投票 最多可选1项

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Are you ready?

A Yes

B No

提交

Software Engineering

Part 4
Project Management

Chapter 34
Project Scheduling

Contents

34.1 Why Are Projects Late?

- an unrealistic deadline established by someone outside the software development group
- changing customer requirements that are not reflected in schedule changes;
- an honest underestimate of the amount of effort and/or the number of resources that will be required to do the job;
- predictable and/or unpredictable risks that were not considered when the project commenced;
- technical difficulties that could not have been foreseen in advance;
- human difficulties that could not have been foreseen in advance;
- miscommunication among project staff that results in delays;
- a failure by project management to recognize that the project is falling behind schedule and a lack of action to correct the problem

34.1 Recommend steps

1. Perform a detailed estimate.
2. Using an incremental process model.
3. Meet with the customer and explain why the imposed deadline is unrealistic.
4. Offer the incremental development stragegy as an alternative.

34.2.1 Scheduling Principles

- compartmentalization—define distinct tasks
- interdependency—indicate task interrelationship
- effort validation—be sure resources are available
- defined responsibilities—people must be assigned
- defined outcomes—each task must have an output
- defined milestones—review for quality

单选题 1分

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此题未设置答案，请点击右侧设置按钮

Suppose that you are a software development team manager, if your project fall behind schedule in late stage of this project, what action would you take?

A Add more people

B Postpone the schedule

C Remove some functions

D Other

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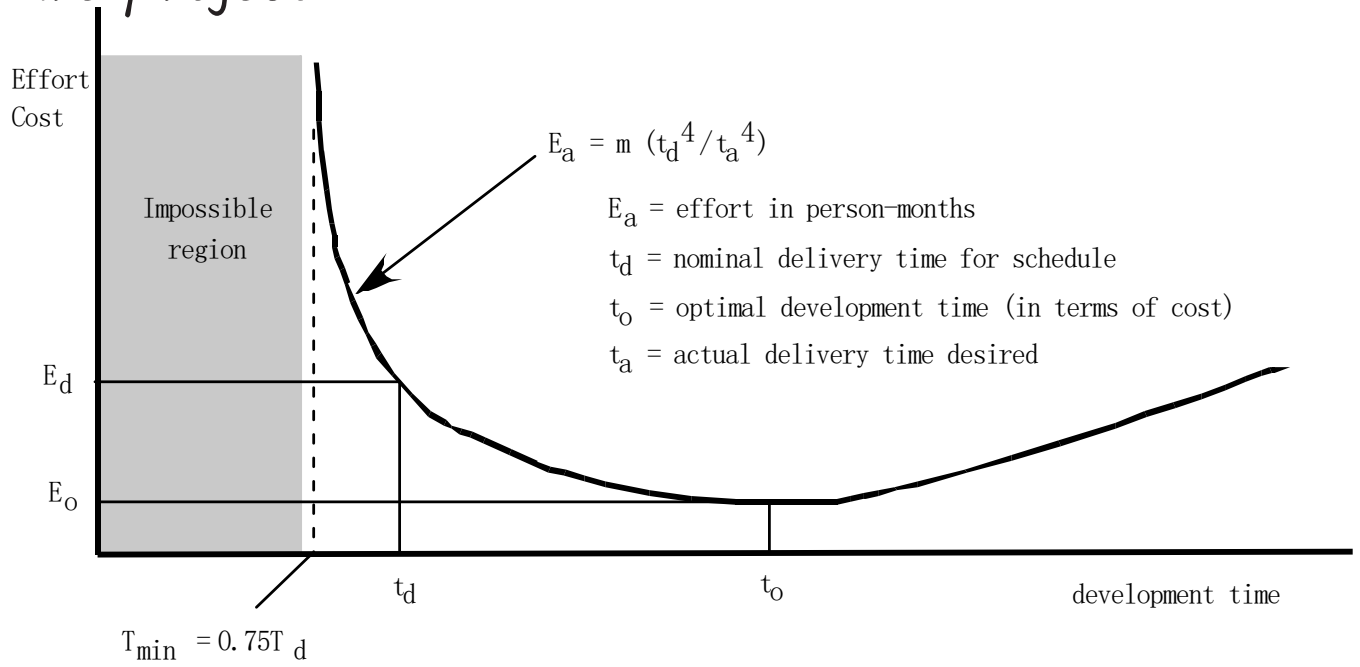
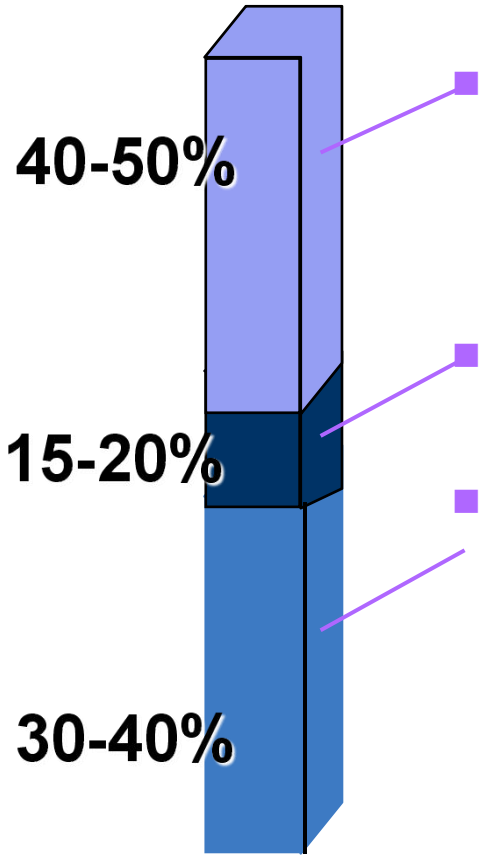
34.2.2 Effort and Delivery Time

Putnam-Norden-Rayleigh (PNR) Curve:
relationship between effort applied and delivery time for a software project



- indicates that the project delivery time cannot be compressed much beyond 0.75td.
- the lowest cost delivery option to 2td.

34.2.3 Effort Allocation



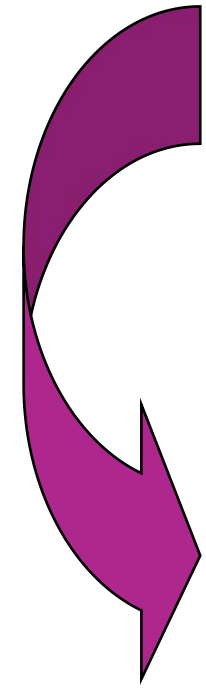
- "front end" activities
  - customer communication
  - analysis
  - design
  - review and modification
- construction activities
  - coding or code generation
- testing and installation
  - unit, integration testing
  - white-box, black box testing
  - regression testing

34.3 Defining Task Sets

1. determine type of project
2. assess the degree of rigor required
3. identify adaptation criteria
4. select appropriate software engineering tasks

Project Type:
Concept development projects, New application development
Application enhancement, Application maintenance projects,
Reengineering projects

34.3 Task Set Refinement

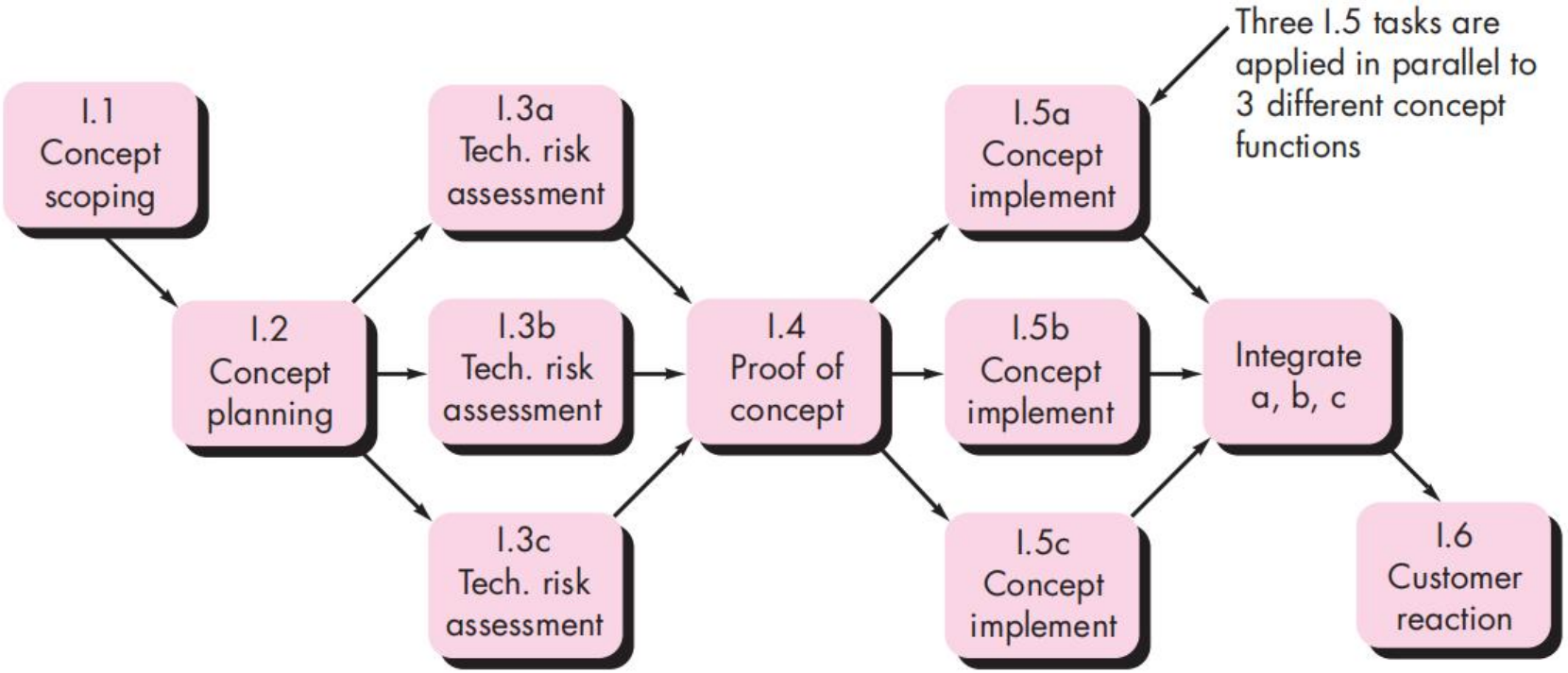


is refined to

1.1 **Concept scoping** determines the overall scope of the project.

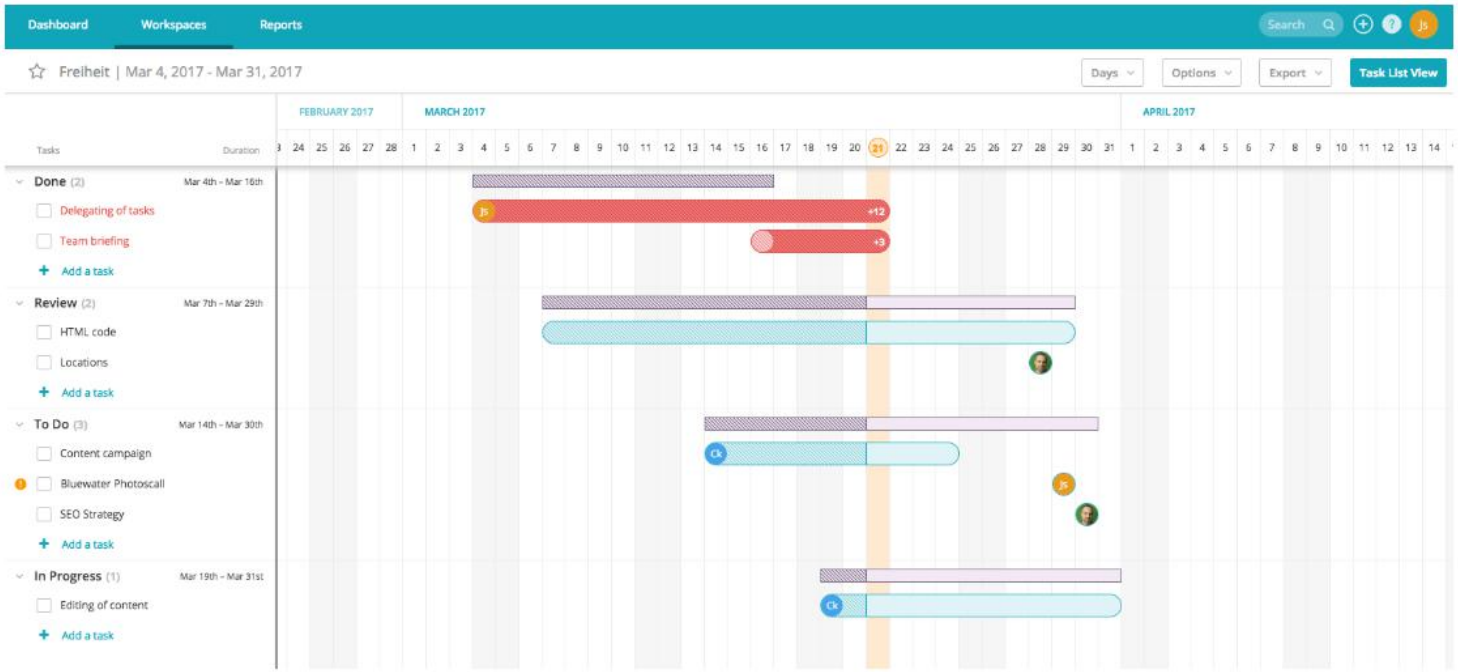
Task definition: Action 1.1 Concept Scoping
1.1.1 Identify need, benefits and potential customers;
1.1.2 Define desired output/control and input events that drive the application;
Begin Task 1.1.2
1.1.2.1 TR: Review written description of need[7]
1.1.2.2 Derive a list of customer visible outputs/inputs
1.1.2.3 TR: Review outputs/inputs with customer and revise as required; endtask Task 1.1.2
1.1.3 Define the functionality/behavior for each major function;
Begin Task 1.1.3
1.1.3.1 TR: Review output and input data objects derived in task 1.1.2;
1.1.3.2 Derive a model of functions/behaviors;
1.1.3.3 TR: Review functions/behaviors with customer and revise as required;
endtask Task 1.1.3
1.1.4 Isolate those elements of the technology to be implemented in software;
1.1.5 Research availability of existing software;
1.1.6 Define technical feasibility;
1.1.7 Make quick estimate of size;
1.1.8 Create a scope definition;
endtask definition: Action 1.1

34.5 Define a Task Network



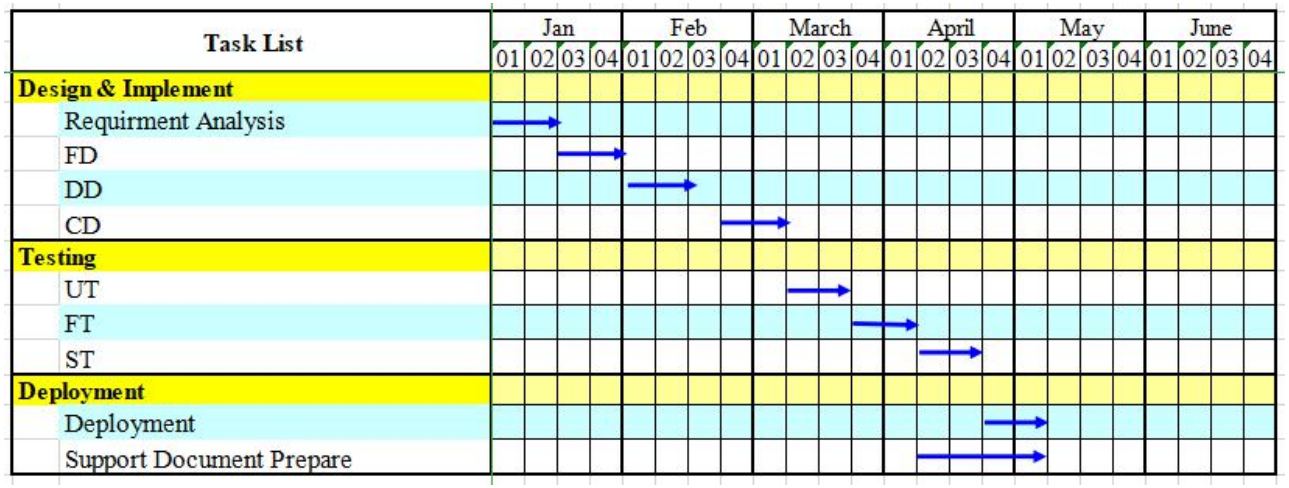
34.5 Timeline Charts (gantt graph)

Gantt graph
(proposed by Henry Laurence Gantt)



https://clickup.com/blog/free-gantt-chart-software/

34.5 Timeline Charts (gantt graph)



Task List	Jan				Feb				March				April				May				June			
	01	02	03	04	01	02	03	04	01	02	03	04	01	02	03	04	01	02	03	04	01	02	03	04
Design & Implement																								
Requirment Analysis																								
FD																								
DD																								
CD																								
Testing																								
UT																								
FT																								
ST																								
Deployment																								
Deployment																								
Support Document Prepare																								

Task		2020							
		April				May			
		01	02	03	04	01	02	03	04
1. Python learning									
Requiement:***									
1.1	data clean								
1.2	simulation data generation								
1.3	measure confirm								
2. Prediction model									
Requiement:***									
2.1	Prophet model								
2.2	arima model								
3. Data process									
3.1	data fetch								
3.2	tool design								
3.3	tool testing								

34.5 Schedule Tracking

- conduct **periodic project status meetings** in which each team member reports progress and problems.
- evaluate the results of all reviews conducted throughout the software engineering process.
- determine whether formal project **milestones** (the diamonds shown in Figure) have been accomplished by the scheduled date.
- compare **actual start-date to planned start-date** for each project task listed in the resource table.
- meet informally with practitioners to obtain their subjective assessment of progress to date and problems on the horizon.
- use earned value analysis to assess progress quantitatively.

34.6 Earned Value Analysis (EVA)

- Earned value
  - is a measure of progress
  - enables us to assess the “percent of completeness” of a project using quantitative analysis rather than rely on a gut feeling
  - “provides accurate and reliable readings of performance from as early as 15 percent into the project.” [Fle98]

34.6 Computing Earned Value-I

- The *budgeted cost of work scheduled* (BCWS) is determined for each work task represented in the schedule.
  - $BCWS_i$ is the effort planned for work task *i.*
  - To determine progress at a given point along the project schedule, the value of BCWS is the sum of the $BCWS_i$ values for all work tasks that should have been completed by that point in time on the project schedule.

- The BCWS values for all work tasks are summed to derive the *budget at completion,* BAC. Hence,

$$BAC = \sum (BCWS_k) \text{ for all tasks } k$$

34.6 Computing Earned Value-II

- Next, the value for *budgeted cost of work performed* (BCWP) is computed.
  - The value for BCWP is the sum of the BCWS values for all work tasks that have actually been completed by a point in time on the project schedule.

- "the distinction between the BCWS and the BCWP is that the former represents the budget of the activities that were planned to be completed and the latter represents the budget of the activities that actually were completed." [Wil99]
- Given values for BCWS, BAC, and BCWP, important progress indicators can be computed:
  - Schedule performance index, SPI = BCWP/BCWS
  - Schedule variance, SV = BCWP – BCWS
  - SPI is an indication of the efficiency with which the project is utilizing scheduled resources.

34.6 Computing Earned Value-III

- Percent scheduled for completion = BCWS/BAC
  - provides an indication of the percentage of work that should have been completed by time *t.*
- Percent complete = BCWP/BAC
  - provides a quantitative indication of the percent of completeness of the project at a given point in time, *t.*
- *Actual cost of work performed,* ACWP, is the sum of the effort actually expended on work tasks that have been completed by a point in time on the project schedule. It is then possible to compute
  - Cost performance index, CPI = BCWP/ACWP
  - Cost variance, CV = BCWP – ACWP

34.6 Earned Value Example

Assume you are a software project manager and that you've been asked to compute earned value statistics for a small software project.

The project has 56 planned work tasks that are estimated to require 582 person-days to complete. At the time that you've been asked to do the earned value analysis, 12 tasks have been completed. However the project schedule indicates that 15 tasks should have been completed. The following scheduling data (in person-days) are available:

Task	Planned Effort	Actual Effort
1	12.0	12.5
2	15.0	11.0
3	13.0	17.0
4	8.0	9.5
5	9.5	9.0
6	18.0	19.0
7	10.0	10.0
8	4.0	4.5
9	12.0	10.0
10	6.0	6.5
11	5.0	4.0
12	14.0	14.5
13	16.0	—
14	6.0	—
15	8.0	—

Compute the following value:
SPI,
schedule variance,
percent scheduled for completion,
percent complete,
CPI,
cost variance

34.6 Earned Value Example

Question:Compute the following value:
SPI(Schedule performance index),
SV (schedule variance),
percent scheduled for completion,
percent complete,
CPI,
cost variance

BCWS (scheduled 1-12) = 126.50
BAC (scheduled 1-15) = 156.50
BCWP (performed 1-12) = 127.50
SPI = BCWP/BCWS = 127.5/126.5 = 1.008
SV = BCWP - BCWS = 127.5 - 126.5 = 1.0
percent scheduled for completion=BCWS/BAC=126.5/156.5=80.8%
percent complete = BCWP/BAC = 81%
at the end of task11:
BCWP=112.5, ACWP = 113
CPI=BCWP/ACWP = 112.5 / 113 = 99.6%
Cost variance = BCWP - ACWP = 0.5

Summary

- Schedule (taskset -> gantt chart)
- Earned Value

Practice： make a plan for your project

THE END