For the purposes of this problem set, we restrict attention to truth-functional schemata all of whose sentence letters are among p_1 and p_2, that is, schemata drawn from $\mathbb{S}(\{p_1, p_2\})$. We employ the following terminology in these problems.

- We write $\mathbb{A}(\{p_1, p_2\})$ for the set of truth-assignments to the sentence letters p_1, p_2.

- If $S, T \in \mathbb{S}(\{p_1, p_2\})$, S *implies* T if and only if for every $A \in \mathbb{A}(\{p_1, p_2\})$, if A satisfies S, then A satisfies T. S and T are equivalent if and only if S implies T and T implies S.

- A list of truth-functional schemata is *succinct* if and only if no two schemata on the list are equivalent.

- A list L of schemata is an *anti-chain* if and only if no schema on L implies any other schema on L.

- An anti-chain L is *maximal* if and only if for every schema S not included in L, the list L^* obtained from L by appending S is not an anti-chain.

- A truth-functional schema *implies a list of schemata* if and only if it implies every schema on the list.

- The *power* of a truth-functional schema is the length of a longest succinct list of schemata it implies.

1. (30 points) What is the power of the schema $p_1 \oplus p_2$?

2. (40 points) Make a list of all the numbers that are lengths of maximal anti-chains. Explain your answer.

3. (30 points) What is the length of a longest succinct list of schemata all of which imply the schema

$$p_1 \supset p_2.$$