Tour de **OAAR**

Mid-Term Progress Report

Goals Of The Project

Telescope Handling

Basic Telescope Handling
Exploring the night sky

Softwares Of OAAR

Arduino
MATLAB
Python Libraries (Numpy, Astropy)
DDW
FocusMax, ASCOM

Astrophotography

Mastering Astrophotography

Simulation

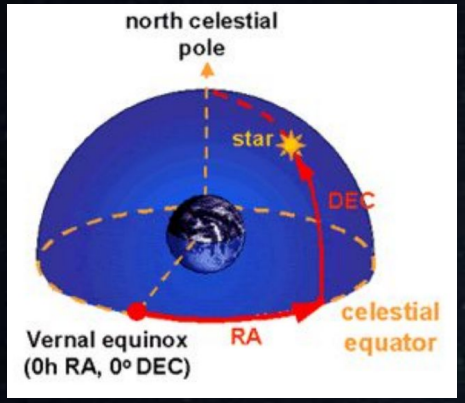
Universe Sandbox
Stellarium

WEEK 1

- ❏ Coordinate System
- ❏ Types of Telescopes
- ❏ Parts of Telescope
- ❏ Types of Mounts

Coordinate Systems

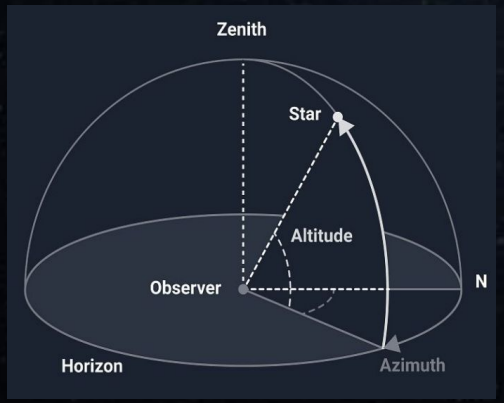
Equatorial coordinate system:



We assume a big celestial sphere in which earth is present

RA is similar to longitude and Dec is like latitude

Azimuthal coordinate system:



This coordinate system uses observer local horizon as the plane
fixed to location of Earth , not stars unlike equatorial system

Other coordinate systems:

Ecliptic coordinate system
Galactic coordinate system
Supergalactic coordinate system.

PARTS OF A TELESCOPE

Reflective

Uses Mirrors

Refractive

Uses Lens

TYPES OF TELESCOPES

TYPES OF MOUNTS

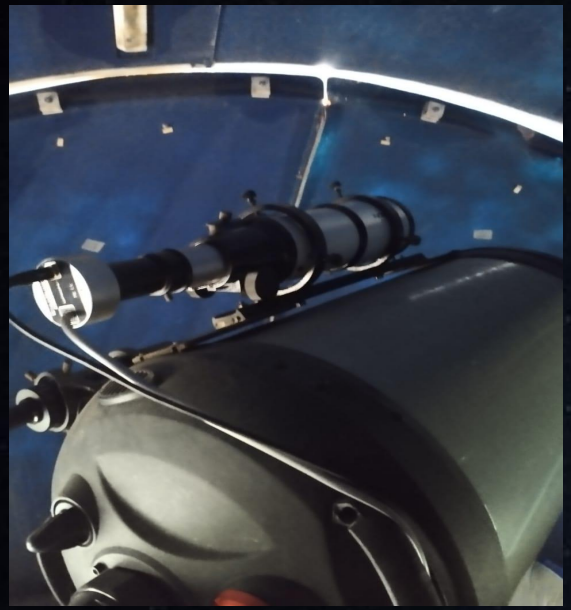
Alt-Az

Equatorial

WEEK 2

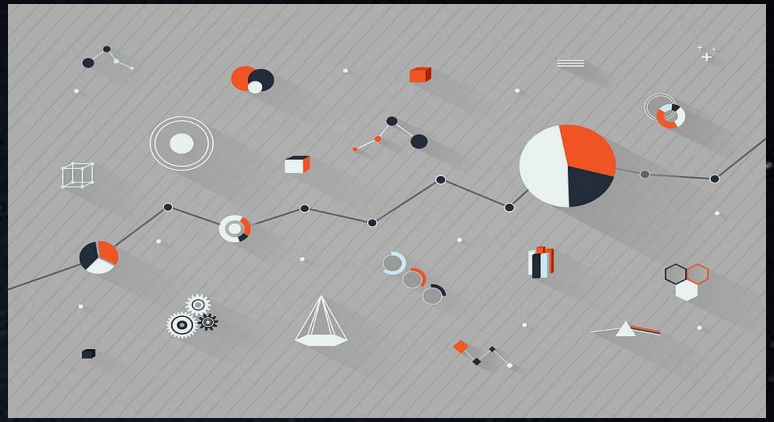
- Observatory Tour
- Python
- Arduino

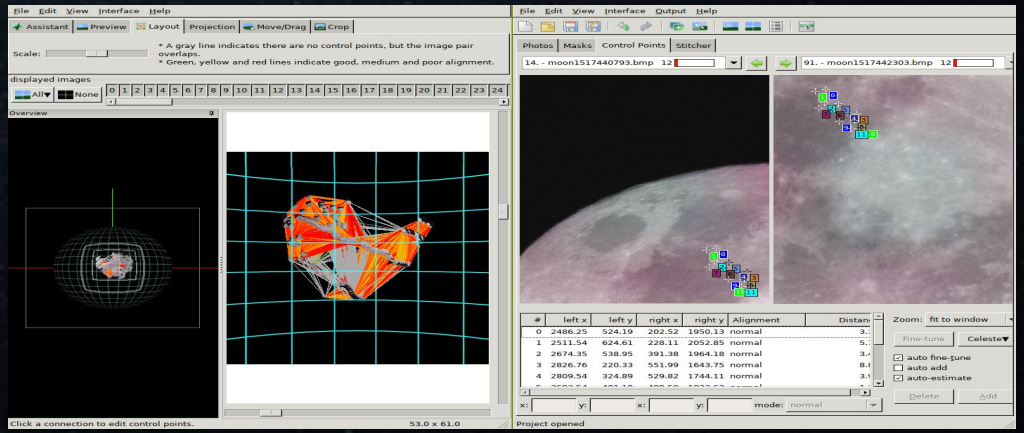
Observatory Tour



Why use Python?!

1. Data analysis and visualization
2. Interfacing with astronomical software
3. Machine learning and simulations





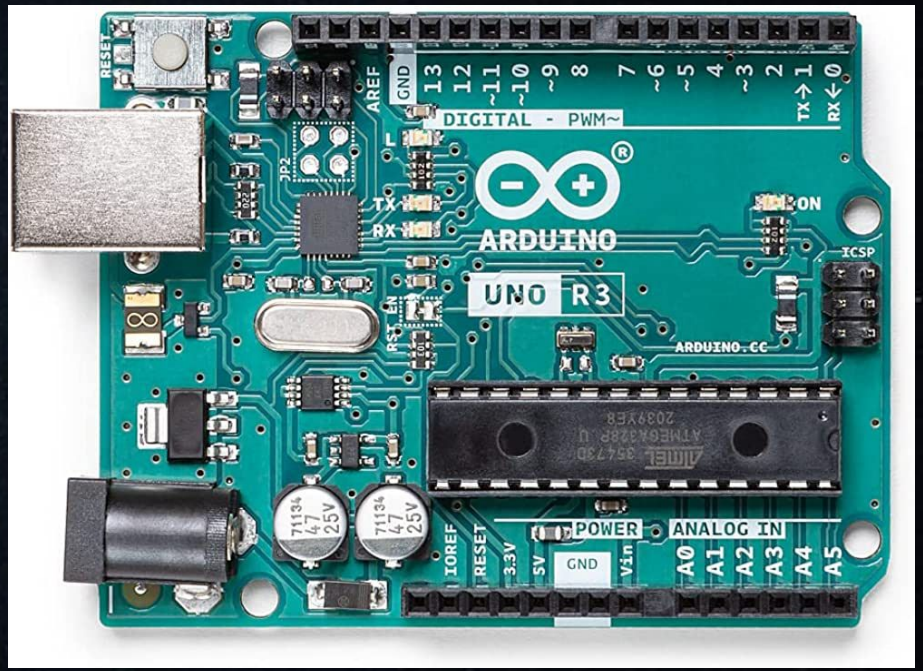
Takeaways

- Basics including functions
- Numpy Library : NumPy is a powerful Python library for scientific computing that provides support for large, multi-dimensional arrays and a wide range of mathematical functions.

We did an assignment based on python and numpy library.

Arduino

Arduino is a free and open-source electronics platform that includes both hardware and software. The Arduino board, a development board with a microcontroller at its core, is what makes Arduino tick.



What is a Microcontroller?

- To operate electrical equipment, a microcontroller (a tiny computer on a single integrated circuit) is employed.
- It is equipped with a CPU, memory, and input/output devices.

WEEK 3

- ❏ Astrophotography
- ❏ Telescope Handling
- ❏ Intro to MATLAB

Astrophotography

We learnt how to capture stunning photographs of the night sky with a normal smartphone, this can be done by going to pro mode and changing a few settings like:

ISO

SHUTTER SPEED

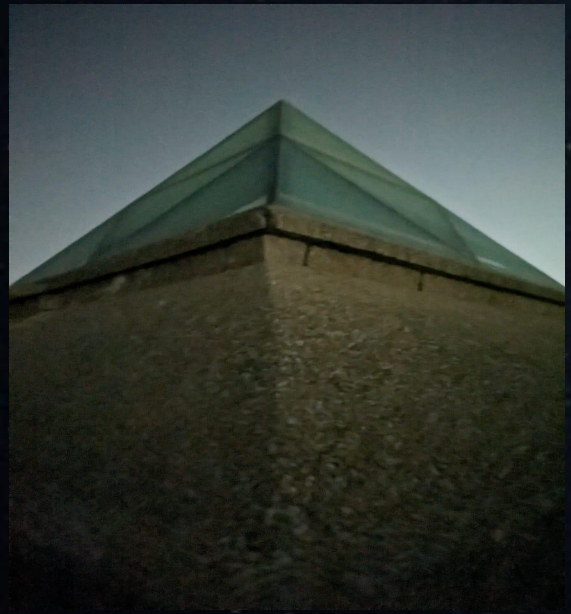
FOCUS

BASIC EDITING

Now all that's left, are your skills!

TRANSFORMATION

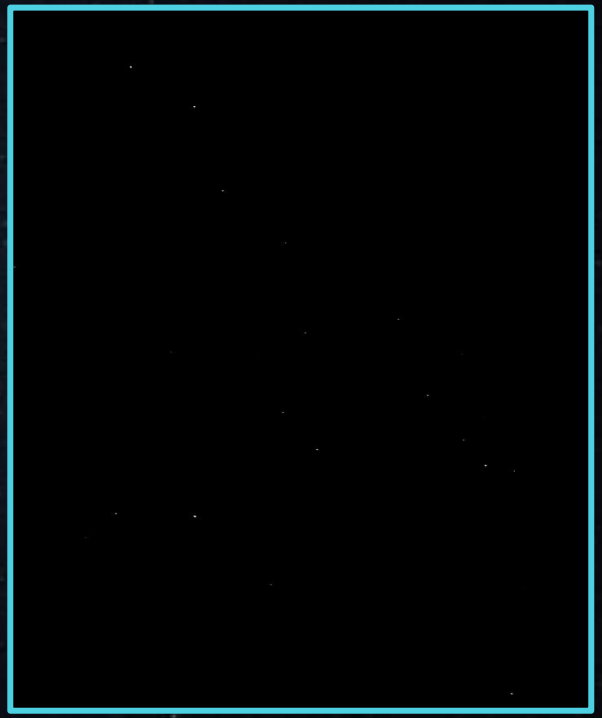
BEFORE



AFTER

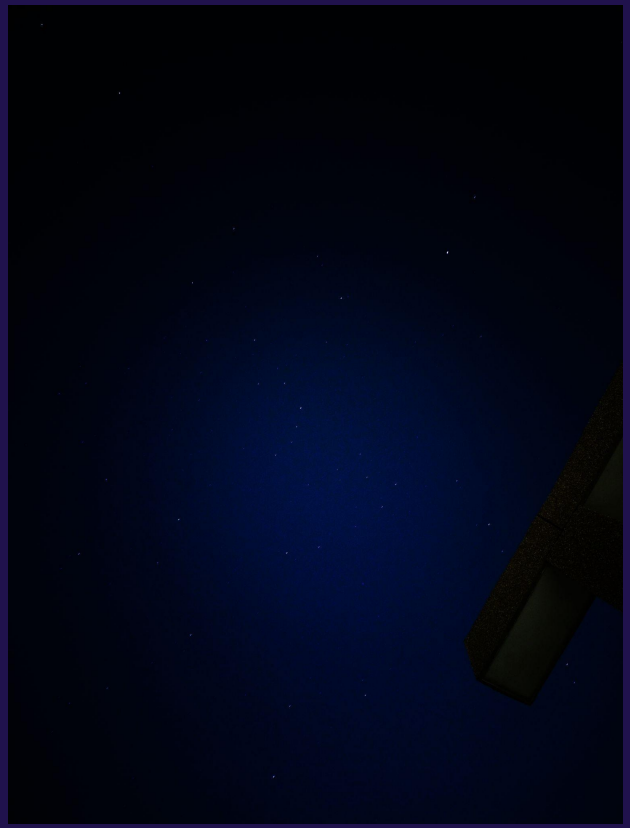
BEFORE

AFTER

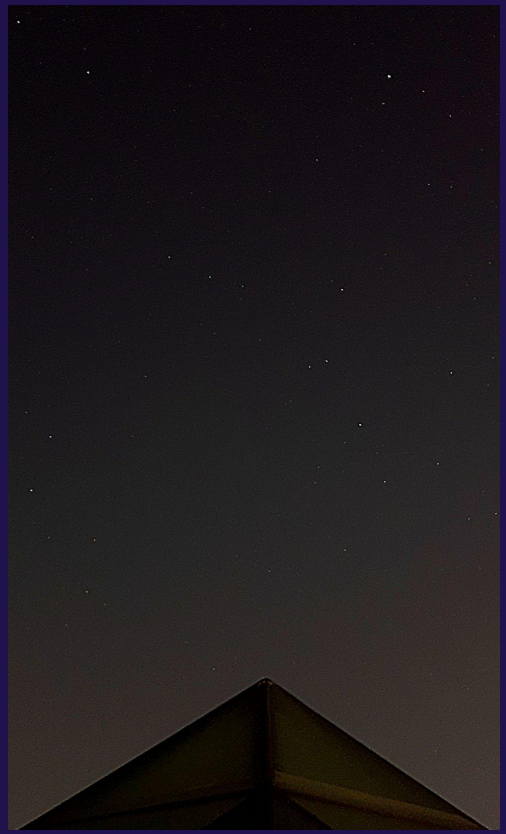


Astrophotography Showcase

ARYA



ARPITA



NILAY

Astrophotography Showcase

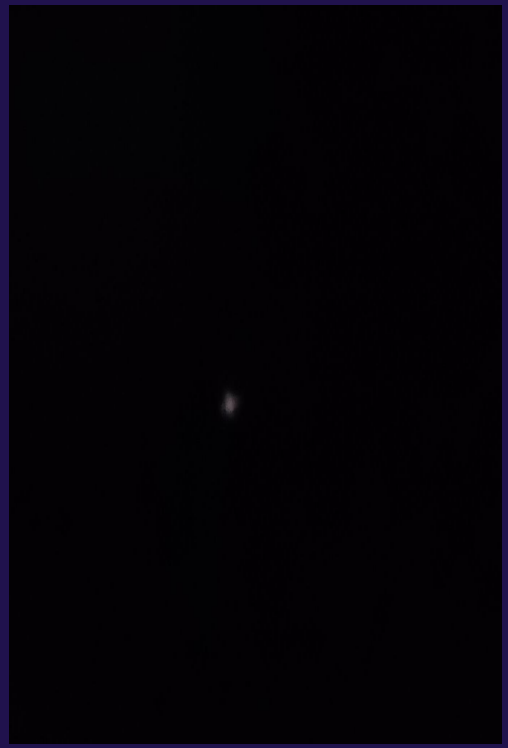
VISHAKHA

AYAN

SIRI

Astrophotography Showcase

SOHEL

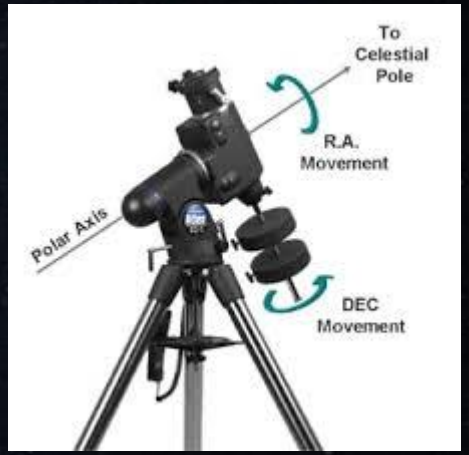


ABHINAV

PAARITOSH

Telescope Handling

- We learnt how to handle and work with the Telescope
- We worked with telescopes with equatorial mounts. It has 2 parameters, Right ascension and declination.

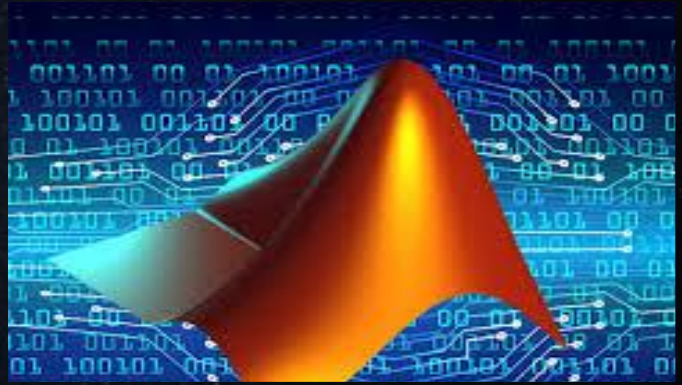


STEPS:

- We first point the telescope at the celestial pole i.e. the Pole star.
- Then we change the RA and Dec according to the celestial object that we are going to observe.

Intro to MATLAB

MATLAB, short for matrix laboratory, is a programming language and numerical computing environment used for data analysis, visualization, and algorithm development. It is widely used in engineering, science, and finance.



Uses of MATLAB in Astronomy

Data can be visualized in MATLAB with plots, graphs, and charts. Some tasks which can be performed using MATLAB are:

- Data Analysis
- Simulation
- Image Processing etc.

What’s Next?

- Digital Dome Works
- Advanced MATLAB Projects
- Astrophotography using Observatory
- Simulation of star systems
- Comparative Case Studies

Thank You

“Cosmos is within us”