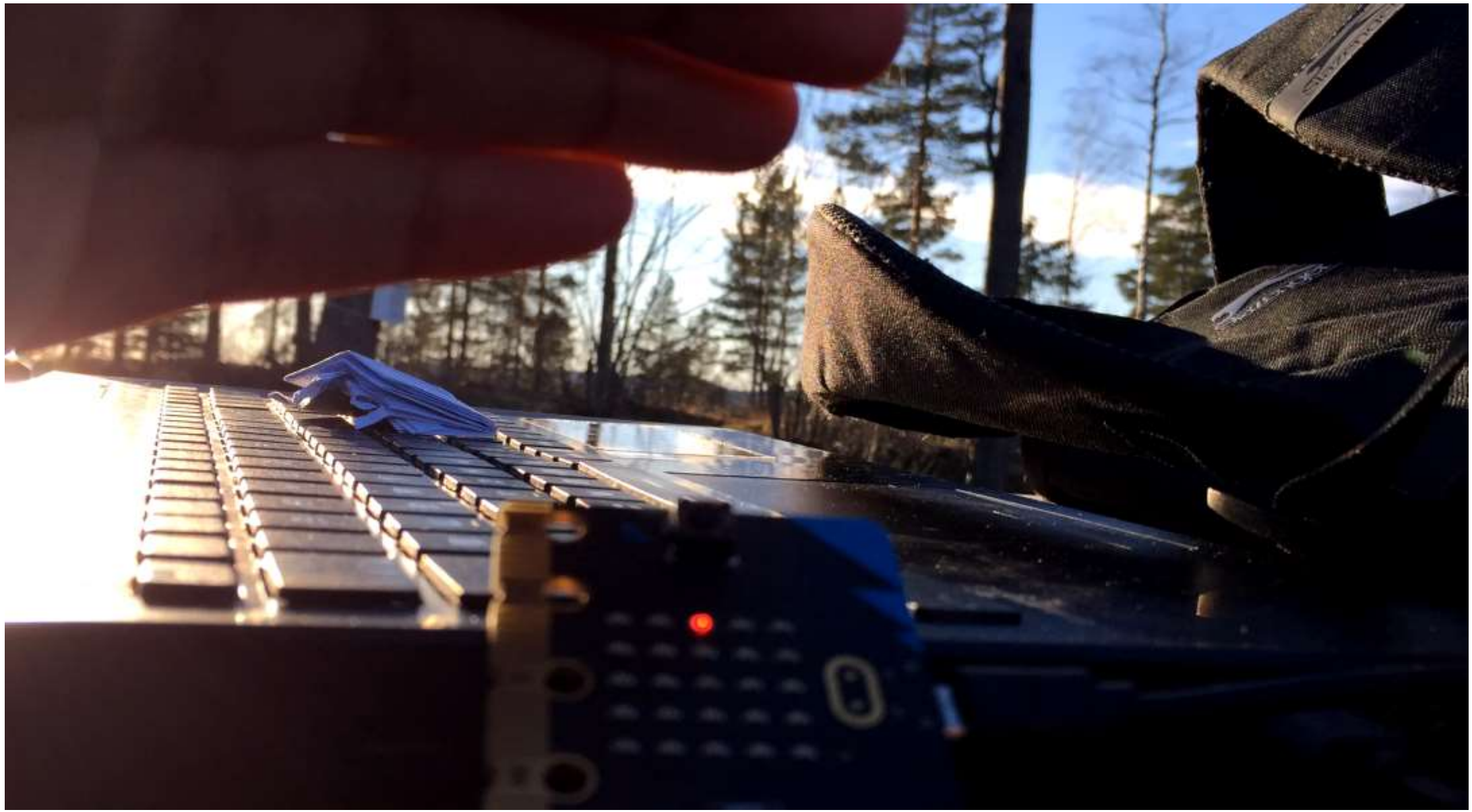
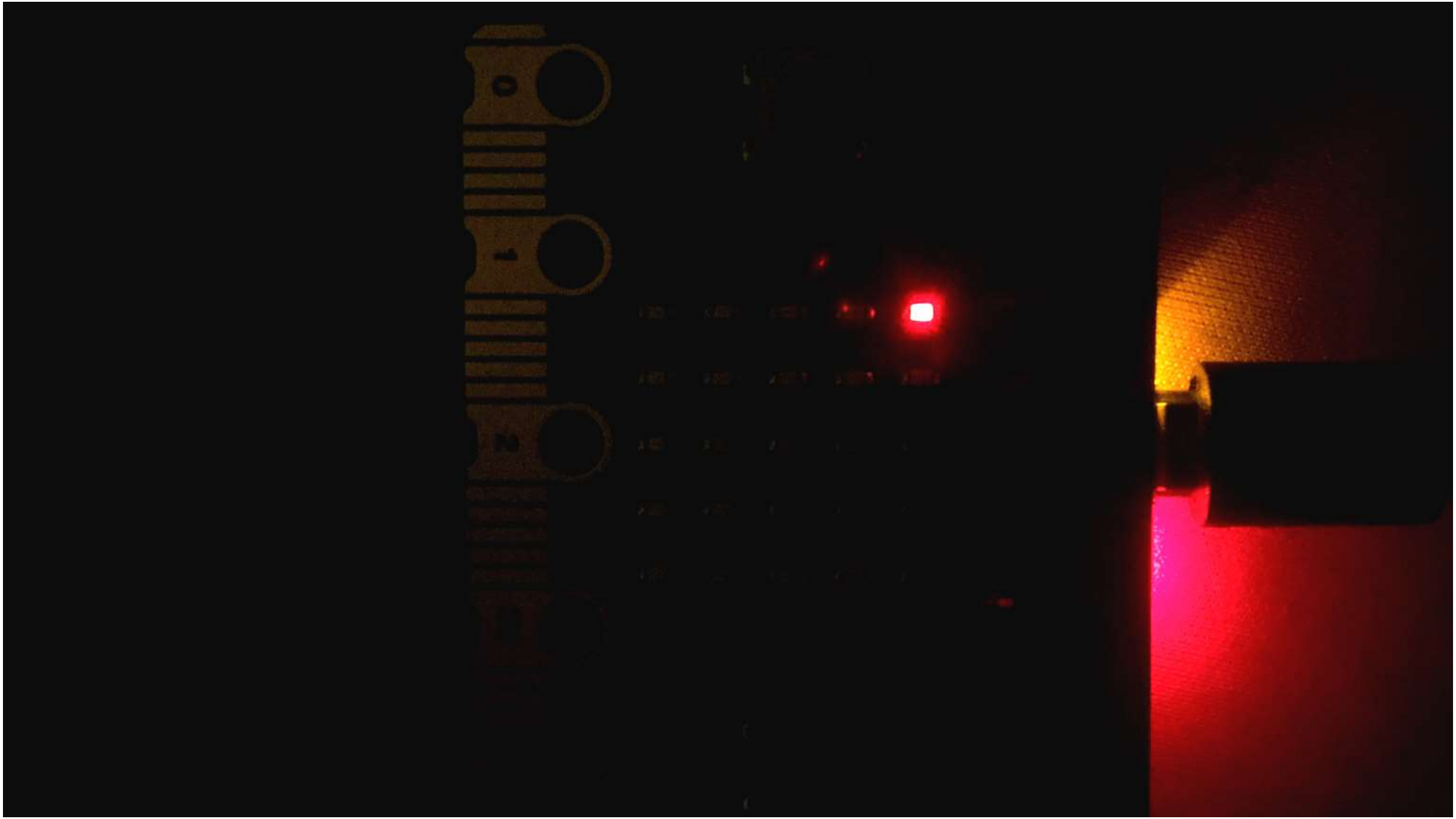
Skygazing Map

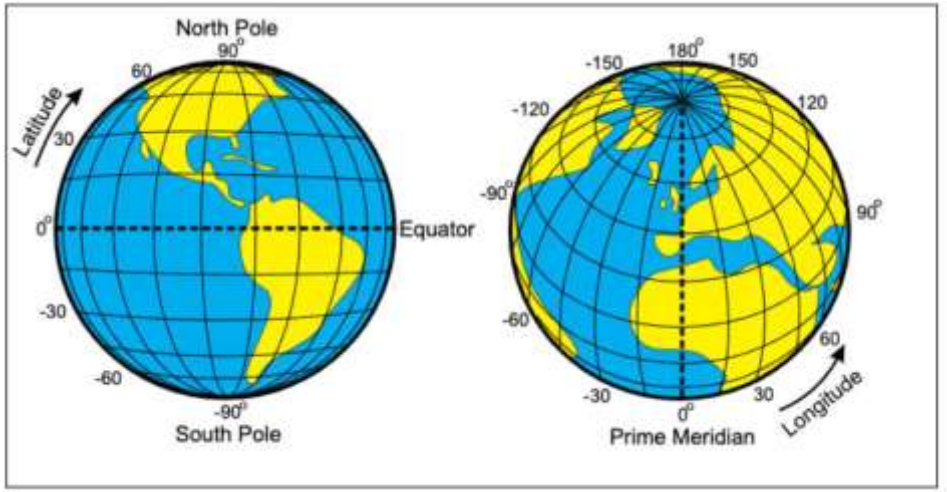
Mustafa Hassan

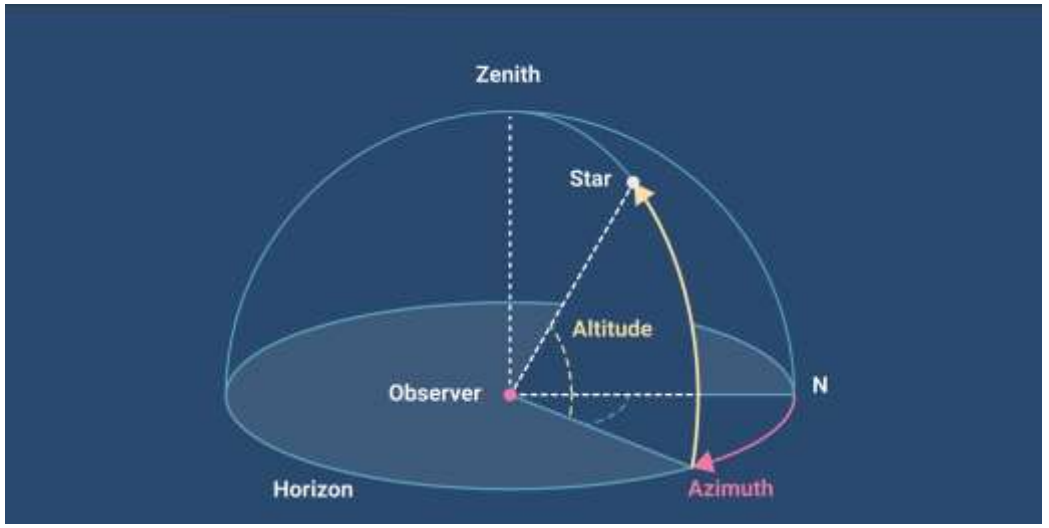




Important Variables

- Lat & Long
- RA & Dec
- Alt & azimuth





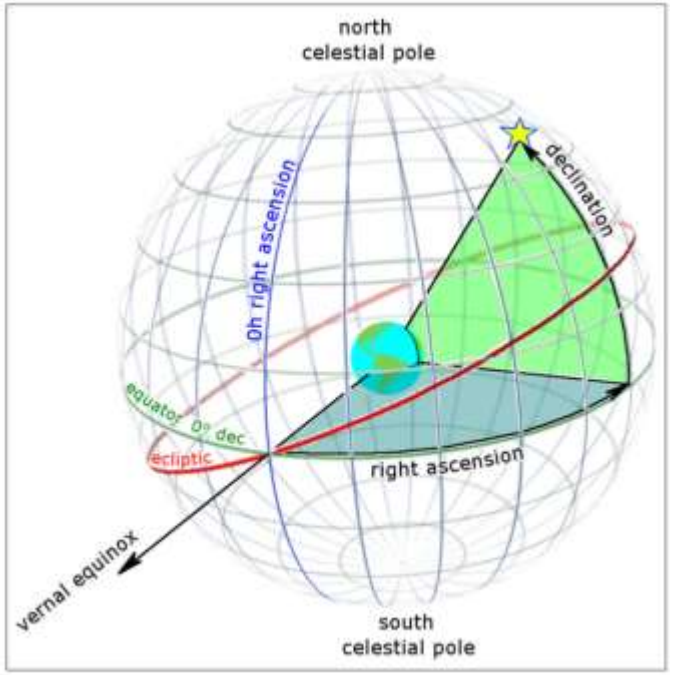
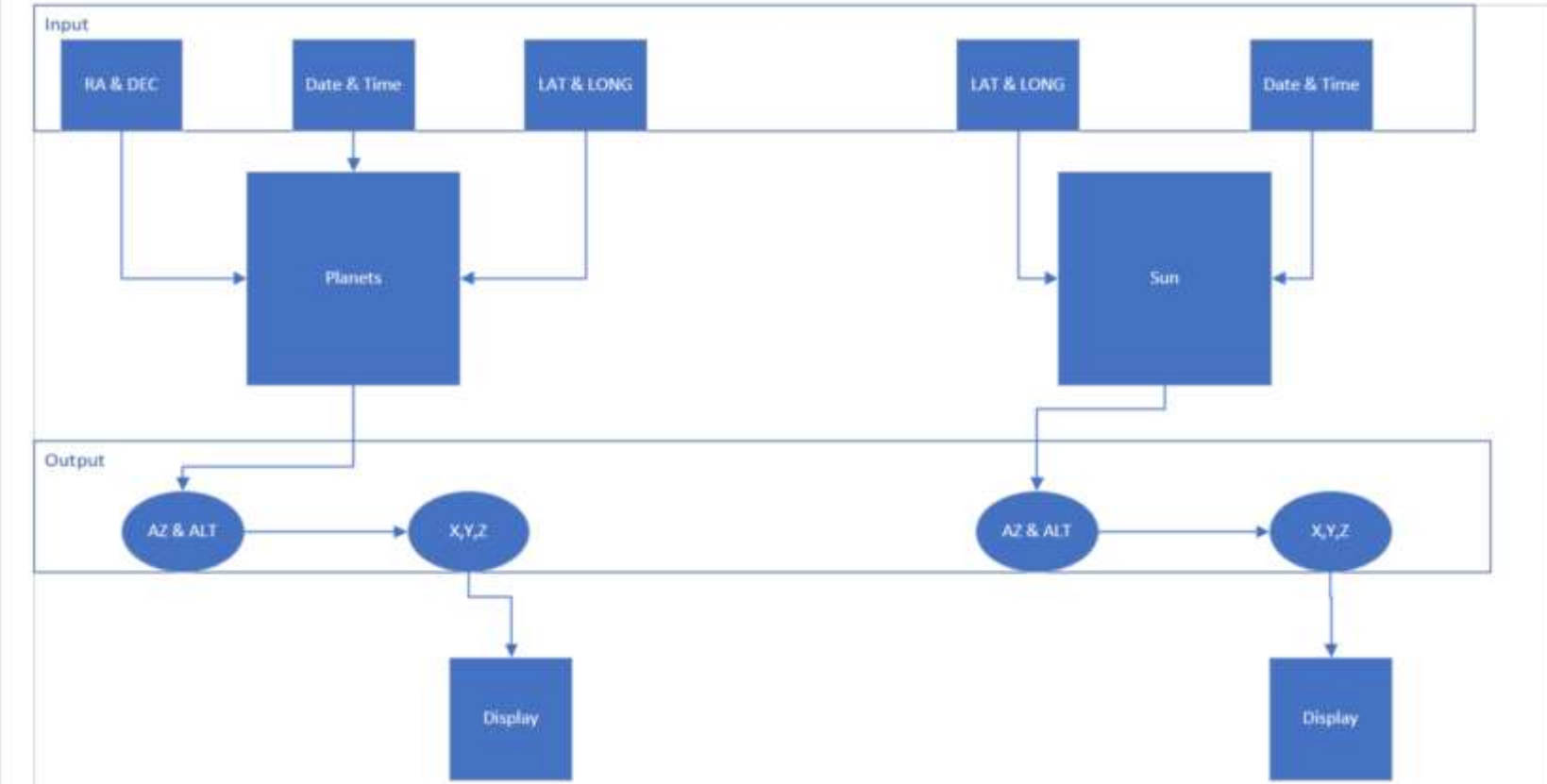
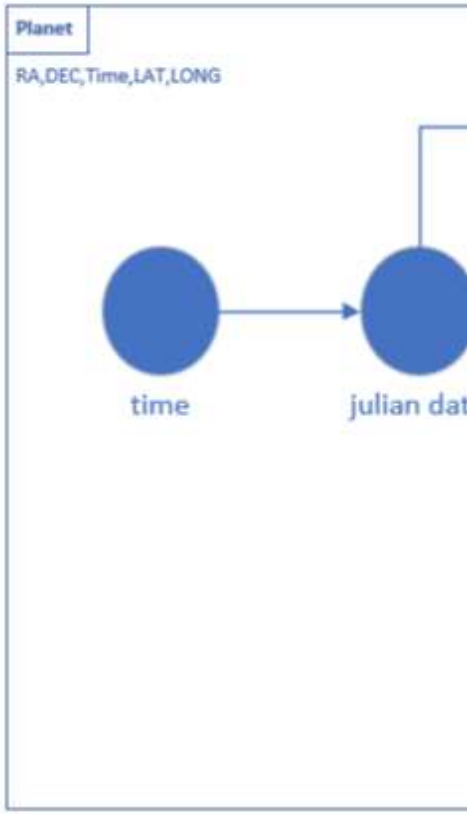


Diagram:


Input
RA & DEC
Date & Time
LAT & LONG
LAT & LONG
Date & Time
Planets
Sun
Output
AZ & ALT
X,Y,Z
AZ & ALT
X,Y,Z
Display
Display

```
juliandate:long_long_float:= Long_Long_Float(GetDay) + 2415018.5 + timeDuration -(1.0/24.0);
```



Ephemeris for Mars

DATE			RIGHT ASCENS			DECLINATION			Approx	Observable	Constellation
Year	Mth	Day	hour	min	sec	deg	min	sec	Mag.		
2021	11	02	13	57	18	-11	30	18	1.65	Not observable	Virgo
2021	11	03	13	59	52	-11	44	44	1.65	Not observable	Virgo
2021	11	04	14	02	26	-11	59	05	1.65	Not observable	Virgo
2021	11	05	14	05	01	-12	13	22	1.65	Not observable	Virgo
2021	11	06	14	07	37	-12	27	35	1.65	Not observable	Virgo
2021	11	07	14	10	12	-12	41	42	1.65	Not observable	Virgo
2021	11	08	14	12	48	-12	55	45	1.65	Not observable	Virgo
2021	11	09	14	15	25	-13	09	42	1.65	Not observable	Virgo
2021	11	10	14	18	02	-13	23	34	1.65	Not observable	Virgo
2021	11	11	14	20	39	-13	37	20	1.65	Not observable	Virgo
2021	11	12	14	23	17	-13	51	01	1.65	Not observable	Libra
2021	11	13	14	25	55	-14	04	36	1.64	Not observable	Libra
2021	11	14	14	28	34	-14	18	06	1.64	Not observable	Libra
2021	11	15	14	31	13	-14	31	29	1.64	Not observable	Libra
2021	11	16	14	33	53	-14	44	47	1.64	Not observable	Libra
2021	11	17	14	36	33	-14	57	58	1.64	Not observable	Libra
2021	11	18	14	39	13	-15	11	03	1.64	Not observable	Libra
2021	11	19	14	41	55	-15	24	01	1.64	Not observable	Libra
2021	11	20	14	44	36	-15	36	53	1.64	Not observable	Libra
2021	11	21	14	47	18	-15	49	38	1.64	Not observable	Libra
2021	11	22	14	50	01	-16	02	16	1.63	Not observable	Libra
2021	11	23	14	52	44	-16	14	48	1.63	Not observable	Libra
2021	11	24	14	55	27	-16	27	12	1.63	Not observable	Libra
2021	11	25	14	58	11	-16	39	29	1.63	Not observable	Libra
2021	11	26	15	00	56	-16	51	38	1.63	Not observable	Libra

All times computed for Drammen (latitude 59.74; longitude 10.20)
and expressed in Drammen time.

ᵏUT

ıding the fraction of

imal hours
degrees, East positive.

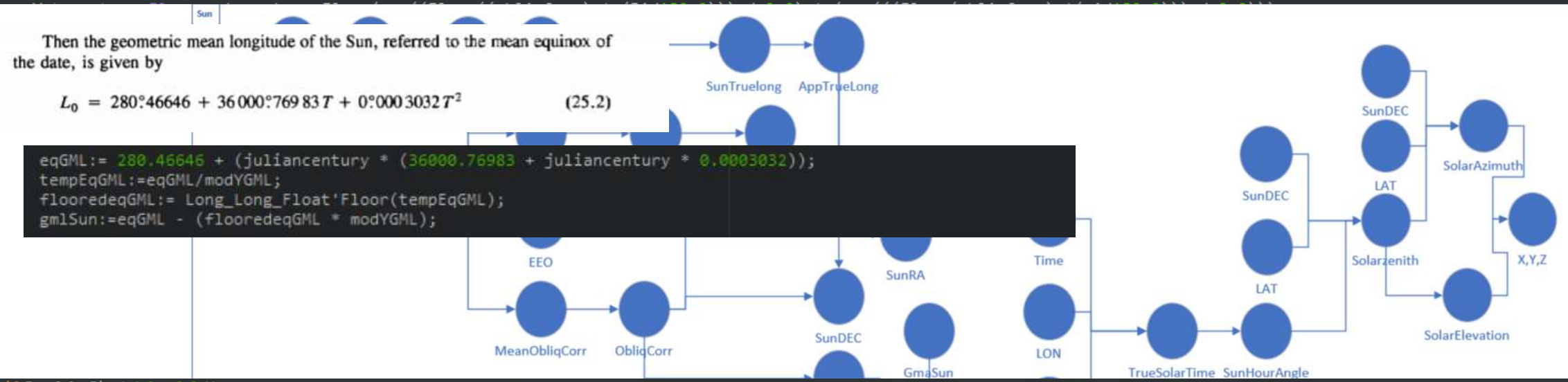
ıg LST in range 0 to 360

```
SunRtAscending:Long_Long_Float:= Long_Long_Float(Arctan((Cos(Float(obliqCorr) * (PI/180.0)) * Sin(Float(SunAppLong) * (PI/180.0))), Cos(Float(SunAppLong)*(Pi/180.0))) * (180.0/PI));
SunDeclin:Long_Long_Float:= Long_Long_Float(arcsin(sin(float(obliqCorr) *(pi/180.0)) * sin(float(SunAppLong) * (pi/180.0))) *(180.0/Pi ));
```

Then the geometric mean longitude of the Sun, referred to the mean equinox of the date, is given by

$$L_0 = 280.46646 + 36000.76983\,T + 0.0003032\,T^2 \qquad (25.2)$$

```
eqGML:= 280.46646 + (juliancentury * (36000.76983 + juliancentury * 0.0003032));
tempEqGML:=eqGML/modYGML;
flooredeqGML:= Long_Long_Float'Floor(tempEqGML);
gmlSun:=eqGML - (flooredeqGML * modYGML);
```



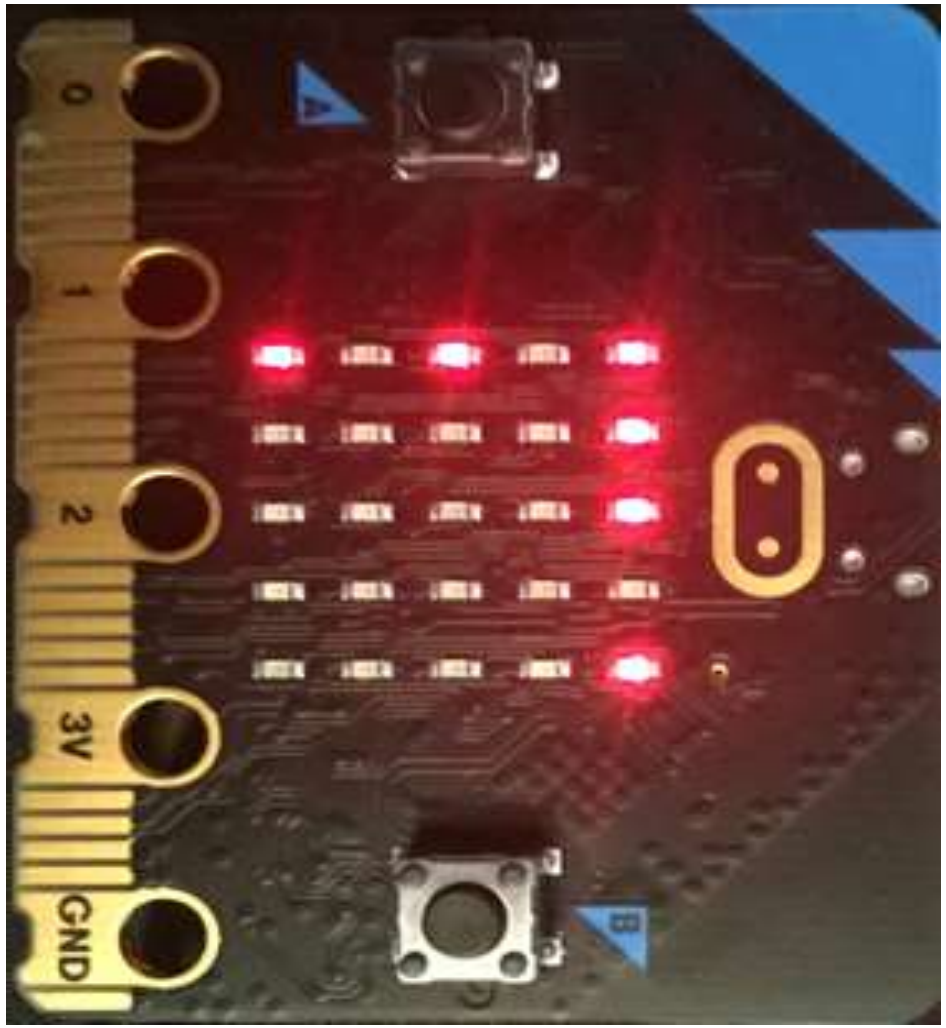

```
if TrueSolarTime/ 4.0 < 0.0 then
   sunHa:= TrueSolarTime / 4.0 + 180.0;
else
   sunHa:= TrueSolarTime / 4.0 - 180.0;
end if;
SolarzenithAngle:= (180.0/Pi) * Long_Long_Float(Arccos(sin(Float(LAT) *(Pi/180.0)) * sin(Float(SunDeclin) *(pi/180.0)) + cos(Float(lat) *(pi/180.0)) * cos(Float(SunDeclin) *(pi/180.0)) * cos(Float(sunHa) *(pi/180.0))));
SolarElevationAngle:= 90.0 - SolarzenithAngle;

if sunHa > 0.0 then
   eqAZMORE:= Long_Long_Float((180.0/Pi) * Arccos(((sin(Float(LAT) * (Pi/180.0)) * cos(Float(SolarzenithAngle) *(Pi/180.0))) - sin(Float(SunDeclin)* (Pi/180.0))) / (cos(Float(LAT) * (Pi/180.0)) * sin(Float(SolarzenithAngle)*(Pi/180.0)))) + 180.0);
   tempEqAZMORE:=eqAZMORE/modYAZ;
   flooredeqAZMORE:= Long_Long_Float'Floor(tempEqAZMORE);
   SolarAzimuth:=eqAZMORE - (flooredeqAZMORE * modYAZ);

else
   eqAZESS:= 540.0 -(180.0/Pi) * Long_Long_Float(Arccos(((sin(Float(lat) *(Pi/180.0)) * cos(Float(SolarzenithAngle)* (Pi/180.0))) - sin(Float(SunDeclin) * (Pi/180.0))) / (cos(Float(LAT) * (pi/180.0)) * sin(Float(SolarzenithAngle) *(Pi/180.0)))));
   tempEqAZLESS:=eqAZESS/modYAZ;
   flooredeqAZLESS:= Long_Long_Float'Floor(tempEqAZLESS);
   SolarAzimuth:=eqAZESS - (flooredeqAZLESS * modYAZ);

end if;
xSun:= rSun * Long_Long_Float(cos(Float(SolarElevationAngle) * (pi/180.0)) * cos(Float(SolarAzimuth) * (Pi/180.0)));
ySun:= rSun* Long_Long_Float(cos(Float(SolarElevationAngle) * (pi/180.0)) * sin(Float(SolarAzimuth) * (Pi/180.0)));
zSun:= rSun * Long_Long_Float(sin(Float(SolarAzimuth) * (Pi/180.0)));
```

Map



Questions?