

Overview of DWSIM Spoken Tutorials

Spoken Tutorial Project
<http://spoken-tutorial.org>

National Mission on Education through ICT
<http://sakshat.ac.in>

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Learning Objectives

We will

- **learn to install DWSIM**
- **get introduced to DWSIM**
- **get a glimpse of DWSIM spoken tutorials that are already available**
- **learn about all possible help available for DWSIM**



System Requirements

- **Any OS: Windows, Linux, Mac OS X or FOSSEE OS on ARM**



What is simulation?

- **Study of a physical system with
 - a mathematical model
 - and a computer solution to this model**
- **Simulation helps predict the behaviour**
- **It is inexpensive, safe and fast**
- **Eliminates the need to do these studies on the physical system**



ISRO Missions: Less cost, less time

Simulation is one main reason

- **Simulation is one of the reasons**
- **See** http://articles.economictimes.indiatimes.com/2009-09-28/news/27634017_1_chandrayaan-ii-m-annadurai-moon-mission
- **One sixth to one tenth cost**
- **Also completed in time**



Reliance Refinery, Jamnagar

- **Reliance Jamnagar refinery, largest single stream grassroot refinery:**
<http://www.bechtel.com/projects/jamnagar-oil-refinery/>
- **Completed in time, without cost overruns**
- **Not a single pilot plant run was made!**
- **Based on simulation only!**



Commercial Process Simulators

- Aspen Plus
- SimSci Pro/II
- CHEMCAD



What is DWSIM?

- **State of the art process simulator**
- **Open source software**
- **Absolutely free (GPL)**
- **Developed by Daniel Wagner**
- **Thermodynamic support by Gregor Reichert**
- **Used all over the world**



DWSIM on MS Windows

- Download from
<https://sourceforge.net/projects/dwsim/>
- Click the Download button
- I got this file: DWSIM_bin_v34_b5740
- It is in the Downloads folder
- Right click, run as an administrator
- Choose both Chemsep and C++ libraries
- Keep pressing enter



Advantages of DWSIM

- It is completely free, for academia and industry
- So, affordable to SMEs
- It has many features that are found in commercial simulators
- It has CAPE Open compliant thermodynamics
- It has excellent solvers



Open Content in DWSIM

- The entire code is available under GPL
- Solution method for every unit operation is documented
- Property estimation methods are also explained
- Commercial simulators keep these confidential



Flexibility in using DWSIM

The user can use

- custom models
- their own compounds
- thermodynamics and other properties
- DWSIM's thermodynamic library for external applications



We have excellent Spoken Tutorials on DWSIM



Spoken Tutorial: Material stream in DWSIM

**Explains how to create material streams in
DWSIM**



Spoken Tutorial: Introduction to Flowsheeting

Explains how to

- **simple flowsheet of a flash and a mixer**
- **how to simulate it**
- **how to verify the results**



Spoken Tutorial: Shortcut distillation

- **How to simulate a shortcut distillation column**
- **Calculates the number of trays, feed tray location, etc.**



Spoken Tutorial: Rigorous Distillation

- **Starting point is shortcut distillation**
- **Explains how to carry out rigorous distillation calculations**
- **It is used in the sensitivity studies tutorial**



Spoken Tutorial: Sensitivity analysis and Adjust

- How to vary an independent variable, such as reflux ratio
- What value of it will give a dependent variable, say, purity
- How to do this by trial and error
- How to do this without trial and error



Spoken Tutorials on DWSIM

- 1 Creating a material stream in DWSIM
- 2 Introduction to Flowsheeting
- 3 Shortcut distillation
- 4 Rigorous distillation
- 5 Sensitivity analysis and adjust
- 6 More in progress ...



What can you do with DWSIM?

- **Get a working solution quickly**
- **what if studies**
- **Identifying bottlenecks and increasing throughput**
- **Optimisation**
- **Understanding solution methods**
- **Understanding thermodynamics**



Use of DWSIM for Students

- Understand the chemical engineering concepts well
- User of DWSIM can quickly learn any other simulator as well
- Extremely useful in industry
- Useful to get core engineering jobs
- Extremely useful to entrepreneurs also



Help available on DWSIM



1. Spoken Tutorials Forum

Help on Spoken Tutorial

- Based on exact time information
- Go to

<http://forums.spoken-tutorial.org>



Help available on DWSIM:

2. FOSSEE Forum

- No time information for a question
- Visit <http://forums.fossee.in>



Help available on DWSIM:

3. Textbook Companion Project

- The FOSSEE team coordinates coding of solved examples of popular books
- We give honorarium and certificate to those who do this

For more details, please visit this site: http://dwsim.fossee.in/Textbook_Companion_Project

- DWSIM solution is available for example problems



Help available on DWSIM:

4. Lab Migration Project

- We help migrate labs based on commercial simulators to DWSIM
- We give honorarium and certificates to those who do this

For more details, please visit this site:

<http://dwsim.fossee.in/lab-migration-project>

- Migrated labs may be useful to you

- We can migrate your labs also



Help is available from worldwide DWSIM community also



Help available on DWSIM:

5. DWSIM Unit Ops Guide

- **Go to folder where DWSIM is installed**
- **Go to docs sub-folder**
- **Open Unit Operations and Utilities guide**
- **In the current version, it is called**
`Unit_Ops_and_Utilities_Guide.pdf`



Help available on DWSIM:

6. DWSIM Technical Manual

- **Locate technical manual, in the same folder**
- **In the current version, it is called `tech_manual.pdf`**
- **This describes how to calculate various properties**



Help available on DWSIM:

7. DWSIM Discussion Forum

- Go to <https://sourceforge.net/p/dwsim/discussion/>
- You can see previous discussions
- You can post your questions also
- You have to register in sourceforge first
- Only then, can you ask your questions



Summary

We learnt the following in this tutorial:

- **How to install**
- **Spoken Tutorials available on DWSIM**
- **Why you should use DWSIM**
- **Help and projects available from Spoken Tutorial and FOSSEE projects**
- **Help on DWSIM from the worldwide user community**



Assignment 1: Install DWSIM

- Install DWSIM on your machine
- Check that DWSIM opens up



Assignment 2: Explore DWSIM

- Explore the interface of DWSIM
- Go through every menu and button
- Identify what all DWSIM can do



Assignment 3:

Practise Spoken Tutorials

- **Listen to the Spoken Tutorials mentioned earlier**
- **Practise the tutorials using the side-by-side method explained here:**

<http://spoken-tutorial.org/side-by-side-method/>



Assignment 4:

Visit Spoken Tutorial Forum

- Go through DWSIM discussions in the Spoken Tutorial Forum:
<http://forums.spoken-tutorial.org>
- Register
- Post a timed question



Assignment 5:

Visit FOSSEE Forum

- Go through DWSIM discussions in the FOSSEE Forum:

<http://forums.fossee.in>

- Register
- Post a question



Assignment 6: Create a DWSIM Textbook Companion

- Write a textbook companion for DWSIM
- Check the URL mentioned before:
http://dwsim.fossee.in/Textbook_Companion_Project



Assignment 7: Migrate your college simulation lab to DWSIM

- Migrate your college lab to DWSIM
- Visit the URL mentioned before: <http://dwsim.fossee.in/lab-migration-project>



Assignment 8: Go through documents that come with DWSIM

- Go through the equipment manual mentioned in this tutorial
- Go through the properties manual mentioned in this tutorial



Assignment 9: Visit the discussion forum of the worldwide community

- Go to <http://sourceforge.net/p/dwsim/discussion/>
- See previous discussions
- Register and log in
- Ask a question



Assignment 10: Online Help and More Online Tutorials

- Open DWSIM
- Press F1 and start the help facility
- Explore the help available on various topics
- Visit the tutorials available at <http://dwsim.inforside.com.br/wiki/index.php?title=Category:Tutorials>



About the Spoken Tutorial Project

- Watch the video available at http://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- It summarises the Spoken Tutorial project



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- If you do not have good bandwidth, you can download and watch it



Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- Conducts workshops using spoken tutorials
- Gives certificates to those who pass an online test
- For more details, please write to contact@spoken-tutorial.org



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- More information on this mission is available at

<http://spoken-tutorial.org/NMEICT-Intro>



Thanks!

<http://dwsim.inforside.com.br/>

