The new requirements :

The main goal is to design an Algorithm to Evaluate the s-boxes in different sizes by using genetic programming and produce the new s-box that we want to use in our new lightweight algorithm, (based on sponge extendable output function)

**The current goal**, first we need to proof that our evaluation code is working perfectly …we want to proof that, by replicate the Golden 4x4 paper .. we followed some setting they did :

We wrote code to produce the canonical version of the s-box first ,However, we are using genetic programming while they used exhaustive search .

the problems are in the evaluation function they are used some properties like differential and linear properties … and I didn’t know how they weighted these properties to evaluate the s-boxes .

**so**, first we need to ***know how they use the properties*** and what they are the ***other properties they used to produce their golden s-box*** , to do the same setting in our code and see if we can get the same result or not . if we can get the same result this will be great as here we can proof that our code is working properly and then we could build our setting to produce our golden s-box to use it in our algorithm .

the second problem is sagemath , my supervisor think that may be because of sage we cant get the result but first we have to try with sagemath as it easier than writing the code from scratch .