



FOSSEE Summer Fellowship Report

On

Creation of Spoken Tutorials

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Chapter 1

Introduction

The Spoken Tutorial Project is about teaching and learning a specific Free and Open Source Software such as Linux, LaTeX, C/C++, eSim etc. using a basic video tutorial. This popular multi-award winning educational portal is used to gain expertise over various Free and Open Source Softwares through individual learning. It's steady-paced, multi-lingual courses ensure that anybody with a computer and a desire for learning, can learn from any place, at any time and in a language of their choice. Students, Staff Teachers from Schools, Colleges, Universities, Poly-technics, ITIs, Skill centers, NGOs all can avail the training at very low cost.

The Spoken tutorial project facilitates learning in the online mode that is well-suited for long distance education. Both teachers and students can master the software from their own convenient time and place. which makes the project popular. Any student or faculty can master the courses on the latest courses and also get certificates. Lately, all government and private institutions are migrating to Open Source Softwares. People who are up to date with latest and open source software will have an edge in the job market and can also become entrepreneurs and save money by using open source software.

Spoken Tutorials offers partnership to some institutes to give their learners a range of 75+ relevant Basic and Specialized Courses. These include General IT skills, Programming, Web development, Multimedia, Mathematics, Sciences, Industrial process simulation packages and many more. Institutes can train unlimited students in many courses along with Certificates. IIT Bombay is leading the effort to popularise eSim. This effort is part of the Free and Open source Software for Science and Engineering Education (FOSSEE) project, supported by the National Mission on Education through ICT of the Ministry of Education. IIT Bombay is using Spoken Tutorials to create learning material for FOSS. This is the main page for the organisation of the scripts required for Scilab spoken tutorials. We invite the Scilab user community to participate in this activity. Overall coordination for the series was done by Rashmi Patankar and Sumanto Kar from FOSSEE project, IIT Bombay. Nirmala and Vineeta from Spoken Tutorial project, IIT Bombay, were the reviewers from ST end.

Chapter 2

Spoken Tutorial

2.1 Spoken Tutorial Project

Spoken Tutorial is a multi-award winning educational content portal. It provides numerous different resources on various FOSS to enable self learning among the users. It also provides the freedom to choose from multiple languages and also in their convenient place, time and pace. According to their expertise, the learner has the option to choose the tutorial that within their expertise level. To ensure the active participation of the learner, the tutorials are made in an interactive manner including side by side practice and assignments. The Spoken Tutorial project is funded by the National Mission on Education through Information and Communication Technology (ICT), launched by the Ministry of Human Resources and Development, Government of India. In these times where digital learning has become increasingly popular, initiatives like the Spoken Tutorial Project are of vital importance.

2.1.1 Process of creation of a Spoken Tutorial

- **Outline:**
Creating an outline is the first step in the creation of a spoken tutorial. Outline of the spoken tutorial gives an understanding about the contents explained in the tutorial.
- **Script:**
A script is the written guide of the actions done in the tutorial. Every action small or big done during the tutorial is written in the script. The script strictly adheres to the Spoken tutorial guidelines and is made in a simple and straightforward manner.
- **Slides:**
Slides are made to help understand the theory concepts better. The slides are made using LaTeX for good layout and presentation. Color and format used in the slides of a tutorial is uniform throughout a series of tutorials in accordance with the ST guidelines.

- Novice check:
Novice check is done by a person who has little or no knowledge of the software but has satisfied the pre-requisites of the tutorial. The novice points out the places where the tutorial is unclear or difficult to understand.
- Recording:
The video is recorded according to the ST guidelines. The video is recorded with high quality and will strictly follow the script and avoid unwanted information.
- Review:
After the above mentioned steps, all the related files are sent to the reviewer who verifies that the recording and files follow the ST guidelines. This is to double check the quality of the content to be uploaded. Once all comments and suggestions are taken care of, the tutorial is published in the Spoken tutorial website.

Chapter 3

eSim Simulations

3.1 eSim Simulations

eSim (previously known as Oscad / FreeEDA) is a free/libre and open source EDA tool for circuit design, simulation, analysis and PCB design. It is an integrated tool built using free/libre and open source software such as KiCad, Ngspice, Verilator, Makerchip, GHDL and OpenModelica. eSim is released under GPL.

eSim offers similar capabilities and ease of use as any equivalent proprietary software for schematic creation, simulation and PCB design, without having to pay a huge amount of money to procure licenses. Hence it can be an affordable alternative to educational institutions and SMEs. It can serve as an alternative to commercially available/licensed software tools like OrCAD, Xpedition and HSPICE.

3.2 Mixed Signal Simulations with NGHDL

Mixed Signal Simulation in eSim is achieved by NGHDL, which is the combination of Ngspice and GHDL. Using NGHDL in eSim users can perform simulations of any type of Digital circuits or combinations of Digital and Analog circuits.

3.3 Mixed Signal Simulations with OpenModelica

eSim has a interesting feature of Interfacing itself and OpenModelica software. Using this feature users can create and simulate effective Mixed Signal Circuits in both eSim and OpenModelica softwares.

Chapter 4

Contributions

4.1 Creating Spoken Tutorials for eSim Series

In the eSim series, I have worked on 2 tutorials:

- Mixed Signal Simulation and NGHDL
- eSim interface to OpenModelica

4.1.1 Mixed Signal Simulation using NGHDL

This tutorial explores the options in the NGHDL of eSim for Mixed Signal Simulations. Where, I have explained in detail about options and features in the NGHDL tab. I have generated a digital model using NGHDL and simulated a Mixed Signal project using the model created as one of the component in the circuit. I wrote the script and slides for this tutorial which was then checked by my mentor followed by the novice. At last I have completed the recording for the tutorial.

- Opening NGHDL tab
- Features of NGHDL tab
- Adding and removing the .vhdl files in NGHDL tab
- Uploading the file to create a Digital model
- Opening a Mixed Signal project
- Exploring a Mixed Signal circuit
- Analog and digital blocks in the circuit
- Simulating and checking the outputs of the circuit

4.1.2 eSim interface to OpenModelica

This tutorial explores about interfacing eSim with OpenModelica software and using OpenModelica with eSim for Mixed Signal Simulations. Where, I have explained in detail about options and features in the Modelica Converter tab. I have converted a Ngspice Netlist file to Modelica Netlist file in Modelica Converter tab. I have added the Modelica's executable file in eSim's Modelica Converter tab. I have opened and Simulated a Mixed Signal Project through OpenModelica. I wrote the script and slides for this tutorial which was then checked by my mentor followed by the novice. I also completed the recording for the tutorial.

- Opening Modelica Converter tab in eSim
- Explaining the features of Modelica Converter tab
- Adding the Mixed Signal Project
- Converting the Ngspice Netlist file to Modelica's netlist file
- Adding OpenModelica's executable file to eSim
- Opening the OMEdit workspace
- Exploring the Mixed signal circuit inside OMEdit
- Simulating the added project
- Ploting and checking the graph of each variables in the circuit

Chapter 5

Challenges and Outcomes

5.1 Professional outcomes

Professional skills developed during this fellowship are:

- Professional communication skills
- Time management and work prioritization
- Team work and guidance under more than one mentor
- Familiarized with LaTeX and eSim software

5.2 Challenges faced during the fellowship

Challenges faced during this fellowship are:

- Getting my first script approved based in the ST norms
- How to increase explanation without deviating from the 80-20 rule
- Creating the perfect slides using LaTeX software
- Maintaining the work spreadsheet on a daily basis

Chapter 6

Conclusion

This summer fellowship has been a very wonderful experience and I have honed my knowledge and skills. I was able to achieve my learning goals and learnt the various process in Creating a Spoken Tutorial. Furthermore I experienced that it is of importance that the education is objective and that you have to be aware of the view of other people. This helped me to define what skills and knowledge I have to improve in the coming time.

The professional and technical skills I acquired from this internship will certainly help me in my future endeavors. I feel much more confidence in myself, and now I look forward to facing the upcoming challenges of the world. This fellowship has given me new insights and motivation to pursue my career.

Chapter 7

Current status of tutorials

- The Spoken Tutorials are presently undergoing review
- After all review phases have been successfully completed, the team will publish the videos on the Spoken Tutorial website

Chapter 8

References

- <https://spoken-tutorial.org/about-us/>
- <https://spoken-tutorial.org/>
- <https://esim.fossee.in/home>