1. Prove that there are an odd number of halving edges from each point and they are located as mentioned in the lecture.

2. For every even $n$, show an example of $n$ points in the plane such that there are no more than $n/2$ halving lines for this point set. Prove that there are always at least $n/2$.

3. Prove that between $n$ points and $m$ lines in the plane, the number of incidences (sum of the number of points for each line) is at most $O(n^{2/3}m^{2/3} + n + m)$.

4. Show that if $h(3n) \geq 3h(n) + 3n/2$, then $h(n) = \Omega(n \log n)$.

5. Denote by $\text{pair-cr}(G)$ the minimum number of pairs of edges that cross in a planar drawing of $G$. Prove that $\text{pair-cr}(G) \leq \text{cr}(G) \leq \left(\frac{2\text{pair-cr}(G)}{2}\right)$.

6. (HW) Show that if we have $n$ points in the plane, then there are at most $O(n^2/k^3 + n/k)$ lines that contain at least $k$ points.

New exercises and notes can be found at http://dcg.epfl.ch/page78315.html
Solutions to selected homeworks should be sent to doemoetoer.palvoelgyi@epfl.ch or handed in at the beginning of the next session.