RADIO TELESCOPE
Task for Radio Telescope Team

Make presentation for objectives
Main objectives of our project is :-

1. Mapping the Night Sky:

- **Planning and Resources:**
  - Use online star charts like Stellarium Web [Stellarium Web Online Star Map] or Sky & Telescope's Interactive Sky Chart [Interactive Sky Chart | Map Your Night Sky - Sky & Telescope] to identify interesting celestial objects (stars, planets, nebulae, etc.) visible from your location based on date and time. These tools will help you plan your observations.
  - Consider getting a good astronomy book or app for further information about objects and their locations.

2. Telescope Control System:

- **Mechanics:**
  - Design a sturdy mount for the telescope dish using metal or strong wood. Ensure it has smooth bearings (e.g., ball bearings) for low-friction movement.
  - Choose gears with appropriate gear ratios to balance between speed and precision of movement. Consider factors like telescope weight, desired pointing accuracy, and motor torque.
  - Select stepper motors for precise positioning control. They offer good holding torque when powered.
- **Motor Selection:**
  - **Torque Calculation:**
    - Measure the total weight (W) of the telescope dish and mount.
    - Determine the maximum distance (D) from the motor shaft's center to the point where the dish connects to the mount (moment arm).
    - Calculate the torque (T) required using the formula: $T = W * D$
  - **Motor Selection:**
    - Choose stepper motors with a torque rating exceeding the calculated torque to handle the dish's weight and potential wind resistance.
    - Consider factors like motor speed, size, and voltage requirements when selecting.
- **Microcontroller:**

- Use a microcontroller like Arduino or Raspberry Pi to control the stepper motors. These offer good programmability for telescope movement and interfacing with a computer.
- **Joystick Control:**
  - Connect a joystick or gamepad to the microcontroller for user-friendly telescope control.
  - Program the microcontroller to translate joystick movements into motor control signals for smooth pointing adjustments.

3. Stand Design:

- Build a sturdy tripod or pier-like stand using metal or strong wood.
- Ensure the stand can handle the weight of the telescope and dish assembly without wobbling.
- Consider adding weights to the base for additional stability, especially in windy conditions.

4. Interfacing with PC:

- Connect the microcontroller to your computer using a USB cable.
- Install software libraries that allow your computer to communicate with the microcontroller.
- Develop custom software (or use existing astronomy software) to send movement commands to the telescope control system based on your desired sky map coordinates.

- **Amplifiers:**
  - You might need an amplifier to boost the weak signal from faint celestial objects before capturing an image with your camera.
  - The need for an amplifier depends on the telescope's optics, camera sensitivity, and the specific objects you're observing. Consult your camera and telescope manuals for guidance.
- **Filters:**
  - Light pollution filters can help reduce the impact of streetlights and other light sources, improving the visibility of faint objects.
  - Consider narrowband filters that selectively allow light from specific wavelengths, which can be useful for observing nebulae or emission lines from stars.

Your task is to read up on radio telescopes to gain a better understanding of the components required for the project.
Deadline for the task 21 June 2024