Nitte Meenakshi Institute of Technology

Bengaluru, Karnataka 560064

Affiliated to Visvesvaraya Technological University, Belagavi

(21EE39)
Internship/ Mini project/ Self study

On

"Internet Speed Test using Python"

Carried out at

"Nitte Meenakshi Institute of Technology"

Submitted in partial fulfillment for the award of

BACHELOR OF ENGINEERING

Submitted by

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Department of Electrical and Electronics Engineering

Nitte Meenakshi Institute of Technology

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Department of Electrical and Electronics Engineering

CERTIFICATE

Certified that the Internship done in the company **"Nitte Meenakshi Institute of Technology"** is carried out on **"Internet Speed Test using Python"** by **Sanjana Chauhan (1NT21EE054)** a bonafide student of **Nitte Meenakshi Institute of Technology**, **Bengaluru** in partial fulfillment for the award of B.E Degree in **Electrical and Electronics Engineering** of the **Visvesvaraya Technological University, Belagavi** during the year **2022-2023**. It is certified that all corrections/suggestions indicated have been incorporated in the report deposited in the department library. The **Internship/Miniproject/Self-study** report has been approved as it satisfies the academic requirement in respect of **Internship/Miniproject/Self-study** work for completion of the autonomous scheme of Nitte Meenakshi Institute of Technology for the above

Signature of the HoD (EEE)   **Signature of the Principal**   **Signature of the Guide**

EXTERNAL VIVA

Examiners   **Signature with Date**

1.

2.

ACKNOWLEDGEMENT

It gives me immense satisfaction and great pride to present this report. At this point of time, I would like to express my heartfelt gratitude to the people who have helped me make this venture successful.

I would like to extend my sincere regards and gratitude to the HoD of EEE Dept. for their support and guidance in the completion of the Internship/Miniproject/Self-study work on time.

I take this opportunity to express my sincere words of gratitude to our beloved principal Dr. H C Nagaraj, for all the support and encouragement.

I take my immense pleasure in expressing my gratitude to all the academic and non-academic staff members of EEE Dept, NMIT, Bengaluru who directly or indirectly assisted in my learning during the Internship/Miniproject/Self-study work.

Student Name: SANJANA CHAUHAN

USN: 1NT21EE054

DECLARATION

I, the student of B.E. VII Semester, **Sanjana Chauhan (1NT21EE054)** studying in Nitte Meenakshi Institute of Technology, Bengaluru, hereby declare that the work being presented in the report entitled "**Internet speed Test using Python**", which is being submitted as a part of Internship/Mini project/Self-study, is an authentic record of my own work that hasbeen carried out by me during the academic year 2022- 2023 from to at Nitte Meenakshi Institute of Technology, Bengaluru.

Place: **Bengaluru**   **Student Name:**   SANJANA CHAUHAN

Date: **USN:**   1NT21EE054

Signature:

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INTRODUCTION

During my internship, I was exposed to and trained in three essential software tools used for engineeringand scientific analysis: LT SPICE, MATLAB, and Python. These programs are widely used in a varietyof industries, including electronics, power systems, data science, and machine learning.

Through practical training and project work, I was able to gain a solid understanding of each software'sfunctionality and application in solving real-world problems. This report aims to provide an overview ofmy experiences with LT SPICE, MATLAB, and Python during my internship and highlight the valuableskills and knowledge that I have gained from their usage. A mini project was hence completed by makingthe use of the above skills learnt

Steganography is the practice of concealing a message within another message or a physical object. Incomputing/electronic contexts, a computer file, message, image, or video is concealed within another file, message, image, or video.

The first recorded use of the term was in 1499 by Johannes Trithemius in his *Steganographia*, a treatiseon cryptography and steganography, disguised as a book on magic. Generally, the hidden messages appear to be (or to be part of) something else: images, articles, shopping lists, or some other cover text. For example, the hidden message may be in invisible ink between the visible lines of a private letter.

The advantage of steganography over cryptography alone is that the intended secret message does not attract attention to itself as an object of scrutiny. Plainly visible encrypted messages, no matter how unbreakable they are, arouse interest and may in themselves be incriminating in countries in which encryption is illegal.

Whereas cryptography is the practice of protecting the contents of a message alone, steganography is concerned with concealing the fact that a secret message is being sent and its contents.

Steganography includes the concealment of information within computer files. In digital steganography,electronic communications may include steganographic coding inside of a transport layer, such as a document file, image file, program, or protocol.

Media files are ideal for steganographic transmission because of their large size. For example, a sender might start with an innocuous image file and adjust the colour of every hundredth pixel to correspond toa letter in the alphabet. The change is so subtle that someone who is not specifically looking for it is unlikely to notice the change.
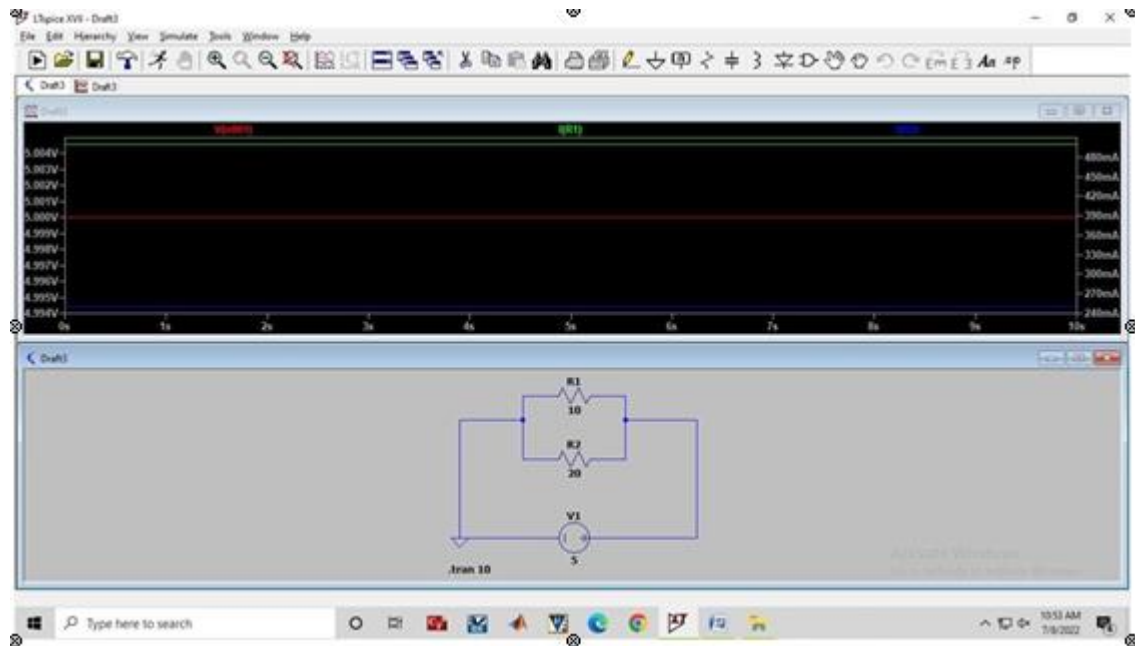
LT SPICE

DC Circuits

Resistance connected in series: In circuit we have two resistances connected in series R1=10ohm andR2=20ohm. The voltage for the circuit is 5V (DC) having a period of 10 sec.
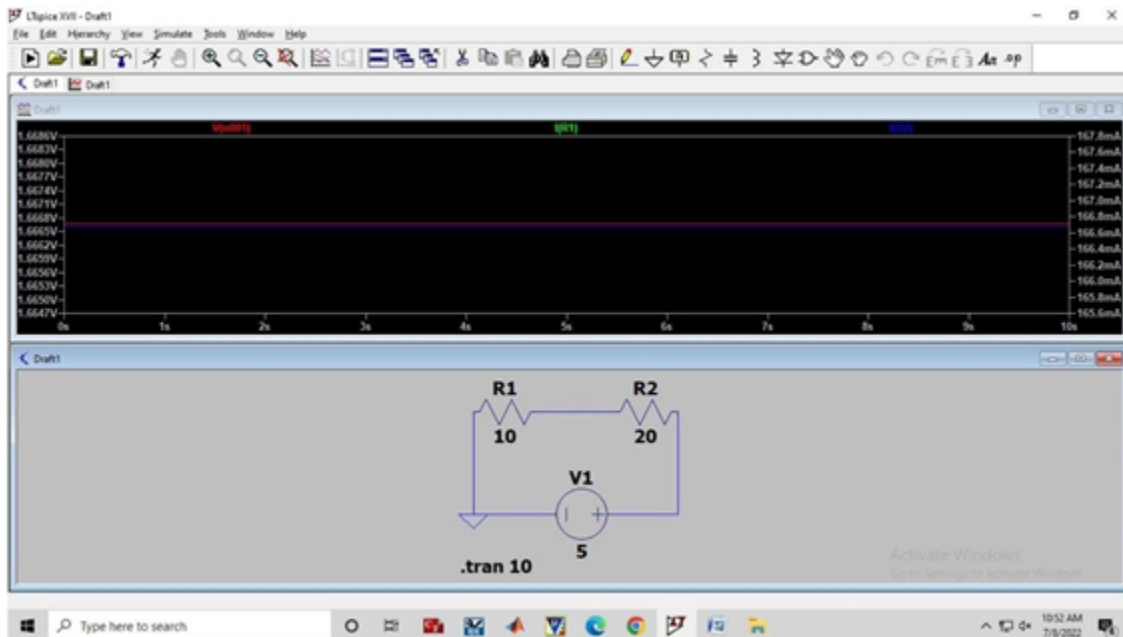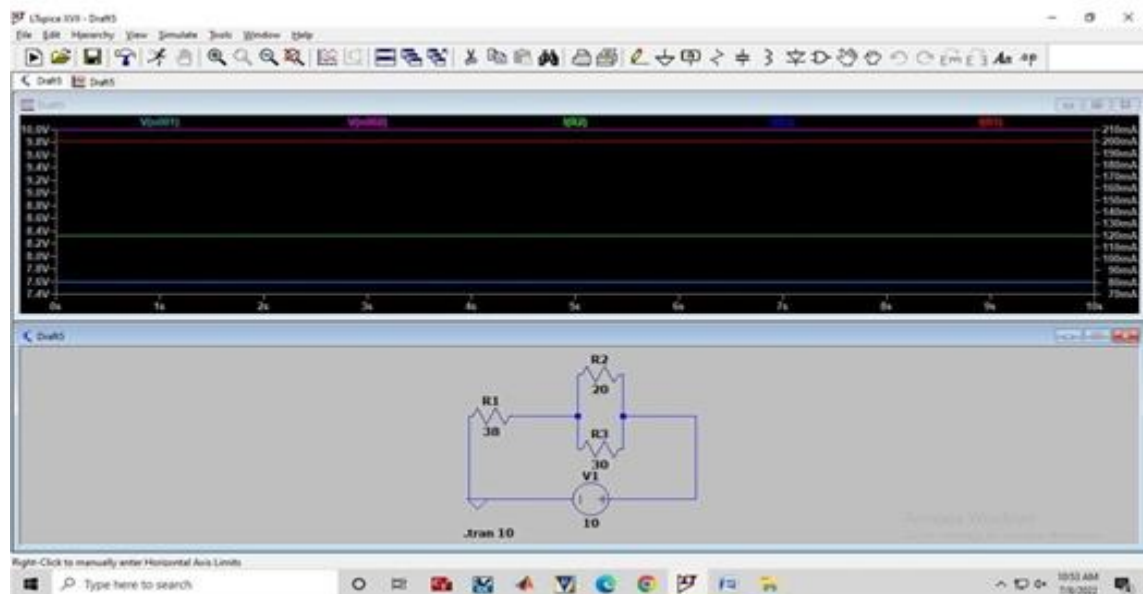

DC Circuits

Resistance connected in Parallel: The circuit is composed of two resistances connected in parallel toeach other R1=10ohm and R2=20ohm. The voltage for the circuit is 5V (DC) having a period of 10 sec
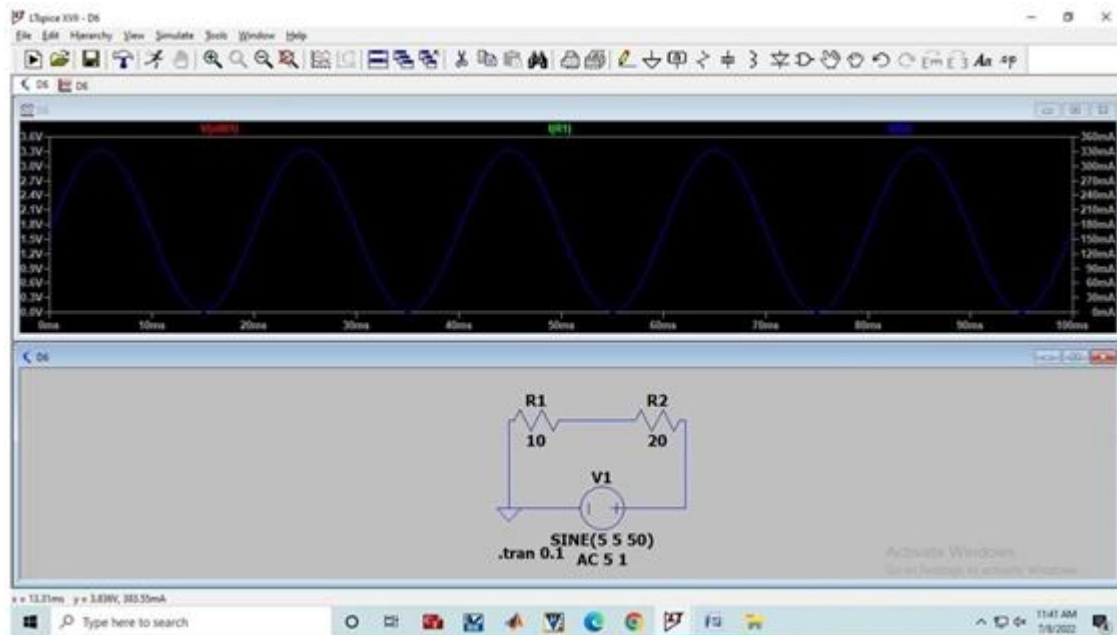
DC Circuits

Combination of series and parallel: The circuit is composed of 3 resistances, R1=38ohm, R2=20ohm, R3=30ohm in which R2 and R3 connected in parallel to each other and their combination is connected in series with R1. The voltage for the circuit is 5V (DC) having a period of 10 sec.
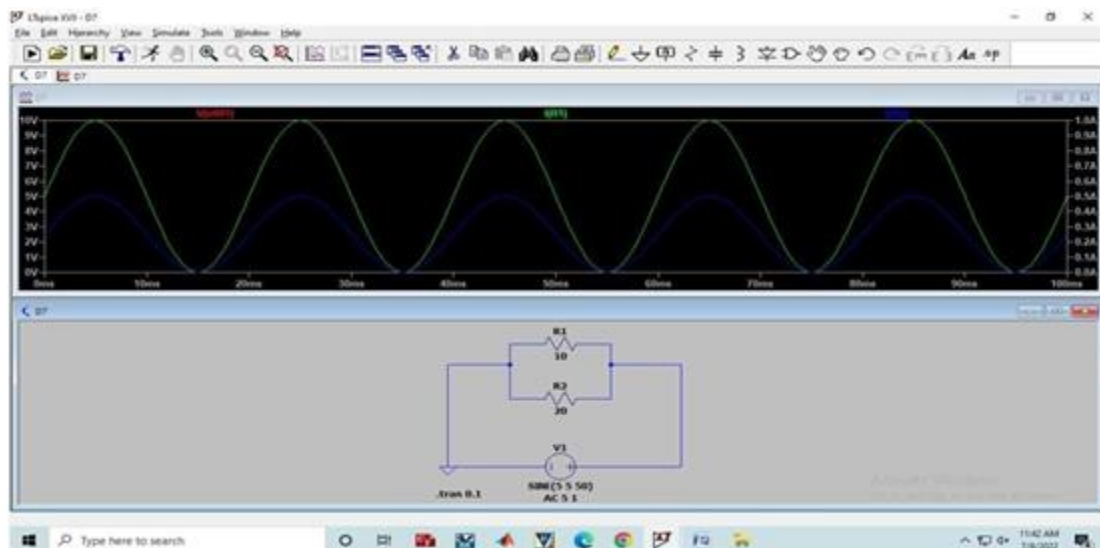

AC Circuits

Resistance connected in series: The circuit consists of two resistance R1=10ohm and R2=20ohm connected in series. The voltage for the circuit is 5V (AC) for a period of 0.1 seconds at 50Hz with amplitude set at 5
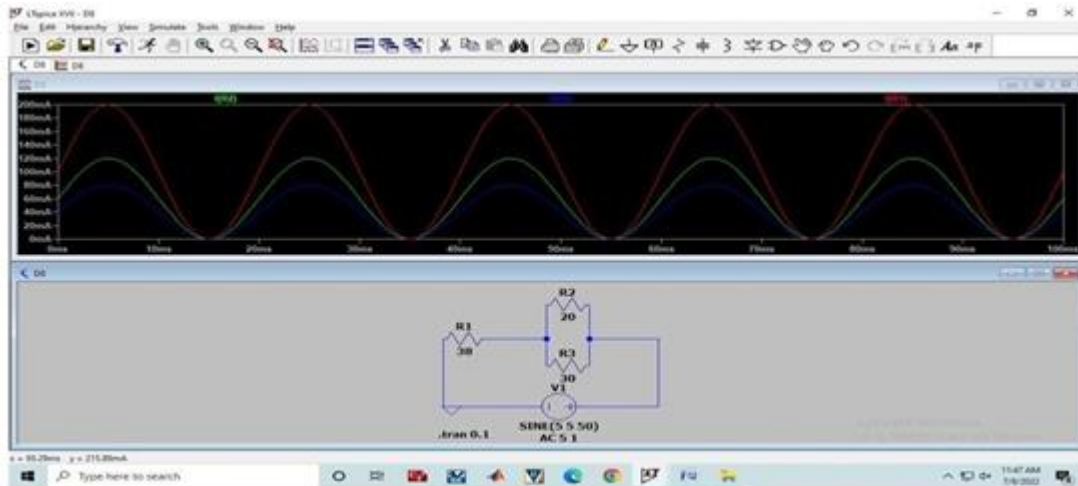
AC Circuits

Resistance connected in parallel: The circuit consists of two resistance R1=10ohm and R2=20ohm connected in parallel. The voltage for the circuit is 5V (AC) for a period of 0.1 seconds at 50Hz with amplitude set at 5, Run for a duration of 0.1s.

AC Circuits

Combination of series and parallel: The circuit is composed of 3 resistances, R1=38ohm, R2=20ohm, R3=30ohm in which R2 and R3 connected in parallel to each other and their combination is connected in series with R1. The voltage for the circuit is 5V(AC) for a period of 0.1 sec at 50HZ with amplitude set at 5 run for a duration of 0.1 sec.
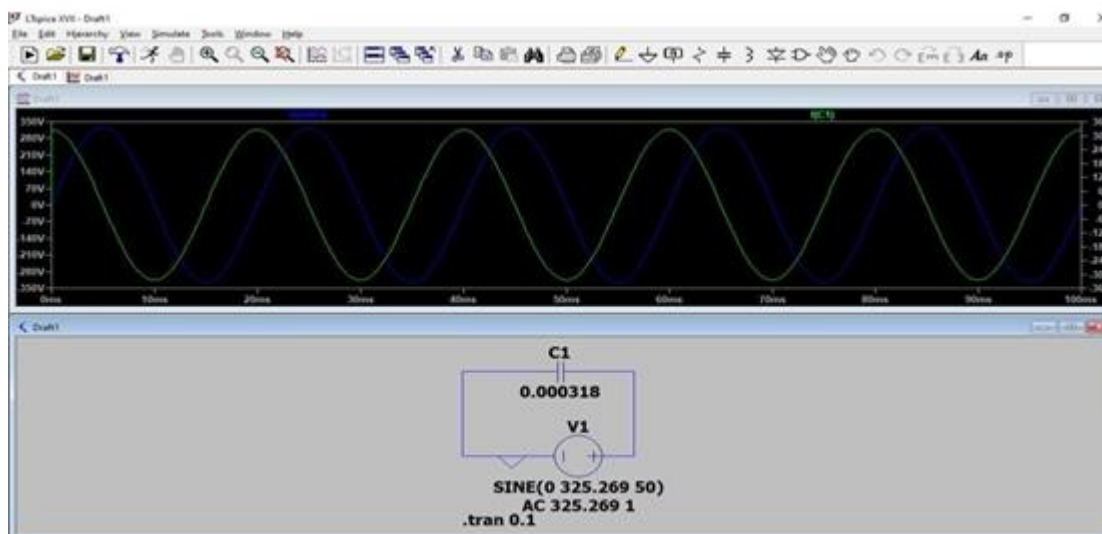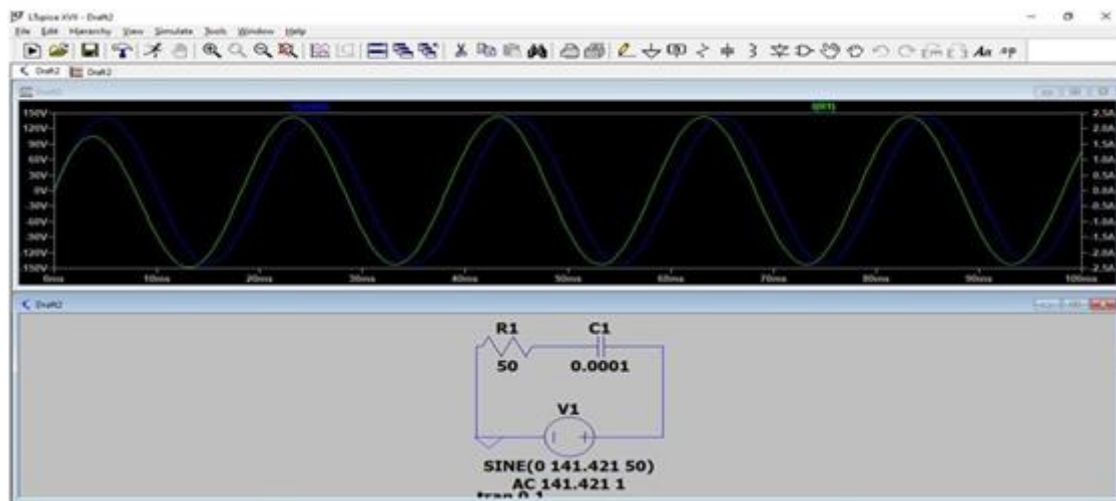
AC Circuits

Capacitive Circuit: The circuit is made with a capacitance of 3.18*10e-5C and an AC voltage with 50Hzand 325.269 amplitude is applied across circuit, Run for a duration of 0.1s. The circuit gives a sinusoidalwave with same voltage and current amplitude but different phase where the voltage is lagging and current leading.
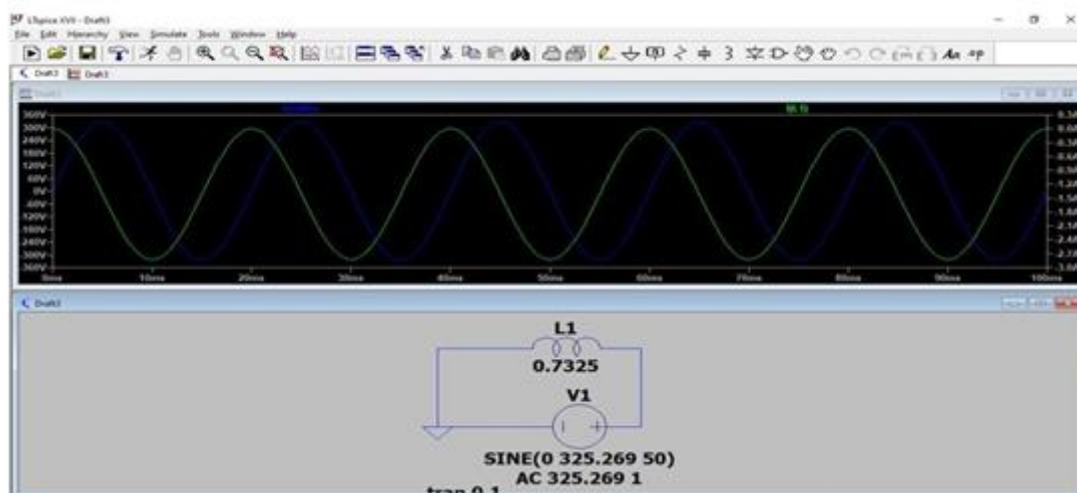

AC Circuits

Combination of capacitor and resistor: A 50ohm resistance and a 1x10e-4C capacitor are connected in series 5C and an AC voltage with 50Hz and 141.421 amplitude is applied across circuit. Run for a duration of 0.1s. In the circuit sinusoidal wave voltage lags current.

AC Circuits

Inductive Circuit: This circuit is composed of an inductor with an inductance of 0.7325H and an AC voltage with 50 HZ and 325.629 amp. Run time 0.1 sec.

AC Circuits

Combination of resistance and inductance: The circuit consists of a resistor of 10ohm and inductor of 7H in series. A voltage with 339.411 amplitude and 50Hz is connected to the circuit. It is run for 0.1 s ,the graph shows the voltage leading the current, which can be determined by the phasor diagram of the circuit. *I*t is in a sinusoidal wave form.
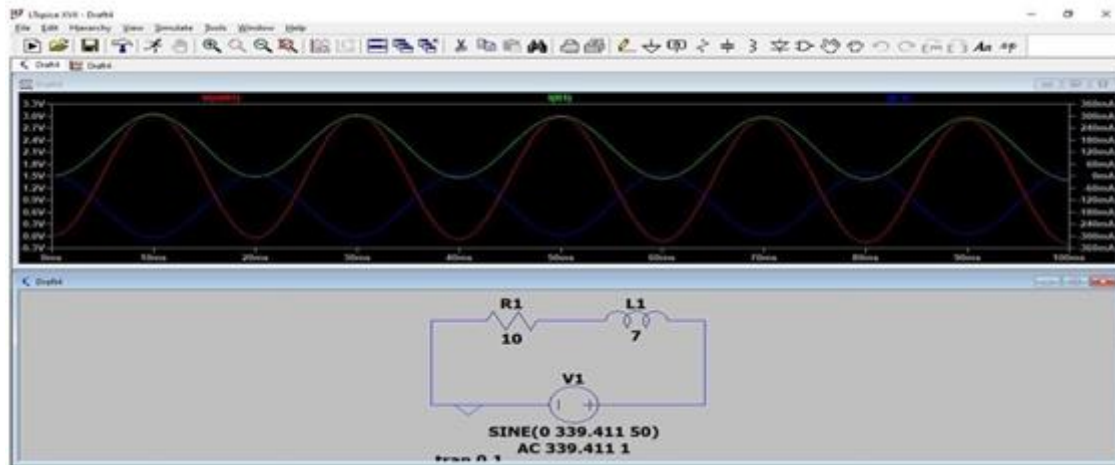
AC Circuits

LCR Combination Circuit: The circuit composed of a inductor of 0.119H ,resistor of 42.5ohm , and a capacitor of 1.3x10e-4C. A voltage with an amplitude of 282.843 and a frequency of 50Hz is connectedacross the circuit
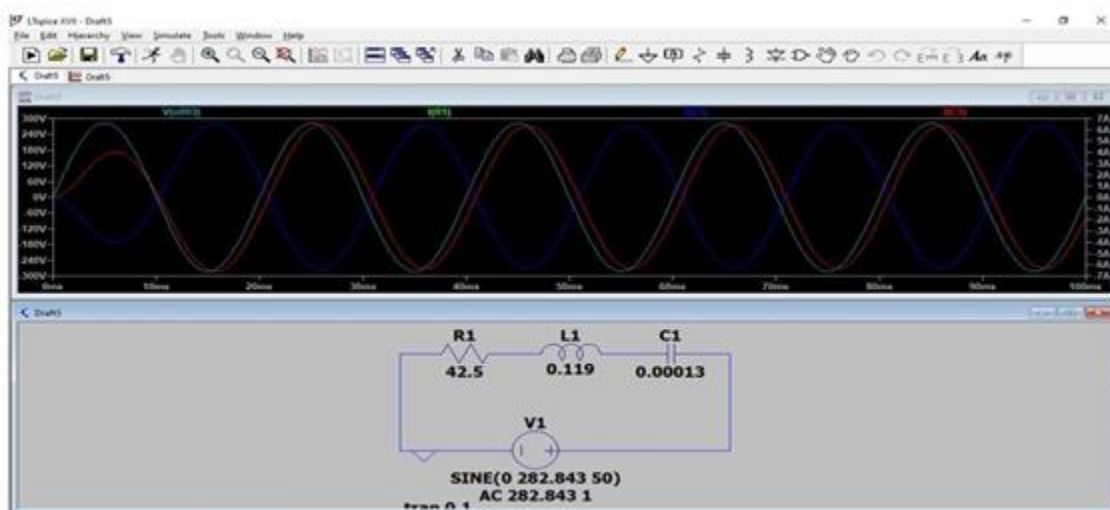
AC Circuits

Full wave rectifier with refined capacitance

AC Circuits

Full wave rectifier without refined capacitance:

SCRATCH

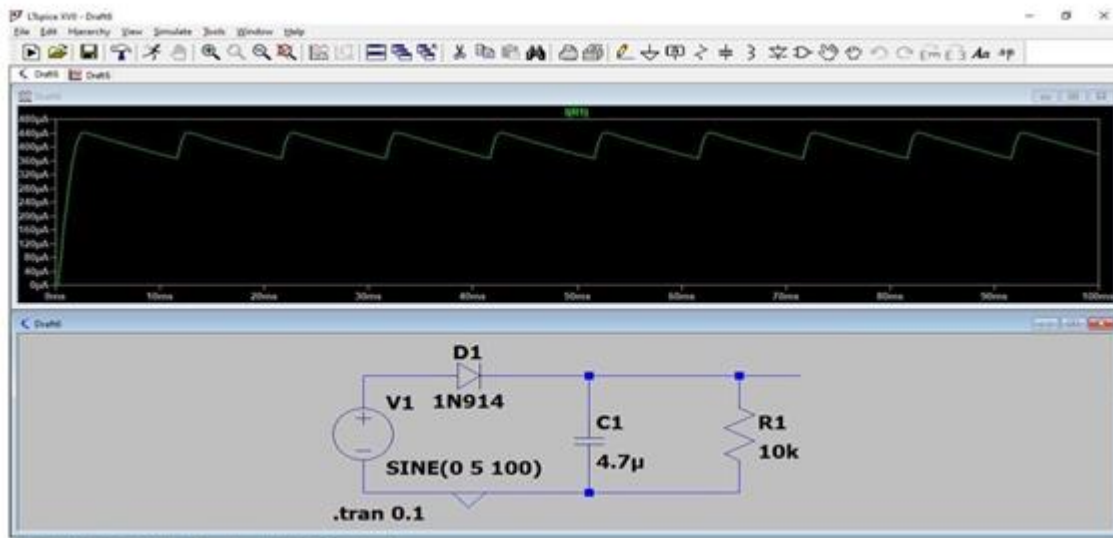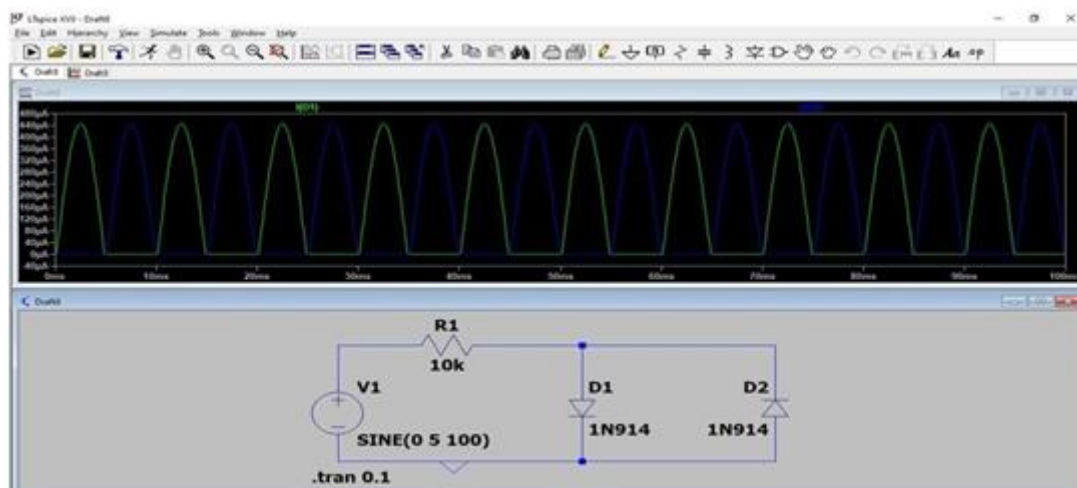Scratch is a programming language and online community developed by the Lifelong Kindergarten Group at the Massachusetts Institute of Technology (MIT). It is designed to introduce children and beginners to programming concepts and computer science in a fun and interactive way. Scratch uses a block-based visual programming interface, which allows users to drag and drop code blocks to create animations, games, stories, and other interactive projects. It also provides a library of pre-made graphics,sounds, and animations, making it easy for users to create engaging and dynamic projects without any prior programming experience.

One of the key benefits of Scratch is its focus on collaboration and sharing. Users can share their projectswith others in the online community, receive feedback, and even remix other users' projects to create

their own variations. Scratch has been widely adopted by schools and educational institutions around theworld as a tool for teaching programming and computer science to children. It is also used by hobbyists,artists, and makers to create interactive projects and prototypes.

Overall, Scratch provides an accessible and engaging platform for learning programming concepts and developing computational thinking skills. Learning scratch in doing animation of things to make thingsconvey easily to the clients. A presentation was also done in groups of 2. The follow topics were briefed:Chemical sensors, Image sensors, Infrared sensors.

MATLAB

MATLAB (short for Matrix Laboratory) is a high-level programming language and computing environment widely used in engineering, science, and mathematics. It is developed by MathWorks and is a popular tool for numerical analysis, data visualization, and algorithm development. MATLAB hasa simple and intuitive syntax that allows users to perform complex computations with ease.

MATLAB provides a wide range of built-in functions and toolboxes for data analysis, signal processing,image processing, machine learning, and many other fields. It also supports the creation of custom functions, scripts, and graphical user interfaces (GUIs). MATLAB has a powerful debugging and profiling tool that helps users to identify and fix errors in their code.

One of the major strengths of MATLAB is its ability to work with matrices and arrays, which are essential components of many mathematical and scientific problems. MATLAB provides powerful tools for manipulating and analyzing matrices, such as matrix multiplication, decomposition, and eigenvalue calculations.

MATLAB is widely used in academia, industry, and research. It is used for a variety of applications, such as data analysis, financial modeling, control systems design, and digital signal processing. MATLAB is also popular in the field of machine learning and deep learning, due to its support for neuralnetworks and other advanced algorithms.

In summary, MATLAB is a powerful programming language and computing environment that is widelyused in engineering, science, and mathematics. Its ease of use, extensive library of functions, and powerful matrix manipulation capabilities make it a popular choice for researchers, students, and professionals.

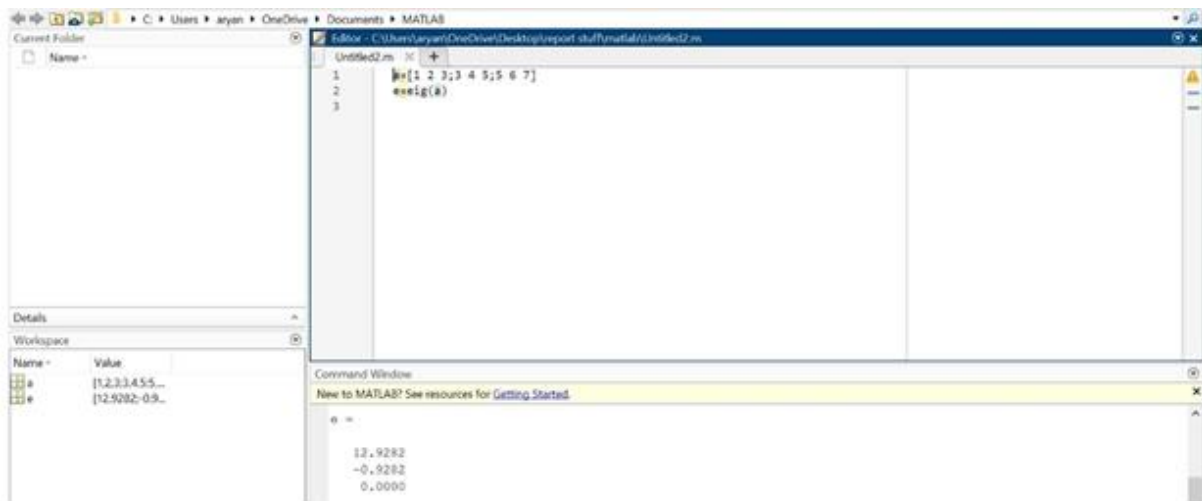Usage of mat lab and its introduction was briefed by respectable professors in the field of industry. Its basics and demonstration was given the professors, shown how it works on multiple inputs and outputsin a matrix.

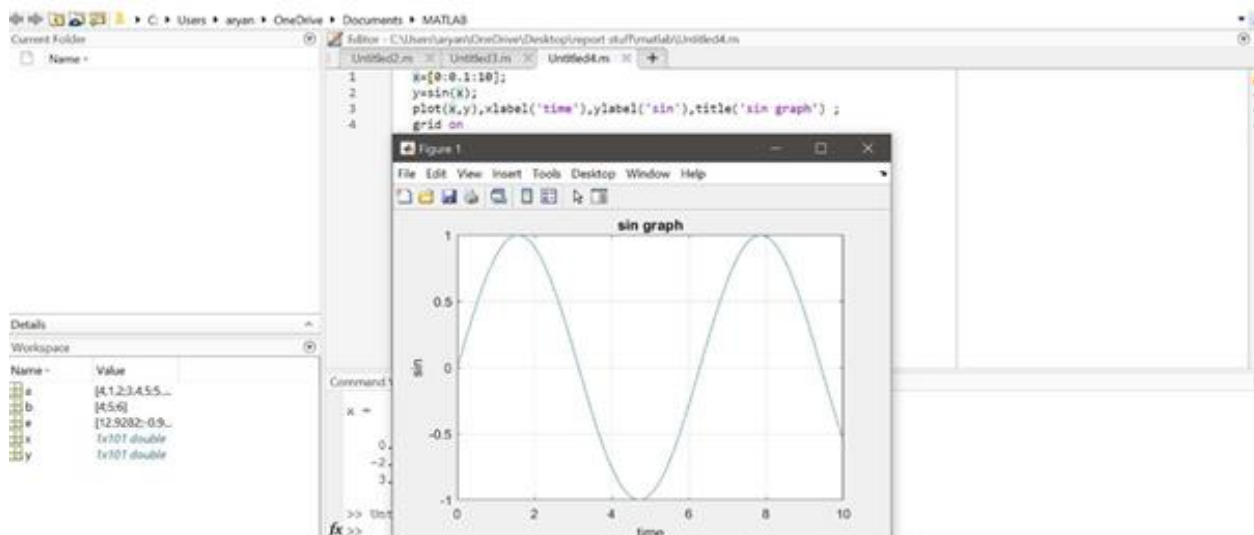**Inverse of a matrix**: Inverse of a matrix was found by using inv() function in matlab
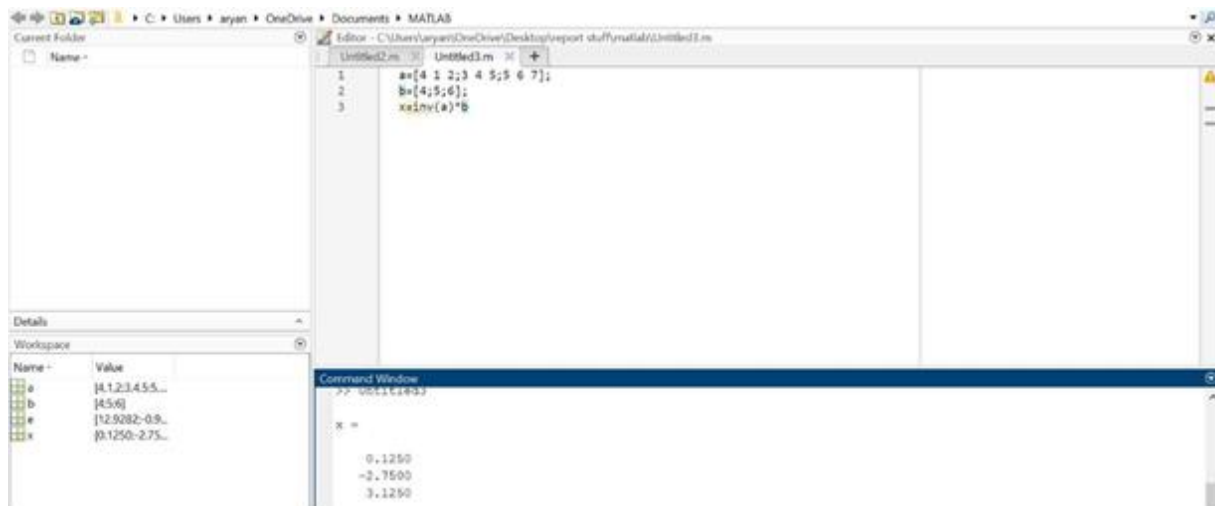
Eigen value of a matrix: Found using eig() function in matlab.

Sine wave function graph: It was performed using plot() and label() functions. Its range is on the x axisand y axis was given by sin() was assigned.

Displaying numbers in a specific range: It is displayed using the for loop. Number in range 1 to 17.

PYTHON

Python is a high-level, interpreted programming language that was first released in 1991. It was created by Guido van Rossum and is now maintained by the Python Software Foundation. Python's design philosophy emphasizes code readability and simplicity, making it a popular choice for beginners and experienced developers alike.

Python supports multiple programming paradigms, including procedural, functional, and object-orientedprogramming. It has a large standard library that provides a wide range of tools for developers to work with, from web development frameworks to scientific computing libraries. Additionally, Python has a vast community of developers who create third-party libraries and modules, making it easy to find solutions for a wide range of programming tasks.

One of the key features of Python is its ease of use and readability, which is achieved through its simplesyntax and indentation-based block structure. This makes it easy to write, read, and maintain Python code. Moreover, Python's interpreted nature allows for quick prototyping and testing of code, making itan ideal language for rapid development.
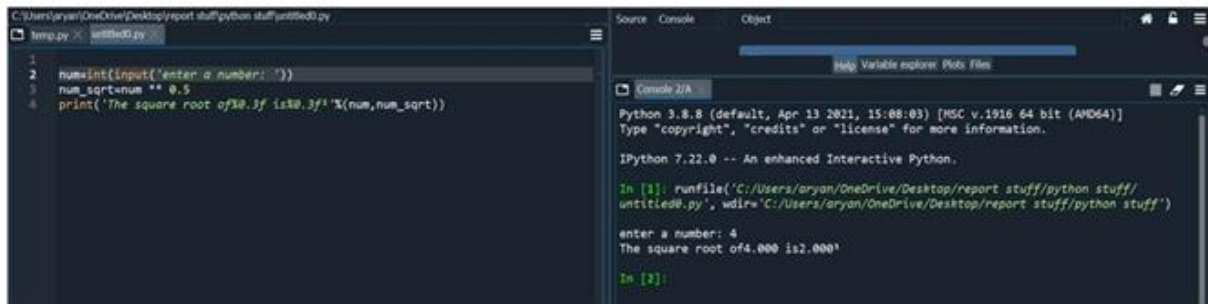
Python is widely used across industries and domains, including web development, scientific computing,data analysis, artificial intelligence, machine learning, and more. It is supported on multiple platforms, including Windows, macOS, and Linux, making it a versatile language for developers.

Overall, Python's simplicity, versatility, and community support have made it one of the most popular programming languages in use today.

Basic python programs were taught along with an overview on python programming and logic based programming.

Finding square root of a number: In this program, we store the number in num and find the square root using the ** exponent operator. This program works for all positive real numbers.
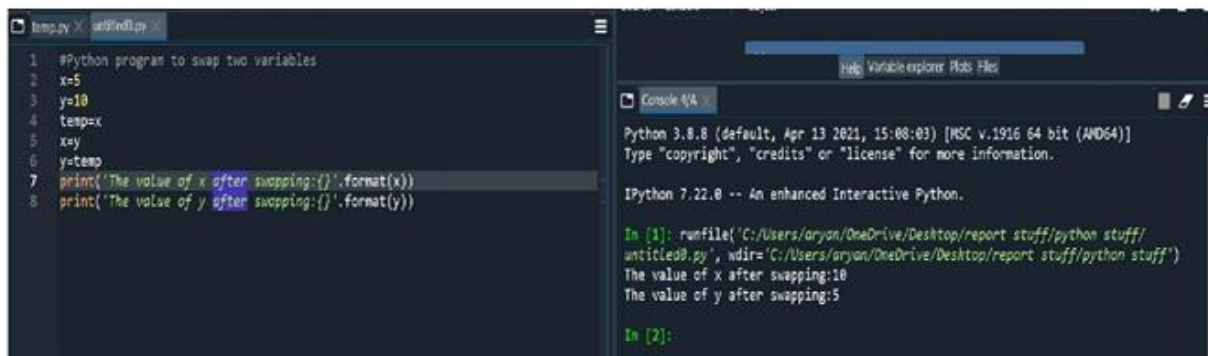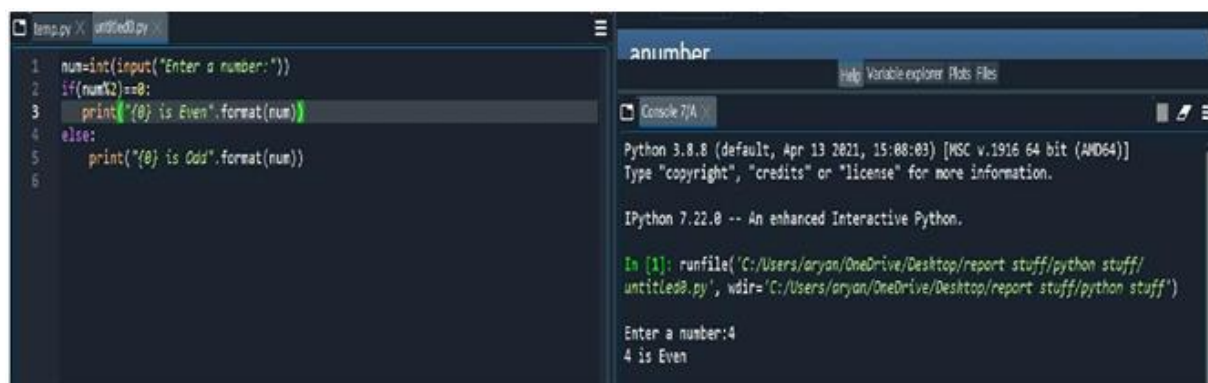
Swapping of two numbers: In this program, we use the temp variable to hold the value of x temporarily.We then put the value of y in x and later temp in y. In this way, the values get exchanged.

To check if a number is even or odd: A number is even if it is perfectly divisible by 2. When the number is divided by 2, we use the remainder operator % to compute the remainder. If the remainder isnot zero, the number is odd.

Factorial of a number: Here, the number whose factorial is to be found is stored in num, and we checkif the number is negative, zero or positive using if... elif… else statement. If the number is positive, we use for loop and range () function to calculate the factorial.

```
1   num=7
2   factorial=1
3   if num<0:
4       print("Sorry,factorial does not exist for negative numbers")
5   elif num ==0:
6       print("The factorial of 0 is 1")
7   else:
8       for i in range(1,num+1):
9           factorial=factorial*i
10      print("The factorial of",num,"is",factorial)
```

Fibonacci Series: Here, we store the number of terms in n terms. We initialize the first term to 0 and the second term to If the number of terms is more than 2, we use a while loop to find the next term in the sequence by adding the preceding two terms.

Sine Wave Plot: Python libraries for plotting graph and mathematical functions are imported. The x andy axis names and functions are assigned, title of the graph is assigned and centre axis line , grid i

```
1   import matplotlib.pyplot as plot
2   import numpy as np
3   time = np.arange(0, 10, 0.1)
4   amplitude = np.sin(time)
5   plot.plot(time, amplitude)
6   plot.xlabel('Time')
7   plot.ylabel('Amplitude = sin(time)')
8   plot.grid(True, which='both')
9   plot.axhline(y=0, color='g')
10  plot.show()
11  plot.show()
12
```
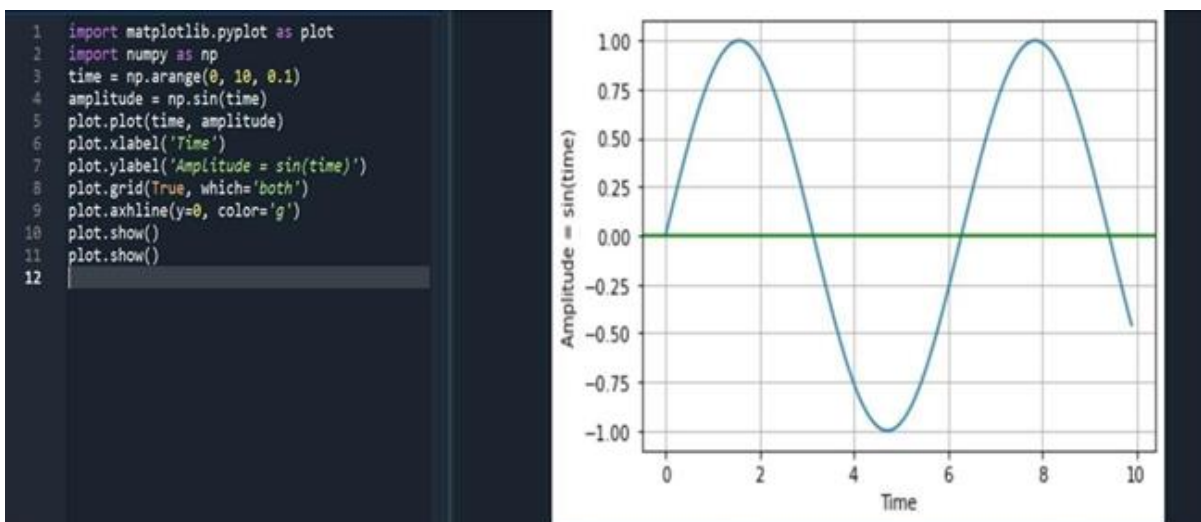
1. INTRODUCTION

1.1 Internet Speed

Internet speed, the number they give you (5 Mbps, for example), has nothing to do with how fast your internet works. It's not like a car or motorcycle where you can measure how fast it goes in miles per hour (mph).

Instead, internet speed is your (allocated) bandwidth. Bandwidth is the amount of data that can be sent to you, usually measured in seconds. For example, 5 Mbps would mean that you can receive up to 5 megabits of data per second.
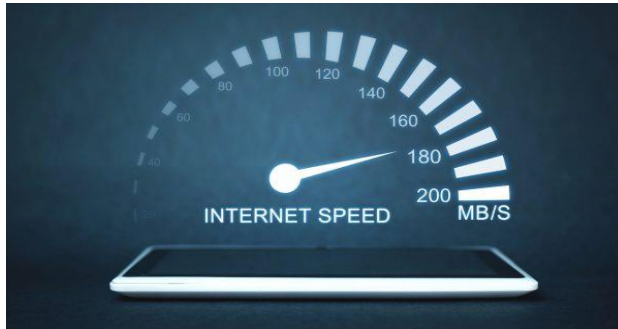
Fig 1.1 Internet speed

1.2 Working of Bandwidth

The best way to explain (and understand) how bandwidth (and your internet speed) works is by using an analogy.

Think of bandwidth like a freeway. All cars (data) travel at the same speed, so to get more data from the internet to your computer faster, the freeway needs to be wider.

In other words, say 1 Mbps is the equivalent to a 1 lane freeway. And let's say that you were trying to download an image, which is 5 Mb in size. So if you had a bandwidth of 1 Mbps (1 lane freeway) it would take you roughly 5 seconds to download the image.

Now let's say that you have a 5 Mbps (bandwidth) connection, or a 5 lane freeway. How fast will you receive your image? *1 second*.
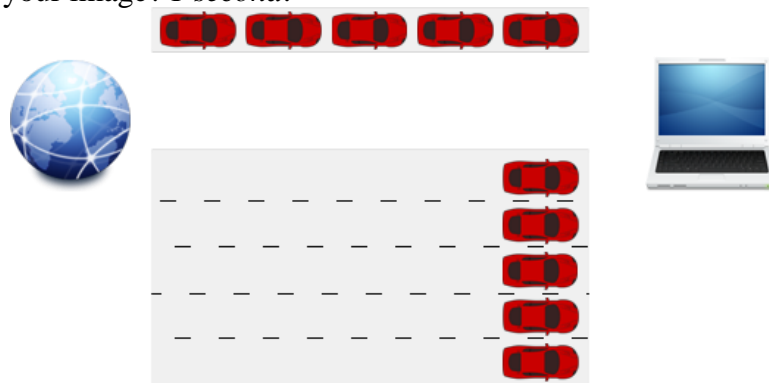
More bandwidth means that you'll receive more data at the same time. In this example, you can download 5 images with the wider bandwidth in the same time you could 1 with the narrower bandwidth.

Fig 1.2 bandwidth working

What's important to note here, and this confuses a lot of people, is that your internet isn't any faster from 1 Mbps to 5 Mbps, or however much bandwidth your connection has. Your data is just transferred to you at a faster rate because more data can be sent at the same time. It's more efficient, making your internet perceptually faster, not technically faster.

1.3 kbps, mbps, MBps and gbps

Another confusing aspect of shopping for internet based on speeds are all the terms or abbreviations being used. Mbps, MBps, kbps, Gbps; what does all of this mean?
These are the abbreviations for the amount of data that is being sent per second. Here is what each of them mean. Below that I've outlined a basic conversion guide and a rough idea as to how big each piece of data you consume is.

- **kbps** – Kilobits per second. This is used when talking about dialup (56k for example) and low speed DSL.

- **Mbps or mbps** – Megabits per second. Some people confuse this with mega*bytes*. The difference between the two is how the "b" is written in the abbreviation; Mbps = megabits and MBps = megabytes**.** This is the most common unit of speed used.

- **MBps** – Megabytes per second. Megabytes aren't usually used in (residential) internet plans.

- **gbps** – Gigabits per second. Gigabits are hardly used for internet plans, and the costs make them unpractical for families and small businesses.

bit based transfer rates

1000 bps = 1 kbps
1000 kbps = 1 mbps
1000 mbps = 1 gbps
1000 gbps = 1 tbps
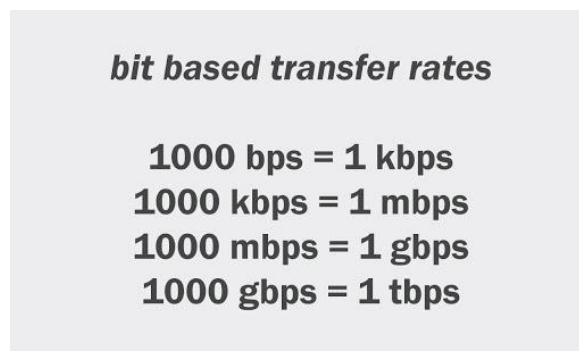
Fig 1.3 bit based transfer rates

1.4 Difference Between Upload and Download Speeds

Another confusing thing about shopping for internet is when you see speeds listed like this:
5/1 Mbps .Well, that means that internet plan has a download speed of 5 mbps and an upload speed of 1 mbps.The reason why your upload and download speed are different is because most internet connections are asymmetric. In English this means that the bandwidth is a different size going one way compared to the other. Since most users consume content rather than upload it, the bandwidth for download speeds is larger (than the upload).

SPEEDTEST   12/10/2021 6:12 AM   ✓ RESULTS ⚙ SETTINGS

PING ms   DOWNLOAD Mbps   UPLOAD Mbps
1   9179.23   8169.69

Fastmetrics   GO   Fastmetrics Inc.
San Francisco, CA

DOWNLOAD Mbps   UPLOAD Mbps
30.89   34.30
Ping ms   10   68   13

13.68

20
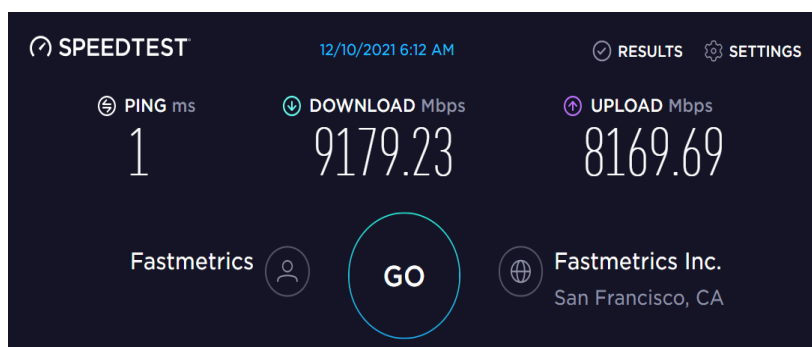
2. SOFTWARE USED

The language used to code this simple internet speed test app in python. Python has been in the top 10 popular programming languages for a long time, as the community of Python programmers has grown a lot due to its easy syntax and library support. Python is commonly used for developing websites and software, task automation, data analysis, and data visualization. Since it's relatively easy to learn, Python has been adopted by many non-programmers such as accountants and scientists, for a variety of everyday tasks, like organizing finances. The python version used in this code is 3.10.5(64-bit).

The Internet speed test app is implemented using GUI (Graphical User Interface). a graphical user interface (GUI) is an interface that is drawn on the screen for the user to interact with. User interfaces have some common components:

- Main window
- Menu
- Toolbar
- Buttons
- Text Entry
- Labels

All of these items are known generically as widgets. There are many other common widgets and many custom widgets that Tkinter supports. A developer will take the widgets and arrange them logically on a window for the user to interact with.

A graphical user interface works by waiting for the user to do something. The something is called an event. Events happen when the user types something while your application is in focus or when the user uses their mouse to press a button or other widget.

Underneath the covers, the GUI toolkit is running an infinite loop that is called an event loop. The event loop just waits for events to occur and then acts on those events according to what the developer has coded the application to do. When the application doesn't catch an event, it effectively ignores that it even happened.

When you are programming a graphical user interface, you will want to keep in mind that you will need to hook up each of the widgets to event handlers so that your application will do something.

 Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit. Creating a GUI application using Tkinter is an easy task. Tkinter provides various controls, such as buttons, labels and text boxes used in a GUI application. These controls are commonly called widgets.

3. WORKING

Step 1:
We begin with installing the required libraries using the pip package manager. Enter the below commands in your command line or terminal to install the modules. We need to install:
• Request: to fetch data from API
• Tkinter: to make our internet speed test app GUI (Graphical User Interface) based.
• Speedtest-cli package: Speedtest-cli is a module that is used in the command-line interface for testing internet bandwidth using speedtest.net. We now move to our Python file to code. We start with importing the libraries

Step2:
As a next step, we initialize our GUI window using the Tkinter module.this step describe the basic outlook of our app.

Step 3:
This is the step where we add functionality to our code. This part is the most crucial in getting correct internet speed information, as this involves fetching data from the speedtest-cli package
.
We then write the code for the most important function of this app, which is for displaying internet speed.

Step 4:
We then add functionality to our code. This part is the most crucial in getting correct internet speed information.

Step 5:
We now start to code the elements as per the GUI, for heading, text, labels, buttons, etc.
To start with, we code the text field for the download and upload speed , along with the label to indicate so:
• We use the Label method to generate a label of text of internet speed test , download speed and upload speed.
• We code a Check speed Button, on which we click to check the speed of the internet
• We give our button some styling, along with the name – 'Check Speed'. We use the 'command' widget, which shows what function (here, speedcheck function) would run on the click (key press) of the button, as coded in the previous step. After adding this, we add the output elements in our code. The elements on which our internet speed information would be displayed.
• Yet again, we add a label to title our result in the following text box
• To display the output we use a text field, which gets its value, every time the "Check Speed" button is pressed. This envokes the function to check internet speed info fetched from the speedtest.net after processing.On execution of our code, the Tkinter displays the output
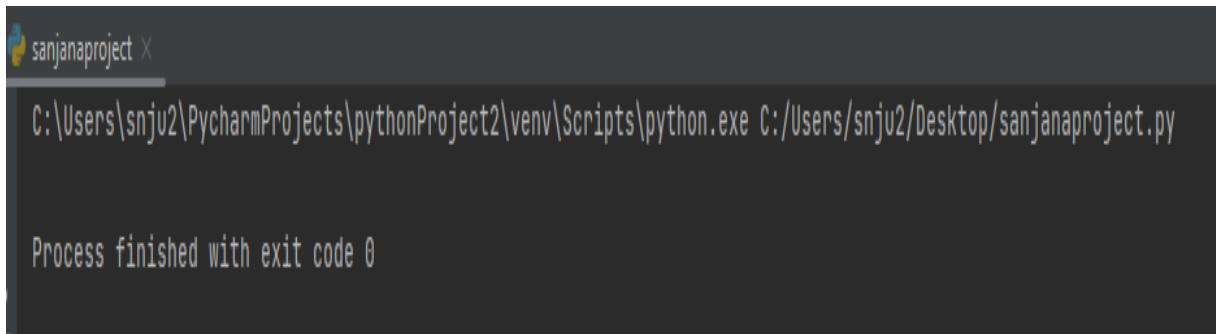
4. CODE

```python
3    #import neccesary modules
4    from tkinter import *
5    #from turtle import speed
6    import speedtest_cli
7    #function for speed check
8    def speedcheck():
9        # Create an instance of Speedtest and call it sp
10       sp = speedtest_cli.Speedtest()
11       sp.get_servers()
12       #converting to Mbps
13       down=str(round(sp.download()/(10**6) ,3))+"Mbps"
14       up=str(round(sp.upload()/(10**6),3))+"Mbps"
15       #fetching download speed
16       lab_down.config(text=down)
17       #fetching upload speed
18       lab_up.config(text=up)
19   #gui
20   sp=Tk()
21   sp.title("Internet Speed Test")
22   sp.geometry("500x600")
23   sp.config(bg="Black")
24   #designing label
25   #we use the label method to generate a label of text of internet speed test,download speed,upload speed
26   lab=Label(sp,text="Internet Speed Test",font=("Time New Roman",30,"bold"),bg="Black",fg="White")
27   lab.place(x=60,y=30,height=50,width=380)
28   #making label to show download speed
29   lab=Label(sp,text="Download Speed ⯆",font=("Time New Roman",20,"bold"))
30   lab.place(x=60,y=120,height=50,width=380)
31   lab_down=Label(sp,text="00",font=("Time New Roman",20,"bold"))
32   lab_down.place(x=60,y=190,height=50,width=380)
33   #making label to show upload speed
34   lab=Label(sp,text="Upload Speed ⯅",font=("Time New Roman",20,"bold"))
35   lab.place(x=60,y=280,height=50,width=380)
36   lab_up=Label(sp,text="00",font=("Time New Roman",20,"bold"))
37   lab_up.place(x=60,y=350,height=50,width=380)
38   #button for call to function
39   #we code a check button on which we click to check the speed of internet
40   #we give our button some styling along with the name-"Check Speed"
41   #We give our button some styling, along with the name - 'Check Speed'. We use the 'command' widget, which shows what
42   #function (here, speedcheck function) would run on the click (key press) of the button, as coded in the previous step.
43   button=Button(sp,text="Check Speed",font=("Time New Roman",20,"bold"),bg="Red",fg="Black",relief=RAISED,command=speedcheck)
44   button.place(x=60,y=450,height=50,width=380)
45
46   sp.mainloop()
```

Fig 4.1 project code

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5. PROJECT OUTPUT

If the code works successfully ,the terminal gives the following output:

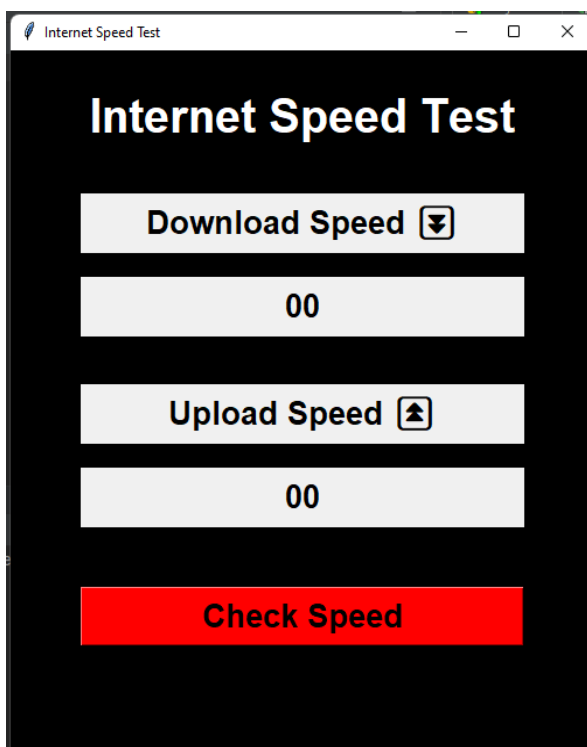Fig 5.1 project output 1

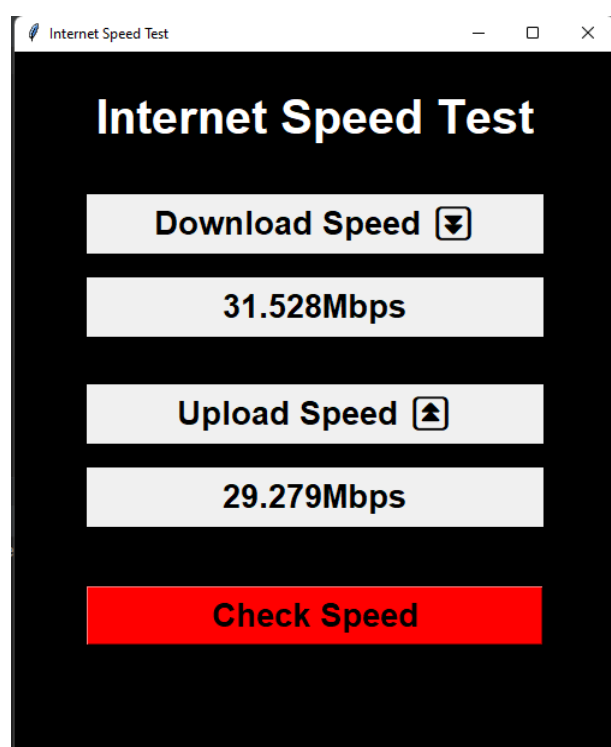The app looks like this when it is executed

Fig 5.2 project output 2

Fig 5.3 project output 3

6. OUTCOME

6.1 TECHNICAL OUTCOMES

• Ability to analyse a given engineering problem, identify an appropriate problem solving method and to implement the method to achieve a meaningful result.

• This training helps bridge the gap between theoretical and practical knowledge.

• Ability to apply previously acquired knowledge in problem solving.

• Ability to take engineering actions.

6.2 NON TECHNICAL OUTCOMES

As we all are very much familiar that the non-technical skills such as the verbal and written communication, personality development, time management and resource utilization are very important for any employee. Here I would like to express regarding my learning goals, how much I learned and what has to be improved

• Problem Solving Skills/Decision Making

The internship introduced me to real-life work problems and hence developed my problem-solving skills.

• Self Confidence :

Working as an intern and completing imperative tasks for my departments gave me confidence to believe in myself. Believing in yourself is not only vital to your success but it also helps you feel much more competent and confident in every task you do.

• Adaptability Skills

Being attentive to your surroundings easily is one of the most useful soft skills not only desirable to employers but also important to your self-growth.

• Communication skills

It's one of the top listed skills that recruiters look for in a resume and something that can get you from bottom to top. Communicating well is a gem of which you can learn during internship experiences.

• Responsibility

Being responsible is an integral skill required in the job arena. My internship experience makes me more responsible and accountable for what decisions I make a how I execute what's been allocated to me.

• Time Management

During an internship which is almost the beginning of my work life, I can't mark my absence on a regular basis. Hence, it helps me learn to manage my time better by maintaining a balance between my work and personal life

7. CONCLUSION

I learned how to create a GUI (graphical user interface) environment. I used it to create a simple internet speed test app in python. It uses Speedtest-cli package which is a module that is used in the command-line interface for testing internet bandwidth using speedtest.net. Python offers multiple options for developing GUI (Graphical User Interface). Out of all the GUI methods, tkinter is the most commonly used method. It is a standard Python interface to the Tk GUI toolkit shipped with Python. Python with tkinter is the fastest and easiest way to create the GUI applications. Creating a GUI using tkinter is an easy task.

8. REFERENCE

- https://www.programiz.com/
- https://www.geeksforgeeks.org/how-to-test-internet-on-linux-using-speedtest-cli/?ref=gcse
- https://thecleverprogrammer.com/2021/06/23/internet-speed-test-using-python/
- https://www.educative.io/answers/how-to-detect-internet-speed-using-python
- https://github.com/sivel/speedtest-cli