# The Best of Both Worlds: Byzantine Agreement Protocols for (but not limited to) Chickens

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# Setting:

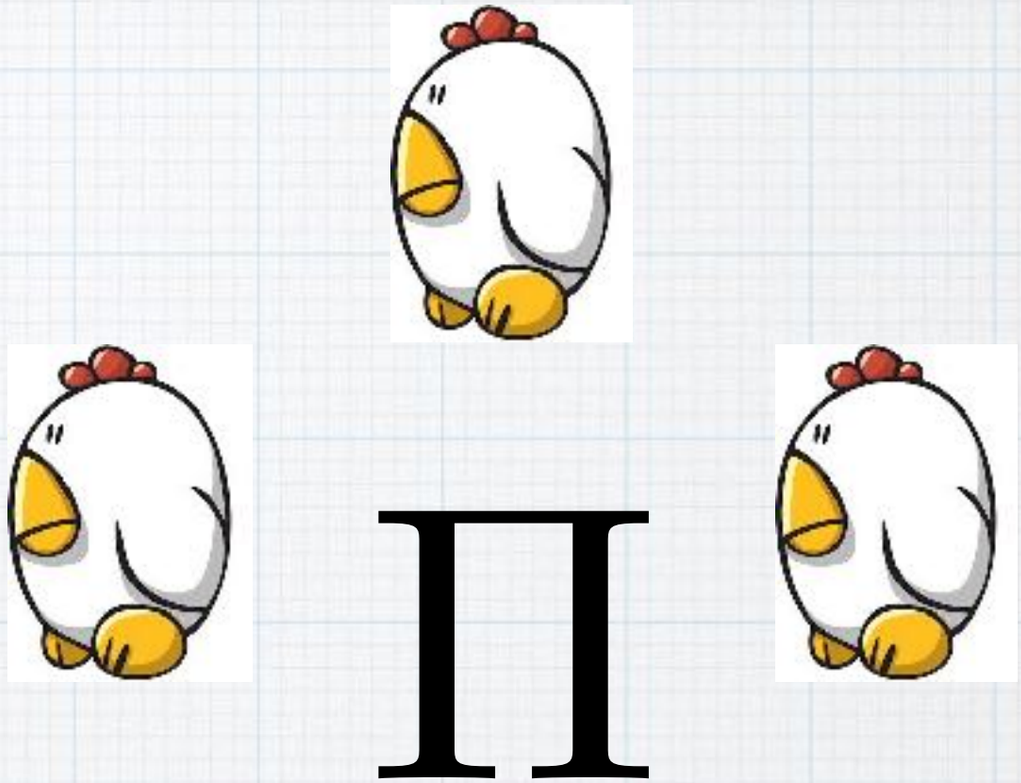
- Old Mc Donald's Crypto Farm
- Farm and pen are separated by road




# Classical Problem From Crypto/ Distributed Computing:

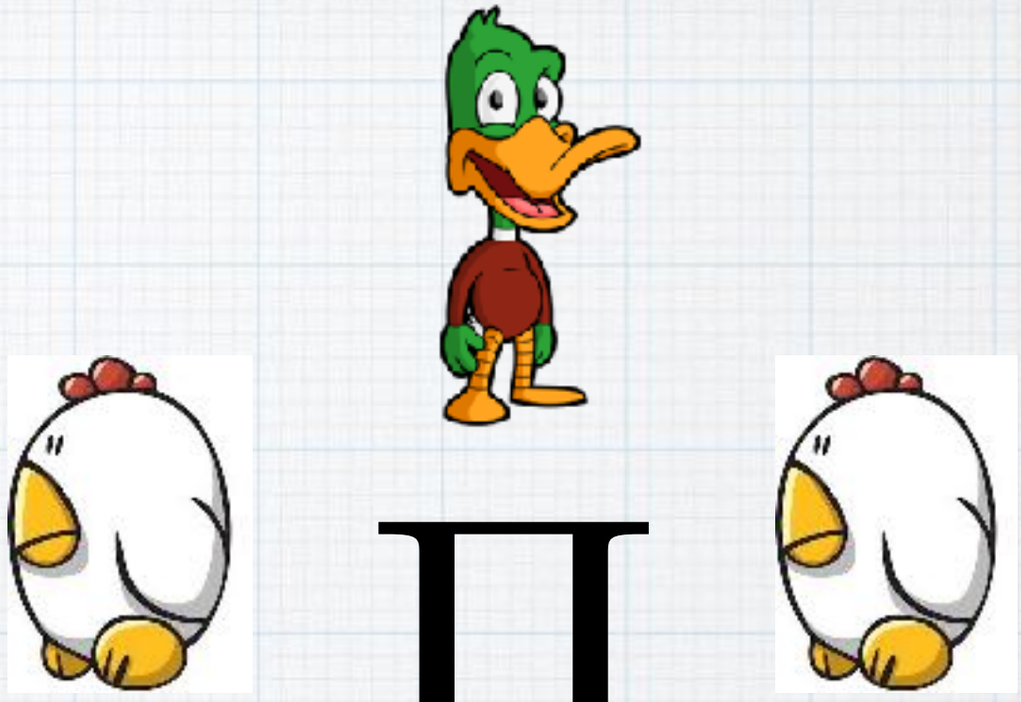
- Chickens trying to decide whether to cross street
- Problem: Birds of a feather flock together!
- How can they ensure that all of them cross at once?

# Solution: Run Protocol for Byzantine Agreement!

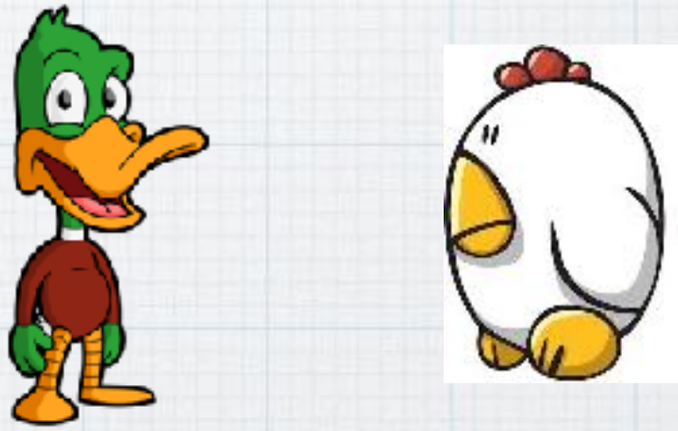


- Agreement ensures that all chickens cross street at once
- Chickens are connected via gossiping network

# Problem: What if some of the chickens are actually malicious Ducks?



- Ducks may try to prevent agreement!
- Protocol must be secure in the presence of duck-minority!



# Two Types of Protocols

- Let the number of chickens be n.
- Use synchronized clocks: Can tolerate up to n/2 ducks by proceeding in lockstep fashion.
- Problem: Chickens don't have watches. Must use sunrise to synchronize instead!
- Synchronous rounds take a whole day!

# Two Types of Protocols

- Let the number of chickens be n.
- Without synchronization: Can tolerate up to n/3 ducks.
- Chickens can agree very fast...
- but can tolerate only n/3 ducks :(

# QUESTION:

Is there a protocol which is both fast AND resilient?

Is it optimal?

# Check out our paper on EPRINT!

- Combining Asynchronous and Synchronous Byzantine Agreement: The Best of Both Worlds
- Julian Loss and Tal Moran
- URL: ia.cr/2018/235

# Open Question:

Why did the chickens try to cross the road in the first place?

# THANKS FOR LISTENING!