In this project, your task is to explore the following two computer vision applications.

(i) Structure from Motion (SfM) and
(ii) (Object Tracking.

Note that your grade will depend on the extent of the analysis and just completing the requirements outlined here fully will get you 90% of the total credits. Work in a group of two and your teammate should be different from previous group assignments.

Report: Structure your report as below:

1. Introduction.
2. Part I: SfM
    a. Methods. Discuss one of the methods from each application step by step with code snippet.
    b. Experiments and Results
    c. Discussion
3. Part II: Object Tracking
    a. Methods. Discuss one of the methods from each application step by step with code snippet.
    b. Experiments and Results (include evaluation)
    c. Discussion
4. Conclusion

Code: Write code in jupyter notebook and submit both the notebook and pdf export.

Structure from Motion

Set camera in auto-focus mode. Do experiments for the following.
Algorithms:

1. Sequential adjustment
2. Bundle adjustment

Experiments:

1. Indoor and outdoor objects.
2. Objects close and far
3. Vary the number of views

Object Tracking

Algorithms:

i. Mean Shift or CamShift
ii. CSRT or KCF
iii. SORT or DeepSort

Experiments:

i. Moving camera with static object
ii. Moving camera with moving object
iii. Static camera with moving object
iv. Try with varying object velocity. You can skip frame to try vary the speed.