Please submit your answers typed up in TeX, either in hard copy or via e-mail by 1 pm on April 24.

1. **(30 points)** Let P be the poset obtained by removing the $\hat{0}$ and $\hat{1}$ elements from D_{36} (the poset of divisors of 36).

    (a) Draw a Hasse Diagram of P.

    (b) Draw a Hasse Diagram of $J(P)$.

    (c) Draw the order complex $\Delta(P)$.

2. **(40 points)** Let $\mathcal{A}$ be the arrangement of 16 hyperplanes $x_i = 0$ and $x_i = 1$ for $i = 1, \ldots, 4$.

    (a) Compute the characteristic polynomial $\chi_{\mathcal{A}}(x)$.

    (b) Use the characteristic polynomial to compute the number of bounded and unbounded regions of $\mathcal{A}$.

3. **(30 points)** Let Π_4 be the partition lattice, i.e. the poset of partitions of the set $\{1, 2, 3, 4\}$. Draw a Hasse diagram of Π_4, and label each element x with the value of $\mu_{\Pi_4}(\hat{0}, x)$, where μ_{Π_4} is the Möbius function.