TOPSIM-Planspiele
Learning business by doing business

TOPSIM – Project Management

Participants' Manual

Part I b

Version 2.5

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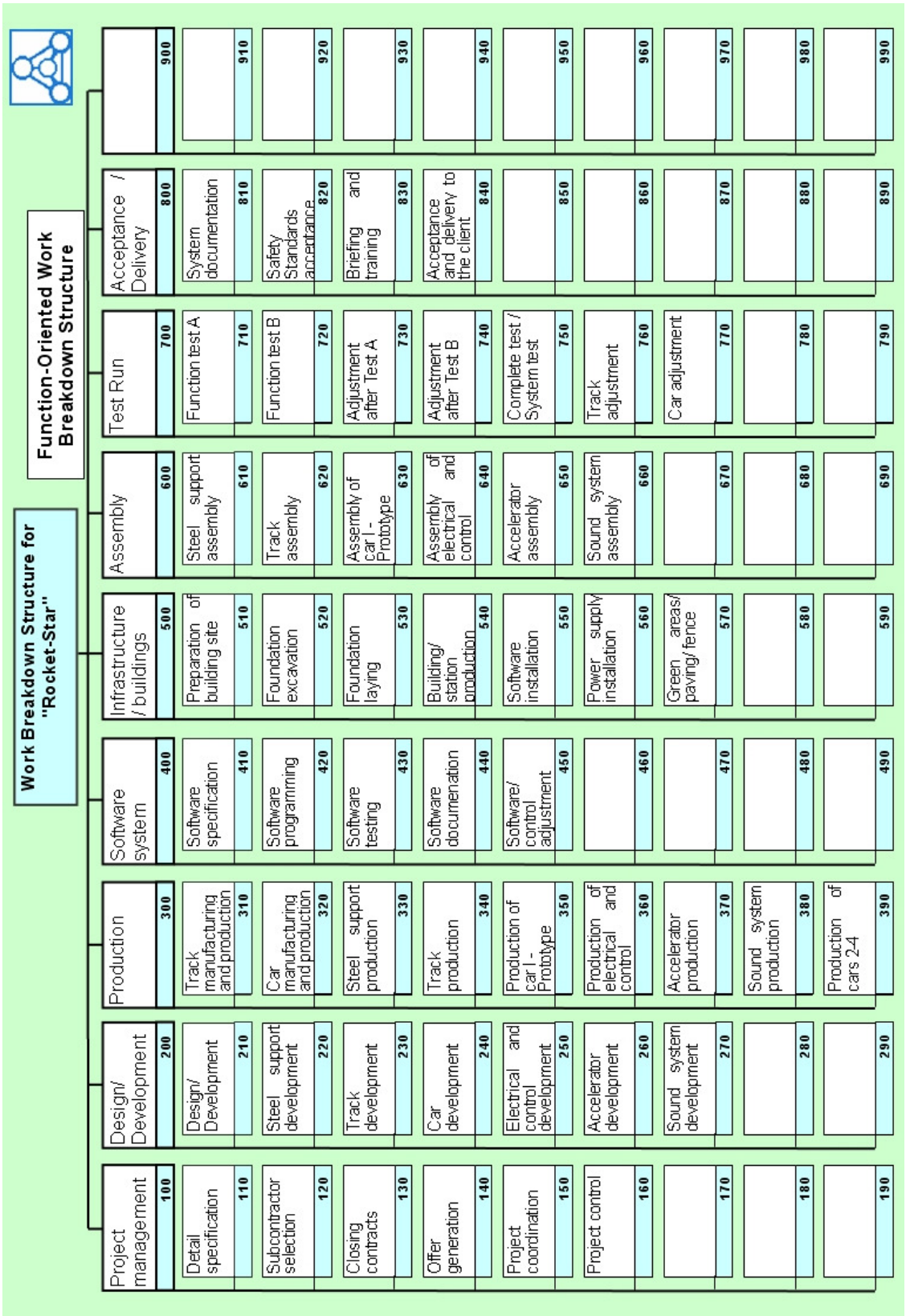
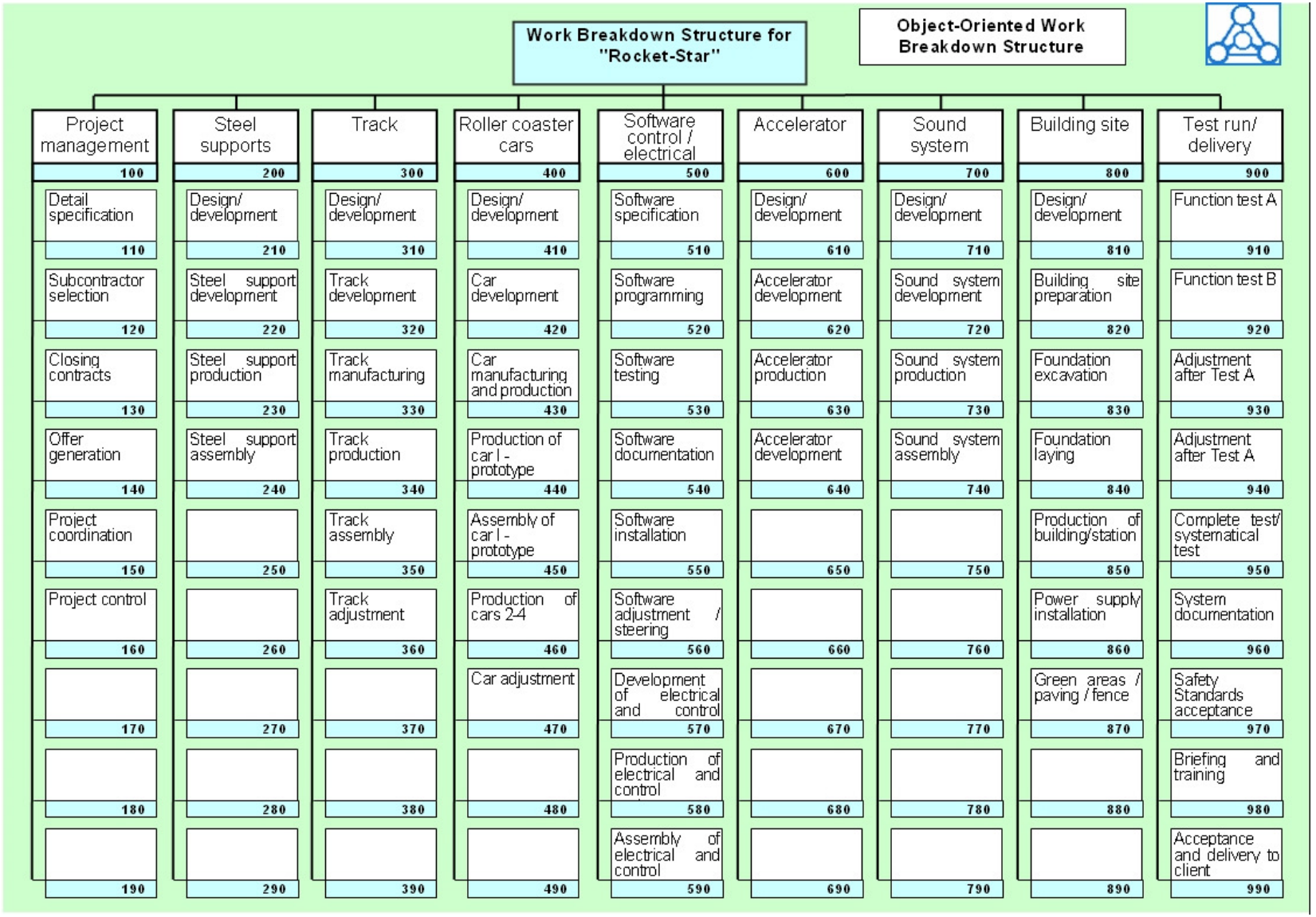
4.2.4 The Work Breakdown Structure (WBS)

With the requirements for the roller coaster in mind and based on similar Hypercoaster equipment, the planning department developed the following two alternative work breakdown structures for the project team.




Work Breakdown Structure for "Rocket-Star"
Object-Oriented Work Breakdown Structure
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Offer generation
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370
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410
Car development
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Car manufacturing and production
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Production of car I - prototype
440
Assembly of car I - prototype
450
Production of cars 2-4
460
Car adjustment
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480
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Software specification
510
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Software testing
530
Software documentation
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Software installation
550
Software adjustment / steering
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Production of electrical and control
580
Assembly of electrical and control
590
Accelerator
600
Design/ development
610
Accelerator development
620
Accelerator production
630
Accelerator development
640
650
660
670
680
690
Sound system
700
Design/ development
710
Sound system development
720
Sound system production
730
Sound system assembly
740
750
760
770
780
790
Building site
800
Design/ development
810
Building site preparation
820
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830
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870
880
890
Test run/ delivery
900
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920
Adjustment after Test A
930
Adjustment after Test A
940
Complete test/ systematical test
950
System documentation
960
Safety Standards acceptance
970
Briefing and training
980
Acceptance and delivery to client
990

4.2.5 The Project Kick-Off Meeting

4.2.5.1 Analysis of the Tasks

Based on the work breakdown and the technical requirements of the individual work packages, the purchasing department reviewed offers from internal departments and external companies. Scheduling is defined in **weeks**. The selected departments and companies meet at a project kick-off meeting to decide on the scheduling for the individual work packages with the project team. Due to technological requirements the work packages are related to one another as specified below.

No.	Subproject/Work Package Description	Costs (1000EUR)	Duration (Weeks)	Direct Successors No. Work Package
1	Design	210	8	3 - 4 - 5 - 6 - 7
2	Project management	400	*	Start/Start-End/End
3	Steel support development	130	7	8 - 9 - 10 - 16
4	Track development	90	6	8 - 9 - 10 - 12
5	Car development	120	7	8 - 9 - 10 - 13
6	Electrical development	80	5	8 - 9 - 10 - 19
7	Building site preparation	90	3	11
8	Accelerator development	180	4	20
9	Software specification	40	6	14
10	Sound system development	240	8	22
11	Foundation excavation	260	4	15
12	Track manufacture	90	5	17
13	Car manufacture	70	6	18
14	Software programming	270	21	21
15	Foundation laying	380	8	23
16	Steel support production	1100	18	24
17	Track production	900	16	26
18	Production of car 1 - prototype	280	17	27
19	Electrical production	160	8	28 - 29
20	Accelerator production	340	20	29
21	Software Test	60	4	25
22	Sound system production	180	15	31
23	Building/Station production	600	16	32
24	Steel support assembly	290	8	26
25	Software documentation	20	3	30
26	Track Assembly	280	14	33 - 34
27	Assembly of car 1 - prototype	60	9	33 - 34
28	Electrical assembly	50	7	33 - 34
29	Accelerator assembly	40	8	33 - 34
30	Software installation	30	2	33 - 34
31	Sound system assembly	140	10	33 - 34
32	Power supply installation	340	6	33 - 34
33	Function test A	110	3	35 - 36
34	Function test B	80	4	37
35	Production of cars 2-4	210	5	38
36	Adjustment after Test A	70	3	38
37	Adjustment after Test B	50	3	38
38	Complete/Systematical Test	90	3	39 -40 -41 -42 -43
39	Track adjustment	60	3	44
40	Car adjustment	45	3	44
41	Software/electrical adjustment	65	4	44
42	System documentation	50	3	44 - 45
43	Green area, pavement, fence	70	3	46
44	Safety Standards acceptance	35	2	46
45	Briefing and training	40	2	46
46	Acceptance and delivery to the client	30	1	

The moderator outlined the fundamental aspects of the critical path method to all concerned at the kick-off meeting.

4.2.5.2 Fundamentals of the Critical Path Method

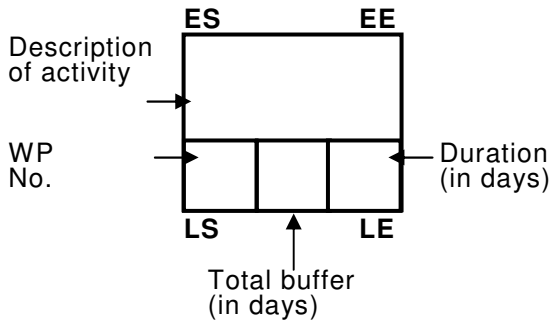
With the critical path method, the activities/work packages are chronologically ordered and linked with arrows. The following questions should be considered.

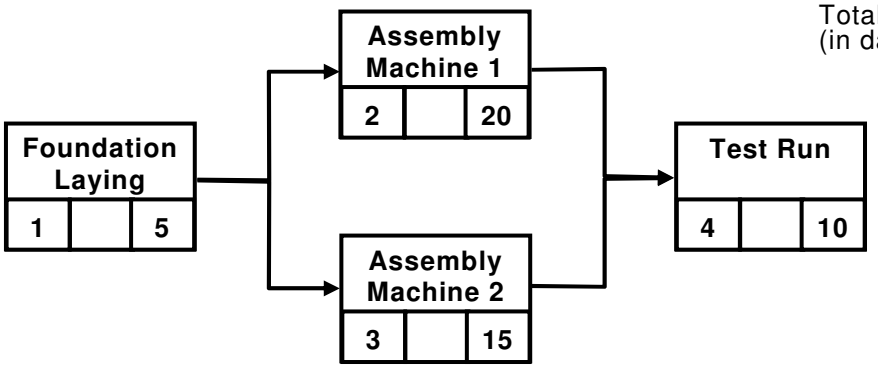
- Which activity must logically precede another activity?
- What is the duration of the activities/work packages?
- Can certain activities be processed in parallel?

An example of the development and computation of a network diagram

Below is an illustration of a network diagram for a project
(Note: the unit of time for the purpose of this example are days)

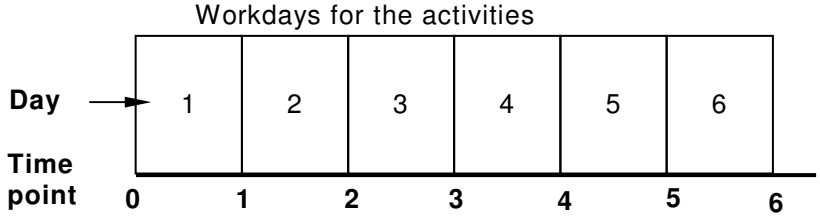
ES = Earliest starting point
EE = Earliest ending point
LS = Latest starting point
LE = Latest ending point
WP = Work Package





> Refer to **ES**, **EE**, **LS** and **LE** by **time points**.

The earliest starting point (ES) of the first activity/work package is by definition always time point 0. The second workday (see below) begins with time point 1.



> When working with the critical path method, it is important to maintain a distinction between **periods of time** (days, weeks, etc.) and **points in time**.

Computing a Network Diagram

Forward calculation:
Computation of the earliest end points (EE) of all activities/work packages from the beginning of the project.

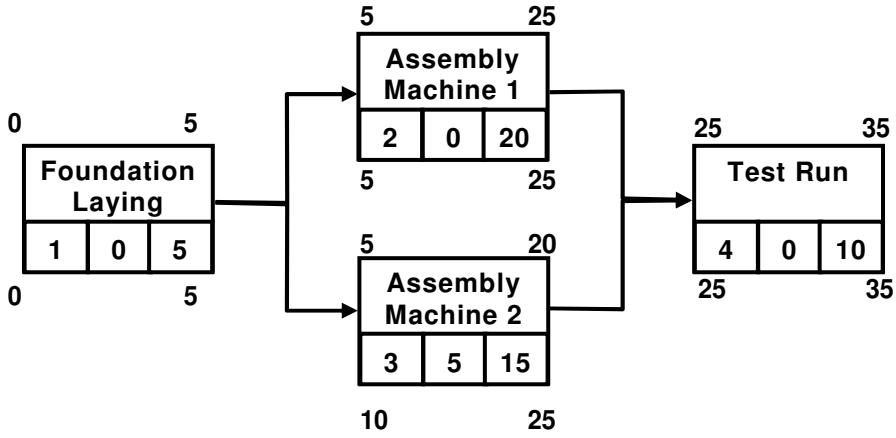
Backward calculation and buffers determination:
Subsequently, the earliest end (EE) of the project is set equal to the latest end (LE). Calculations proceed from the end of the network diagram and the latest starting points (LS) for the procedure/work packages are determined. The total buffer for the individual procedure/work packages is thus computed.

Total Buffer TB = Latest Start LS – Earliest Start ES.

Determining the critical path and/or the critical paths:

If the total buffer time for an activity is 0, then the activity/work package is **time critical**.
It is possible to have multiple chains of activities/work packages that all have buffer times of 0. These chains are referred to as **"critical paths"**.

The example of the calculation is as follows:



Work packages 1, 2 and 4 have buffers of 0 and accordingly lie on the critical path.

4.2.5.3 Advantages of the Critical Path Method (CPM)

The critical path method offers some important advantages over conventional planning methods. Utilisation of the critical path method shows that:

- It ensures a systematic approach to the project‘s interconnected activities.
- It ensures the appropriate scheduling of activities/work packages.
- It identifies when additional time is available, when it is not available, and when acceleration measures are critically needed.
- It serves as a flexible information medium for exchanging data between those leading the project and those implementing it, as well as among mobilized departments.
- It allows the project to be appropriately controlled and for monitoring of deadlines, capacity and costs.

Task for the Project Team

The Moderator requests that the project participants provide a network plan based on the specified relationships between the work packages for the roller coaster project. After which the following tasks must be completed:

- Compute the forward and backward calculations and
  - Determine the deadline for the project
  - Identify the critical paths (e.g. chains of work packages with buffers of 0).
  - Determine which work packages are non-critical (e.g. have a buffer greater than 0)
- Calculate the total costs for the overall project.

5 Project Optimization and Quote Submission

5.1 Starting Situation

Based on the chronological and predecessor-successor relationships, the durations and costs of the work packages (as discussed at the kick-off meeting ,see page 3), the starting situation is as follows:

Starting Situation – Network diagram

			Costs	Time	Buffer	Earliest		Latest	
No.	Description	Status	(TEUR)	(Weeks)		Start	End	Start	End
1	Design	NS	210	8	0	0	8	0	8
2	Project management	NS	400	50	14	8	58	22	72
3	Steel support development	NS	130	7	0	8	15	8	15
4	Track development	NS	90	6	5	8	14	13	19
5	Car development	NS	120	7	4	8	15	12	19
6	Electrical development	NS	80	5	6	8	13	14	19
7	Building site preparation	NS	90	3	10	8	11	18	21
8	Accelerator development	NS	180	4	8	15	19	23	27
9	Software specification	NS	40	6	4	15	21	19	25
10	Sound system development	NS	240	8	7	15	23	22	30
11	Foundation excavation	NS	260	4	10	11	15	21	25
12	Track manufacture	NS	90	5	6	14	19	20	25
13	Car manufacture	NS	70	6	8	15	21	23	29
14	Software programming	NS	270	21	4	21	42	25	46
15	Foundation laying	NS	380	8	10	15	23	25	33
16	Steel support production	NS	1100	18	0	15	33	15	33
17	Track production	NS	900	16	6	19	35	25	41
18	Production of car I – Prototype	NS	280	17	8	21	38	29	46
19	Electrical production	NS	160	8	26	13	21	39	47
20	Accelerator production	NS	340	20	8	19	39	27	47
21	Software test	NS	60	4	4	42	46	46	50
22	Sound system production	NS	180	15	7	23	38	30	45
23	Building/Station production	NS	600	16	10	23	39	33	49
24	Steel support assembly	NS	290	8	0	33	41	33	41
25	Software documentation	NS	20	3	4	46	49	50	53
26	Track Assembly	NS	280	14	0	41	55	41	55
27	Assembly of car I – Prototype	NS	60	9	8	38	47	46	55
28	Electrical assembly	NS	50	7	27	21	28	48	55
29	Accelerator assembly	NS	40	8	8	39	47	47	55
30	Software installation	NS	30	2	4	49	51	53	55
31	Sound system assembly	NS	140	10	7	38	48	45	55
32	Power supply installation	NS	340	6	10	39	45	49	55
33	Function Test A	NS	110	3	0	55	58	55	58
34	Function Test B	NS	80	4	1	55	59	56	60
35	Production of cars 2-4	NS	210	5	0	58	63	58	63
36	Adjustment after Test A	NS	70	3	2	58	61	60	63
37	Adjustment after Test B	NS	50	3	1	59	62	60	63
38	Complete/Systematical Test	NS	90	3	0	63	66	63	66
39	Track Adjustment	NS	60	3	1	66	69	67	70
40	Car Adjustment	NS	45	3	1	66	69	67	70
41	Software adjustment	NS	65	4	0	66	70	66	70
42	System documentation	NS	50	3	1	66	69	67	70
43	Green area, pavement, fence	NS	70	3	3	66	69	69	72
44	Safety Standards Acceptance	NS	35	2	0	70	72	70	72
45	Briefing and Training	NS	40	2	1	69	71	70	72
46	Acceptance and delivery to the client	NS	30	1	0	72	73	72	73

Result: The resulting duration of 73 weeks far exceeds the client's requirement of 65 weeks.

5.2 Optimization Possibilities

For many of the project's work packages it is possible to alter the planned duration.

- For work packages with a buffer of 0, a decreased duration could decrease the cost of the time penalty.
- Where a buffer is present lengthening of the duration can be examined to see whether any advantages occur, e.g. in terms of costs.

5.2.1 Alternative Courses of Action:

The purchasing department at Hypermax Inc. has discussed possible acceleration and extension alternatives and their effects with all of the project's participants and other potential suppliers. The results are summarized in the Appendix.

Each alternative can affect the respective work packages in terms of:

- **Duration**: + / —
- **Costs:** + / —
- **Technology index:** + / —
- **Quality index:** + / —

Based on the purchaser's research, alternatives 1 and 2 each entail acceleration measures. Alternative 3 is an extension measure.

In deciding between alternatives, the **rewards** and **penalties** of clients must be considered. See section 4.2.2 on page 15.

Important: Unforeseen events and disturbances may occur during each phase of the project with different effects. These events can also influence the duration, costs, and indices of the various work packages. Your alternative courses of action and solutions can help you in achieving project goals.

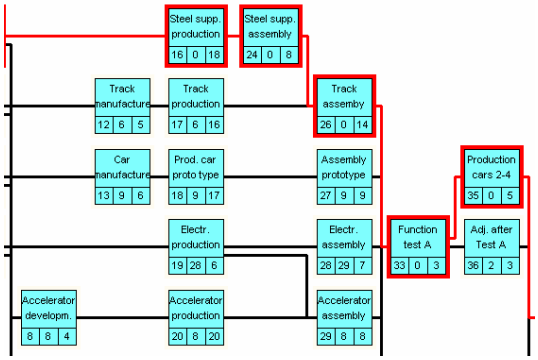
5.2.2 Proceeding with Project Optimization and Bid Submission

Before an offer is made to **Family-Fun Inc.** the project plan should be optimized. This is achieved through your PC-supported participants' system. The impact of your various courses of action on the end date of the project, the total costs, the profit margin, and the technology and quality indices can be tested.

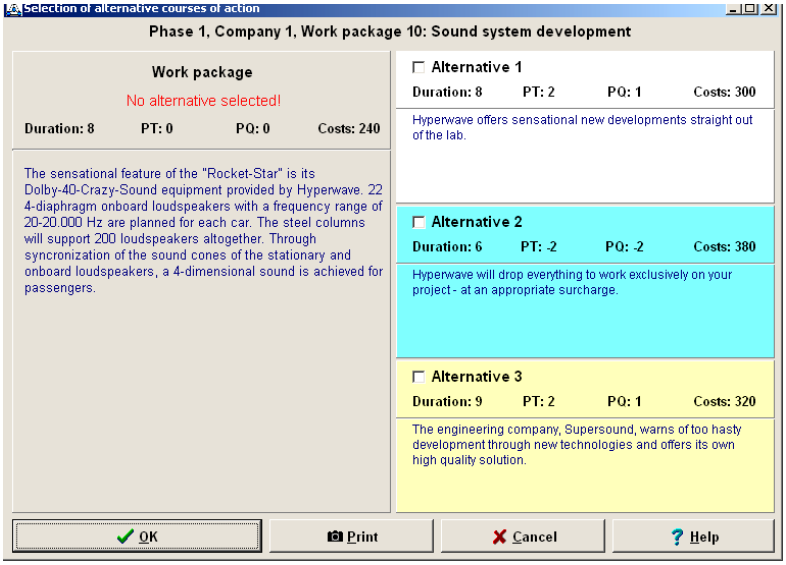
Selecting a Course of Action With Respect to the Network Diagram

The participants' system allows you to plan the project by using the network diagram.

Click on the work package box in the network diagram. Your possible alternatives will be displayed.



The dialog box for selecting between alternative courses of action will appear. Make your selection with a click in the corresponding checkbox.



With each selection the network diagram will be calculated anew so that the effects of each decision are apparent. You can cancel a previous selection by removing your choice from the checkbox with a click.

In this way, the network diagram is a work aid for planning and optimizing your project.

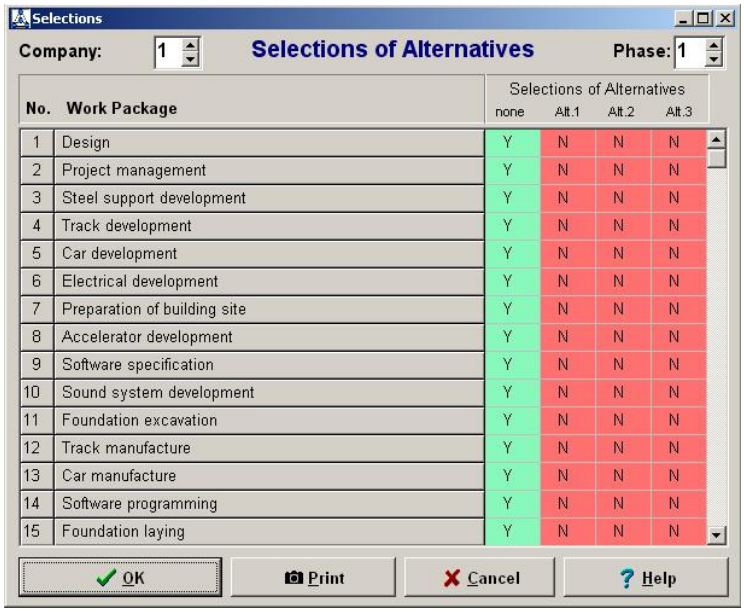
5.2.2.2 Decision Form for the Selection of Alternative Courses of Action

A decision form is also available for selecting between alternative courses of action.

An action can be selected by entering a **Y** in the corresponding column.

Double click on the work packages to display the default settings and the alternative courses of action. Here you can enter the alternative course of action you have chosen.

To return to the default settings enter **Y** in the first column.



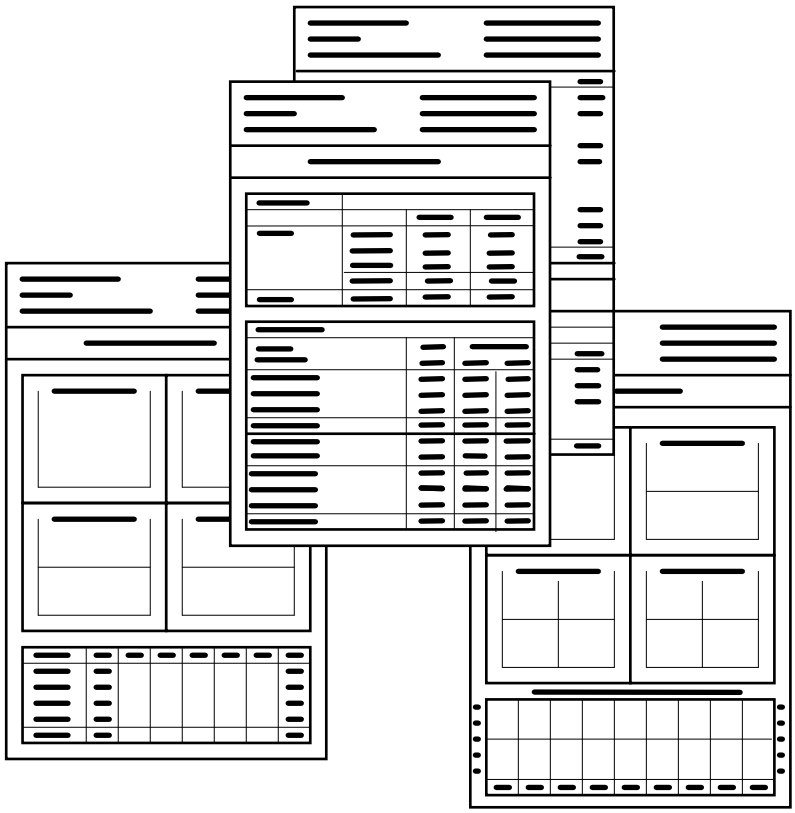
The print function allows you to print an overview of the selected alternatives.

5.3 Project Implementation and Monitoring

After making your bid, the project begins according to the conditions entered. You must monitor and coordinate the project's progress. The project is not expected to proceed uninterrupted. As the project progresses, the respective network diagram and participant reports will provide you with important information for decision making.

TOPSIM
Project Management

Project Implementation
Decisions and Reports



6 The Process of the Simulation - Decisions and Reports

6.1 Overview

6.1.1 Phases/Sections

The project is divided into several phases, which are made available by the instructor. Each phase is divided into a number of weeks.

After you have optimized your plans and submitted a bid the project proceeds according to your decision, phase by phase. Once a phase is made available by the instructor, decisions can be made for particular weeks within the phase.

6.1.2 Simulating Weeks

6.1.2.1 Planning Optimization

Before a week is released you can re-optimize your planning by scrutinizing the network diagram and choosing alternative courses of action and work packages which have not yet begun. Each time an alternative course of action is selected, the network diagram is computed anew so that the effects of your decision are evident. Accordingly, costs contingent on changes are also considered. Changes are only binding after the week has been planned and released.

When the planning effects a new critical path this will be immediately apparent. The consequences of your decisions can be viewed at any time in the project status report.

6.1.2.2 Week Release and Simulation

Once your optimization is complete, you release the week and then the week with all potential events will be simulated. Consequently all work packages beginning during this week will be started. Should disturbances/unforeseen events arise, following your chosen work package, you will be notified and information about potential alternatives provided.

At the end of a simulated week, the week's results are shown in the network diagram task bar and in the project status report. The network diagram also displays shows the critical path(s). Before starting the next week you have the opportunity to re-optimize you planning.

6.1.3 End of Phase

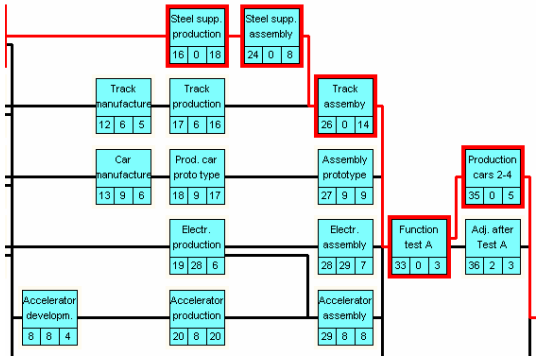
After all of the weeks of the phase are simulated, your decisions will be computed by the instructor. The instructor will combine the results of all the groups, analyze them and then release the next phase.

6.2 Decisions

6.2.1 Planning Optimization: Selection of Alternative Courses of Action for Future Work packages

A decision form is available for selecting between action alternatives.

You can select alternatives in the network diagram.
Click on the activities box in the network diagram and the possible alternative courses of action will be displayed in the dialog box.

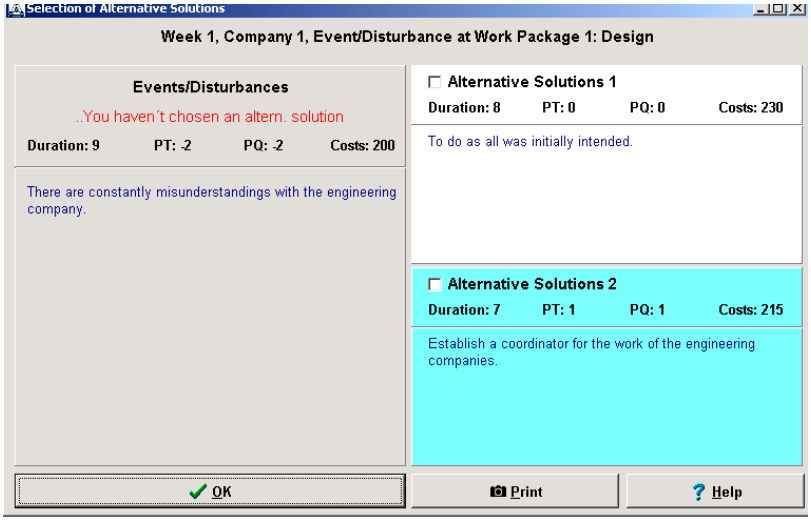


6.2.2 Selection of Alternative Solutions when Disturbances/Events Arise

Should disturbances arise pertaining to work packages in progress, these will be sequentially identified.

At the beginning of a work package an event/disturbance report is shown in a dialog box. The event/disturbance report includes possible **alternative solutions**.

Select an alternative by clicking the corresponding checkbox. Confirm your choice with **OK** or select **Cancel**.



After you have addressed all events/disturbances, the entire week is calculated based on your decisions regarding the work packages, up to the end of the project. The results are displayed in the project report and the network diagram. Before releasing the week you may re-optimize your planning.

6.3 Reports

6.3.1 Participants' Report 1 "Work Package Overview, Potential and Selected Alternatives"

PARTICIPANTS' REPORT 1: Work Package Overview, Possible and Selected Alternatives

	Subproject/Work Package					
No.	Description	Costs (TEUR)	Duration (Weeks)	Altern.1	Altern.2	Altern.3
1	Design	210	8	X	X	X
2	Project Management	400	50	X	X	X
3	Steel Support Development	130	7	X	X	X
4	Track Design	90	6	X	X	X
5	Car Development	120	7	X	X	X
6	Electrical Development	80	5	X	X	X
7	Building Site Preparation	90	3	X	X	X
8	Accelerator Development	180	4	X	X	X
9	Software Specification	40	6	X	X	X
10	Sound System Development	240	8	X	X	X
11	Foundation Excavation	260	4	X	X	X
12	Track Manufacture	90	5	X	X	X
13	Car Manufacture	70	6	X	X	X
14	Software Programming	270	21	X	X	X
15	Foundation laying	380	8	X	X	X
16	Steel Support Production	1100	18	X	X	X
17	Track Production	900	16	X	X	X
18	Production of Car I - Prototype	280	17	X	X	X
19	Electrical Production	160	8	X	X	X
20	Accelerator Production	340	20	X	X	X
21	Software Test	60	4	X	X	X
22	Sound System Production	180	15	X	X	X
23	Building/Station Production	600	16	X	X	X
24	Steel Support Assembly	290	8	X	X	X
25	Software Documentation	20	3	X	X	X
26	Track Assembly	280	14	X	X	X
27	Assembly of Car I Prototype	60	9	X	X	X
28	Electrical Assembly	50	7	X	X	X
29	Accelerator Assembly	40	8	X	X	X
30	Software Installation	30	2	X	X	X
31	Sound System Assembly	140	10	X	X	X
32	Power Supply Installation	340	6	X	X	X
33	Function Test A	110	3	X	X	X
34	Function Test B	80	4	X	X	X
35	Production of Cars 2-4	210	5	X	X	X
36	Adjustment after Test A	70	3	X	X	X
37	Adjustment after Test B	50	3	X	X	X
38	Complete/Systematic Test	90	3	X	X	X
39	Track Adjustment	60	3	X	X	X
40	Car Adjustment	45	3	X	X	X
41	Software Adjustment	65	4	X	X	X
42	System Documentation	50	3	X	X	X
43	green areas/ Pavement / Fence	70	3	X	X	X
44	Safety Standards Acceptance	35	2	X		X
45	Briefing and Training	40	2	X		X
46	Acceptance/Delivery to the Client	30	1	X		
	Total Costs / End Date	8525	73			

X = Possible Alternative, *** = Selected Alternative, --- = Selection no longer possible

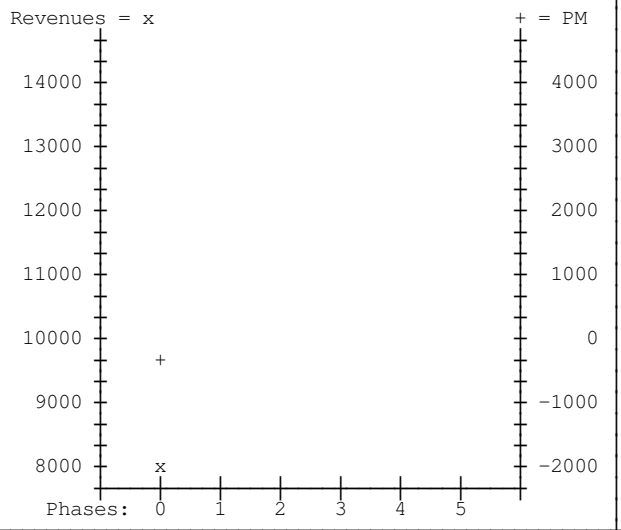
6.3.2 Participants' Report 2 "Time, Costs, PM, Performance"

PARTICIPANTS' REPORT 2: Time, Costs, PM, Performance

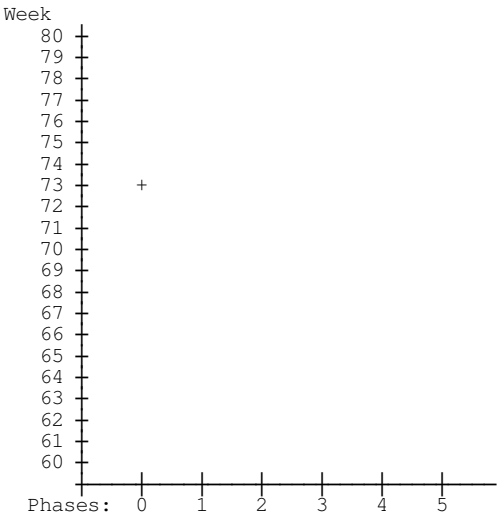
Profit Margin						
	Project Duration	Total Costs	Indices		Revenues	Profit Margin
Plan	(Weeks)	(TEUR)	Technol.	Quality	(TEUR)	(TEUR)
.. before optimization	73	8525	100	100	8050	-475

OVERVIEW OF THE PROJECT RESULTS

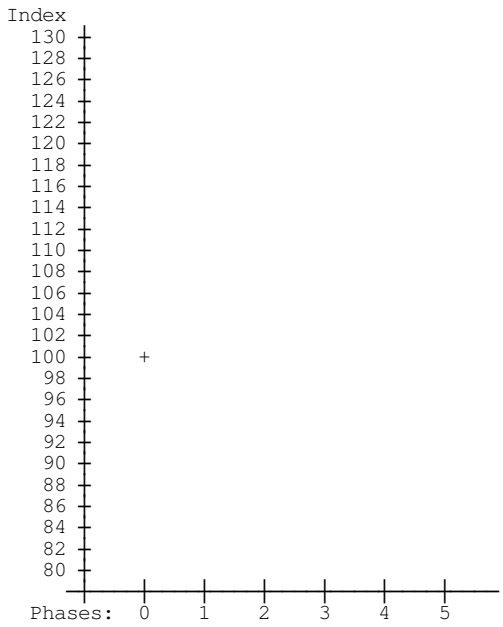
REVENUES / PROFIT MARGIN (PM) (TEUR)



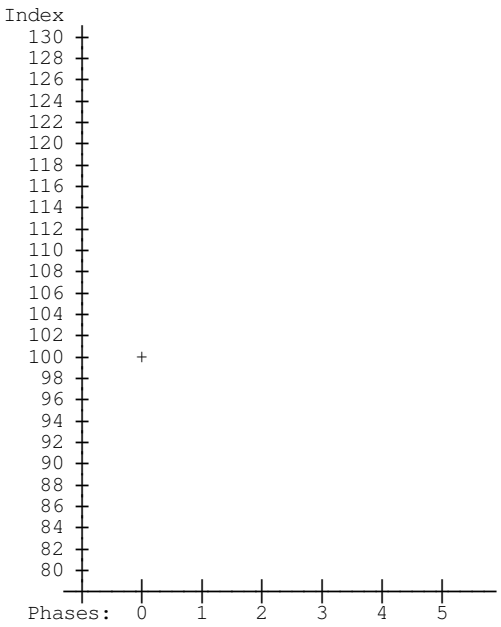
END DATE



TECHNOLOGY / ATTRACTION



QUALITY / RELIABILITY



6.3.3 Participants' Report 3 "Project Status Report"

PARTICIPANTS' REPORT 3: Project Status Report

No.	Description of the Work Package	Status	Costs (TEUR)	Time (wks)	Buffer (wks)	Project: Techn.	Project: Qual.	Earliest Start	Earliest End	Latest Start	Latest End
1	Design	NS	210	8	0**	0	0	0	8	0	8
2	Project Management	NS	400	50	14	0	0	8	58	22	72
3	Steel Support Development	NS	130	7	0**	0	0	8	15	8	15
4	Track Design	NS	90	6	5	0	0	8	14	13	19
5	Car Development	NS	120	7	4	0	0	8	15	12	19
6	Electrical Development	NS	80	5	6	0	0	8	13	14	19
7	Building Site Preparation	NS	90	3	10	0	0	8	11	18	21
8	Accelerator Development	NS	180	4	8	0	0	15	19	23	27
9	Software Specification	NS	40	6	4	0	0	15	21	19	25
10	Sound System Development	NS	240	8	7	0	0	15	23	22	30
11	Foundation Excavation	NS	260	4	10	0	0	11	15	21	25
12	Track Manufacture	NS	90	5	6	0	0	14	19	20	25
13	Car Manufacture	NS	70	6	8	0	0	15	21	23	29
14	Software Programming	NS	270	21	4	0	0	21	42	25	46
15	Foundation laying	NS	380	8	10	0	0	15	23	25	33
16	Steel Support Production	NS	1100	18	0**	0	0	15	33	15	33
17	Track Production	NS	900	16	6	0	0	19	35	25	41
18	Production of Car I - Prototype	NS	280	17	8	0	0	21	38	29	46
19	Electrical Production	NS	160	8	26	0	0	13	21	39	47
20	Accelerator Production	NS	340	20	8	0	0	19	39	27	47
21	Software Test	NS	60	4	4	0	0	42	46	46	50
22	Sound System Production	NS	180	15	7	0	0	23	38	30	45
23	Building/Station Production	NS	600	16	10	0	0	23	39	33	49
24	Steel Support Assembly	NS	290	8	0**	0	0	33	41	33	41
25	Software Documentation	NS	20	3	4	0	0	46	49	50	53
26	Track Assembly	NS	280	14	0**	0	0	41	55	41	55
27	Assembly of Car I Prototype	NS	60	9	8	0	0	38	47	46	55
28	Electrical Assembly	NS	50	7	27	0	0	21	28	48	55
29	Accelerator Assembly	NS	40	8	8	0	0	39	47	47	55
30	Software Installation	NS	30	2	4	0	0	49	51	53	55
31	Sound System Assembly	NS	140	10	7	0	0	38	48	45	55
32	Power Supply Installation	NS	340	6	10	0	0	39	45	49	55
33	Function Test A	NS	110	3	0**	0	0	55	58	55	58
34	Function Test B	NS	80	4	1	0	0	55	59	56	60
35	Production of Cars 2-4	NS	210	5	0**	0	0	58	63	58	63
36	Adjustment after Test A	NS	70	3	2	0	0	58	61	60	63
37	Adjustment after Test B	NS	50	3	1	0	0	59	62	60	63
38	Complete/Systematic Test	NS	90	3	0**	0	0	63	66	63	66
39	Track Adjustment	NS	60	3	1	0	0	66	69	67	70
40	Car Adjustment	NS	45	3	1	0	0	66	69	67	70
41	Software Adjustment	NS	65	4	0**	0	0	66	70	66	70
42	System Documentation	NS	50	3	1	0	0	66	69	67	70
43	green areas/ Pavement / Fence	NS	70	3	3	0	0	66	69	69	72
44	Safety Standards Acceptance	NS	35	2	0**	0	0	70	72	70	72
45	Briefing and Training	NS	40	2	1	0	0	69	71	70	72
46	Acceptance/Delivery to the Client	NS	30	1	0**	0	0	72	73	72	73

Work Package Costs (TEUR)	8525	Technology (Index)	100	100	Quality (Index)
Change Costs (TEUR)	0	Bonus/Penalty	0	0	Bonus/Penalty
Delay Costs (TEUR)	0	PT (TEUR)			PQ (TEUR)
Total Work Package Costs (TEUR)	8525	Bonus/Penalty End Date			-1950 (TEUR)
		Bonus Milestone Date			0 (TEUR)
Profit Margin Phase 0 (TEUR)	-475	Total Bonuses/Penalties			-1950 (TEUR)

** = critical work package

6.3.4 Participants' Report 4 "Alternatives and Project Results"

PARTICIPANTS' REPORT 4: Alternatives and Project Results

Work Package			selected Alternatives	Events:					
No.	Description	Risk:	0	Ev.	S/A	Time	Costs	PT	PQ
1	Design		0						
2	Project Management		0						
3	Steel Support Development		0						
4	Track Design		0						
5	Car Development		0						
6	Electrical Development		0						
7	Building Site Preparation		0						
8	Accelerator Development		0						
9	Software Specification		0						
10	Sound System Development		0						
11	Foundation Excavation		0						
12	Track Manufacture		0						
13	Car Manufacture		0						
14	Software Programming		0						
15	Foundation laying		0						
16	Steel Support Production		0						
17	Track Production		0						
18	Production of Car I - Prototype		0						
19	Electrical Production		0						
20	Accelerator Production		0						
21	Software Test		0						
22	Sound System Production		0						
23	Building/Station Production		0						
24	Steel Support Assembly		0						
25	Software Documentation		0						
26	Track Assembly		0						
27	Assembly of Car I Prototype		0						
28	Electrical Assembly		0						
29	Accelerator Assembly		0						
30	Software Installation		0						
31	Sound System Assembly		0						
32	Power Supply Installation		0						
33	Function Test A		0						
34	Function Test B		0						
35	Production of Cars 2-4		0						
36	Adjustment after Test A		0						
37	Adjustment after Test B		0						
38	Complete/Systematic Test		0						
39	Track Adjustment		0						
40	Car Adjustment		0						
41	Software Adjustment		0						
42	System Documentation		0						
43	green areas/ Pavement / Fence		0						
44	Safety Standards Acceptance		0						
45	Briefing and Training		0						
46	Acceptance/Delivery to the Client		0						

Ev. = Event
S/A = Selected Solution/Alternative
PT = Project Technology
PQ = Project Quality

X = low risk
XX = medium risk
XXX = high risk

6.3.5 Participants` Report 5 “Bar Chart”

PARTICIPANTS' REPORT 5: Bar Chart

No.	Description	Earliest Start	Earliest End	Latest Start	Latest End	Bar Chart (PP P P P; 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85)
1	Design	1	8	1	8	00000000
2	Project Management	9	58	23	72	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX----------
3	Steel Support Development	9	15	9	15	0000000
4	Track Design	9	14	14	19	XXXXXX-----
5	Car Development	9	15	13	19	XXXXXXX----
6	Electrical Development	9	13	15	19	XXXXX------
7	Building Site Preparation	9	11	19	21	XXX----------
8	Accelerator Development	16	19	24	27	XXXX--------
9	Software Specification	16	21	20	25	XXXXXX----
10	Sound System Development	16	23	23	30	XXXXXXXX-------
11	Foundation Excavation	12	15	22	25	XXXX----------
12	Track Manufacture	15	19	21	25	XXXXX------
13	Car Manufacture	16	21	24	29	XXXXXX--------
14	Software Programming	22	42	26	46	XXXXXXXXXXXXXXXXXXXX----
15	Foundation laying	16	23	26	33	XXXXXXXX----------
16	Steel Support Production	16	33	16	33	0000000000000000000
17	Track Production	20	35	26	41	XXXXXXXXXXXXXXXX------
18	Production of Car I - Prototype	22	38	30	46	XXXXXXXXXXXXXXXXX---------
19	Electrical Production	14	21	40	47	XXXXXXXX-------------------------
20	Accelerator Production	20	39	28	47	XXXXXXXXXXXXXXXXXXXX--------
21	Software Test	43	46	47	50	XXXX----
22	Sound System Production	24	38	31	45	XXXXXXXXXXXXXXX--------
23	Building/Station Production	24	39	34	49	XXXXXXXXXXXXXXXX----------
24	Steel Support Assembly	34	41	34	41	00000000
25	Software Documentation	47	49	51	53	XXX----
26	Track Assembly	42	55	42	55	00000000000000
27	Assembly of Car I Prototype	39	47	47	55	XXXXXXXXX--------
28	Electrical Assembly	22	28	49	55	XXXXXXX-------------------------
29	Accelerator Assembly	40	47	48	55	XXXXXXXX--------
30	Software Installation	50	51	54	55	XX----
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
46	Acceptance/Delivery to the Client	73	73	73	73	0

0 = duration critical work package
X = duration non-critical work package
- = total float work package

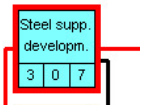
6.3.6 Participants' Report 6: "Network Diagram"

The network diagram will be distributed by the instructor once the project team has submitted their manually configured plan. The network diagram illustrates the situation at the start of the simulation before optimization has taken place.

The network diagram involves several functions:

OK	Quits the network diagram and returns you to your workspace.
Print	Prints the network diagram
Help	Opens TOPSIM-Help.
Project Status Report	Opens the Project Status Report which may be viewed at any time during planning.
Release Week	Ends planning and starts simulating the week.
Project value	Indicates: **Duration, Costs, Technology (PT), Quality (PQ), Revenues and Profit Margin (PM)**

Critical Path:

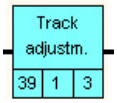


All work packages on the critical path are indicated by a red border or line.

Notable:

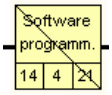
Work packages which are nearly critical (e.g. a buffer of only one week) are indicated by a blue border.

Work packages which have not yet been started:



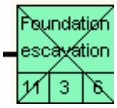
Work packages which have not yet been started are bright blue.

Work packages in progress:



Work packages in progress are yellow with a diagonal line through them.

Finished work packages:



Finished work packages are green and are crossed out.

The network diagram is the most important planning and monitoring tool for the project.

TOPSIM
Project Management

Appendix

Evaluation of the action alternatives for work packages

Planning Example

Appendix: Evaluation of Alternative Courses of Action – Planning example

Work package / No.:	10	Designation:	Sound System Development
Duration (Weeks): 8	Costs (T€): 240	Responsible:	Engineering Company

Description and information on the work package

A novel and unique feature of the RocketStar is its Dolby-40-Crazy-Sound equipment provided by Hyperwave. Each car will have 22 4D loudspeakers with a frequency range of 20 to 20.000 Hz. Along the tracks the steel supports will hold 200 loudspeakers. By synchronizing all of the stationary and onboard loudspeakers passengers will have a 4 dimensional sound experience.

Risk assessment:
* (green) = low
** (yellow) = middle
*** (red) = high

Work Package according to the primarily planning

	Alternative 1	Alternative 2	Alternative 3
Time / Costs	8 / 300	6 / 380	9 / 320
Points (Tech. / Qual.)	+2 / +1	-2 / -2	+2 / +1
	Hyperwave offers sensational new developments straight out of the lab.	Hyperwave will drop everything to work exclusively on your project – at an appropriate surcharge.	The engineering company, Supersound, warns against hasty development of new technologies and offers its own high quality solution.
Risk			

Evaluation of Alternatives (Comparing rewards and penalties, see section 4.2.2)

Changes compared to Phase 0	+/-	Δ Costs T€	Δ Revenues T€	+/-	Δ Costs T€	Δ Revenues T€	+/-	Δ Costs T€	Δ Revenues T€
Potential Time (Weeks)	*0*			*-2*		*600*	*1*		
Cost of Work Package (T€)		*60*			*140*			*80*	
Cost of Change (T€)		*12*			*12*			*12*	
Project Technology (Points)	*2*		*100*	*-2*	*100*		*2*		*100*
Project Quality (Points)	*1*		*60*	*-2*	*120*		*1*		*60*
Sum		*72*	*160*		*372*	*600*		*92*	*160*
Profit Margin (T€)		*88*			*228*			*68*	
Δ Profit Margin/Week Accelerated (T€)		*---*			*114*			*---*	
Δ Profit Margin/Week Extended (T€)		*---*			*---*			*68*	