Project Manual

Project: PLCopen-Editor

Course:	Software Engineering
Class:	Tinf19C
Professor:	Christian Holder, Markus Rentschler
Project manager:	Mouaz Tabboush
Team members:	Elian Yildirim Franziska Kopp Leonie de Santis
Version:	PHB 1.0, May 2021

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1. Table of revision

Version	Date	Comment	Author
0.1	02.11.2020	Created Project assignment und Project organization	Leonie de Santis
0.2	03.11.2020	Work breakdown structure	Mouaz Tabboush
0.3	03.11.2020	Project context, Project Objectives Plan, WP-Description, Milestone plan, Gantt chart, Project risks	Leonie de Santis
0.4	13.05.2021	Update List of Operations	Leonie de Santis
1.0	14.05.2021	Update Gantt chart	Leonie de Santis

2. Project assignment

<table>
<tr><th colspan="2">Project assignment</th></tr>
<tr><td>Project objective (Output):
Development of an editor GUI, which supports the PLC programming languages FBD (Function Block Diagram) and SFC (Sequential Function Chart). The common logic blocks should be available as graphical library elements and should be able to be dragged into the editor window and connected with each other.
It should be possible to save and load the PLC programs as PLCopen or AML.</td><td>Non-objectives / Non-contents:<ul><li>The PLC programming languages LAD, IL and ST need not be supported</li><li>The verification of the function of an example program on a runtime system was taken from the requirements and is optional.</li></ul>.</td></tr>
<tr><td colspan="2">Project benefits (Outcome):
With the PLCopen-Editor GUI graphical PLC programs can be created. The languages FBD and SFC as well as the common logic blocks are available for this purpose. The programs can be saved or loaded as PLCopen XML or AML files.
The exported file can be imported and loaded in other development environments (e.g. AML editor).</td></tr>
<tr><td>Project client: C. Holder; M. Rentschler</td><td>Project manager: Mouaz Tabboush</td></tr>
<tr><td>Team members:<ul><li>Elian Yildirim</li><li>Franziska Kopp</li><li>Leonie de Santis</li></ul></td><td>Other defendants:</td></tr>
<tr><td>Main tasks:<ul><li>Documentation</li><li>Analysis</li><li>Design</li><li>Coding</li><li>Testing</li></ul></td><td>Milestones:<ul><li>Analysis- / Design-Phase</li><li>Coding-Phase</li><li>Testing-Phase</li><li>Project completion</li></ul></td></tr>
<tr><td>Start of project: Introductory lecture and project awarding</td><td>Start date: 11.09.2020</td></tr>
<tr><td>End of project: Presentation of the result</td><td>End date: Mai 2021</td></tr>
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3. Project Objectives Plan

Objective type	Project objectives
Sub-objectives:	Design: • Workflow • Editor GUI • Import/Export Coding: • Homepage • Editor window • Programming languages: FBD, SFC • FBs that are dragged into the editor window and connected • Import/Export Testing: • Error Detecting • GUI Testing • Export Testing • Side effects (Delete, Move, …) • Components (Function Blocks, Connectors, Variables)

4. Project context

Initial situation
For the creation of PLC programs there is an editor of the open source project OpenPLC, which can be used as a reference.

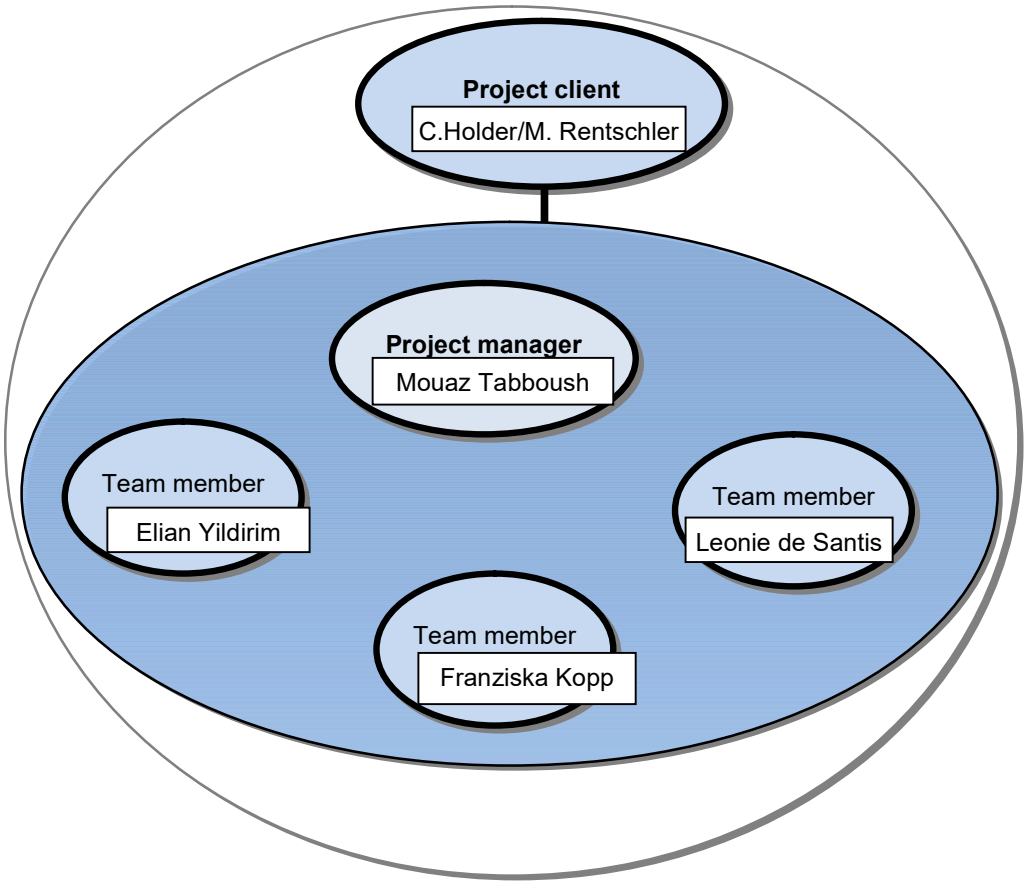
Temporal project context	
Pre-project phase	**Post-project phase**
• Familiarization in PLC • Familiarization with the OpenPLC editor	• Further PLC programming languages can be added • Additional function modules can be added

Factual project context	
Context	**Measures required**
Other projects and exams in the theoretical phase	Fair distribution of tasks within the team and keeping to deadlines
Projects in the practical phase and the resulting time constraints	Longer periods of time for tasks to be performed

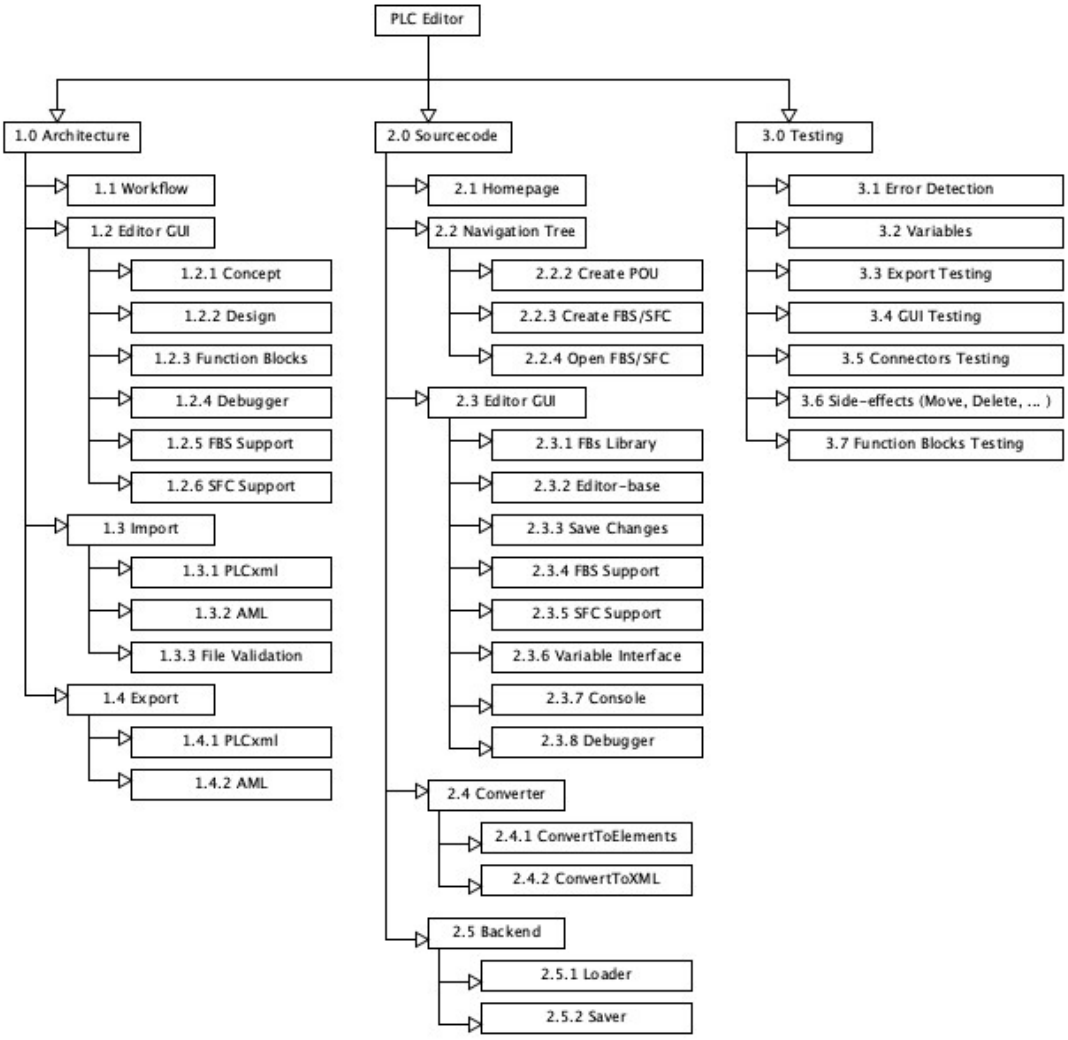
Social context			
Stakeholder group	**Potentials / Chances**	**Conflicts / Risks**	**Measures**
Client	Satisfied with the results	Changes in requirements during the project phase	Clear and regular communication between client and contractor
Contractor	Achieving the requirements	Difficulties within the team and time conflicts	Useful, regular meetings and keeping to deadlines
User	Using the PLCopen-Editor	difficulties in handling the program	Clear GUI structure and self-explanatory operation

5. Project organization

Project role	Role Description	Name
Project client	• Client	C. Holder M. Rentschler
Project manager	• Project manager und Test manager	Mouaz Tabboush
Team members	• Developer • Technical writer • Product manager • Test manager	Elian Yildirim Franziska Kopp Leonie de Santis



6. Work Breakdown Structure (WBS)



7. WP-Description

Work package: 0.0 Analysis	
WP content / outcome:	• CRS • SRS • BC • PM • SAS
Ownership:	Mouaz Tabboush, Leonie de Santis
Collaboration:	Elian Yildirim, Franziska Kopp

Work package: 1.0 Architecture/Design	
WP content / outcome:	• Workflow • Editor GUI • Import, Export
Ownership:	Elian Yildirim, Mouaz Tabboush
Collaboration:	Franziska Kopp, Leonie de Santis

Work package: 2.0 Coding	
WP content / outcome:	• Homepage • Project overview • Editor • FBD, SFC, FB • Import. Export • Converter
Ownership:	Leonie de Santis, Franziska Kopp
Collaboration:	Mouaz Tabboush, Elian Yildirim

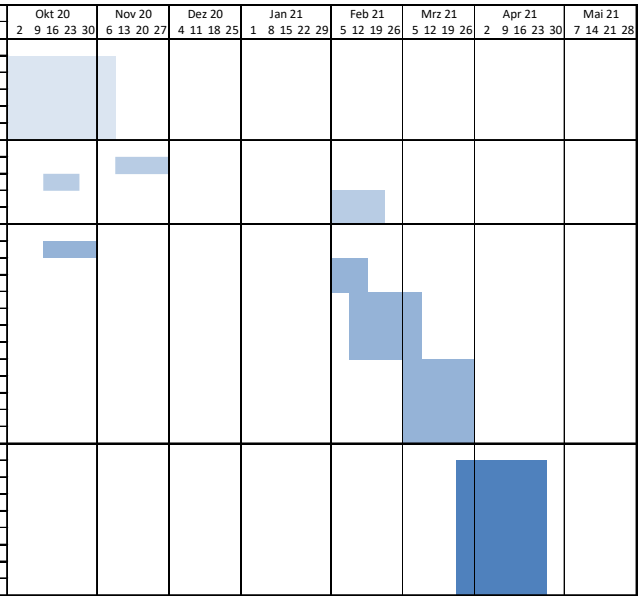
Work package: 3.0 Testing	
WP content / outcome:	• Error Detecting • Variables • Export: PLCopen XML / AML testing • GUI testing • Side-effects (Delete, Move, …) • Function Blocks
Ownership:	Franziska Kopp, Elian Yildirim
Collaboration:	Leonie de Santis, Mouaz Tabboush

8. Milestone plan

PSP-Code	Milestone name	PLAN - Date	ACTUAL - Date
0.0	**Analysis**		
0.1	CRS	06.11.2020	28.10.2020
0.2	BC	06.11.2020	7.11.2020
0.3	SRS	06.11.2020	6.11.2020
0.4	PM	06.11.2020	3.11.2020
0.5	SAS	06.11.2020	9.11.2020
1.0	**Architecture/Design**		
1.1	Workflow	27.11.2020	9.11.2020
1.2	Editor GUI	23.10.2020	23.10.2020
1.3	Import	19.02.2021	19.01.2021
1.4	Export	19.02.2021	19.01.2021
2.0	**Coding**		
2.1	Homepage	22.12..2020	12.12.2020
2.2	Navigation tree	12.02.2021	10.02.2021
2.3	Editor	12.03.2021	04.05.2021
2.3.1	FBs	05.04.2021	27.04.2021
2.3.4	FBD	05.04.2021	30.03.2021
2.3.5	SFC	05.04.2021	30.03.2021
2.3.6	Variables Interface	05.03.2021	09.03.2021
2.4	Converter	26.03.2021	23.02.2021
2.5.1	Loader/Import	26.03.2021	23.02.2021
2.5.2	Saver/Export	26.03.2021	22.04.2021
3.0	**Testing**		
3.1	Error Detecting	05.05.2020	13.05.2021
3.2	Variables	05.05.2020	13.05.2021
3.3	Export testing	05.05.2020	13.05.2021
3.4	GUI-Testing	05.05.2020	13.05.2021
3.5	Connector-Testing	05.05.2020	13.05.2021
3.6	Side effects (Delete, Move, …)	05.05.2020	13.05.2021
3.7	Function Blocks Testing	05.05.2020	13.05.2021

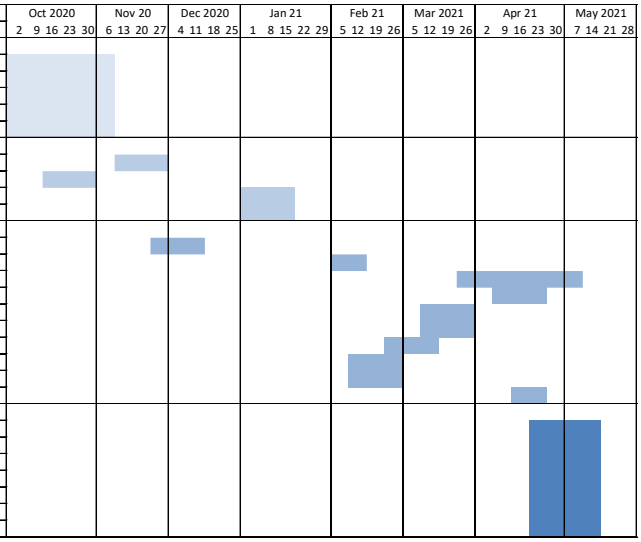
9. Gantt chart

Nr.	Predecessor	Task Name	Duration	Start	End
1		Phase 1-Analyse			
2		CRS	40 d	02.10.2020	06.11.2020
3		BC	40 d	02.10.2020	06.11.2020
4		SRS	40 d	02.10.2020	06.11.2020
5		PM	40 d	02.10.2020	06.11.2020
6		SAS	40 d	02.10.2020	06.11.2020
7		Phase 2-Architektur/Design			
8		Workflow	14 d	13.11.2020	27.11.2020
9		Editor-GUI	7 d	16.10.2020	23.10.2020
10		Import	14 d	05.02.2021	19.02.2021
11		Export	14 d	05.02.2021	19.02.2021
12		Phase 3-Coding			
13		Homepage	14 d	16.10.2020	30.10.2020
14		Navigation tree	7 d	05.02.2021	12.02.2021
15		Editor	7 d	05.02.2021	12.02.2021
16	9,15	FBs	21 d	12.02.2021	05.03.2021
17	9,15	FBD	21 d	12.02.2021	05.03.2021
18	9,15	SFC	21 d	12.02.2021	05.03.2021
19	9,15	Variables Interface	21 d	12.02.2021	05.03.2021
20		Console	21 d	05.03.2021	26.03.2021
21		Debugger	21 d	05.03.2021	26.03.2021
22		Converter	21 d	05.03.2021	26.03.2021
23	10	Loader/Importer	21 d	05.03.2021	26.03.2021
24	11	Saver/Exporter	21 d	05.03.2021	26.03.2021
25		Phase 4-Testing			
26		Error Detecting	28 d	26.03.2021	23.04.2021
27		Variables	28 d	26.03.2021	23.04.2021
28	19,2	PLCopen XML Testing	28 d	26.03.2021	23.04.2021
29	19,2	AML XML Testing	28 d	26.03.2021	23.04.2021
30	12	GUI Testing	28 d	26.03.2021	23.04.2021
31	16,17,18	Connectors Testing	28 d	26.03.2021	23.04.2021
32	15	Side-effects (Delete, Move,...)	28 d	26.03.2021	23.04.2021
33	16,17,18	Components	28 d	26.03.2021	23.04.2021



Actual gantt chart of 14.05.2021:

Nr.	Predecessor	Task Name	Duration	Start	End
1		Phase 1-Analysis			
2		CRS	40 d	02.10.2020	06.11.2020
3		BC	40 d	02.10.2020	06.11.2020
4		SRS	40 d	02.10.2020	06.11.2020
5		PM	40 d	02.10.2020	06.11.2020
6		SAS	40 d	02.10.2020	06.11.2020
7		Phase 2-Architecture/Design			
8		Workflow	14 d	13.11.2020	27.11.2020
9		Editor-GUI	7 d	16.10.2020	23.10.2020
10		Import	14 d	05.01.2021	19.01.2021
11		Export	14 d	05.01.2021	19.01.2021
12		Phase 3-Coding			
13		Homepage	14 d		12.12.2020
14		Navigation tree	7 d		10.02.2021
15		Editor	35 d		04.05.2021
16	9,15	FBs	21 d		27.04.2021
17	9,15	FBD	21 d		30.03.2021
18	9,15	SFC	21 d		30.03.2021
19	9,15	Variables Interface	14 d		09.03.2021
20		Converter	21 d		23.02.2021
21	10	Loader/Importer	21 d		23.03.2021
22	11	Saver/Exporter	7 d		22.04.2021
23		Phase 4-Testing			
24		Error Detecting	21 d	23.04.2021	13.05.2021
25		Variables	21 d	23.04.2021	13.05.2021
26	22	Export Testing	21 d	23.04.2021	13.05.2021
27	12	GUI Testing	21 d	23.04.2021	13.05.2021
28	16,17,18	Connectors Testing	21 d	23.04.2021	13.05.2021
29	15	Side-effects (Delete, Move,...)	21 d	23.04.2021	13.05.2021
30	16,17,18	Components	21 d	23.04.2021	13.05.2021



10. Project risks

Risk Analysis			
Risk	**Annotation**	**Probability of occurrence**	**Measure**
Personnel risks	Member leaves project	Low	Project plan will have to be adapted, so that the working hours of the missing member distributes to the left members
Planning risk	Milestones are not achieved at the planned time	Medium	Project plan will have to be adapted
Risk in communication between the members	Tasks are done in a different way than consulted or tasks are not done in time.	Medium	Regular meetings
Risk in communication to client	The project is not implemented the way the client wanted it to be.	Medium	As soon as there are concerns about how the client wants something to be implemented, the product manager will ask the client.
Financial risk	The planning of the costs is wrong and the project is more expensive than expected.	Low	As soon as there are concerns about the costs, the members of the project will discuss about how to reduce the costs.

11. List of Operations

Operations and responsibility		
Person	**Category**	**Task**
Elian Yildirim **Role:** Developer	**Documentation**	• System Requirements Specification (SRS) • MOD 002: Navigator • MOD 003: Editor • Systemtestplan (STP)
	Implementation	• Design • Editor/Graph • Testing Navigator
Franziska Kopp **Role:** Technical Editor	**Documentation**	• Business Case • Meeting Minutes • MOD 001: Converter
	Implementation	• Import • PLC-Objects Models • Testing Converter
Leonie de Santis **Role:** Product manager	**Documentation**	• Customer Requirements Specification (CRS) • Project Manual (PM) / Gantt chart • MOD 001: Converter
	Implementation	• Library for function blocks • Import/Export • Variable Interface • PLC-Objects Models • Testing Converter
Mouaz Tabboush **Role:** Project manager	**Documentation**	• System Architecture Specification (SAS) • Work Breakdown Structure (WBS) • MOD 003: Editor
	Implementation	• Editor/Graph • Connections • Testing Editor