AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH
FACULTY OF SCIENCE AND TECHNOLOGY

Assignment Title:	FoodSavvy: A Digital Solution for Efficient Food Waste Management		
Assignment No:	Exercise-7,8,9	Date of Submission:	02 May, 2024
Course Title:	**Software Engineering**		
Course Code:	CSC 3112	Section:	I
Semester:	Spring 2023-24	**Course Teacher:**	**Tonny Shekha Kar**

* *Student(s) must complete all details except the faculty use part.*
** Please submit all assignments to your course teacher or the office of the concerned teacher.

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Faculty use only

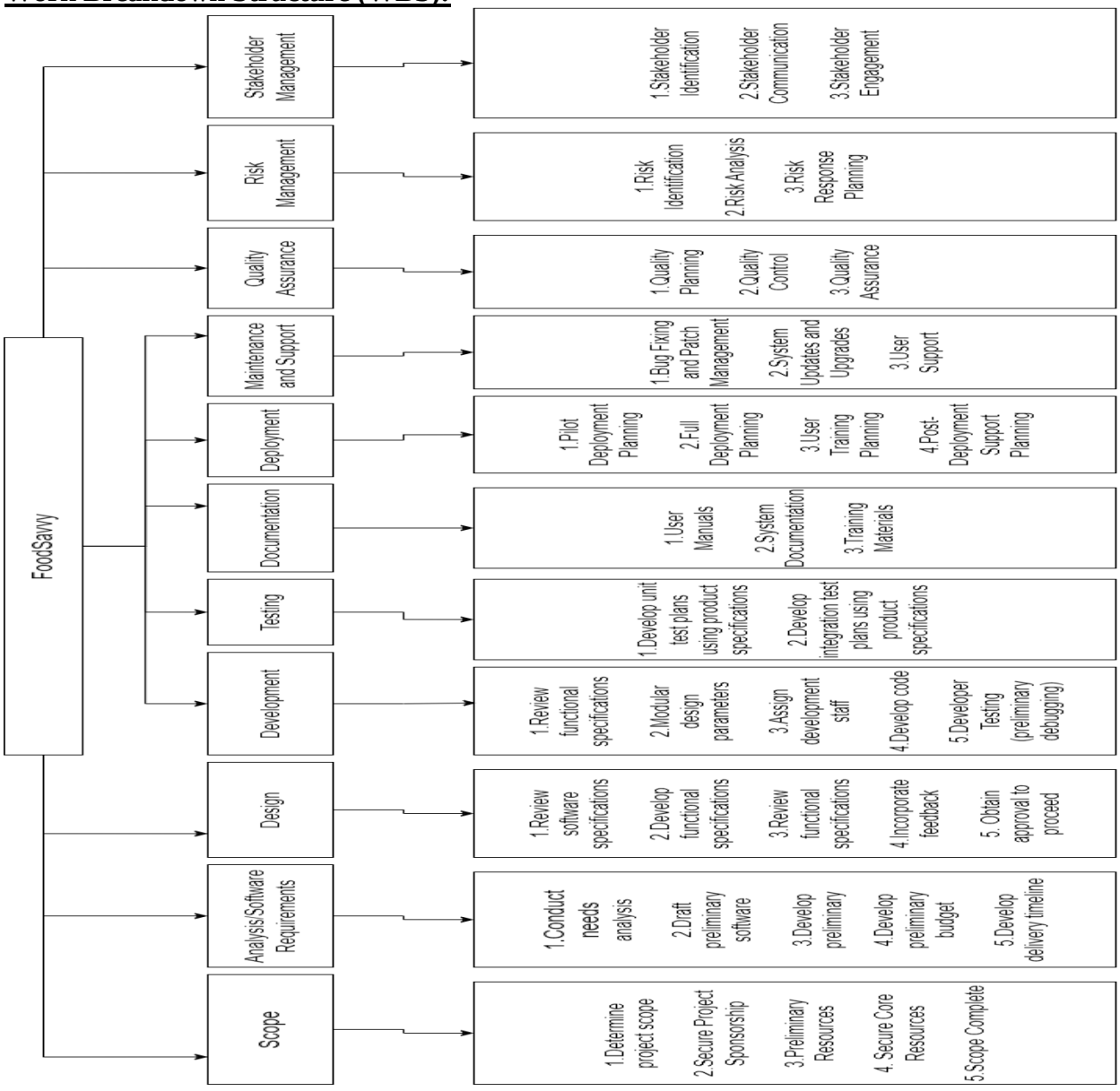
FACULTY COMMENTS		
	Marks Obtained	
	Total Marks	

Exercise-7

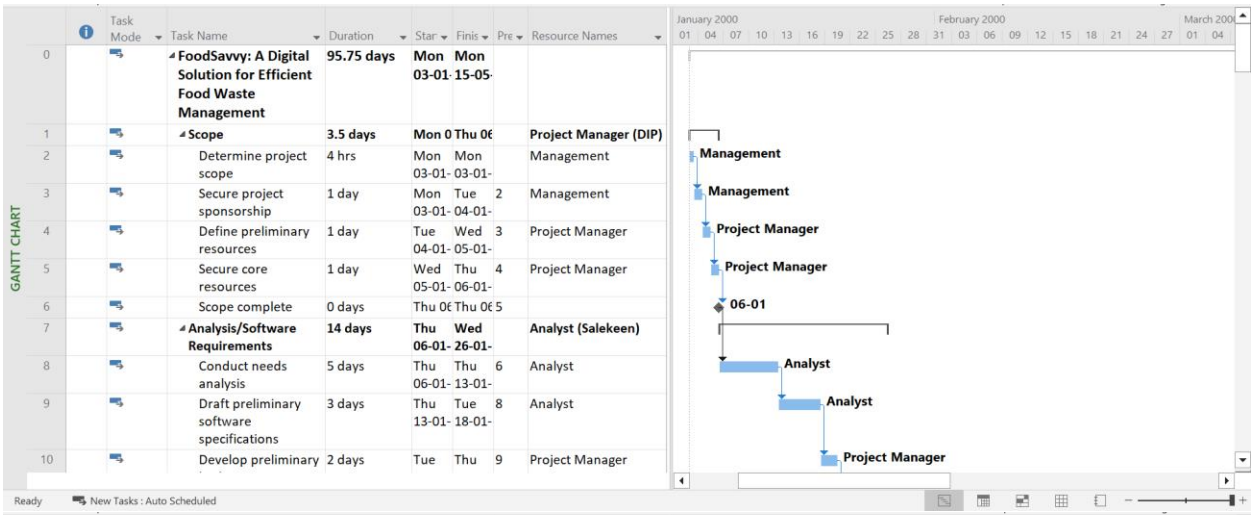
WBS and Effort Estimation

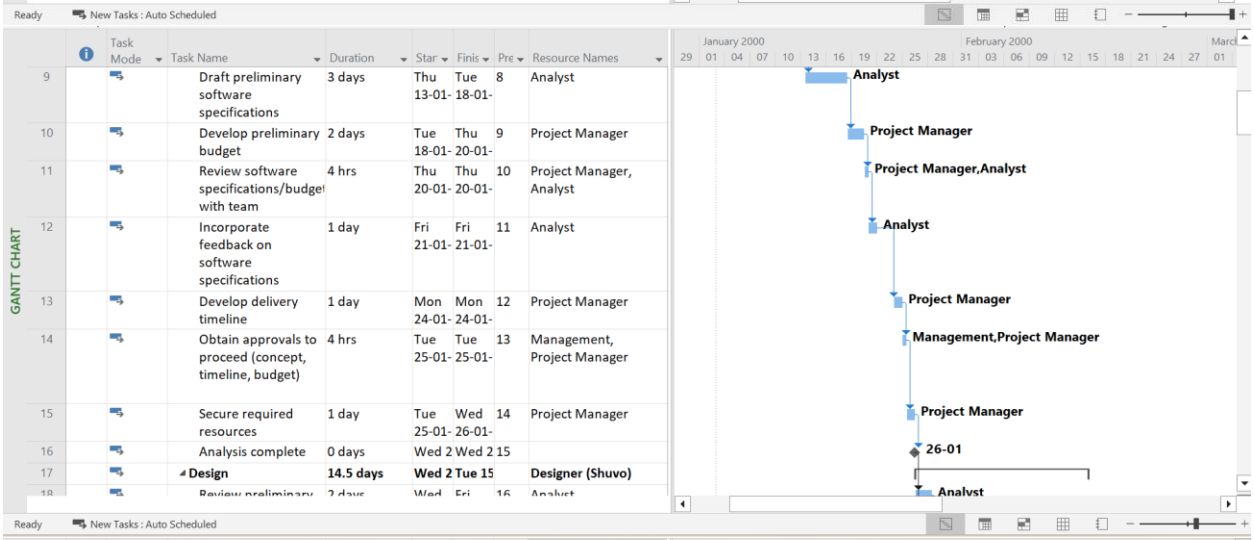
Work Breakdown Structure (WBS) and Effort Estimation: In the realm of software development, a WBS serves as a foundational tool for organizing and delineating project tasks. It systematically breaks down the software project into manageable components, from high-level objectives to granular tasks, facilitating a comprehensive understanding of project scope. Effort estimation, closely tied to WBS, involves predicting the time, resources, and costs required for each task. Accurate effort estimation relies on a deep understanding of the project requirements, historical data, and the capabilities of the development team. Together, WBS and effort estimation provide the groundwork for realistic project planning and resource management.

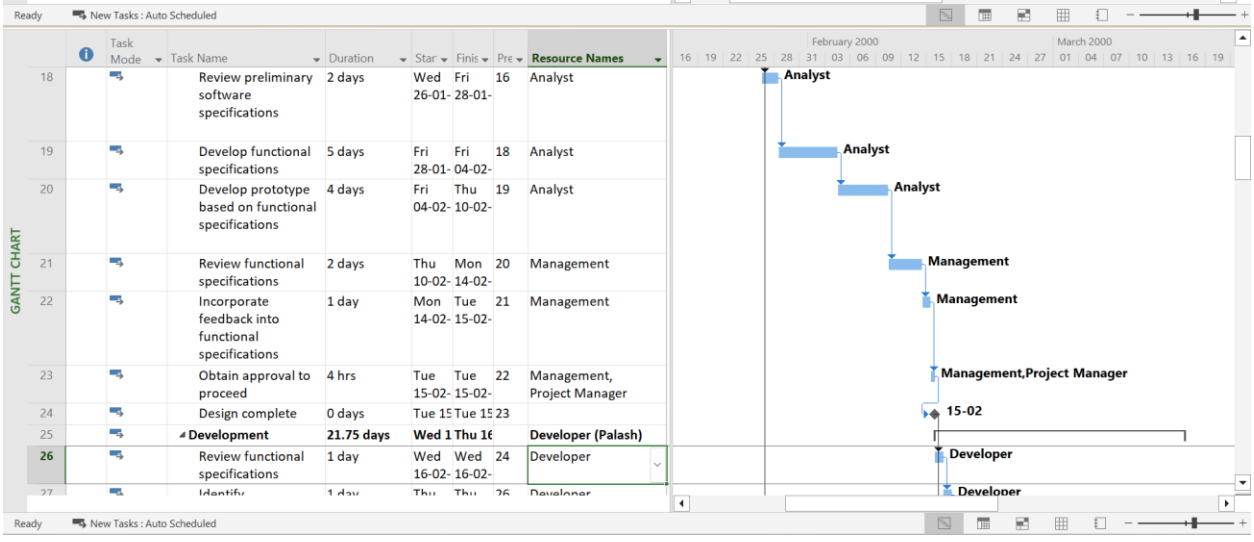
Work Breakdown Structure (WBS):

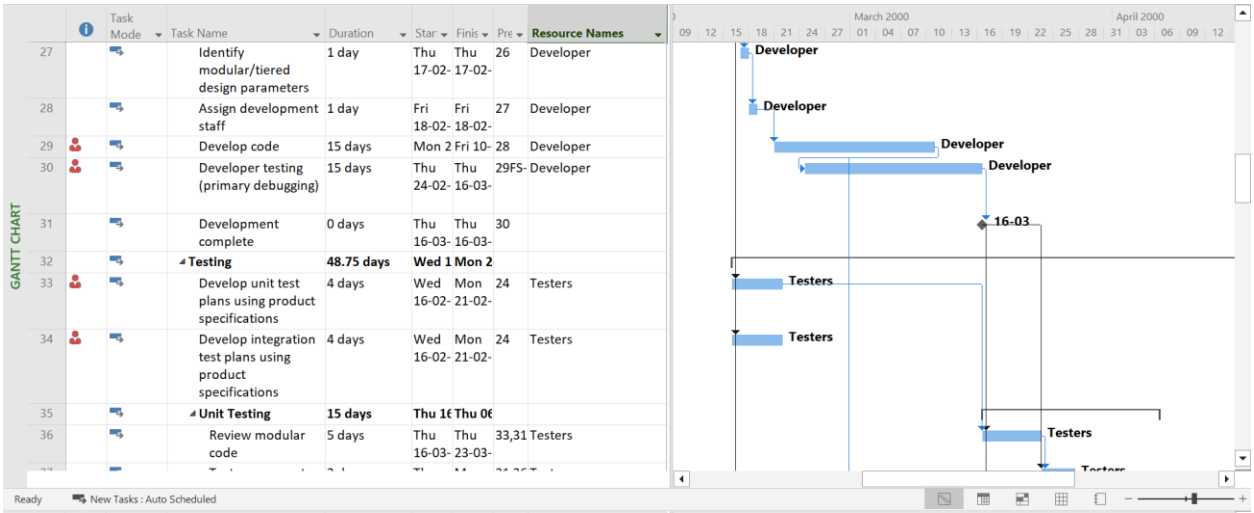


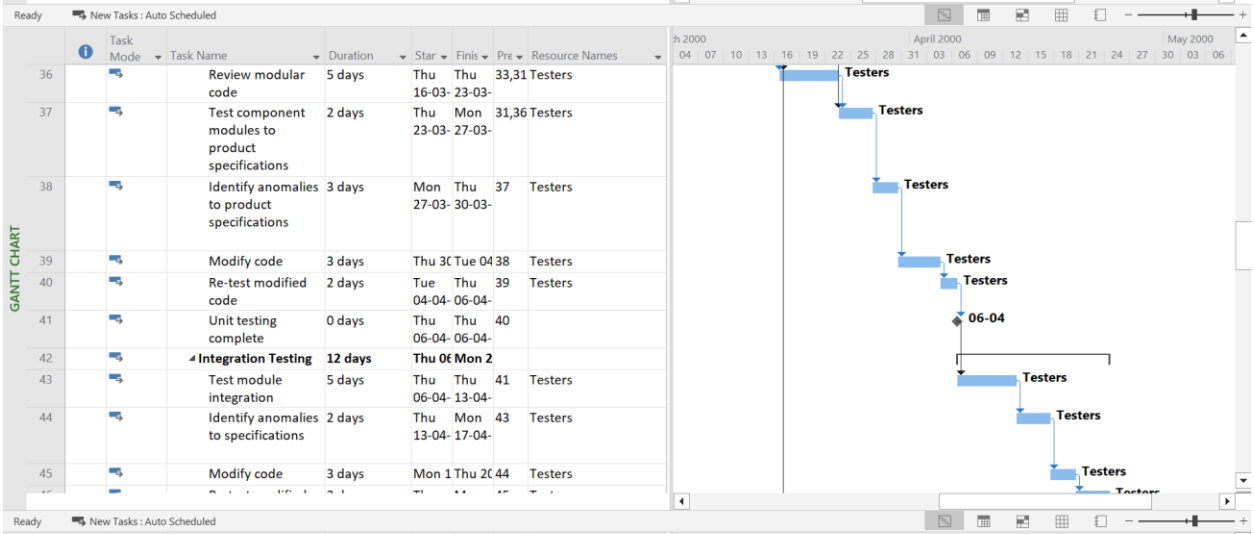
Gantt Chart

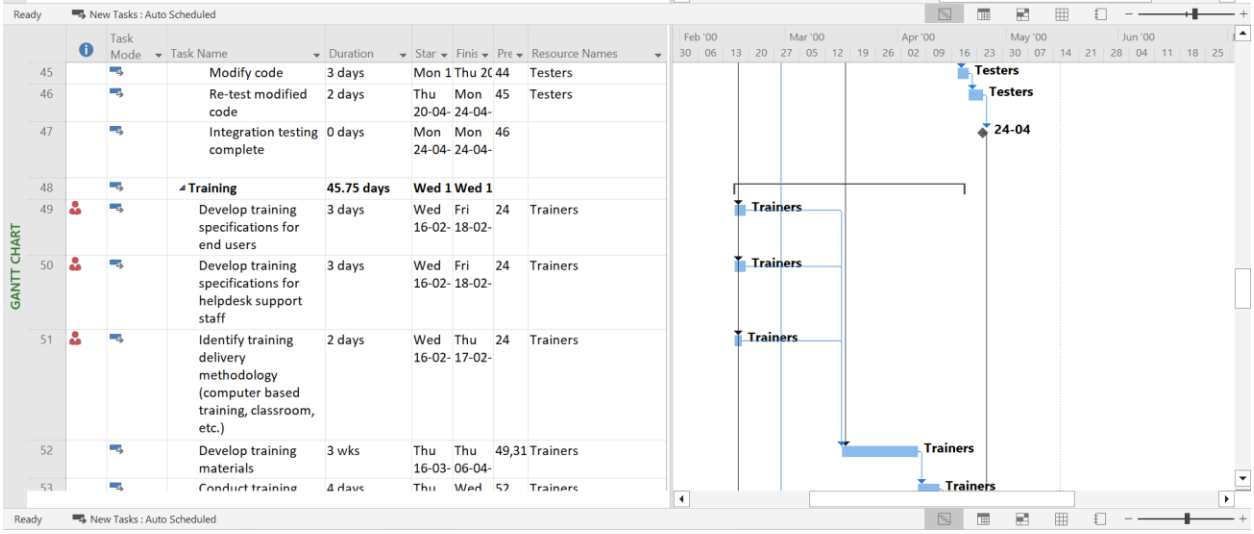

GANTT CHART
Task Mode
Task Name
Duration
Star
Finis
Pre
Resource Names
0 FoodSavvy: A Digital Solution for Efficient Food Waste Management 95.75 days Mon 03-01- Mon 15-05-
1 Scope 3.5 days Mon 0 Thu 0 Project Manager (DIP)
2 Determine project scope 4 hrs Mon 03-01- Mon 03-01- Management
3 Secure project sponsorship 1 day Mon 03-01- Tue 04-01- 2 Management
4 Define preliminary resources 1 day Tue 04-01- Wed 05-01- 3 Project Manager
5 Secure core resources 1 day Wed 05-01- Thu 06-01- 4 Project Manager
6 Scope complete 0 days Thu 0 Thu 0 5
7 Analysis/Software Requirements 14 days Thu 06-01- Wed 26-01- Analyst (Salekeen)
8 Conduct needs analysis 5 days Thu 06-01- Thu 13-01- 6 Analyst
9 Draft preliminary software specifications 3 days Thu 13-01- Tue 18-01- 8 Analyst
10 Develop preliminary 2 days Tue Thu 9 Project Manager
January 2000
February 2000
March 200
Management
Management
Project Manager
Project Manager
06-01
Analyst
Analyst
Project Manager
Ready
New Tasks : Auto Scheduled

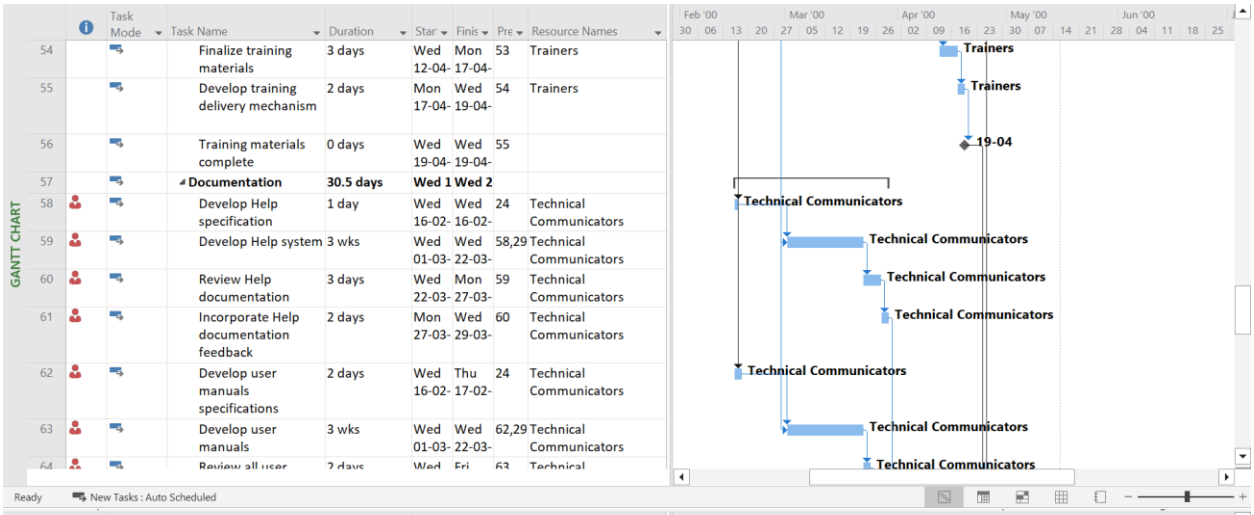

GANTT CHART
Task Mode
Task Name
Duration
Star
Finis
Pre
Resource Names
9 Draft preliminary software specifications 3 days Thu 13-01- Tue 18-01- 8 Analyst
10 Develop preliminary budget 2 days Tue 18-01- Thu 20-01- 9 Project Manager
11 Review software specifications/budge with team 4 hrs Thu 20-01- Thu 20-01- 10 Project Manager, Analyst
12 Incorporate feedback on software specifications 1 day Fri 21-01- Fri 21-01- 11 Analyst
13 Develop delivery timeline 1 day Mon 24-01- Mon 24-01- 12 Project Manager
14 Obtain approvals to proceed (concept, timeline, budget) 4 hrs Tue 25-01- Tue 25-01- 13 Management, Project Manager
15 Secure required resources 1 day Tue 25-01- Wed 26-01- 14 Project Manager
16 Analysis complete 0 days Wed 2 Wed 2 15
17 Design 14.5 days Wed 2 Tue 15 Designer (Shuvo)
January 2000
February 2000
Analyst
Project Manager
Project Manager,Analyst
Analyst
Project Manager
Management,Project Manager
Project Manager
26-01
Analyst
Ready
New Tasks : Auto Scheduled

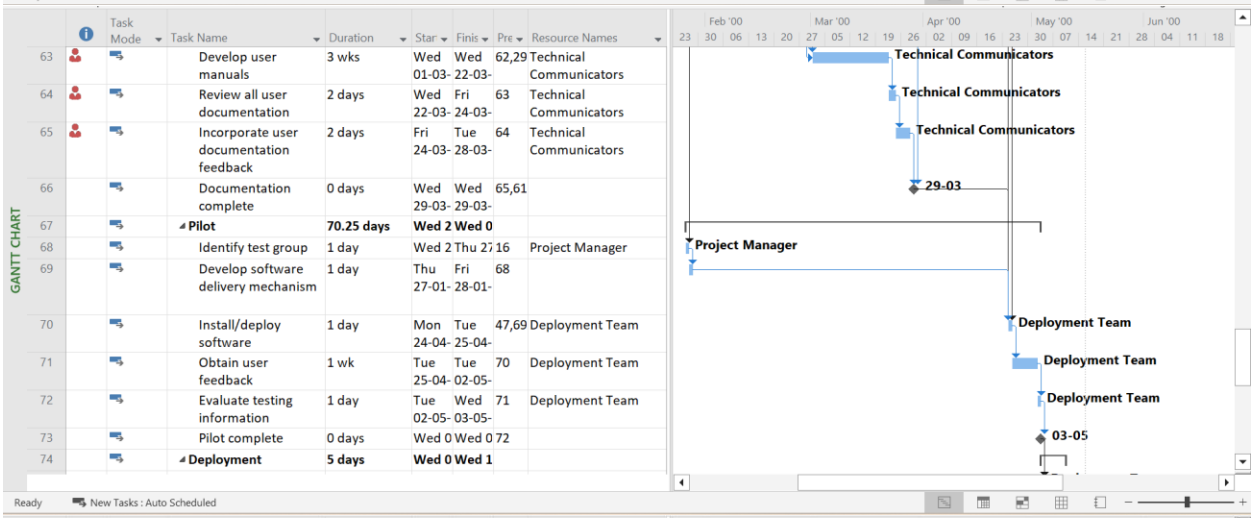

GANTT CHART
Task Mode
Task Name
Duration
Star
Finis
Pre
Resource Names
18 Review preliminary software specifications 2 days Wed 26-01- Fri 28-01- 16 Analyst
19 Develop functional specifications 5 days Fri 28-01- Fri 04-02- 18 Analyst
20 Develop prototype based on functional specifications 4 days Fri 04-02- Thu 10-02- 19 Analyst
21 Review functional specifications 2 days Thu 10-02- Mon 14-02- 20 Management
22 Incorporate feedback into functional specifications 1 day Mon 14-02- Tue 15-02- 21 Management
23 Obtain approval to proceed 4 hrs Tue 15-02- Tue 15-02- 22 Management, Project Manager
24 Design complete 0 days Tue 15 Tue 15 23
25 Development 21.75 days Wed 1 Thu 16 Developer (Palash)
26 Review functional specifications 1 day Wed 16-02- Wed 16-02- 24 Developer
February 2000
March 2000
Analyst
Analyst
Analyst
Management
Management
Management,Project Manager
15-02
Developer
Developer
Ready
New Tasks : Auto Scheduled

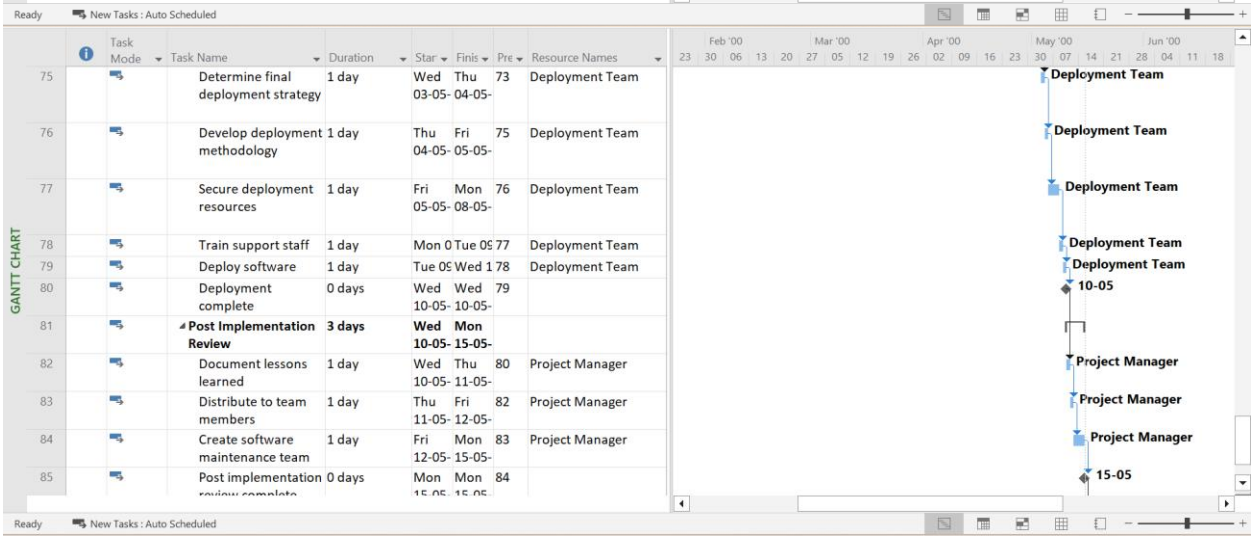

GANTT CHART
Task Mode
Task Name
Duration
Star
Finis
Pre
Resource Names
27 Identify modular/tiered design parameters 1 day Thu 17-02- Thu 17-02- 26 Developer
28 Assign development staff 1 day Fri 18-02- Fri 18-02- 27 Developer
29 Develop code 15 days Mon 2 Fri 10- 28 Developer
30 Developer testing (primary debugging) 15 days Thu 24-02- Thu 16-03- 29FS- Developer
31 Development complete 0 days Thu 16-03- Thu 16-03- 30
32 Testing 48.75 days Wed 1 Mon 2
33 Develop unit test plans using product specifications 4 days Wed 16-02- Mon 21-02- 24 Testers
34 Develop integration test plans using product specifications 4 days Wed 16-02- Mon 21-02- 24 Testers
35 Unit Testing 15 days Thu 1(Thu 0(
36 Review modular code 5 days Thu 16-03- Thu 23-03- 33,31 Testers
March 2000
April 2000
09 12 15 18 21 24 27 01 04 07 10 13 16 19 22 25 28 31 03 06 09 12
Developer
Developer
Developer
Developer
16-03
Testers
Testers
Testers
Ready
New Tasks : Auto Scheduled


GANTT CHART
Task Mode
Task Name
Duration
Star
Finis
Pre
Resource Names
36 Review modular code 5 days Thu 16-03- Thu 23-03- 33,31 Testers
37 Test component modules to product specifications 2 days Thu 23-03- Mon 27-03- 31,36 Testers
38 Identify anomalies to product specifications 3 days Mon 27-03- Thu 30-03- 37 Testers
39 Modify code 3 days Thu 3(Tue 04 38 Testers
40 Re-test modified code 2 days Tue 04-04- Thu 06-04- 39 Testers
41 Unit testing complete 0 days Thu 06-04- Thu 06-04- 40
42 Integration Testing 12 days Thu 0(Mon 2
43 Test module integration 5 days Thu 06-04- Thu 13-04- 41 Testers
44 Identify anomalies to specifications 2 days Thu 13-04- Mon 17-04- 43 Testers
45 Modify code 3 days Mon 1 Thu 2(44 Testers
h 2000
April 2000
May 2000
04 07 10 13 16 19 22 25 28 31 03 06 09 12 15 18 21 24 27 30 03 06
Testers
Testers
Testers
Testers
Testers
06-04
Testers
Testers
Testers
Ready
New Tasks : Auto Scheduled


GANTT CHART
Task Mode
Task Name
Duration
Star
Finis
Pre
Resource Names
45 Modify code 3 days Mon 1 Thu 2(44 Testers
46 Re-test modified code 2 days Thu 20-04- Mon 24-04- 45 Testers
47 Integration testing complete 0 days Mon 24-04- Mon 24-04- 46
48 Training 45.75 days Wed 1 Wed 1
49 Develop training specifications for end users 3 days Wed 16-02- Fri 18-02- 24 Trainers
50 Develop training specifications for helpdesk support staff 3 days Wed 16-02- Fri 18-02- 24 Trainers
51 Identify training delivery methodology (computer based training, classroom, etc.) 2 days Wed 16-02- Thu 17-02- 24 Trainers
52 Develop training materials 3 wks Thu 16-03- Thu 06-04- 49,31 Trainers
Feb '00
Mar '00
Apr '00
May '00
Jun '00
30 06 13 20 27 05 12 19 26 02 09 16 23 30 07 14 21 28 04 11 18 25
Testers
Testers
24-04
Trainers
Trainers
Trainers
Trainers
Trainers
Ready
New Tasks : Auto Scheduled


GANTT CHART
Task Mode
Task Name
Duration
Start
Finish
Predecessors
Resource Names
54 Finalize training materials 3 days Wed 12-04- Mon 17-04- 53 Trainers
55 Develop training delivery mechanism 2 days Mon 17-04- Wed 19-04- 54 Trainers
56 Training materials complete 0 days Wed 19-04- Wed 19-04- 55
57 Documentation 30.5 days Wed 1 Wed 2
58 Develop Help specification 1 day Wed 16-02- Wed 16-02- 24 Technical Communicators
59 Develop Help system 3 wks Wed 01-03- Wed 22-03- 58,29 Technical Communicators
60 Review Help documentation 3 days Wed 22-03- Mon 27-03- 59 Technical Communicators
61 Incorporate Help documentation feedback 2 days Mon 27-03- Wed 29-03- 60 Technical Communicators
62 Develop user manuals specifications 2 days Wed 16-02- Thu 17-02- 24 Technical Communicators
63 Develop user manuals 3 wks Wed 01-03- Wed 22-03- 62,29 Technical Communicators
64 Review all user 2 days Wed Fri 63 Technical
Feb '00 Mar '00 Apr '00 May '00 Jun '00
Trainers
Trainers
19-04
Technical Communicators
Technical Communicators
Technical Communicators
Technical Communicators
Technical Communicators
Technical Communicators
Technical Communicators
Ready
New Tasks : Auto Scheduled


GANTT CHART
Task Mode
Task Name
Duration
Start
Finish
Predecessors
Resource Names
63 Develop user manuals 3 wks Wed 01-03- Wed 22-03- 62,29 Technical Communicators
64 Review all user documentation 2 days Wed 22-03- Fri 24-03- 63 Technical Communicators
65 Incorporate user documentation feedback 2 days Fri 24-03- Tue 28-03- 64 Technical Communicators
66 Documentation complete 0 days Wed 29-03- Wed 29-03- 65,61
67 Pilot 70.25 days Wed 2 Wed 0
68 Identify test group 1 day Wed 2 Thu 27 16 Project Manager
69 Develop software delivery mechanism 1 day Thu 27-01- Fri 28-01- 68
70 Install/deploy software 1 day Mon 24-04- Tue 25-04- 47,69 Deployment Team
71 Obtain user feedback 1 wk Tue 25-04- Tue 02-05- 70 Deployment Team
72 Evaluate testing information 1 day Tue 02-05- Wed 03-05- 71 Deployment Team
73 Pilot complete 0 days Wed 0 Wed 0 72
74 Deployment 5 days Wed 0 Wed 1
Feb '00 Mar '00 Apr '00 May '00 Jun '00
Technical Communicators
Technical Communicators
Technical Communicators
29-03
Project Manager
Deployment Team
Deployment Team
Deployment Team
03-05
Ready
New Tasks : Auto Scheduled


GANTT CHART
Task Mode
Task Name
Duration
Start
Finish
Predecessors
Resource Names
75 Determine final deployment strategy 1 day Wed 03-05- Thu 04-05- 73 Deployment Team
76 Develop deployment methodology 1 day Thu 04-05- Fri 05-05- 75 Deployment Team
77 Secure deployment resources 1 day Fri 05-05- Mon 08-05- 76 Deployment Team
78 Train support staff 1 day Mon 0 Tue 09 77 Deployment Team
79 Deploy software 1 day Tue 09 Wed 1 78 Deployment Team
80 Deployment complete 0 days Wed 10-05- Wed 10-05- 79
81 Post Implementation Review 3 days Wed 10-05- Mon 15-05-
82 Document lessons learned 1 day Wed 10-05- Thu 11-05- 80 Project Manager
83 Distribute to team members 1 day Thu 11-05- Fri 12-05- 82 Project Manager
84 Create software maintenance team 1 day Fri 12-05- Mon 15-05- 83 Project Manager
85 Post implementation 0 days Mon Mon 84
Feb '00 Mar '00 Apr '00 May '00 Jun '00
Deployment Team
Deployment Team
Deployment Team
Deployment Team
Deployment Team
10-05
Project Manager
Project Manager
Project Manager
15-05
Ready
New Tasks : Auto Scheduled

Effort Estimation:

Using COCOMO (Constructive cost model):

Project type: Organic

Coefficient = 2.4
P=1.05
T=0.38
SLOC = 5000

Effort = PM = Coefficient<Effort factor»* (SLOC/1000)^P

= 2.4*(5000/1000)^1.05
= 13
Development time = DM = 2.5* (PM)T

= 2.5*13*0.38
= 6.626 ~ 26 Weeks

Required number of people = ST = PM/DM
= 13/6.626
=1.96~2

Exercise-8

Activity Scheduling and Resource Allocation

Activity Scheduling and Resource Allocation: Activity scheduling involves sequencing project tasks in a logical order to ensure efficient progression towards project milestones. In software engineering, this entails scheduling software development, testing, and deployment activities, considering dependencies between tasks and project deadlines. Resource allocation complements activity scheduling by assigning the necessary resources, including human resources, equipment, and budget, to each task. Effective resource allocation maximizes productivity while minimizing bottlenecks and resource conflicts, ultimately contributing to timely project completion.

RESOURCE SHEET

	Resource Name	Type	Material	Initials	Group	Max.	Std. Rate	Ovt. Rate	Cost/Use	Accrue	Base Calendar	Code	Add New Column
1	Management	Work		M		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard		
2	Project Manager	Work		P		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard		
3	Analyst	Work		A		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard		
4	**Developer**	**Work**		**D**		**100%**	**$0.00/hr**	**$0.00/hr**	**$0.00**	**Prorated**	**Standard**		
5	**Testers**	**Work**		**T**		**100%**	**$50.00/hr**	**$0.00/hr**	**$0.00**	**Prorated**	**Standard**		
6	**Trainers**	**Work**		**T**		**100%**	**$45.00/hr**	**$0.00/hr**	**$0.00**	**Prorated**	**Standard**		
7	**Technical Communicators**	**Work**		**T**		**100%**	**$50.00/hr**	**$0.00/hr**	**$0.00**	**Prorated**	**Standard**		
8	Deployment Team	Work		D		100%	$50.00/hr	$0.00/hr	$0.00	Prorated	Standard		
9	Project Manager (DIP)	Work		P		100%	$100.00/hr	$120.00/hr	$80.00	Prorated	Standard		
10	Analyst (Salekeen)	Work		A		100%	$75.00/hr	$85.00/hr	$70.00	Prorated	Standard		
11	Designer (Shuvo)	Work		D		100%	$70.00/hr	$80.00/hr	$60.00	Prorated	Standard		
12	Developer (Palash)	Work		D		100%	$60.00/hr	$70.00/hr	$50.00	Prorated	Standard		

Ready | New Tasks : Auto Scheduled

Exercise-9

Risk Analysis

Risk Analysis: Risk analysis is integral to mitigating uncertainties inherent in software projects. It involves identifying, assessing, and prioritizing potential risks that could impact project objectives. In software engineering, risks may include technical challenges, changes in requirements, resource constraints, and external dependencies. By conducting risk analysis early in the project lifecycle, software teams can develop proactive risk mitigation strategies to minimize the likelihood and impact of adverse events. Regular monitoring and reassessment of risks throughout the project ensure that mitigation efforts remain relevant and effective, safeguarding project success.

	A	B	C	D	E	F	G	H	I	J	K
1	**Risk ID**	**Risk description**	**Risk category**	**Probability**	**Impact**	**Severity**	**Risk response**	**Contingency plan**	**Risk owner**	**Risk status**	**Risk monitoring**
2	R1	Scope creep	Scope	4	5	20	Minimize	Regular scope reviews	Project manager	Ongoing	Weekly
3	R2	Technology compatibility issues	Technical	3	4	12	Minimize	Conduct through tests	Technical lead	Ongoing	Biweekly
4	R3	Inadequate user training	Resource	3	3	9	Avoid	Implement robust training program	Training specialist	Ongoing	Monthly
5	R4	Regulatory changes	External	1	5	5	Accept	Stay updated on regulations	Compliance officer	Ongoing	As required
6	R5	Server downtime	Technical	1	3	3	Accept	Establish backup servers	IT administrator	Ongoing	Daily
7	R6	Data security breach	Security	1	5	5	Transfer	Secure data with encryption	Cybersecurity expert	Ongoing	As required
8	R7	Insufficient budget	Cost	4	5	20	Minimize	Seek additional funding	Finance manager	Ongoing	Biweekly

Risk Matrix

Probability						
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5
	1	2	3	4	5
	Impact				

Color code	Score
High	>12
Medium	5 to 12
Low	1 to 4