Assignment 4 (Programming)

1. Implement the merge sort.

2. Suppose we have a sorted sequence A and would like to check if a value v is in A, we can check the midpoint of the sequence against v and eliminate half of the sequence from further consideration. The binary search algorithm repeats this procedure, halving the size of the remaining portion of the sequence each time.

   Implement the binary search.

3. Use divide-and-conquer to design an algorithm to compute a^n, where a and n are two positive integers input by the user.