1. Implement Schnorr’s protocol (the prover and the verifier) from the lecture. Additionally implement the extractor and the simulator for this protocol. Note that last two are never needed in practice.

2. Alice wants to prove to Bob, who knows Alice’s public key and an encrypted value, that she encrypted the value 0. Design and implement a sigma protocol for this language and prove it to be complete, specially sound, and special honest-verifier zero-knowledge.