Problem type 1:

Consider the problem of:

> *(See variants below)*

Please be concise/brief. We will grade kindly. There are lots of correct answers and we're just looking to make sure you understand how languages and problems are connected.

a. **BYH**

Checking whether (or not) a number is divisible by 4). You are given a binary number and need to output if this number is divisible by 4.

b. **BYF**

Summing two *unary* integers.

c. **BYA**

The game of TicTacToe. You are given a completed tic-tac-toe board and you need to determine who won.

d. **BYB**

Given a undirected weighted graph, the shortest path between 2 nodes s and t.

Problem type 2:

Give the recursive definition for the following language:

> *(See variants below)*

Assume $\Sigma = \{\mathtt{0}, \mathtt{1}\}$

a. **BYC**

A language that contains all strings.

b. **BYE**

A language which holds all the strings containing the substring `000`.

c. **BYD**

L_A that contains all palindrome strings using some arbitrary alphabet Σ.

d. **BYG**

A language which holds all the strings containing the substring `000`.