Assignment- 4

1. Compare and contrast regression and segmentation techniques in the context of object segmentation. How do supervised and unsupervised learning methods apply to each approach?
2. Describe the importance of object segmentation in computer vision applications and how it aids tasks like image recognition and scene understanding.
3. Discuss the challenges encountered in object segmentation tasks, including variations in lighting conditions, occlusions, and background clutter.
4. Develop a Python script to implement object segmentation using a pre-trained CNN model such as Mask R-CNN or U-Net. Use a dataset of images with labeled objects and evaluate the segmentation performance using Intersection over Union (IoU) metric.
5. Write a Python function to build a decision tree regression model from scratch. Given a dataset with numerical features and a continuous target variable, implement the algorithm to recursively split nodes based on feature values to minimize mean squared error.