

SMARTSIM

DL SMART-SCADA

SCADA SYSTEMS DEVELOPMENT COURSE





SMART SIMULATOR FOR LEARNING SCADA SYSTEMS

The DL SMART-SCADA is a software that has been developed to teach how to develop supervisory control systems in a unique and effective way.

With this software, students can improve their individual experience on studying SCADA systems in practice.

Professors can explore this trainer to provide experiments to students with the following topics:

Main concepts of SCADA Systems;

Hardware and software components;



Main elemens and resources: Tags, screens, user interface components, real–time databases, trends, historical data record, animations and user permissions;

Development of projects in 3 different environments (not included): Codesys WebVisu, Elipse E3 and WinCC.

INDUSTRIAL SCADA SYSTEMS PROGRAMMING TOOLS



POWERFUL

PROFESSIONAL EXPERIENCE REAL-LIFE SITUATIONS

INDUSTRIAL REALISTIC ENVIRONMENTS

REAL PRACTICAL EXPERIENCE TO STUDENTS BY DEVELOPING A SCADA FOR AN ENTIRE PROCESS



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EFFECTIVE LEARNING WITH GUIDANCE, REAL-LIFE PROJECTS, THEORY AND INSTRUCTIONS FROM BASIC TO ADVANCED

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BATCHING SCADA SYSTEM WITH CODESYS VISU

Goal: The student is required to develop a SCADA system for the ink coloring process using the SCADA system Codesys VISU. The reason is that the factory plans to build a control room for the operation of all its processes and machines.

Automation contents: Codesys Visualization and Web Visu development tool, tags, screens, user interface objects, animations, navigation, charts/trends, alarm summary, variables.

Requires Codesys software (Not included)

BATCHING SCADA SYSTEM WITH ELIPSE E3

Goal: The student is required to develop a SCADA system for the ink coloring process using the SCADA system Elipse E3. The reason is that the factory plans to build a control room for the operation of all its processes and machines.

New automation contents: OPC Server, Elipse E3, features, screens, tags, navigation, interface objects, charts/trends, good practices for supervisory systems.

Requires Codesys and Elipse E3 software (Not included)

IMPROVING THE SOLUTION

Goal: The student is required to implement new features for the ink coloring process using the SCADA system Elipse E3, in order to enhance operation and security of the process.

New automation contents: U sers permissions, recipes and scripting.

Requires Codesys and Elipse E3 software (Not included)

BATCHING SCADA SYSTEM WITH WINCC

Goal: The student is required to develop a SCADA system for the ink coloring process using the SCADA system WinCC.

Automation contents: WinCC basics, features, screens, tags, navigation, interface objects, charts/trends, users permissions, recipes, scripting and good practices.

Requires TIA PORTAL STEP7 professional and WINCC advanced software (Not included)

STUDENT CAN LEARN AND PRACTICE FROM BASIC TO ADVANCED SCADA SYSTEMS TOPICS

With the industrial 3D environments and also the built-in projects it's possible to develop solutions in different softwares widely used in industries, work with both native and external SCADA software, besides planning and comissioning a project.

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			ALARMS			
D.	-	BATCH	ING MACHINE		A	
Id	- Timestamp	Message	13	Status .		
	0	Overweight	Magenta	Active	Overweight Cian Overweight Magenta Overweight Yellow	75.6
	1	Overweight	Yellow	Active		80 K
	2	Overweight	Kev	Active		60 K
					RESETALARM	5
	MAIN	ALARMS	TRENDS		-	

WHY IS IT A SMARTSIM?

IT CONNECTS PROFESSOR, STUDENT AND SCHOOL

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COMPATIBLE WITH THE DL SMART-DASHBOARD (SOLD SEPARETLY)

De Lorenzo's cloud server receives students activities and provides reports and analytics to professors and institutions. Besides, a student can start working at school and continue at home or vice-versa.

The platform includes a query and answer system that enables professors to support the students counting on a team of monitors. That means better support with less effort of the professors. The students can see questions asked by other colleagues too so that way if more than one student have the same doubt the professors answer will attend them all.

PROFESSORS CAN FOLLOW STUDENTS PROGRESS

The professor can do and access everything the student can. Besides, he/she can also access the dashboard's portal. It includes interesting reports and analytics that help the professor to monitor the group in real time, as well as to identify students who are doing very well, as well as those who need help, who are not working at all and who seem to be "cheating".

Tasks report

This is an important tool since it provides evidence of the activities a student worked on. That means the school has evidence of the practical activities the distance learner has done with detailed information about it.

Curso	Tarefa	Timestamp	IsDon
Scripts	1.1 - Abrindo uma tela modal	3/9/2020 6:33:37 PM	False
Desenvolvimento de sistemas supervisórios	2.6 - Implementar Gráficos	11/22/2019 7:14:00 PM	False
Desenvolvimento de sistemas supervisórios	2.5 - Montar interface principal	11/18/2019 5:04:15 PM	True
Desenvolvimento de sistemas supervisórios	2.4 - Construindo os objetos da aplicação	11/18/2019 4:28:54 PM	True
Desenvolvimento de sistemas supervisórios	2.3 - Explorando Recursos	11/15/2019 5:35:44 PM	True
Desenvolvimento de sistemas supervisórios	2.2 - Conhecendo o Elipse E3	11/15/2019 5:10:00 PM	True
Desenvolvimento de sistemas supervisórios	2.1 - Comunicação OPC	11/14/2019 12:57:42 PM	True
Desenvolvimento de sistemas supervisórios	1.8 - Comandos pelo supervisório	11/14/2019 11:25:14 AM	True
Desenvolvimento de sistemas supervisórios	1.7 - Implementando alarmes	11/8/2019 7:33:30 PM	True

PROFESSOR CAN SEE WHICH STUDENTS ARE ON SCHEDULE

With this interface, the professor may choose which groups he/she wants to monitor, to verify who is on schedule, who is pending and so on. It is possible to define the expected progress percentage in relation to the tasks available in the course.

(una			Grupo		% Aprovação
duitiple selections	~	#0 P 17,18,19 A		~	70
					0
Curso	Controle d	e Processos	Visão Artificial		
Aluno	Atividades feitas	Minimo atividades	Atividades feitas	Minimo atividade	16
anonymized	12	27			
anonymized	39	27	7	8	5
anonymized	30	27	7		5
anonymized	39	27			
anonymized	39	27	7	3	5
anonymized	1	27	7		5)
anonymized	30	27	1	8	5
anonymized	11	27	37	6	5
anonymized	27	27			
anonymized	12	27	7	4	5
anonymized	9	27	7		5
anonymized	39	27	7		5
anonymized	39	27	7		5
anonymized	39	27	7		5
anonymized	33	27	7	1	5
anonymized	39	27	7		5
anonymized			.7		5
anonymized	39	27	7		5
anonymized	-	27	1		S
Total	39	27	7		5

RHYTHM

This other dashboard shows the number of activities the students did daily and weekly. The professor may decide to verify it regarding a whole group/class or a specific student.

EFFORT/TASK DEDICATED TIME

If the professor selects a student, he/she may verify how much time the student took to develop and deliver each task of the course.

Tempo por tarefa		
Tarefa	Duracao Total (h)	
Controlador ON-OFF - Forno	4.33	
Estudando a Planta - Forno	4.08	
Controlador PI - Forno	3.14	
Resposta transiente e estacionária - Forno	2.50	
Estudando a planta - Fuso	2.45	
Métodos de Ziegler-Nichols(Malha Fechada) - Forno	2.35	
Controlador PD - Forno	1.99	
Controlador ON-OFF - Válvula	1.88	
PID Siemens - Forno	1.63	
Controlador Proporcional - Forno	1.44	
Controlador PI - Válvula	1.42	
Métodos de Ziegler-Nichols(Malha Aberta) - Forno	1.29	
Estudando a planta - Vávula	1.22	

PROGRESS VS TIME TAKEN

It is also possible to verify the distribution of the dedicated time with relation to the number of tasks done by each student at any period of time. That helps to identify who is doing well, who may need help, who is doing nothing and who is trying to cheat.

TRIALS PER TASK

This chart helps the teacher to understand which task may be the most difficult and which one may be the easiest in order to adjust the deadlines.

IT'S A 3D SIMULATOR

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IT HAS BUILT-IN PROJECTS

+ CONTENTS AND SUPPORT MATERIALS, SO THEY CAN LEARN BY THEMSELVES

PLC <--> SUPERVISORY OPC COMMUNICATION

You did a good job implementing a supervisory in Codesys' Visu, and we received a demand to implement a supervisory for the same paint formulation plant, but this time you will have to do your work in **Elipse E3**. Copy and paste the link below into your browser to **download** and learn more about **Elipse E3**.

https://www.elipse.com.br/en/produto/elipse-e3/

You may not have noticed, but when you developed the supervisory in Visu, you used the tags of the PLC directly in the supervisory, this was due to the fact that there you were working on an **integrated platform** (PLC + Supervisories programming platform in the same software). At this work you will use **Codesys** (Programming Platform) + **Elipse E3** (Supervisory Development Platform), in other words, you will work with two softwares!

There are some ways to do PLC + Supervisory integration with non integrated platforms. The solution we will approach here is the OPC Solution (Open Platform Communication).

The purpose of this content is for you to understand how the OPC protocol works, what is an OPC server, OPC client, and a device, and to know how they communicate, so, use all the content available <u>here</u>.

OBS: In the communication module you will study these industrial communication protocols in detail!

IT AUTOMATICALLY CHECKS STUDENT ACTIVITIES TO LET THEY MOVE ON, LIKE IN GAME

THE PROJECTS INCLUDE GUIDANCE

BUILD THE APPLICATION OBJECTS

To develop the project, we will need to graphically represent the equipment and systems available in the field. This can be done in several ways so that you don't waste time imagining how to do it and focus on implementation, we will give you some ideas:

To build a scale tank, you can use a "Rounded Rectangle" in conjunction with "BarDisplay Image" and a "Text Field":

To build valves, you can use 2 triangles (with color animation to signal valve open or closed), 1 rectangle and lines:

PROFESSORS CAN MONITOR STUDENTS, AND VERIFY WHICH POINT THEY NEED HELP Option available with Dashboard

Group Course	User		
Group 1 6 Machine Automotion with Codesys			
User Progress (POLI)		User Activities	
Student 1		Timestamp	\neg Tasks \rightarrow Task Description
Student 2		Aug 26, 2019	1.1 - Breaking the inertia
		Aug 26, 2019	12-Interlocking with endswit
Student 3		Aug 26, 2019	1.3 - Retentive command
Student 4		Aug 26, 2019	14-Adding other interlocks
Student 5		Aug 26, 2019	15-Using the remote button
Student 6		Aug 26, 2019	21-Manual operation
Shuthan, o		Aug 27, 2019	22-Simultaneous commands
Student 7		Aug 27, 2019	2.3 - Adding water
Student 8		Aug 27, 2019	24-Adjusting the conveyors
Student 9		Aug 27, 2019	31-Dosing station
		Aug 30, 2019	32-Mixing station
Student 10		Sep 2 2019	2.2. Filling the recipient

SYSTEM REQUIREMENTS

ORDER CODES

DL SMART-SCADA

SCADA SYSTEMS DEVELOPMENT COURSE

DL SMART-DASHBOARD

CLASSROOM MANAGEMENT FOR SMARTSIMs

IMPORTANT NOTE:

THIS PRODUTS DO NOT INCLUDE ANY THIRD PARTY SOFTWARES.

TO OUR KNOWLEDGE, CODESYS DEVELOPMENT SYSTEM CAN BE FREE DOWNLOADED AT CODESYS WEB SITE

ELIPSE E3 HAS A DEMO VERSION AVAILABLE AT THE WEBSITE AND AN EDUCATIONAL VERSION CAN BE PURCHASED FROM ELIPSE.

TIA PORTAL STEP7 PROFESSIONAL + WINCC ADVANCED HAVE TRIAL VERSIONS AND AN EDUCATIONAL VERSION ON SIEMENS WEBSITE MINIMUM REQUIREMENTS

OPERATIONAL SYSTEM

64-BIT WINDOWNS 10

DIRECTX VERSION

DIRECTX 11

PROCESSOR

INTEL i5 9400F OR AMD RYZEN 5 3600

MEMORY

8GB

GHRAPHIC CARD

STORAGE

HDD (1GB)

RECOMMENDED REQUIREMENTS

OPERATIONAL SYSTEM

64-BIT WINDOWNS 10 PRO

DIRECTX VERSION

DIRECTX 12

PROCESSOR

INTEL i7 9700 OR AMD RYZEN 7 3700X

MEMORY

16 GB

GHRAPHIC CARD

NVIDIA GTX 1050 TI 4GB OR RX 550 4GB

STORAGE

HDD (1GB)