PS09-04

February 28, 2018

Make a TM M:
on input $\langle S, t \rangle$

1. Verify that S is a set and t is an int.
2. Send the whole $\langle S, t \rangle$ into the oracle. If it returns nothing then return "none exists".
3. If the oracle says that there exists X, the subset, then remove the first character from the set S and run that through the oracle.
4. If the oracle still says there's a subset X (etc.), move on to the next number. If not, reinsert said integer and move on to the next number.
5. Repeat this cycle until in all remaining cases, removing a number causes the oracle to reject the set.
6. Return the remaining set.

At worst case, this algorithm runs twice through the set, making it a linear algorith. Verifying the format of S and t could take a bit longer, but it's a ptime process, making the whole process solveable in polynomial time.