

MITRE eCTF 2023-24

Kitten Postulation

MAX78000 Device—First Program Overview

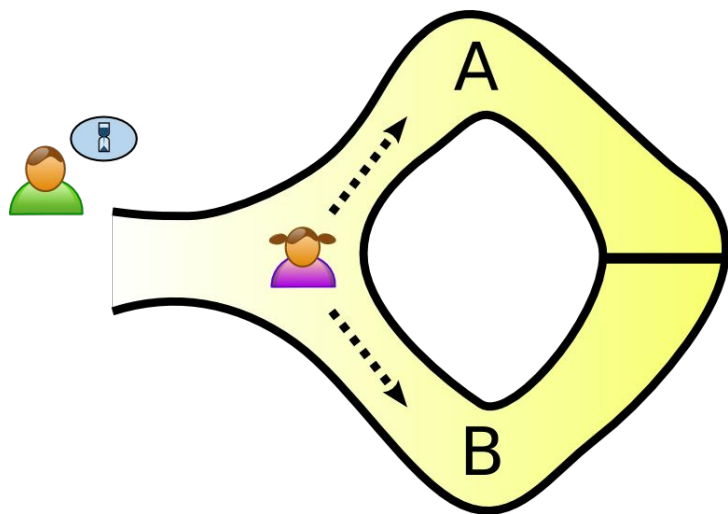
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SOMETIMES I WISH I WAS
AN ELECTRON SO I COULD
BE IN TWO PLACES AT
THE SAME TIME



JB

Kitten Postulation (Not Proved Yet)



Cave ZKP:

- Chance for guessing one correct is $\frac{1}{2}$
- Guessing two consecutive test $\frac{1}{4}$
- Geometric Series that converges to >1

Meaning:

The chances for playing correctly for at least once is greater than 1.

An NP Complete, reducible to SAT problem

Diverge Series:

- Guessing a password for the door, repeated enter and get feedback. Password never change—ZKP repeatedly testing it and probability becomes one over time.

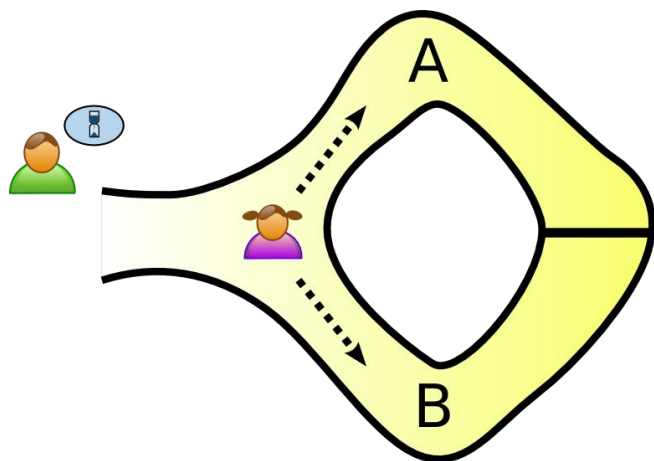
NOT NP Complete – Easy to see a polynomial time

Kitten Postulation (Weird Case)

- What happen if a series converge to >0 but <1 ?

Geometric Series:

- The coefficient A must be less than 1. \rightarrow Meaning even if I have a correct solution, it may have error chances.
- eg the lock has a 80% chances not opening even if give correct password. So probability is $0.8/2$. Two times will be $0.64/4$, etc. It's greater than 0 for sure but less than 1.



Postulation: This is not solvable as a NP-Hard

DEMO FOR MAX78000FTHR

- Example 01: LED
- Example 02: UART with Computer
- Exception Registration
- Data Sheet and SPECS

Plain text = P
Encrypted text = C

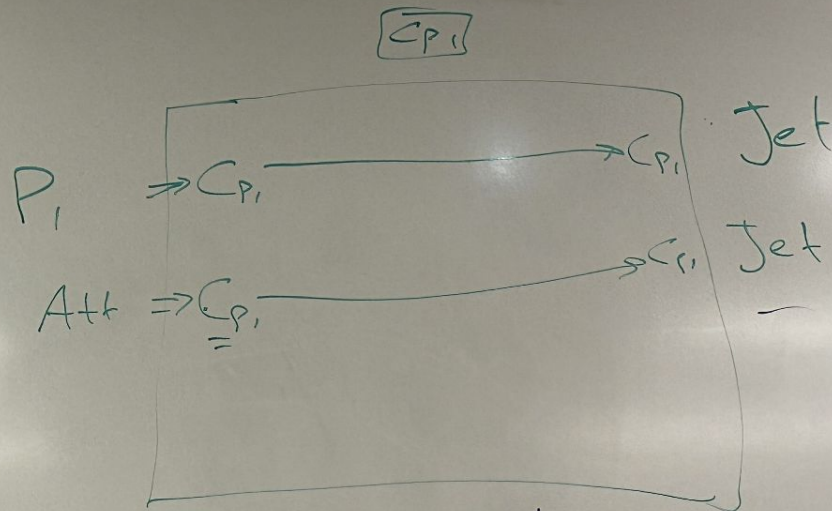
Jet: $[K_{P_1}, K_{P_2}, K_{P_3}]$

$$P_1: K_{P_1} \quad E(\underline{P} \cdot K_{P_1} \cdot N) = \underline{C}_{P_1}$$

$$P_2: K_{P_2}$$

$$D(C \cdot K_{P_1}) = P_{P_1}$$

$$P_3: K_{P_3}$$



AES: 2 ms.

Goal 1: Ciphertext indistinguishability.

CSV file.

- Py. read process.
- Py. generate nonce.
- Py. validate.
- Py. send out.

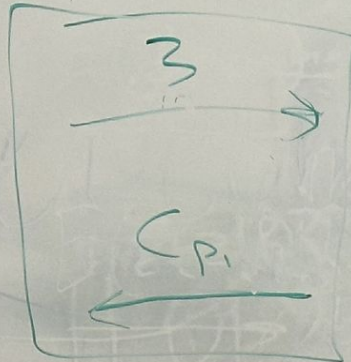
Interval: 0.1 sec.

100 ms.

$$D_{K_P}(C_P) = 3$$

JET

$K_P \rightarrow$



Pilot

- EEPROM STORE info. $\frac{AES}{private\ key}$
 - [Receive Encrypt Send.] = Button push
- K_P UART Rx AES Lib UART Tx

$$E_{K_P}(3) = C_P$$

