Vision 6 - Pose estimation, 3D -> 3D

1. What is a pose of an object? What is the mathematical structure?
2. How does object pose relate to camera pose?
3. If you have (at least three) point correspondence between model and scene, which algorithm can you use to compute the transformation? What are the steps in that algorithm?
4. Estimate the transformation T that aligns the five points in P with the corresponding points in Q:

   P = [1 3 1 4 5
   2 2 1 4 5
   3 1 1 4 2];

   Q = [2.6213 2.2071 1.7071 3.8284 2.4142
   2.6464 5.3536 3.5000 5.0000 7.0000
   5.3536 4.6464 3.5000 8.0000 8.0000];

   P = [1 3 1 4 5; 2 2 1 4 5; 3 1 1 4 2]

   Matlab formatting:

   Q = [[2.621, 2.207, 1.707, 3.828, 2.414];[2.646, 5.354, 3.5, 5.0, 7.0];[5.354, 4.646, 3.5, 8.0, 8.0];]
5. What are the two alignment algorithms/types discussed in class?
6. What is an algorithm for local alignment? What are the steps in the algorithm? When do you stop?
7. Which are the steps in the algorithm for global alignment discussed in class?
8. What are the trade-offs between using few (3) and many (>3) correspondences during RANSAC?
9. What are the names of the three shape features discussed in class?
10. What can you say in general about shape features used for global pose estimation? (What are their properties?)
11. Describe one of the shape features discussed in class (how do they work)?
12. How are these local (typically, as described in class) descriptors compared to each other?