EDU4Chip Project Plan

Contents

1 Lectures (T1)

When the over all lecture plan has been approved then the documentation process can be started which describes which lectures are mapped to which days and also the contents of the lectores in an overview form.

The lectures which are available are found in Table 1

NOTE: Each Lecture might be constituted of several lessons.

Lecture	Lesson	Title	Available	Comment
L01	LE00	General Introduction	Yes	
	LE01	Python Introduction	Yes	
L02	LE02	Verification Tools	Yes	
	LE04	CRV Intro	Yes	
L03	LE03	Simulation Semantics	Yes	
	LE05	cocoTB Introduction	Yes	
L04	LE06	UVM Intro	Yes	
	LE07	UVM TB Toplevel	Yes	
L05	LE08	UVM Test, Environment and Sequence	Yes	
	LE09	UVM UVCs	Yes	
L06	LE15	pyVSC constraints and randomization	Yes	
L07	LE11	Functional Coverage	Yes	
L08	LE12	Checkers	Yes	
	LE14	TLM	Yes	
L09	LE16	Verification Plan	Yes	
	LE10	Bringing it all together	Yes	

Table 1: Overview of available lectures

2 Exercises (T2)

When the over all exercise plan has been approved then the documentation process can be started which describes which exercises are mapped to which days and also the contents of the lectores in an overview form.

The exercises which are available are found in Table 2

Lectgure	Exercise	Title	Available	Comment
L01	E00	Computer Setup	Yes	
L02	E01	Python Exercises	Yes	
L03	E02	Intro CocoTB Exercises	Yes	
L04	E03	SAT CocoTB test - Part 1	Yes	
L04	E04	SAT UVM TB Walk Through	Yes	
L05	E05	Scoreboard Implementation	Yes	
L06	E03	SAT CocoTB test - Part 2	Yes	
L06	E06	Random Virtual Sequence	Yes	
L07	E07	CocoTB Coverage	Yes	
L07	E08	sSDT Coverage	Yes	

Table 2: Overview of available exercises

2.1 Exercise Documentation

The detailed description of the exercises and the information needed to understand the SAT DUT and the backgraound elements of the testbench are found in the "exercise/" folder. Ducumentation includes a PDF file generated by multiple LaTex for the extensive description and a number of powerpoint slides with a summarized version of the topic and exercises included in the PDF.

2.1.1 E00: Computer Setup

This exercise objective is to allow the students to correctly setup their computers (either Windows or Linux machine) and install all the necessary tools. For Windows students the Linux environment is installed with a WSL or Docker.

2.1.2 E01: Python Exercises

Small set of Python exercises which will teach the students basic Python skills.

2.1.3 E02: Intro CocoTB Exercises

Small set of CocoTB exercises which will introduce the students to the Make flow for CocoTB and also introduce some real CocoTB constructs.

2.1.4 E03: SAT CocoTB test

This exercise objective is to familiarize with the cocoTB by implementing a test to generate some input stimuli to the SAT DUT and compare the output of the DUT against a golden reference generated by the reference model.

2.1.5 E04: SAT UVM TB Walk Through

This exercise objective is to provide an overview of the SAT testbench and the generic components of a UVM testbench, as well as familiarizing with the simulation flow, Makefile and the waveform viewer tool, GTKWave.

2.1.6 E05: Scoreboard implementation

This exercise objective is to understand the checking mechanism of a Scoreboard and how this component is connected to the other elements of the testbench. The skeleton of the class is assumed to be available and the exercise shall focus on the comparison mechanism implementation and the connection with the reference model and uVCs.

2.1.7 E06: Random virtual sequence

This exercise objective is to understand the randomization and the random constraints using pyVSC. A virtual sequence shall be implemented to randomize the number of samples to be sent to the DUT. Afterwards a test shall be implemented to override the virtusl sequence type and generate the desired stimuli.

2.1.8 E07: cocoTB coverage

This exercise objective is to familiarize with the concept of the coverage using the pyVSC library. The coverage report shall be generated and briefly analized.

2.1.9 E08: sSDT coverage

This exercise objective is to apply the pyVSC coverage knowledge to the sSDT's uVC. The coverage class for the uVC shall be developed to collect coverage information about the sSDT and the connections between the monitor and the coverage shall be implemented. The coverage report shall be generated and briefly analized.

2.1.10 E09: Protocol checkers

This exercise objective is to understand how coroutines work by developing protocol checkers to ensure the compliance of the sSDT uVC signals with the requirements of the protocol.

2.1.11 E10: SAT coverage

This exercise objective is to apply the pyVSC coverage knowledge to the SAT filter testbench. The monitor coroutine shall be implemented to trigger the sample mechanism of the coverage class. The coverage report shall be generated and briefly analized.

2.1.12 E11: Coverage analysis

This exercise objective is to analize and understand the coverage report. By tweaking the parametrization of the DUT and the random constraints it shall be possible to modify and improve the coverage results.

3 Lecture Plan

This section shows different lecture plans on how to perform the lectures. Each section describes a possible execution plan for the course.

The lectures ae taken from the Table 1 and the exercises from Table 2.

3.1 Full Semester Plan

This lecture plan try to cover a full university semester, covering 13 weeks of lectures and exercises, ending with a small exam, constituted of a written report and an oral presentation.

Lecture	Topic 01	Topic 02	Topic 03	Ex 01	Ex 02	Ex 03
01	LE00	LE01		E00		
02	LE02	LE04		E01		
03	LE03	LE05		E02		
04	LE06	LE07		E03 Part 1	E04	
05	LE08	LE09		E05		
06	LE15			E03 Part 2	E06	
07	LE11			E07	E08	
08	LE12	LE14		E09		
09	LE16	LE10		E10	E11	

Table 3: Lecture Plan for full university semester

3.2 Three Week Plan

This lecture plan is based on 4 x 1h 15m slots every day for 3 weeks (15 days as weekends are not a part of the working days), starting at 09:00.