## UNIT I

# INTRODUCTION TO CAD Tool





@ www.enthutech.in

🖂 eas@enthutech.in

## VOLTAGE

- Voltage is the electrical potential difference between two points in a circuit. It is the "push" that causes current to flow.
- Unit: Volts (V).

## CURRENT

- Current is the flow of electric charge through a conductor.
- Unit: Amperes (A).



🔀 eas@enthutech.in

## KEY COMPONENTS IN PCB







🖂 eas@enthutech.in

Regional www.enthutech.in

## **Passive Components**

Components that do not require external power and cannot amplify signals; they only consume energy or store it temporarily.

## Types

Resistor, Capacitor, Inductor, LDR, Variable Resistor, Switch, Etc.,



🔀 eas@enthutech.in

## ACTIVE COMPONENTS

Components that require an external power source to operate and can amplify or control electrical signals.

## Types

## Diode, Transistor, IC, LED, Battery, Etc.,





🖂 eas@enthutech.in

## Resistor

- A resistor opposes the flow of electrical current.
   Application
- Current limiting in circuits.
- Voltage dividers.

# Capacitors

- A capacitor stores and releases electrical energy
   Application
- Smoothing power supply noise.
- Timing and oscillation circuits.





🖂 eas@enthutech.in

## INDUCTORS

- An inductor stores energy in a magnetic field when current flows through it.
  - Application
- Filters in power supplies.
- Transformers.



# #enthutech®



🖂 eas@enthutech.in

# Diode

- A diode allows current to flow in only one direction.
   Application
- Rectifiers.
- Voltage regulation (Zener diodes).

## TRANSISTOR

- A transistor is a semiconductor device used for amplification and switching.
   Application
- Amplifiers in audio devices.
- Logic gates in digital circuits.



🖂 eas@enthutech.in

Regional www.enthutech.in

# INTEGRATED CIRCUITS (ICS)

- ICs are miniature circuits with multiple electronic components integrated into a single chip.
  - Application
- Microprocessors, Memory Chips.
- Power management and control systems.





🖂 eas@enthutech.in

Regional www.enthutech.in

## Software Installation Process







🖂 eas@enthutech.in

Microsoft Bing	Q eagle 7.5.0 download Q 💿								
	Q SEARCH	IMAGES	COPILOT	VIDEOS	MAPS	NEWS	SHOPPING	: MORE	
	About 15,500,000 results Autodesk Eagle http://eagle.autodesk.com > eagle > software-versions EAGLE version 7.5 - Autodesk New 17, 2015 - All instell files for Autodesk EAGLE Software								
	Manufa Increase yo through au	turing through Ilaboration, ar	iput nd	Suppor Will saved Library.io	ware. <b>Support</b> Will saved libraries, PCB projects, and Library.io be usable after EAGLE retires				
	Suppliers All prospective suppliers are required to register on our prospective supplier								
	See results	s only from ea	agle.autodesk	com					
	elemen	t14 Commun	ity						





🖂 eas@enthutech.in



EAGLE Version 7.5.0 (Mac OS X)

# #enthutech®

#### LEARNING CENTER

DOWNLOAD 🛩

DOWNLOAD 👱

DOWNLOAD 👱



🖂 eas@enthutech.in

Name



#### **Extract the Rar file**

 $\wedge$ 





🖂 eas@enthutech.in



 $\wedge$ 

#### Click the exe file





🖂 eas@enthutech.in

WinZip Self-Extractor - eagle-win64-7.5.0.exe



EAGLE Layout Editor Version 7.5.0

Installation

#### **Click the Setup option**





🖂 eas@enthutech.in

Setup

Cancel

About

Register www.enthutech.in

EAGLE 7.5.0 Setup

#### Welcome

Welcome to the EAGLE Setup program. This program will install EAGLE on your computer.

Click "Next" to continue with the Setup program.

Next

#### **Click the Next option**



← EAGLE 7.5.0 Setup

#### Software License Agreement

Please read the following License Agreement. Press the PAGE DOWN key to see the rest of the agreement.

IMPORTANT NOTICE: PLEASE READ CAREFULLY BEFORE CONTINUING WITH YOUR INSTALLATION OF EAGLE

Do you accept the terms of the preceding License Agreem 1.? If you choose "No", Setup will close. To install EAGLE 1. must accept this agreement.

Yes No

X

### **Click the Yes option**

# **Henthutech**®



www.enthutech.in

🖂 eas@enthutech.in

#### EAGLE 7.5.0 Setup $\leftarrow$

#### Choose Destination Directory

Setup will install EAGLE in the following directory.

To install to this directory, click "Next".

another directory.

Setup.



#### ← EAGLE 7.5.0 Setup

#### Start Copying Files

Setup has enough information to start copying the program files. If you want to review or change any settings, click "Back". If you are satisfied with the settings, click "Next" to begin copving files.

Х

Current Settings:



### **Click the Next option**





🖂 eas@enthutech.in

EAGLE 7.5.0 Setup



🖂 eas@enthutech.in







🖂 eas@enthutech.in

 $\times$ 

## EAGLE SOFTWARE

File View Options Window Help       EAGLE         Name <ul> <li>Documentation</li> <li>Libraris</li> <li>Design Rules</li> <li>Scripts</li> <li>Scripts</li> <li>CAM Jobs</li> <li>Projects</li> </ul> <ul> <li>Bill User Language Pro</li> <li>Scripts</li> <li>CAM Jobs</li> <li>Projects</li> </ul> Single User License #62191E841E-LSR-WLM-1EL FOR EDUCATIONAL USE Coll VII <ul> <li>Registered to:</li> <li>Preevare License for "non-profit" and evaluation purposes. Set the file "freeware Liker" or the URL</li> <li>Www.cadsoft.de/freeware.htm"</li> </ul> <li> <ul> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Oct to know or profiel Banes</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Easy to buy. Easy to learn. Easy to use.</li></ul></li>	E Control Panel - EA	AGLE 7.5.0 Light
Name       Cacumentation         1 Ubraries       Design Rules         2 Design Rules       Version 7.5.0 for Windows (64 bit)         2 Scripts       CacM Jobs         > Projects       Single User Linense #62191E841E-LSR-WLM-1EL         Registered to:       Prevare linense for "non-profit"         Prevare linense for "non-profit"       Registered to:         Prevare linense for "non-profit"       "www.cadsoft.de/freeware.htm"         Prevare linense for "non-profit"       "www.cadsoft.de/freeware.htm"         Prevare linense for "non-profit"       "www.cadsoft.de/freeware.htm"         Prevare linense for "non-profit"       "mow.cadsoft.de/freeware.htm"         Profit       "mow.cadsoft.de/freeware.htm"       <	File View Options	Window Help
> Documentation       Easily Applicable Graphical Layout Editor         > Design Rules       Version 7.5.0 for Windows (64 bit)         > Scripts       Light Edition         > CAM Jobs       Copyright (c) 198-2013 CadSacht         > Projects       Single User License #62191E841E-LSR-WI.M-1EL FOR EDUCATIONAL USE ONLY!         Registered to:       Registered to:         Freeware license for "non-profit" and evaluation purposes. See the file: Threeware.key" of the URL "www.cadsoft.de/freeware.htm"         Easy to buy. Easy to learn. Easy to use.         Easy to buy. Easy to learn. Easy to use.         Edit to may urpoduct line:       Contact us to upgrade for the West RARE Mark         Our product line:       Contact us to upgrade for the West RARE Mark	Name	EAGLE
Libraries       Design Rules         Discripts       User Language Prc         Scripts       Light Edition         CAM Jobs       Single User License #62191E841E-LSR-WLM-1EL.         FOR EDUCATIONAL USE ONLY!       Registered to: Freeware license for "non-profit" and evaluation purposes. See the file "freeware.lkg" or the URL.         Www.cadooft.de/freeware.lkm"       Easy to buy. Easy to learn. Easy to use.         Get to how our product lines: EAGLE Bakerse EAGLE Bakerse EAGLE Bakerse       Context us to uggrade Proce: +199 8635 6999 [Context]	> Documentation	Easily Applicable Graphical Layout Editor
User Language Pro         Scripts         CAM Jobs         Projects         Single User License #62191E841E-LSR-WLM-1EL For EDUCATIONAL USE ONLY!         Registered to: Freeware licenses for "non-profit" and evaluation purposes. See the file "freeware.key" or the URL "www.cadooft.de/freeware.htm"         Easy to buy. Easy to learn. Easy to use.         Get to know our product lines: EAGLE LINE: EAGLE L	<ul> <li>Libraries</li> <li>Design Rules</li> </ul>	Version 7.5.0 for Windows (64 bit)
<ul> <li>Scripts</li> <li>CAM Jobs</li> <li>Projects</li> <li>Bingle User License #62191E841E-LSR-WLM-1EL. FOR EDUCATIONAL USE ONLY!</li> <li>Registered to: Freeware license for "non-profit" and valuation purposes. See the file "freeware.k" or the URL. "www.cadsolt.de/freeware.htm"</li> </ul>	<ul> <li>User Language Pr</li> </ul>	
> CAM Jobs       Copright (5) 1988-2015 CadSoft All rights reserved worldwide         > Projects       Single User License #62191E841E-LSR-WLM-1EL FOR EDUCATIONAL USE ONLY!         Registered to: Freeware license for "non-profit" and evaluation purposes. See the file Treeware license for "non-profit" and evaluation purposes. See the file Treeware license of the URL "www.cadsoft.de/freeware.htm"         Easy to buy. Easy to learn. Easy to use.       Set to know our product lines: FAGE Basines: FAGE Basines: FAGE Basines:	> Scripts	Light Edition
<ul> <li>Projects</li> <li>Frogetered to: Froe EDUCATIONAL USE ONLY!</li> <li>Registered to: Freeware keys for "non-profit" and evaluation purposes. See the file "freeware key" or the URL "www.cadsoft.de/freeware.htm"</li> <li>Easy to buy. Easy to learn. Easy to use.</li> <li>Get to know our product lines: Profit Deale Basines Profit Deale Basi</li></ul>	> CAM Jobs	Copyright (c) 1988-2015 CadSoft All rights reserved worldwide
EAGLE	> Projects	Single User License #62191E841E-LSR-WLM-1EL FOR EDUCATIONAL USE ONLY!  Registered to:  Freeware license for "non-profit" and evaluation purposes. See the file "freeware.key" or the URL "www.cadsoft.de/freeware.htm"  Easy to buy. Easy to learn. Easy to use.  Get to know our product lines: Contact us to upgrade from EAGLE Freeware: Endit E Business: Endit E Resized Scadend.ce Phone: H49 8635 699910





🖂 eas@enthutech.in

o x

# EAGLE SOFTWARE

#### Control Panel - C:\Users\praga\OneDrive\Documents\eagle\NM TEST1 - EAGLE 7.5.0 Light

File View Options	Window Help
Name	Empty Project
Name  Documentation Libraries Design Rules User Language Pro Scripts CAM Jobs Projects	Empty Project Use the context menu to create new schematic or board files within this project.
	Easy to buy. Easy to learn. Easy to use.         Get to know our product lines:       Contact us to upgrade from EAGLE Freeware:         EAGLE Business EAGLE Make EAGLE Learn       Email: sales@cadsoft.de Phone: +49 8635 698910 EAGLE Learn

C:\Users\praga\OneDrive\Documents\eagle\NM TEST1

### **Open the Eagle 7.5.0**





Regional www.enthutech.in

🖂 eas@enthutech.in

Ð

## File Management

PCB

# Create a folder to store all the project files





🖂 eas@enthutech.in

## File Management

## TEST PROJECT 1

### Create a Project folder to store the Design and fabrication files

# **Henthutech**®



🖂 eas@enthutech.in

## NEW PROJECT CREATION

Ę	(	Control Par	nel	Jsers\pra	ga\On	eDve\Documents\eagle\NM TEST1 - EAGLE 7.
F	ile	View Q	ptions	Window	Help	
		New			•	
Ļ	J	Ореп			•	menu to create new schematic or board files within t
		Open rec	ent proj	jects	•	
		Save all				
		Close pro	ject			
		Exit		A	lt+X	
7		rojects				

#### Click file > New





🖂 eas@enthutech.in

## **New Project Creation**

<b>(</b>	Control Panel - C:\	Users\praga\Or	neDri	ve\Docume	ntr\ez	JIE\NM TE
File	View Options	Window Help				
	New	•	E	Project		
•	Open Open recent proj	ects		Schematic		ematic or bo
	Save all			Board Library		
	Close project		O	CAM Job		
	Exit	Alt+X		ULP		
	Tojecto			Script		
				Text		

### Click file > New > Project



#### pard files within this project.

# #enthutech®



🖂 eas@enthutech.in

## **New Project Creation**



### **Rename the project file**

![](_page_27_Picture_3.jpeg)

![](_page_27_Picture_4.jpeg)

🖂 eas@enthutech.in

Register www.enthutech.in

## Rename the project file

![](_page_28_Figure_1.jpeg)

### **Renamed project file**

# #enthutech®

![](_page_28_Picture_4.jpeg)

🖂 eas@enthutech.in

## CREATING SCHEMATIC SHEET

![](_page_29_Figure_1.jpeg)

### **Project > New > Schematic**

**Henthutech**®

![](_page_29_Picture_4.jpeg)

🖂 eas@enthutech.in

## Schematic sheet

![](_page_30_Figure_1.jpeg)

![](_page_30_Picture_3.jpeg)

🖂 eas@enthutech.in 🛛 🌐 www.enthutech.in

## SAVE THE SCHEMATIC SHEET

<u> </u>							-	
File	Edit	Draw	View	Tools	Library	Options	Window	Help
•	New Open Open	 recent		Ctrl+O	1)			
θ	Save			Ctrl+S				
	Save a Save a	as all						
- - 0	Print s Print CAM	setup Process	sor	Ctrl+P				
≱.	Switch	n to bo	ard					
	Impoi Expor	rt t			> >			

## Save the Schematic Scheet in that folder(Test project 1)

![](_page_31_Picture_3.jpeg)

🖂 eas@enthutech.in

## SAVE THE SCHEMATIC SHEET

Save as	
$\leftarrow \rightarrow \checkmark \uparrow$ $\stackrel{\frown}{=}$ « PCB » TEST PR $\checkmark$ $\stackrel{\frown}{C}$ Search TES	ST PROJECT 1
Organize - New folder	
^ Name ^ [	Date modified
V 👤 This PC 🏾 🎬 NM TEST 1 1	8-12-2024 19:54
> 🐸 Windows (C:)	
> 🚅 pragathish (D:)	
> 🛋 New Volume (E	
> 🎾 Network	
File name: NM TEST 1.sch	
Save as type: Schematics (*.sch)	
▲ Hide Folders           Save	Cane

### Save in that created file

![](_page_32_Figure_3.jpeg)

![](_page_32_Picture_4.jpeg)

🖂 eas@enthutech.in

م

?

Cancel

## **Grid Configuration**

![](_page_33_Figure_1.jpeg)

### **Click the Grid option**

#enthutech®

![](_page_33_Picture_4.jpeg)

Register www.enthutech.in

🖂 eas@enthutech.in

## **Grid Configuration**

![](_page_34_Figure_1.jpeg)

Regional www.enthutech.in

🖂 eas@enthutech.in

## Add FRAME

![](_page_35_Figure_1.jpeg)

🖂 eas@enthutech.in

## Add Frame

![](_page_36_Picture_1.jpeg)

## Add Frame

![](_page_37_Figure_1.jpeg)

## Place the frame in that Origin point

# #enthutech®

![](_page_37_Picture_4.jpeg)

🖂 eas@enthutech.in

## **Schematic Sheet**

![](_page_38_Figure_1.jpeg)

![](_page_38_Picture_2.jpeg)

🖂 eas@enthutech.in 🛛 🌐 www.enthutech.in

## **SNAPEdA**

![](_page_39_Picture_1.jpeg)

Snap EDA https://www.snapeda.com

#### SnapMagic Search | Free PCB Footprints and Schematic

Design faster with SnapMagic Search. Download CAD models for millions of electronic components, including schematic symbols, PCB footprints, and 3D models.

## Signup to the Snapeda

![](_page_39_Picture_6.jpeg)

![](_page_39_Picture_7.jpeg)

Company\*

Password\*

Confirm Password\*

D
5
1
2
T
ŏ
¥
R

![](_page_39_Picture_13.jpeg)

Register www.enthutech.in

🖂 eas@enthutech.in

	~			
C	S	m	bol	S
<u> </u>	~,	••••		U I

Work email\*

I'm not a robot

![](_page_39_Picture_21.jpeg)

## Library downloading

![](_page_40_Figure_1.jpeg)

## Library downloading

![](_page_41_Picture_1.jpeg)

## IMPORTING LIDRARY FILE

🐖 1 Schematic - C:\Users\prag	a\OneDrive\Dr_um	ant ) pagle\Test	t project 1\untitle
File Edit Draw View Tool	Library Options	Window Hel	р
🔄 🖶 🖨 🕋 불 1/1 🖙 🔛	Use	$  \mathbf{c} \sim   \mathbf{c}   \mathbf{c}   \mathbf{c}$	design 🗸 🗸
	Open		
●       Sheets       ■ ×       2.54 mm (-         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●         ●       ●       ●       ●       ●	! Update Update all		
			A.

### Click > Library > Use

![](_page_42_Figure_3.jpeg)

🖂 eas@enthutech.in

## IMPORTING LIDRARY FILE

![](_page_43_Picture_1.jpeg)

#### **Select the Component > Open**

![](_page_43_Figure_3.jpeg)

![](_page_43_Picture_4.jpeg)

🖂 eas@enthutech.in

Regional www.enthutech.in

## Add Components

![](_page_44_Figure_1.jpeg)

# Click the Add button to select the components

![](_page_44_Picture_3.jpeg)

![](_page_44_Picture_4.jpeg)

🖂 eas@enthutech.in

## Add Components

![](_page_45_Picture_1.jpeg)

## COMPONENT IMPORT

![](_page_46_Figure_1.jpeg)

By this method you can import multiple Components

# **Henthutech**®

![](_page_46_Picture_4.jpeg)

🖂 eas@enthutech.in

![](_page_47_Picture_0.jpeg)

![](_page_47_Picture_1.jpeg)

![](_page_47_Picture_2.jpeg)

R www.enthutech.in

🖂 eas@enthutech.in