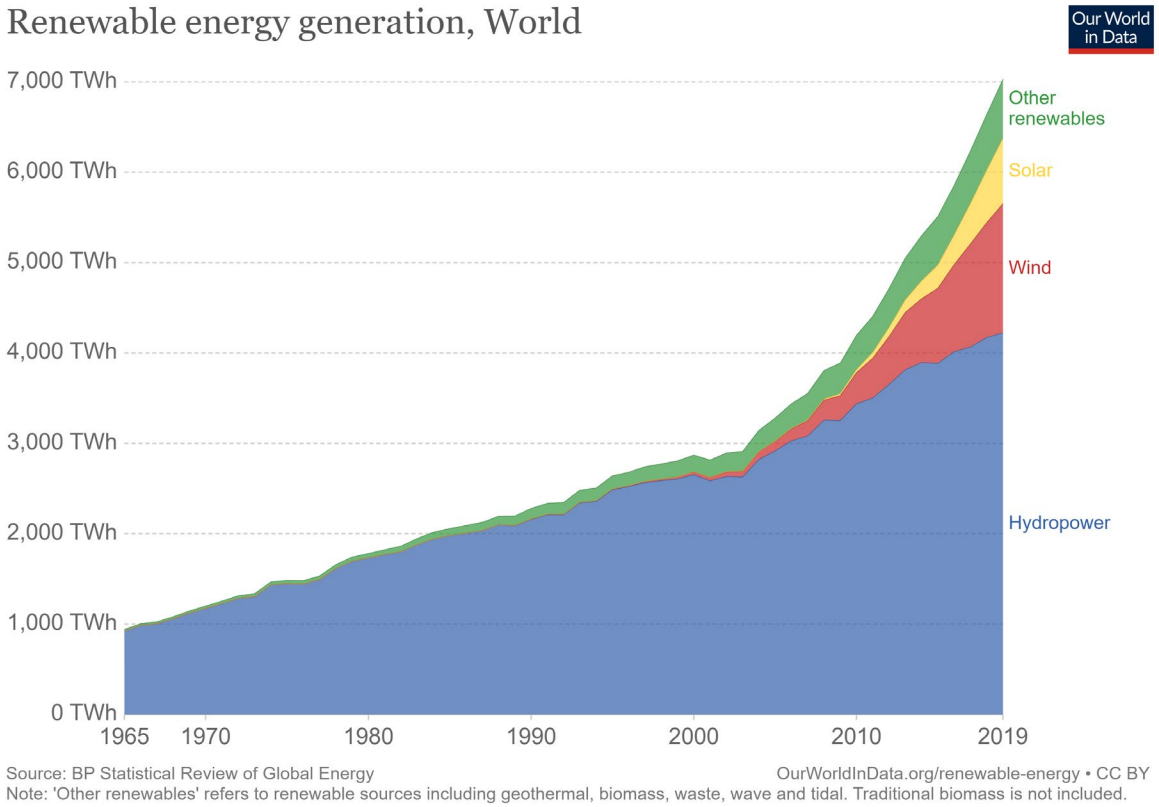
EE Project Sub-lecture 1

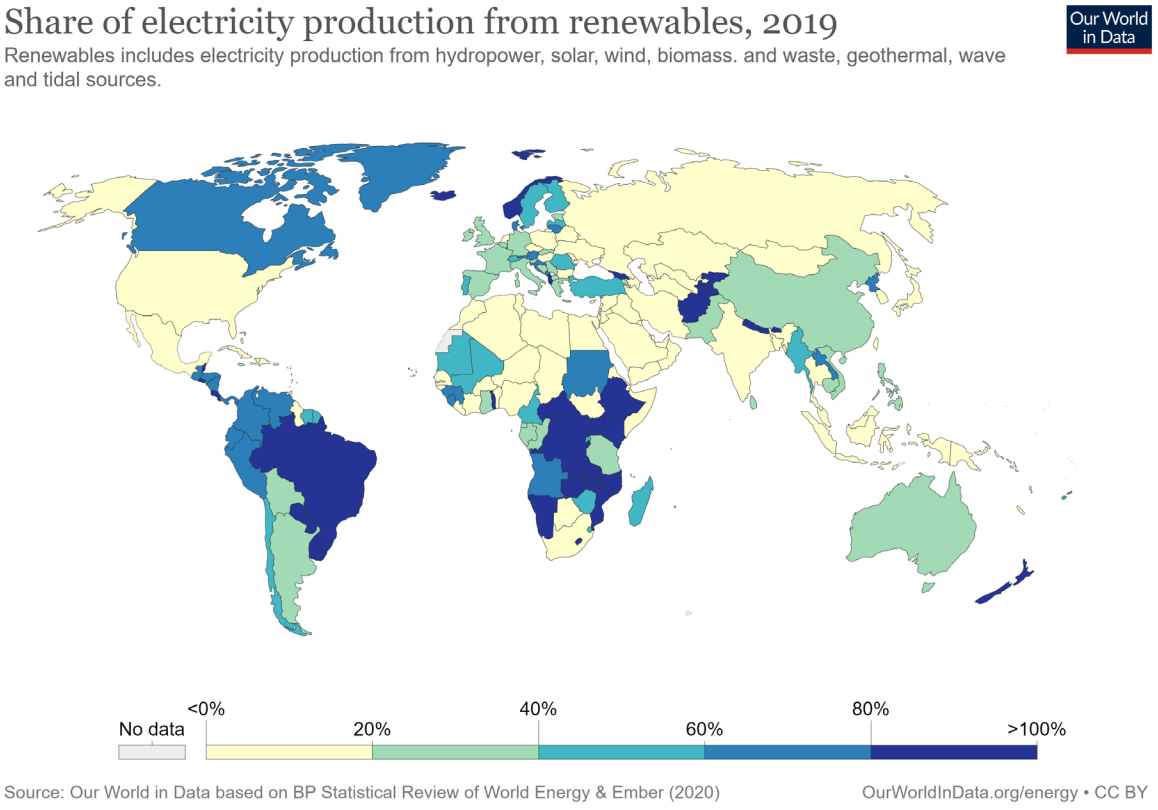
Overview on Solar Energy and Sun tracking

Traditional Energy

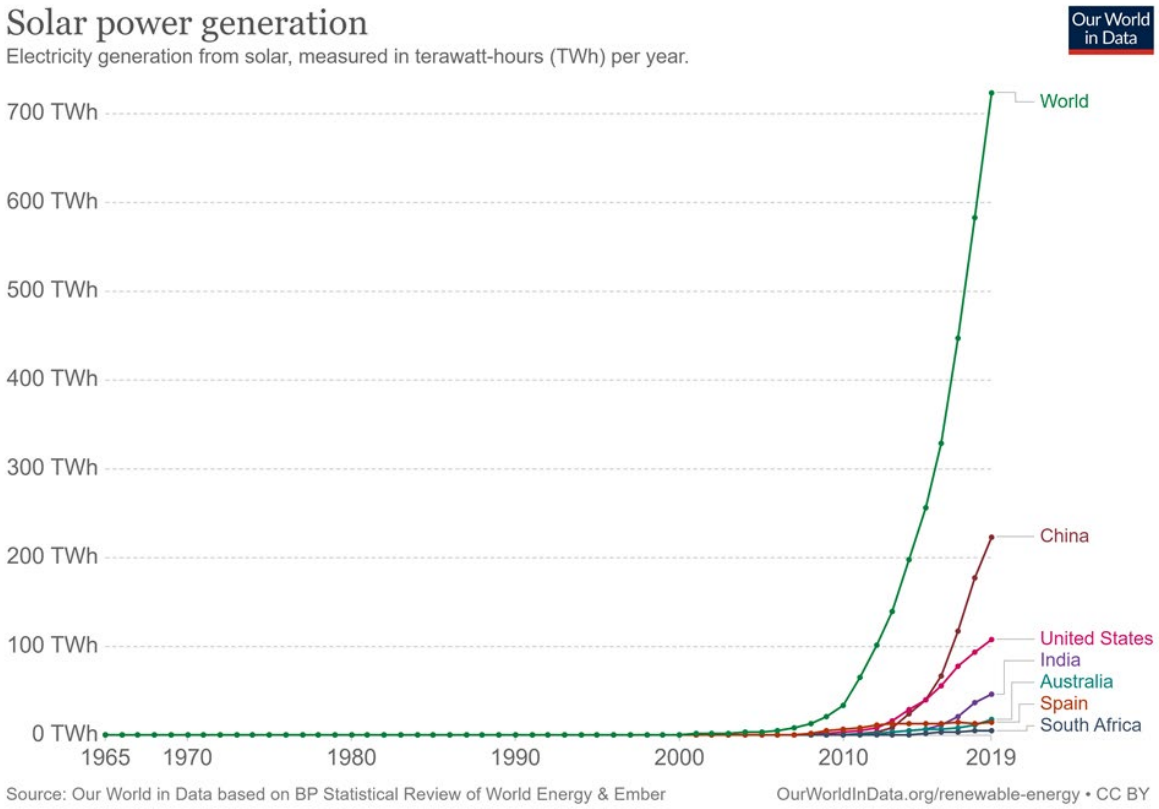
Clean Energy

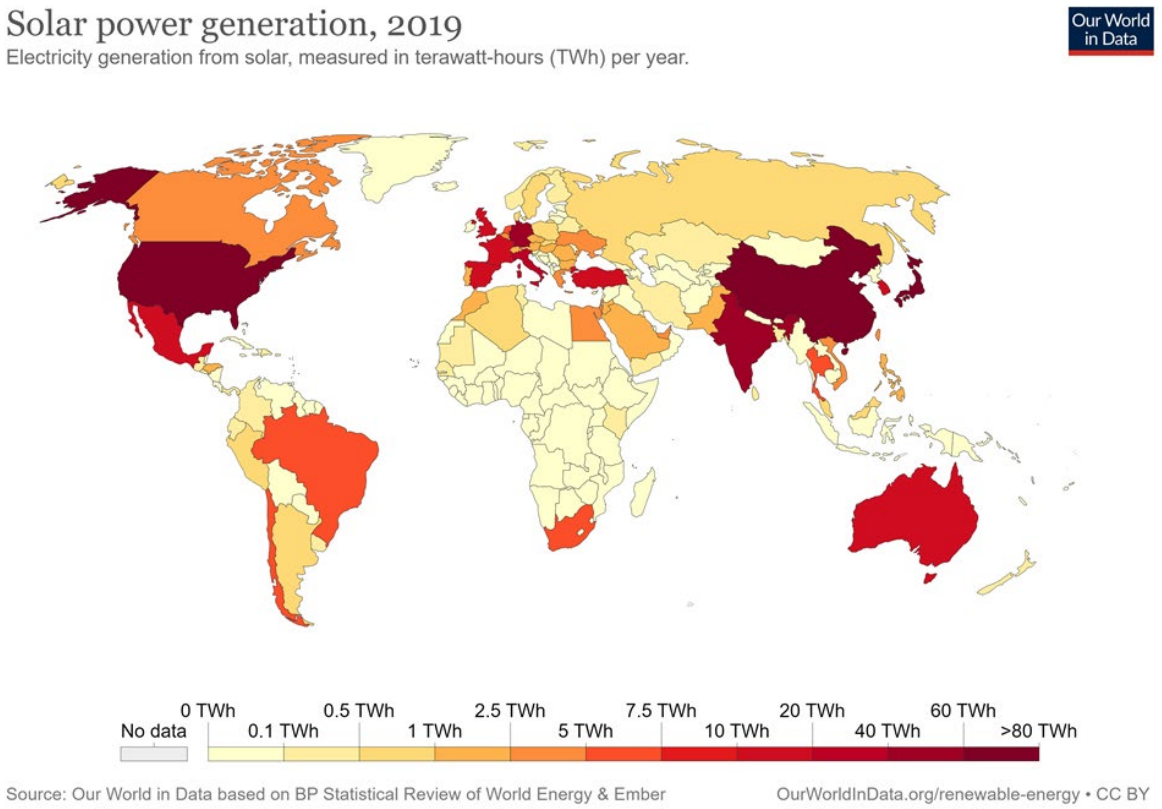
Renewable Energy



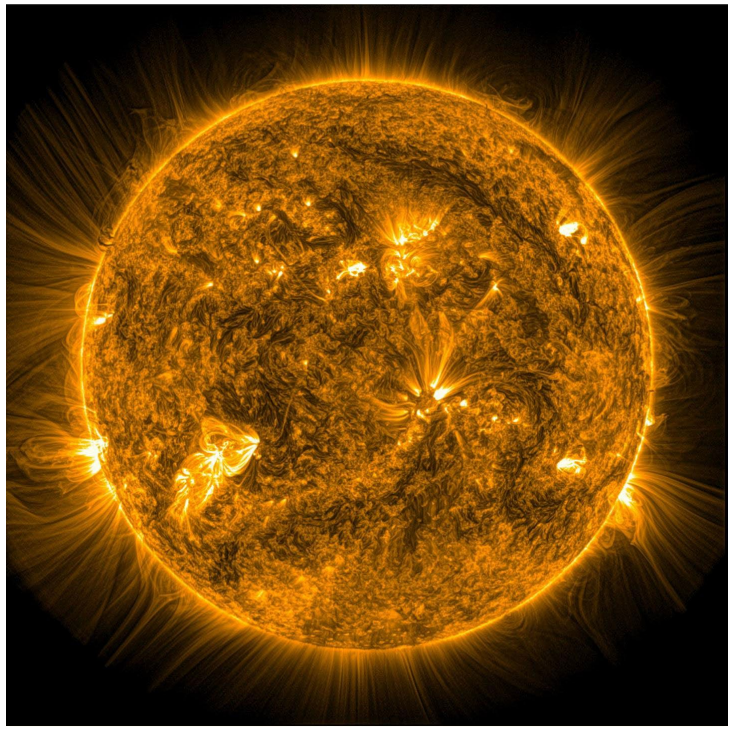


Renewable Energy

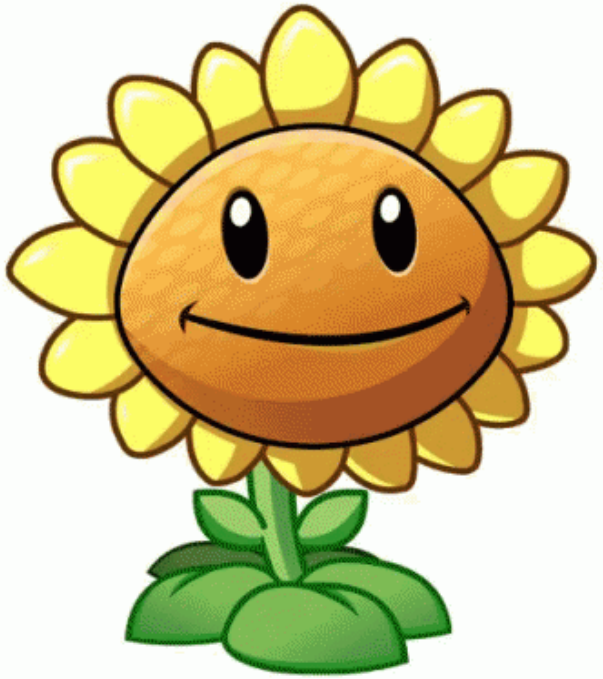


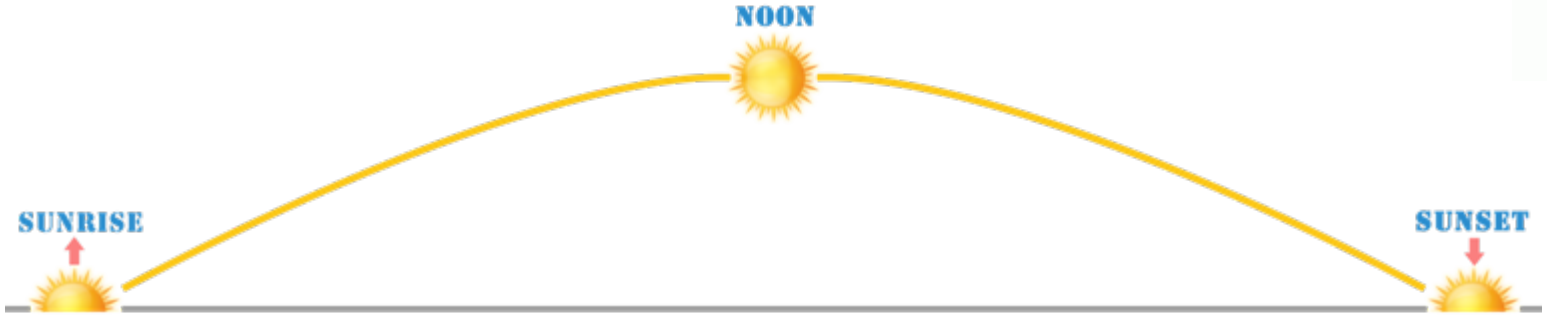


Solar Energy

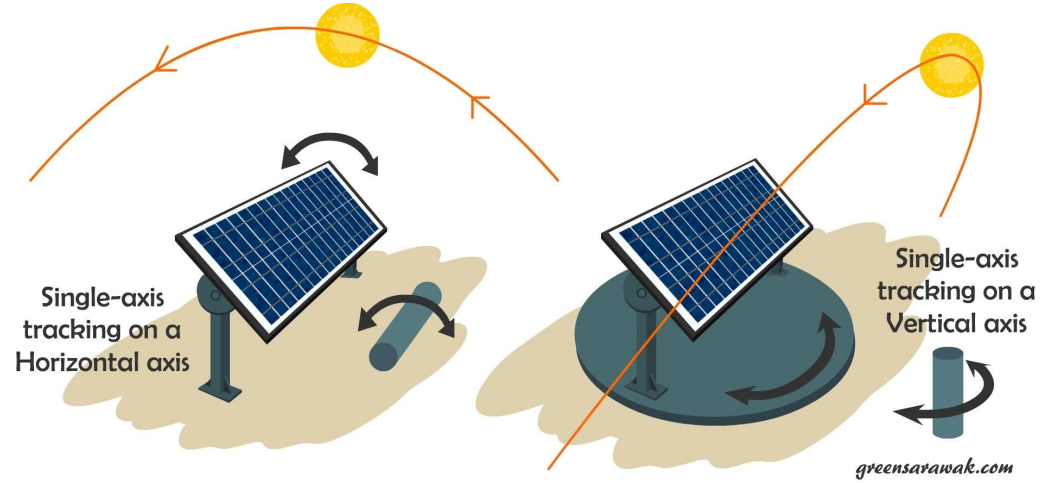


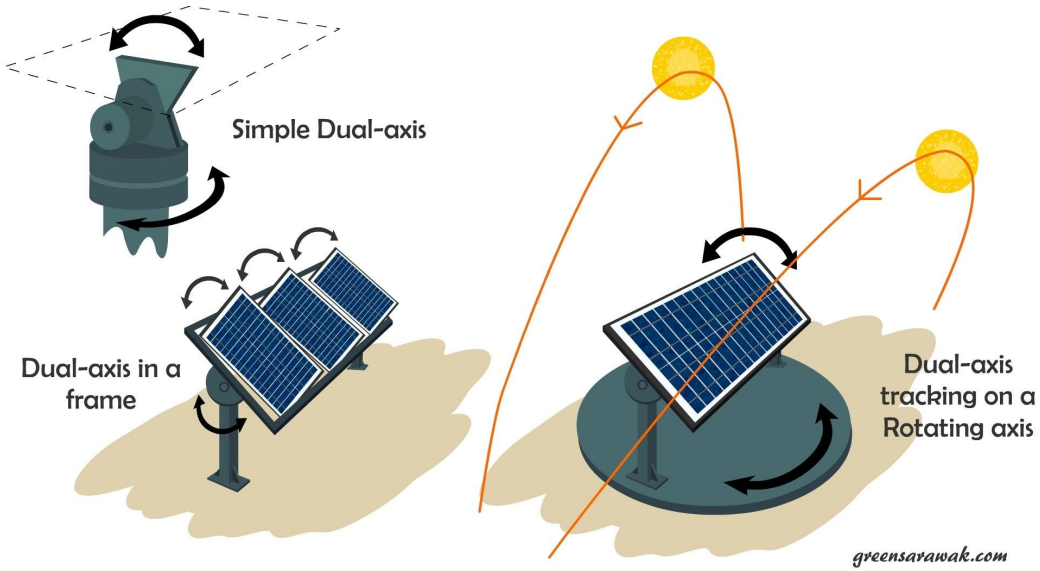
Solar Tracking Technologies

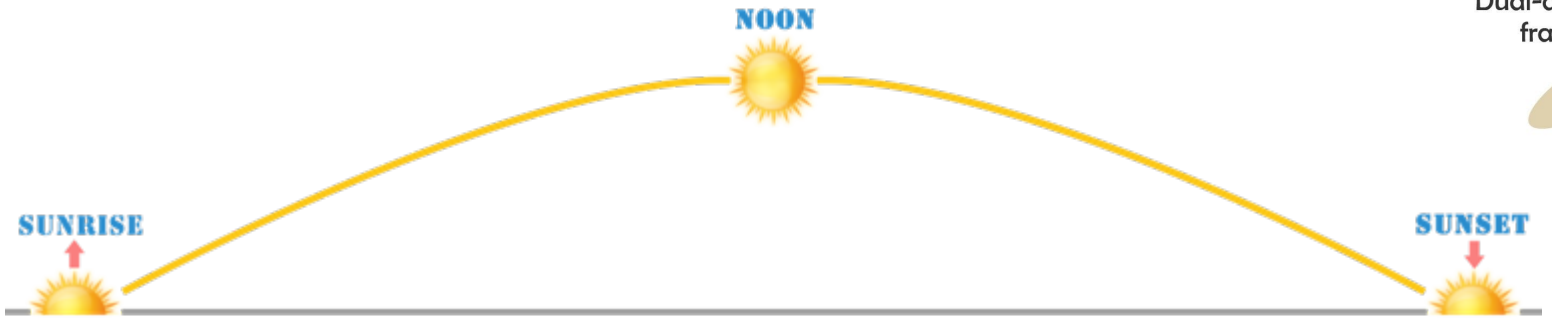




Solar Tracking Technologies

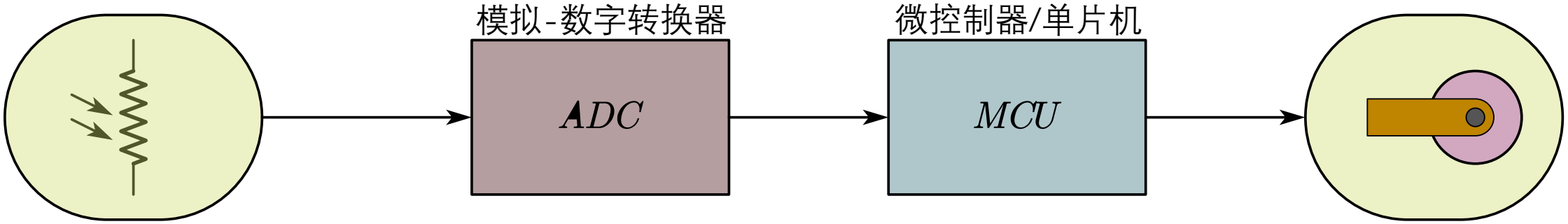


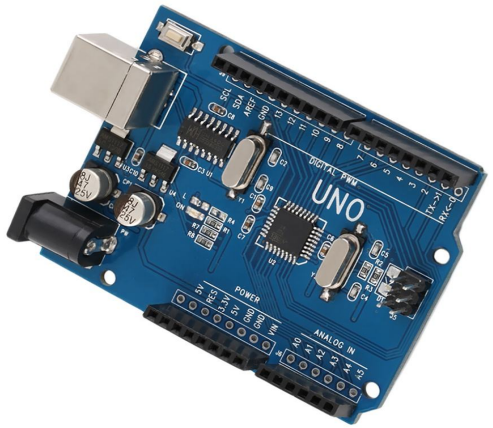


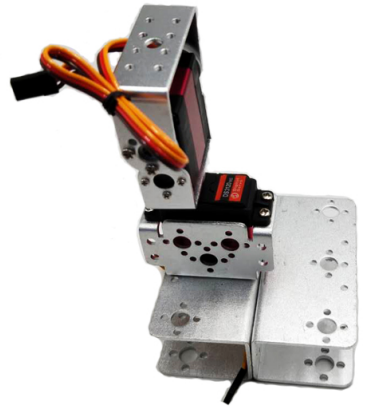


Part-I
Sun Tracking

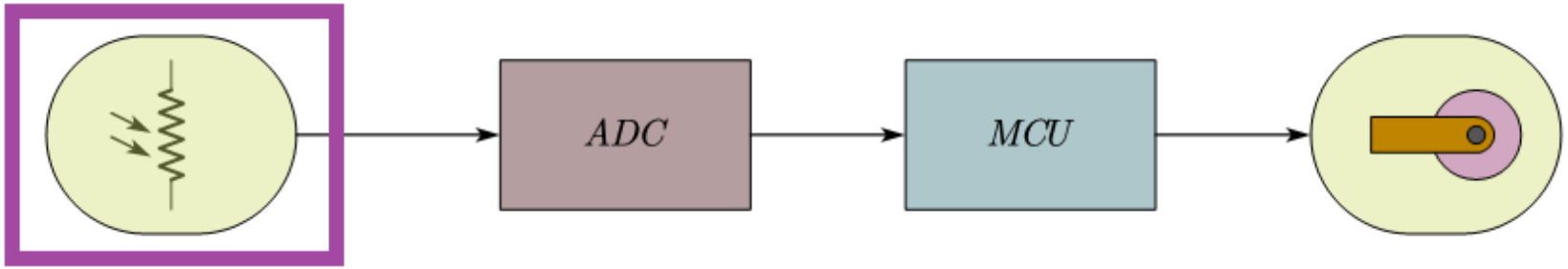
Framework



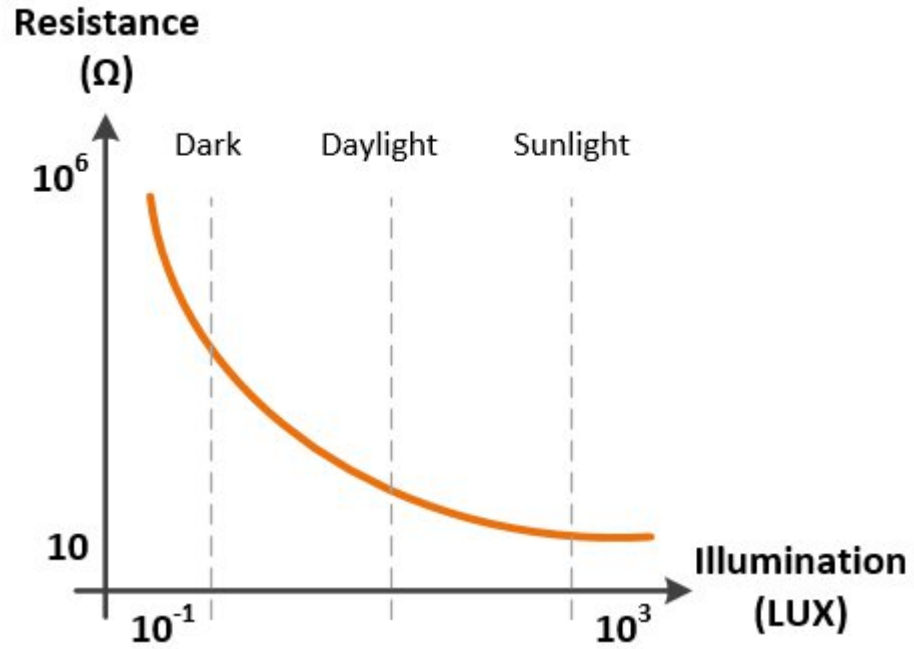




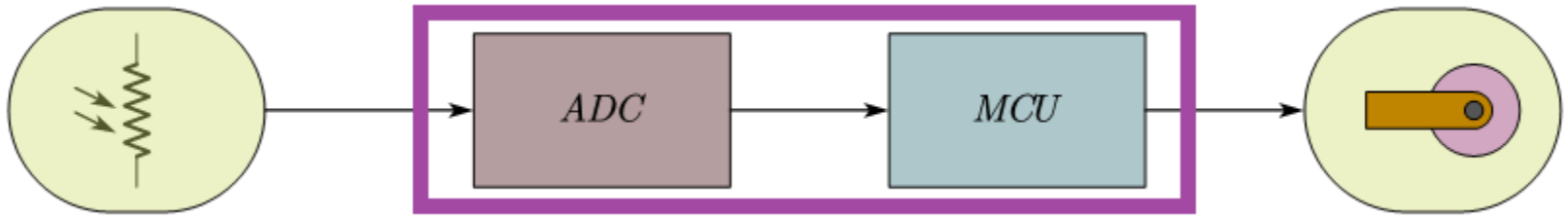
Light Sensor

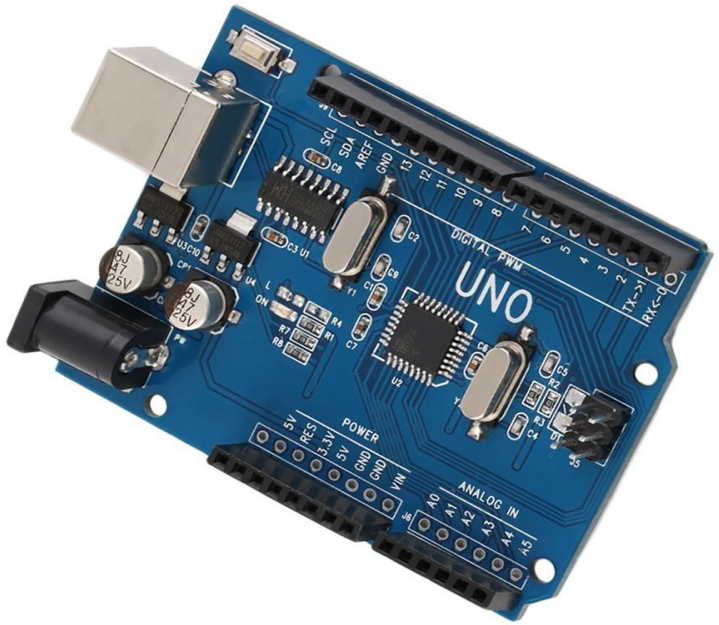


Model: GL5528
Maximum Voltage: 150v DC
Maximum Wattage: 100mw
Spectral Peak: 540nm
Light Resistance: 10K to 20K ohm
Dark Resistance: 1M ohm
Response Time (ms): Up: 20/ Down: 30
Material: Carbon
Size: 5 x 3mm/0.2 x 0.12"



Arduino





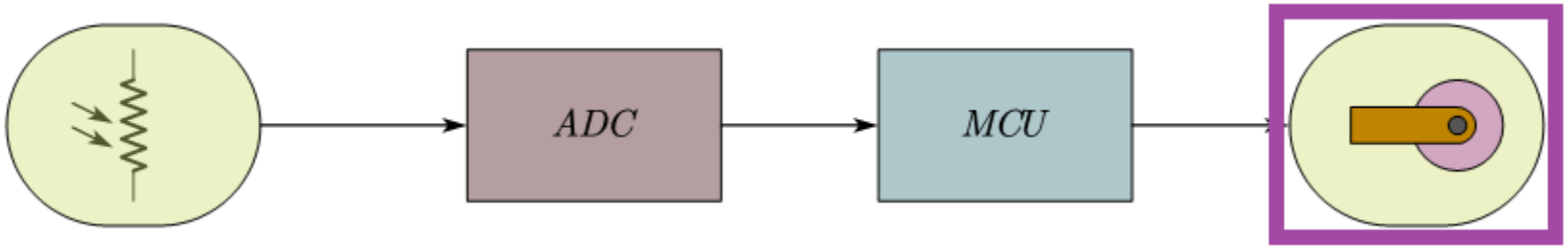
Installation: https://www.arduino.cc/en/Guide

Examples: https://www.arduino.cc/en/Tutorial/BuiltInExamples

Arduino 中文社区: https://www.arduino.cn/

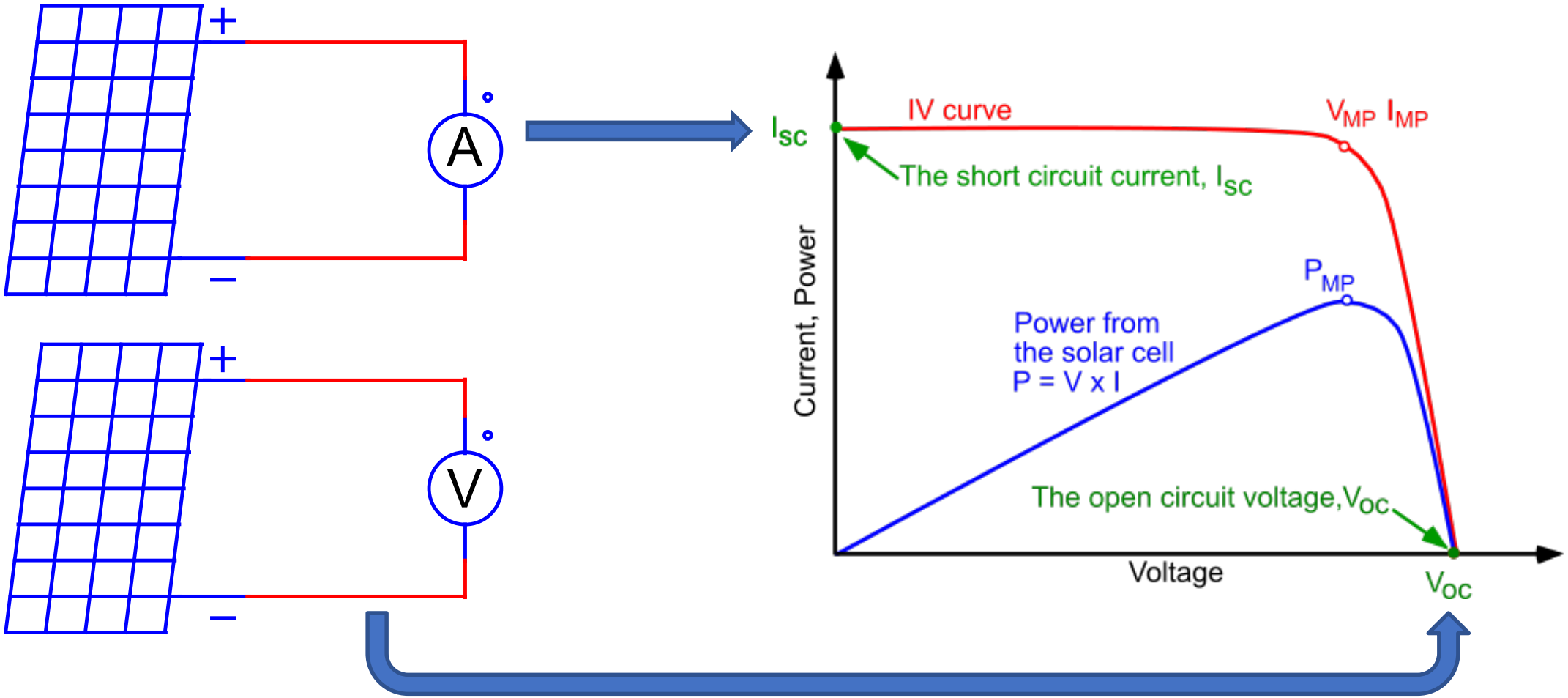
中文教程汇总: https://www.arduino.cn/thread-1066-1-1.html

Servo Steering

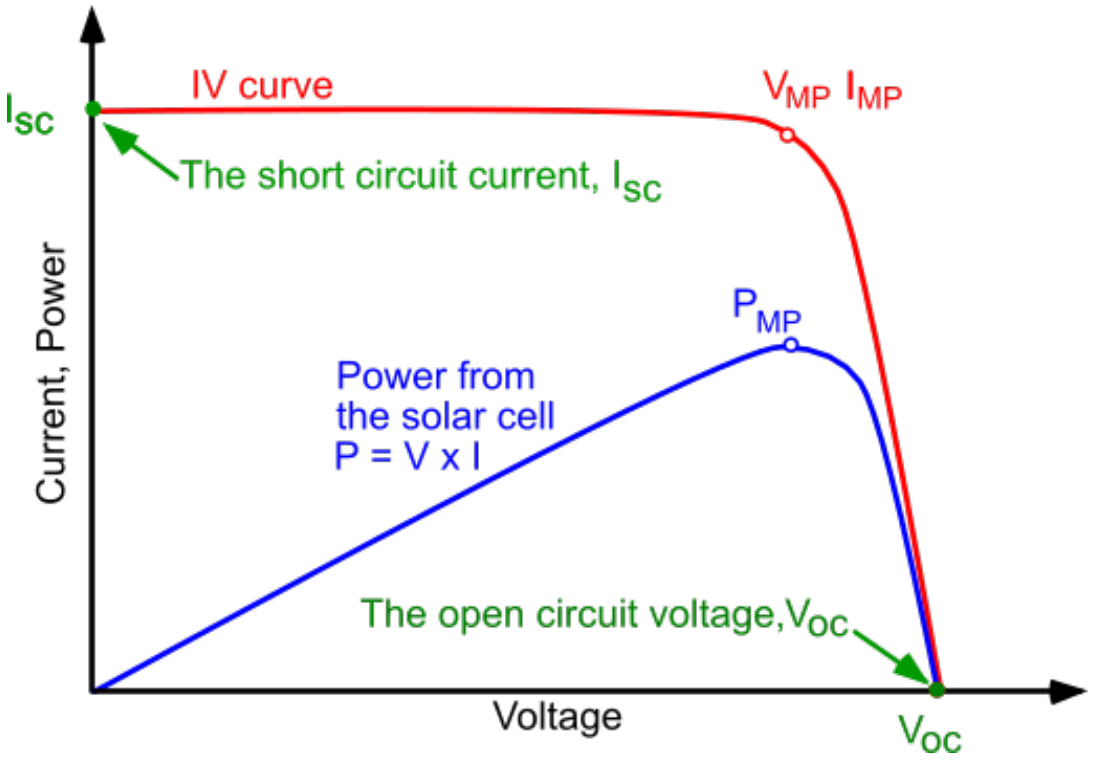


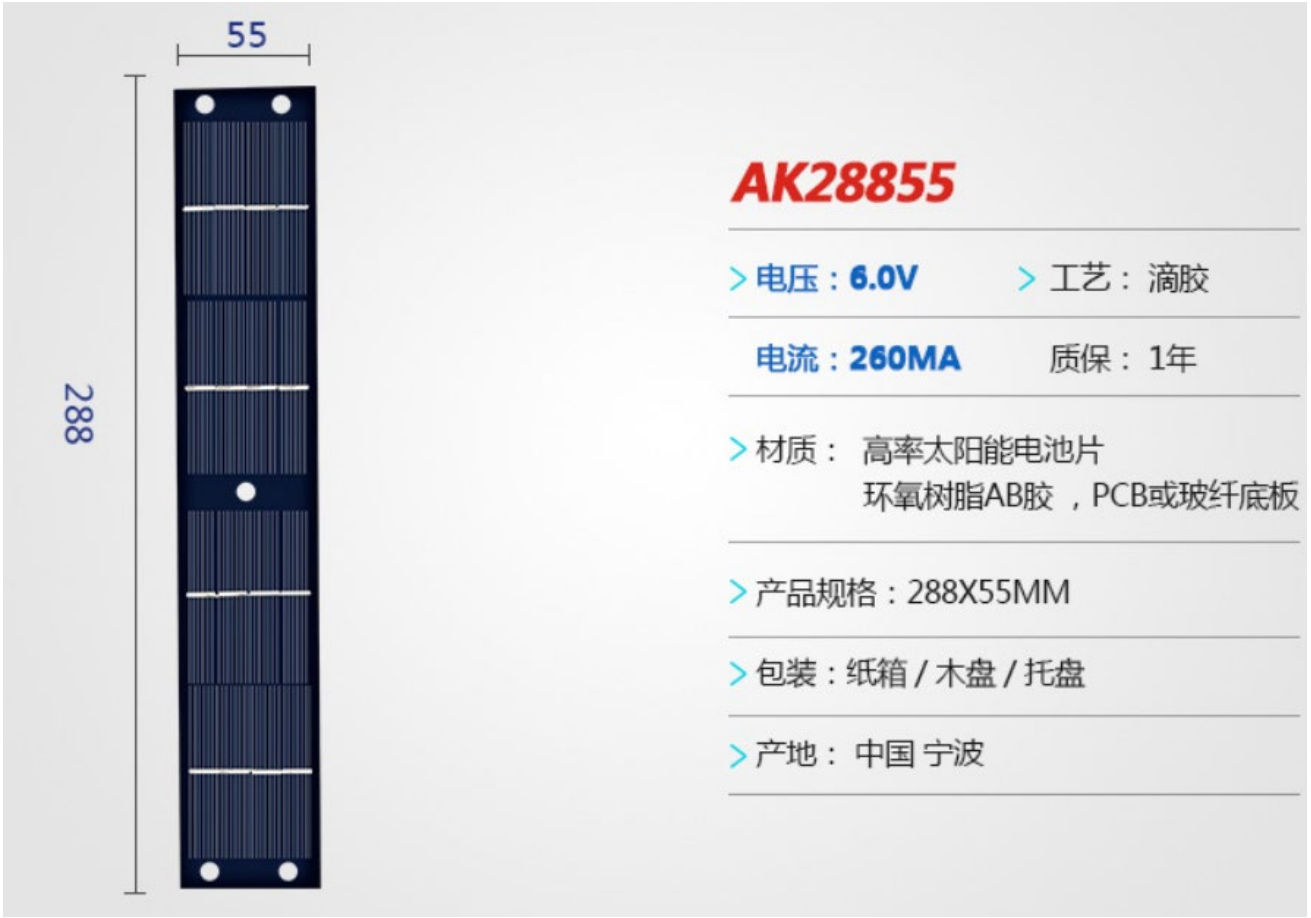
Part-II
Power Management and Use

Solar Cell Properties

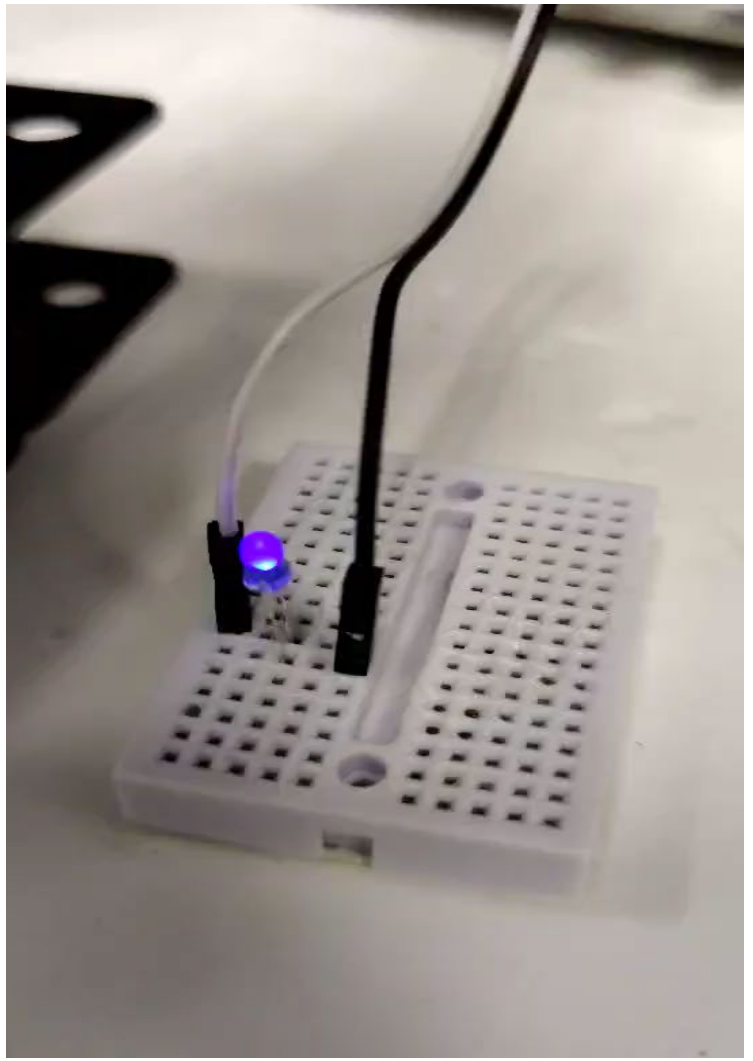


Solar Cell Parameters

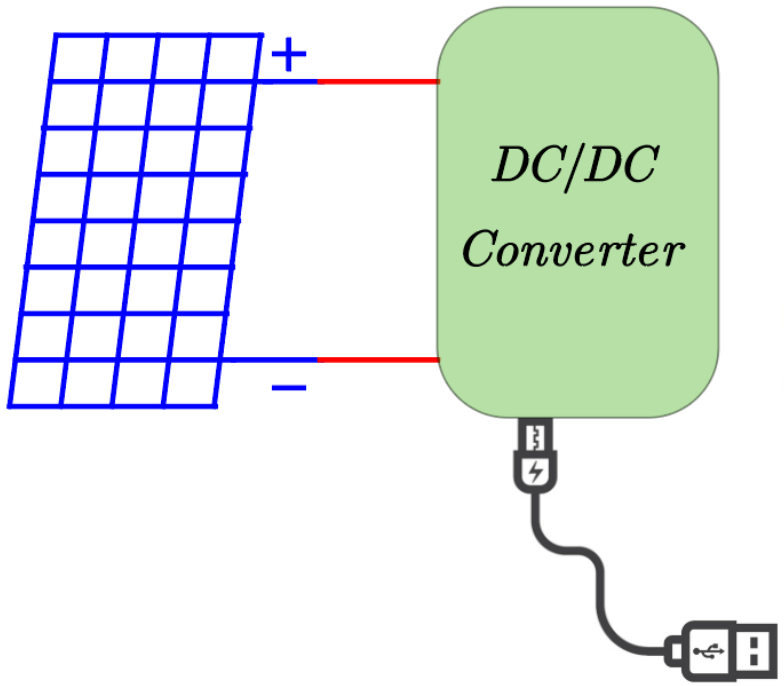


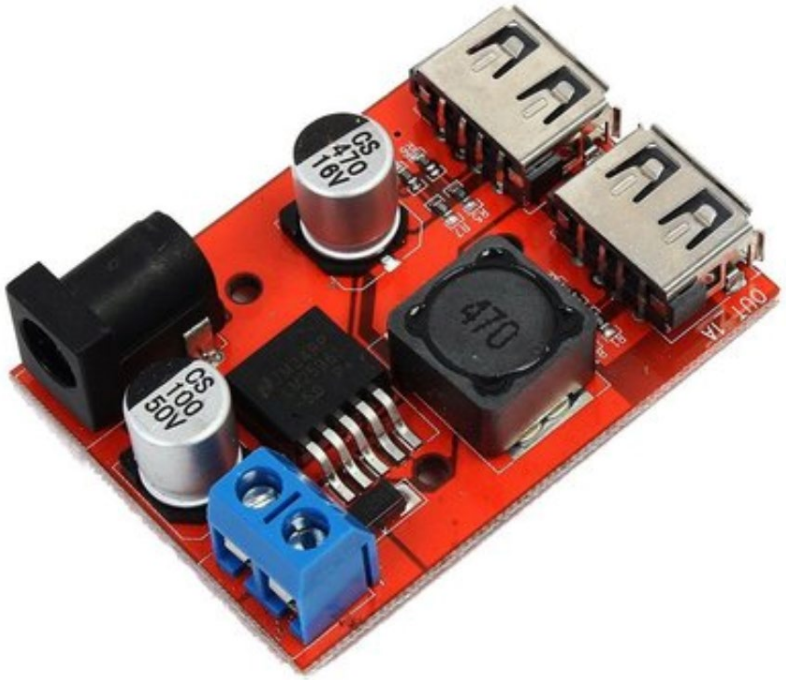


LED as Load



Regulations



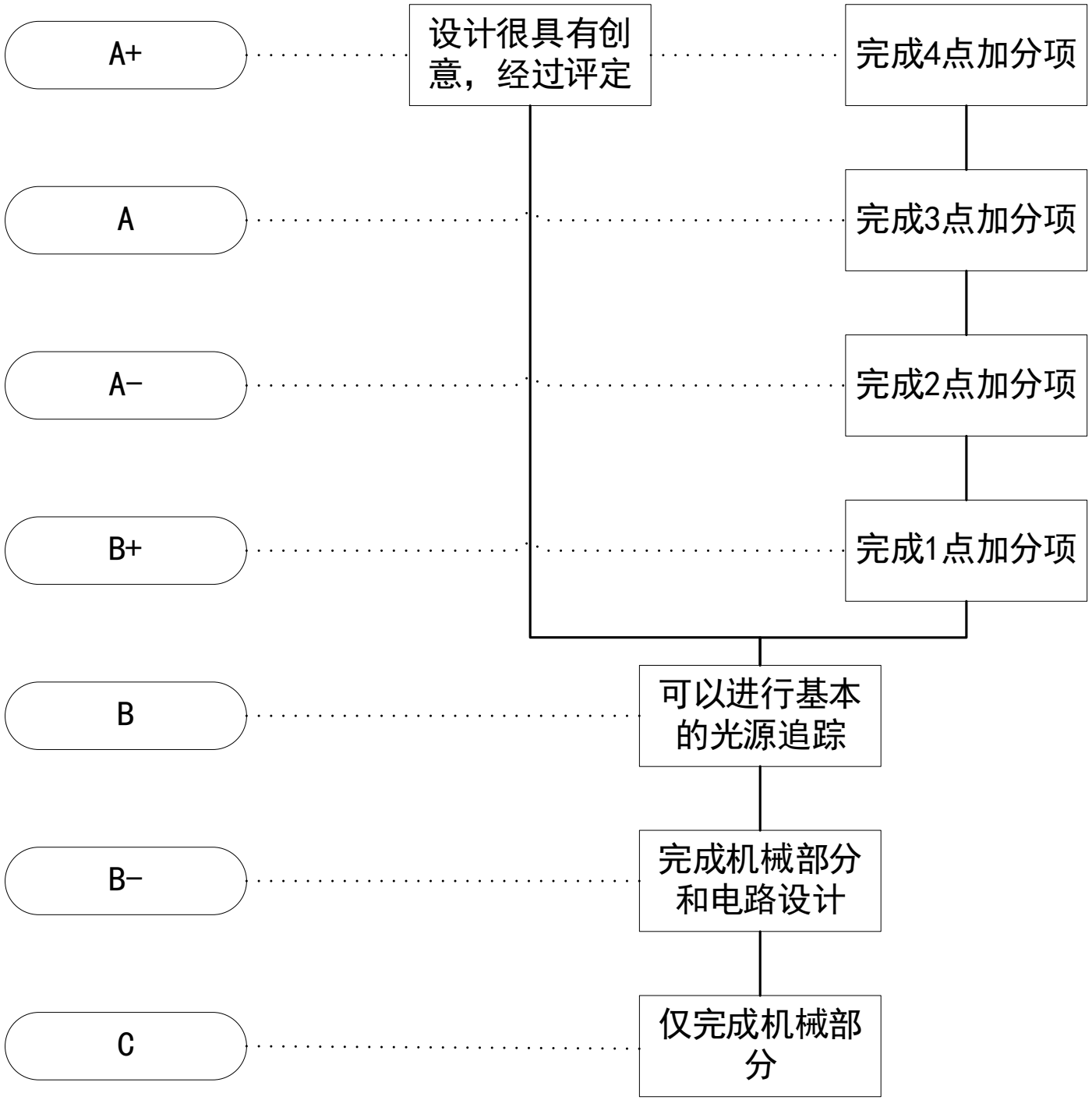


Project Arrangement

Course Arrangement

- 1. Overview on solar energy & sun tracking (this lecture)
- 2. MCU special topic (09 Dec.)
- 3. 3D Print & PCB Design (11 Dec.)
- 4. Sensors & Interfaces (16 Dec.)
- 5. TBA

Rubrics


A+
A
A-
B+
B
B-
C
设计很具有创意，经过评定
完成4点加分项
完成3点加分项
完成2点加分项
完成1点加分项
可以进行基本的光源追踪
完成机械部分和电路设计
仅完成机械部分

Bonus Points

- 3D print pinboard or socket
  - 3D打印转接结构
- PCB design (mounting holes can be integrated in PCB)
  - 印刷电路板设计
- Control optimizations
  - 控制优化（例如暗光复位，极限复位等）
- DC/DC regulation design
  - 稳压电路设计
- DC/DC maximum power point tracking (MPPT) design
  - 最大功率追踪电路设计
- Others intelligent applications of solar energy
  - 其他创新点，可提交评定
- …

Project Rules

- 保护好实验器材，结束后器材将进行回收。
- 组内明确分工，平衡组员工作量。
- 组间可交流思路，但切忌抄袭。
- 对于有3D打印和元件焊接等需求的小组，后期将公布可预约时间。
- 每周进行一次进度交流。

玩得开心！