

# escaping Barcelona

After looking online for a tool to calculate the distance and finding nothing, I decided to ask ChatGPT to help me with a script to calculate it and (after many corrections and failed attempts...) it worked.

Here is the script used:

```
from skyfield.api import load, wgs84
from datetime import datetime, timezone, timedelta

# Constants
MARS_MEAN_RADIUS_KM = 3389.5
BARCA_LAT, BARCA_LON, BARCA_ELEV = 41.3874, 2.1686, 12.0

# Parse datetime for 2025-11-07 18:00 UTC+2
local_naive = datetime(2025, 11, 7, 18, 0)
tz = timezone(timedelta(hours=2))
dt_utc = local_naive.replace(tzinfo=tz).astimezone(timezone.utc)

ts = load.timescale()
t = ts.from_datetime(dt_utc)
eph = load('de440s.bsp')
earth = eph['earth']
try:
    mars = eph['mars']
except KeyError:
    mars = eph['mars barycenter']

site = wgs84.latlon(BARCA_LAT, BARCA_LON, elevation_m=BARCA_ELEV)
observer = earth + site

center_km = observer.at(t).observe(mars).distance().km
surface_km = center_km - MARS_MEAN_RADIUS_KM
if surface_km < 0:
    surface_km = 0.0

million_km = surface_km / 1_000_000.0
print(f"ctf{{{million_km:.3f} M km}}")
```

Running it returned the correct flag:

```
$ python distance.py  
[#####] 100% de440s.bsp  
ctf{361.297 M km}
```

flag: ctf{361.297 M km}