Problem 1.
You are given points $p_0, p_1, \ldots, p_n$, and $p_i$ has coordinates $x[i], y[i]$. Assume that $x[0] = y[0] = 0$.

a. Assume that all points other than point 0 are in quadrant I ($x[i] > 0$ and $y[i] > 0$) or in quadrant III ($x[i] < 0$ and $y[i] < 0$). Describe how to test if $p_0$ is extreme in this set using $O(n)$ steps.

b. Modify your test so it still uses $O(n)$ steps, but it does a bit more: if $p_0$ is extreme, it finds neighbors of $p_0$ on the polyline of the convex hull of our point set (see Figure 3.5, where $p_1$ has neighbors: $p_3$ and $p_6$).

Problem 2.
You have array of numbers $A[0], \ldots, A[n-1]$, and target number $t$. Check if for some $i < n/2$ and $j \geq n/2$ we have $A[i] + A[j] = t$.

a. Describe a reasonable brute force algorithm. What is the running time?

b. Using sorting and binary search, describe how to find the answer in time $O(n \log n)$.

Problem 6 on page 119.
I do not know how one can reduce the number of sets to consider in brute force approach. Instead, explain how problem 2 can be used to reduce the time needed to $O(2^{n/2})$ (or $O(n^{2^{n/2}})$).

Problem 7 on page 119.
Additionally, explain why the clique problem has an algorithm that runs in time $O(2^{n/2})$. 