
+ Monitoring and Controlling	1 day	Thu 12/8/11	Thu 12/8/11
+ Closing	1 day	Fri 12/9/11	Fri 12/9/11

Figure 24: WBS Scenario

The project plan schedule includes five common phases of all projects. The project manager use Top-Down approach to develop the project plan.

In project plan, we can view the description for each task by enable **Indicator Column** and view **Notes** like figure 12.











		Task Name	Duration
1		[-] Smartphone Selection Project	36 days
2		[-] Initiating	5 days
3		Identify Problems	1 day
4		Identify Stakeholders	2 days
5		Identify Stakeholders	0.5 days
6		Identify Stakeholders	0.5 days
7		Identify Stakeholders	1 day
8		Identify Stakeholders	7 days
9		Identify Stakeholders	2 days
10		Identify Stakeholders	0.5 days
11		Identify Stakeholders	0.5 days
12		Write requirement documentation	1 day

Figure 25: Using Notes in Project

## WBS Details



















		Task Name	Duration	Start	Finish	Predecessor	Resource Names
1		<b>Smartphone Selection Project</b>	<b>36 days</b>	<b>Fri 10/21/11</b>	<b>Fri 12/9/11</b>		
2		<b>Initiating</b>	<b>5 days</b>	<b>Fri 10/21/11</b>	<b>Thu 10/27/11</b>		
3		Identify Problems	1 day	Fri 10/21/11	Fri 10/21/11		Manager
4		Identify Stakeholders	2 days	Mon 10/24/11	Tue 10/25/11	3	Manager
5		Stakeholder Expectations	0.5 days	Wed 10/26/11	Wed 10/26/11	4	Manager
6		Create Project Team	0.5 days	Wed 10/26/11	Wed 10/26/11	5	Manager
7		Kick-off meeting	1 day	Thu 10/27/11	Thu 10/27/11	6	Manager
8		<b>Planning</b>	<b>7 days</b>	<b>Fri 10/28/11</b>	<b>Mon 11/7/11</b>		
9		<b>Requirement for selection</b>	<b>2 days</b>	<b>Fri 10/28/11</b>	<b>Mon 10/31/11</b>		
10		Software requirement	0.5 days	Fri 10/28/11	Fri 10/28/11	7	Manager
11		Hardware requirement	0.5 days	Fri 10/28/11	Fri 10/28/11	10	Manager
12		Write requirement documentation	1 day	Mon 10/31/11	Mon 10/31/11	11	Manager
13		<b>Sum up ideas of all Staffs</b>	<b>3 days</b>	<b>Tue 11/1/11</b>	<b>Thu 11/3/11</b>		
14		Get ideas of all staffs	1 day	Tue 11/1/11	Tue 11/1/11	12	Manager
15		Manager sum up all ideas	2 days	Wed 11/2/11	Thu 11/3/11	14	Manager
16		Decide four types of smartphone	1 day	Fri 11/4/11	Fri 11/4/11	15	Manager
17		Write a test plan	0.5 days	Mon 11/7/11	Mon 11/7/11	16	Manager
18		Write check list	0.5 days	Mon 11/7/11	Mon 11/7/11	17	Manager
19		Check All Things	0 days	Mon 11/7/11	Mon 11/7/11	18	
20		<b>Executing</b>	<b>22 days</b>	<b>Tue 11/8/11</b>	<b>Wed 12/7/11</b>		
21		<b>Buy four demo phones for testing function</b>	<b>1 day</b>	<b>Tue 11/8/11</b>	<b>Tue 11/8/11</b>		
22		Order demo smartphones from vendor	0.5 days	Tue 11/8/11	Tue 11/8/11	18	Member 1

Figure 26: WBS Details part 1

	i	Task Name	Duration	Start	Finish	Predecessor	Resource Names
23		Wait for shipping	0.5 days	Tue 11/8/11	Tue 11/8/11	22	
24		Do a Weighted Scoring Model	8 days	Wed 11/9/11	Fri 11/18/11		
25		Testing Functions of phones	8 days	Wed 11/9/11	Fri 11/18/11		
26		Test hardware	8 days	Wed 11/9/11	Fri 11/18/11	23	Member 4,Member 1,Member 2,Member 3
27		Test software	5 days	Wed 11/9/11	Tue 11/15/11	23	Member 1,Member 2,Member 3,Member 4
28		Calculate the Total Cost of Ownership	5 days	Wed 11/9/11	Tue 11/15/11		
29		Research software market	3 days	Wed 11/9/11	Fri 11/11/11	23	Manager
30		Research all related service	2 days	Mon 11/14/11	Tue 11/15/11	29	Manager
31		Decide a smartphone type to buy	1 day	Mon 11/21/11	Mon 11/21/11	24	Manager
32		Check all things	0 days	Mon 11/21/11	Mon 11/21/11	31	
33		Buy completed smartphone package	2.5 days	Tue 11/22/11	Thu 11/24/11		
34		Order from Vendor	1 day	Tue 11/22/11	Tue 11/22/11	31	Manager
35		Wait for shipping	1.5 days	Wed 11/23/11	Thu 11/24/11	34	
36		Testing and find mistake phones	6 days	Thu 11/24/11	Thu 12/1/11	33	Member 1,Member 2,Member 3,Member 4
37		Deliver phone for each staff	2 days	Fri 12/2/11	Mon 12/5/11	36	Manager,Member 1,Member 2,Member 3,Member 4
38		Training	2 days	Tue 12/6/11	Wed 12/7/11	37	Member 1,Member 2,Member 3,Member 4
39		Monitoring and Controlling	1 day	Thu 12/8/11	Thu 12/8/11		
40		Report Performance	1 day	Thu 12/8/11	Thu 12/8/11	38	Manager
41		Closing	1 day	Fri 12/9/11	Fri 12/9/11		
42		Documenting Lessons Learned	1 day	Fri 12/9/11	Fri 12/9/11	39	Manager

Figure 27: WBS Details part 1

## WBS Network Diagram

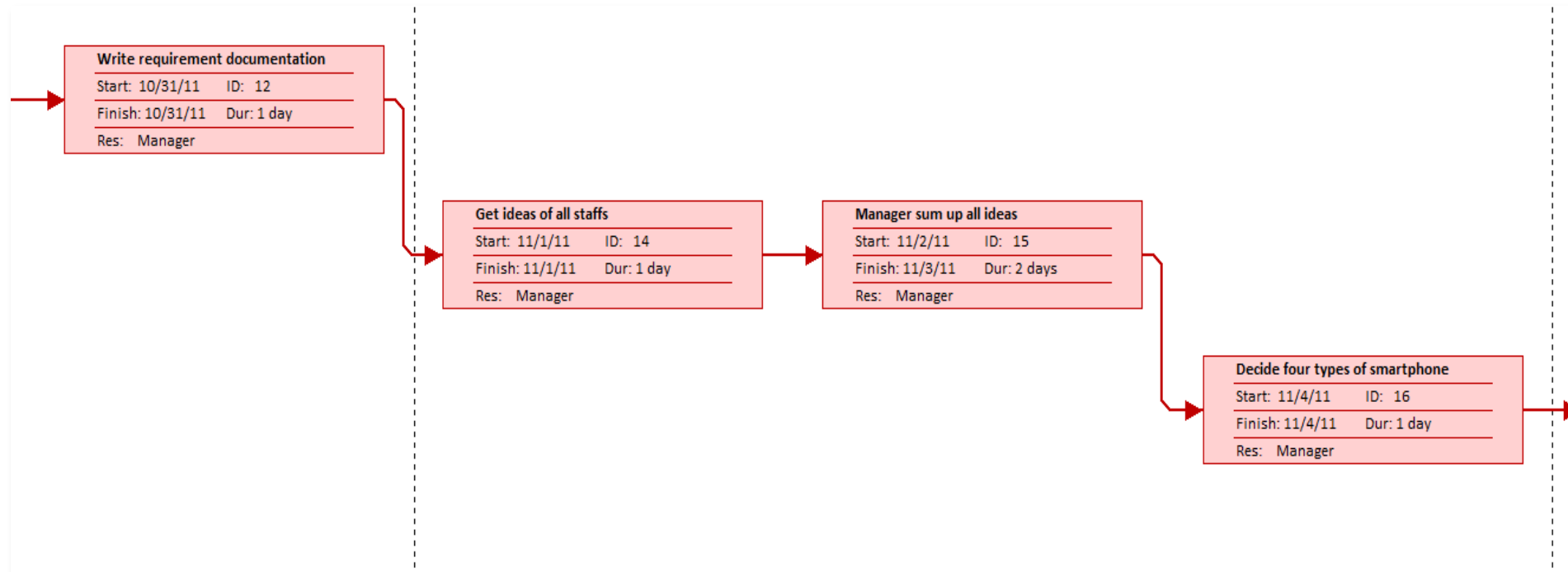


Figure 28: a part of Network Diagram

## WBS Critical Path

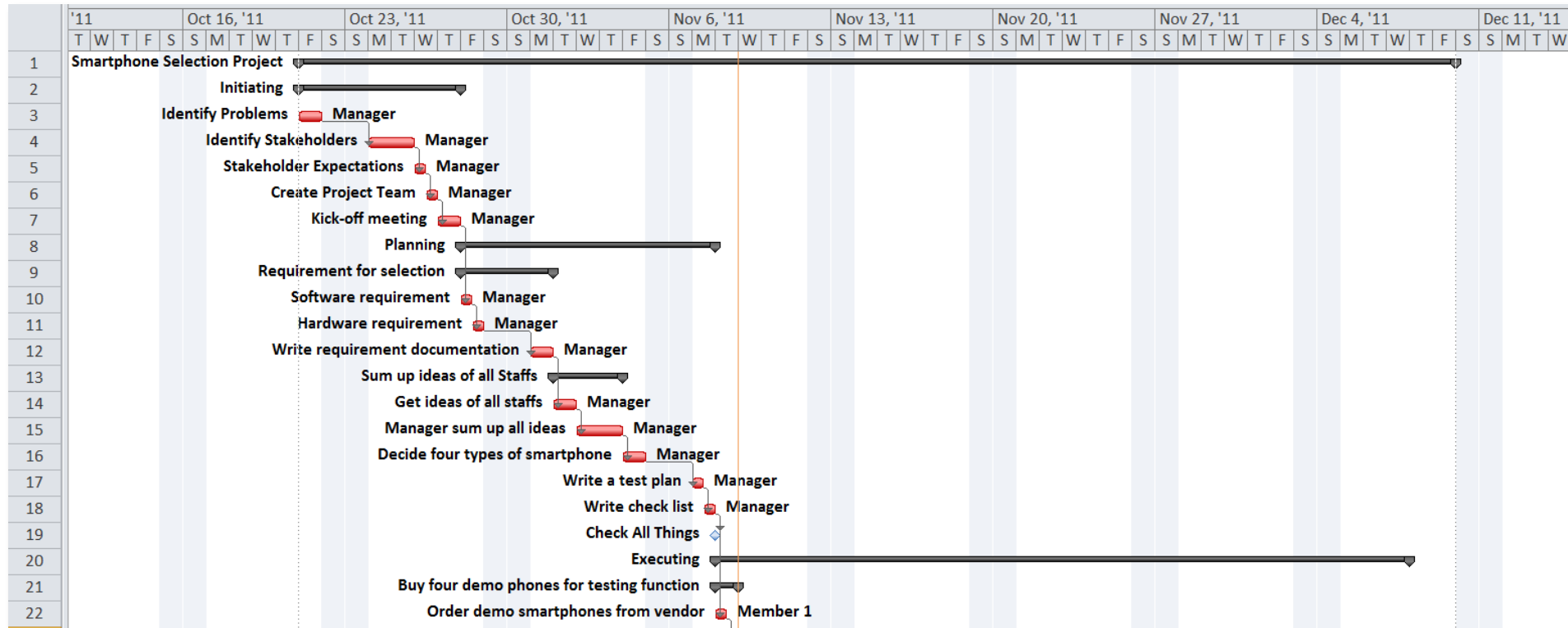


Figure 29: WBS Critical path part 1

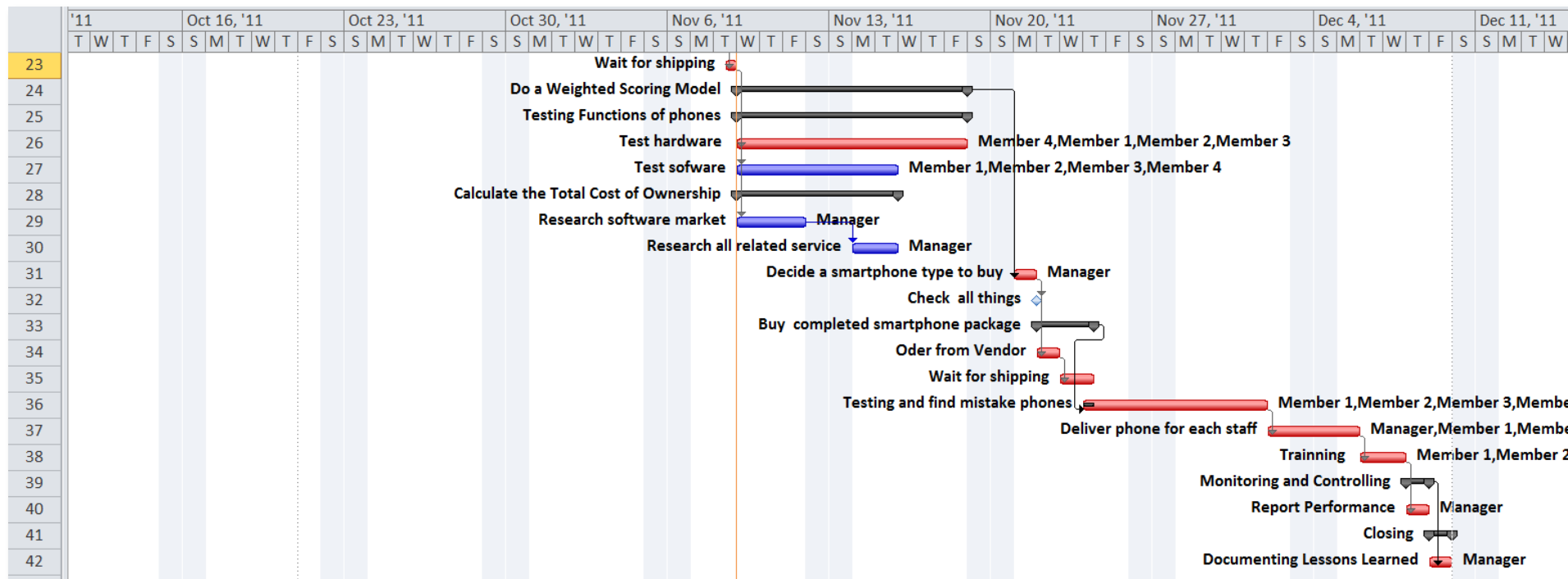


Figure 30: WBS Critical path part 2

### Project Resource Cost

In order to calculate cost for resource in project, we can use the **Bottom-Up Estimates** approach. We can estimate for each individual task cost, then summing them to get the project total cost.

In MS Project, we can easily to calculate cost. We just add Resource Cost and MS Project will calculate automatically.

Now, we assume that the cost of resource for each resource type as following:

Resource Type	Standard Cost	Over allocated Cost
Manager	\$10/hour	\$20/hour
Team member	\$8/hour	\$16/hour

In MS Project, select tab **Resource**=> **Resource Sheet**

We can see as the Figure 18. We can add resource cost for Manager and Team Member as the same way.

**Resource Information**

General **Costs** Notes Custom Fields

Resource Name: Manager

Cost rate tables

For rates, enter a value or a percentage increase or decrease from the previous rate.  
For instance, if a resource's Per Use Cost is reduced by 20%, type -20%.

A (Default)	B	C	D	E
		\$10.00/h		
	Effective Date	Standard Rate	Overtime Rate	Per Use Cost
	--	\$10.00/h	\$20.00/h	\$0.00

Cost accrual: Prorated

Help Details... OK Cancel

Figure 31: Add resource cost

	Task Name	Duration	Start	Finish	Cost
1	<b>Smartphone Selection Project</b>	<b>36 days</b>	<b>Fri 10/21/11</b>	<b>Fri 12/9/11</b>	<b>\$7,760.00</b>
2	+ Initiating	<b>5 days</b>	<b>Fri 10/21/11</b>	<b>Thu 10/27/11</b>	<b>\$400.00</b>
8	- Planning	<b>7 days</b>	<b>Fri 10/28/11</b>	<b>Mon 11/7/11</b>	<b>\$560.00</b>
9	+ Requirement for selection	<b>2 days</b>	<b>Fri 10/28/11</b>	<b>Mon 10/31/11</b>	<b>\$160.00</b>
13	+ Sum up ideas of all Staffs	<b>3 days</b>	<b>Tue 11/1/11</b>	<b>Thu 11/3/11</b>	<b>\$240.00</b>
16	Decide four types of smartphone	1 day	Fri 11/4/11	Fri 11/4/11	\$80.00
17	Write a test plan	0.5 days	Mon 11/7/11	Mon 11/7/11	\$40.00
18	Write check list	0.5 days	Mon 11/7/11	Mon 11/7/11	\$40.00
19	Check All Things	0 days	Mon 11/7/11	Mon 11/7/11	\$0.00
20	- Executing	<b>22 days</b>	<b>Tue 11/8/11</b>	<b>Wed 12/7/11</b>	<b>\$6,640.00</b>
21	+ Buy four demo phones for testing function	<b>1 day</b>	<b>Tue 11/8/11</b>	<b>Tue 11/8/11</b>	<b>\$32.00</b>
24	+ Do a Weighted Scoring Model	<b>8 days</b>	<b>Wed 11/9/11</b>	<b>Fri 11/18/11</b>	<b>\$3,728.00</b>
31	Decide a smartphone type to buy	1 day	Mon 11/21/11	Mon 11/21/11	\$80.00
32	Check all things	0 days	Mon 11/21/11	Mon 11/21/11	\$0.00
33	+ Buy completed smartphone package	<b>2.5 days</b>	<b>Tue 11/22/11</b>	<b>Thu 11/24/11</b>	<b>\$80.00</b>
36	Testing and find mistake phones	6 days	Thu 11/24/11	Thu 12/1/11	\$1,536.00
37	Deliver phone for each staff	2 days	Fri 12/2/11	Mon 12/5/11	\$672.00
38	Training	2 days	Tue 12/6/11	Wed 12/7/11	\$512.00
39	- Monitoring and Controlling	<b>1 day</b>	<b>Thu 12/8/11</b>	<b>Thu 12/8/11</b>	<b>\$80.00</b>
40	Report Performance	1 day	Thu 12/8/11	Thu 12/8/11	\$80.00
41	- Closing	<b>1 day</b>	<b>Fri 12/9/11</b>	<b>Fri 12/9/11</b>	<b>\$80.00</b>
42	Documenting Lessons Learned	1 day	Fri 12/9/11	Fri 12/9/11	\$80.00

Figure 32: Total project resource cost is \$7,760.00



## References

Smartphone Information: <http://smartphones.findthebest.com/compare/96-102-103-152/Nokia-N8-vs-HTC-ThunderBolt-4G-vs-BlackBerry-Bold-9900-vs-Apple-iPhone-4S>

Figure 10: Smart Phone OS Market Share (Wikipedia 2011): <http://en.wikipedia.org/wiki/Smartphone>

Table 2: Comparison free software market for each OS (Wikipedia, 2011): [http://en.wikipedia.org/wiki/Android\\_Market](http://en.wikipedia.org/wiki/Android_Market)