

## Test task for Python language skills

### **Description of the problem:**

Vehicle has a GNSS module with installation height of 1500mm above the moving plane.

Vehicle moves forward on rugged terrain. The GNSS position and vehicle orientation is given in the following vector:

```
time_s,      x_mm, y_mm,  roll_deg, pitch_deg
1621693264.0155628, 9521, -35074, 3.92, -1.35
1621693264.1979840, 9450, -34970, 3.93, -1.22
1621693264.4237902, 9365, -34853, 3.85, -1.24
1621693264.6384845, 9291, -34759, 3.85, -1.12
1621693264.8448036, 9211, -34649, 3.77, -0.99
1621693265.0378000, 9140, -34547, 3.70, -0.90
1621693265.2572992, 9071, -34444, 3.70, -0.70
1621693265.4631655, 8988, -34334, 3.59, -0.55
1621693265.6851535, 8917, -34231, 3.59, -0.49
1621693265.8768837, 8839, -34126, 3.56, -0.46
1621693266.1154845, 8767, -34021, 3.66, -0.38
1621693266.2963840, 8689, -33914, 3.78, -0.44
1621693266.5014370, 8614, -33808, 3.74, -0.53
1621693266.7386210, 8540, -33704, 3.73, -0.75
1621693266.9416296, 8452, -33590, 3.66, -0.91
1621693267.1762938, 8392, -33494, 3.55, -0.97
1621693267.3843954, 8326, -33399, 3.63, -1.00
1621693267.5642680, 8255, -33292, 3.77, -0.89
1621693267.7781956, 8176, -33189, 3.90, -1.00
1621693268.0044500, 8112, -33099, 3.88, -1.24
1621693268.2188272, 8044, -32986, 3.82, -1.58
1621693268.4177945, 7969, -32892, 3.75, -1.95
1621693268.6272150, 7906, -32804, 3.77, -2.05
1621693268.8552556, 7835, -32705, 3.80, -1.95
1621693269.0375066, 7759, -32616, 3.81, -1.72
1621693269.2567391, 7677, -32504, 3.88, -1.31
1621693269.4572983, 7593, -32391, 3.98, -1.04
1621693269.8621871, 7453, -32193, 4.07, -1.17
1621693270.0862586, 7386, -32103, 4.06, -1.31
1621693270.2752004, 7301, -31996, 4.06, -1.56
```

Positive roll corresponds to the orientation when the right side of the vehicle is being lower than the left side. Positive pitch corresponds to the orientation when the front part of the vehicle is being lower than the rear part.

### **Task:**

1. For each point calculate the projection of the GNSS module post on the moving plane
2. For each point calculate the vehicles heading (vehicle is moving smoothly straight ahead)

### **Requirements:**

Problem must be solved using Python 3 language

### **Evaluation criterias:**

- Solution correctness and robustness
- Code cleanness and reusability
- Problem decomposition approach
- Data visualization