The Haute Ecole Arc (HE-Arc) is a university of applied sciences with a wide-ranging program of courses in four departments across several campuses. HE-Arc is supported by the Cantons of Neuchâtel, Jura and Bern.

The Haute Ecole Arc (HE-Arc), Switzerland

The Haute Ecole Arc Ingénierie specializes in Conservation and Restoration, Medical technology, Management and Engineering. Thanks to the outstanding competences of HE-Arc graduates and its highly specialized equipment and courses of study, this university enjoys an excellent reputation in the worlds of industry, politics and research.

HE-Arc Ingénierie's vision can be summed up in a single slogan: „Dare... Think... Do!". These three words encapsulate the essence of the engineers the school trains and the philosophy of its staff.

HE-Arc Ingénierie trains outstanding engineers, capable of working in a team, who are immediately operational and who meet the technological requirements of industry.

This is why HE-Arc Ingénierie needs to form students to be able to develop embedded systems which can be guaranteed to be reliable.
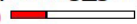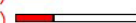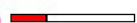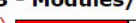
To achieve that goal, the students have to learn hardware design, programming languages, algorithms, but they especially need to learn how to perform efficient and exhaustive tests as well as understand the need of testing.

For this reason we introduced **Testwell CTC++** to our third year program, in order to show students how they can check that the unit tests they have written are perfectly executed as well as checking that they tested every line of code which could be tested.

Introducing **Testwell CTC++** to students is a good way to explain them how a program can be instrumented, to explain them what happens before and during the compilation and how the instrumentation can be used.

We explained students how to write unit tests and **why checking the coverage of the tests is important by using Testwell CTC++**, using some examples provided during the installation, as well as asking students to measure the coverage of the test they wrote for projects developed in during other lessons.

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100 %	(0/0)	100 %	(0/0)	CTCArray.c
76 % -	(259/341)	86 % -	(497/578)	main.cpp
76 % -	**(259/341)**	**86 % -**	**(497/578)**	**DIRECTORY OVERALL**
Directory: ../../../../03 - Modules/alphanumeric_display/alphanumeric_display/alphanumeric_display				
95 % -	(115/121)	99 % -	(244/246)	alphanumeric_display.cpp
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Directory: ../../../../03 - Modules/debug_print/debug_print/debug_global				
30 % -	(14/46)	28 % -	(15/53)	debug_global.c
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Directory: ../../../../03 - Modules/key_pad/key_pad/key_pad				
41 % -	(31/76)	46 % -	(56/121)	key_pad.cpp
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Directory: ../../../../03 - Modules/timer/timer/timer				
92 % -	(11/12)	100 %	(17/17)	timer.cpp
92 % -	**(11/12)**	**100 %**	**(17/17)**	**DIRECTORY OVERALL**

Testwell CTC++ can be used to analyze execution of the source code and can be set to choose multiple options such as Multicondition Coverage and MC/DC Coverage which is particularly useful in order to test the coverage of a condition with multiple variables. This possibility to use MC/DC coverage was a great way to show students where small programming errors could be in programs, leading possibly to a software malfunction when not all combinations of variables in a condition are tested.

Testwell CTC++ can then generate nice reports in HTML format, in which we can see the coverage of all files and functions. This report was used by the professor to evaluate easily what did the students and if the tests the students wrote were exhaustive.

Testwell CTC++ was recommended to be used in combination with Eclipse and GCC, but some students wanted to use other IDE and compilers and have been able to use Testwell CTC++ with a different configuration, thanks to the fact that the coverage tool is not integrated in an IDE but used in the compilation pipeline.

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For further questions please visit www.verifysoft.com and contact us at +49 781 127 8118-0

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