



Strategies for Maniac Challenge

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Our Goals

- To maximize the number of packets we receive
 - Want others be cooperative

- To minimize the number of packets the rivals receive
 - Be non-cooperative



A Simple Forwarding Game



P1\P2	Forward	Drop
Forward	10-1, 10-1	-1, 10
Drop	10, -1	0, 0



Nash Equilibrium – Drop The Packet!

- A Nash equilibrium is a combination of strategies that each player's strategy is a optimal response to the other player's strategies

		Henry	
		Not Guilty	Guilty
Dave	Not Guilty	2 Years	5 Years
	Guilty	5 Years	1 Yr.

P1\P2	Forward	Drop
Forward	10-1, 10-1	-1, 10
Drop	10, -1	0, 0

Prisoners' dilemma

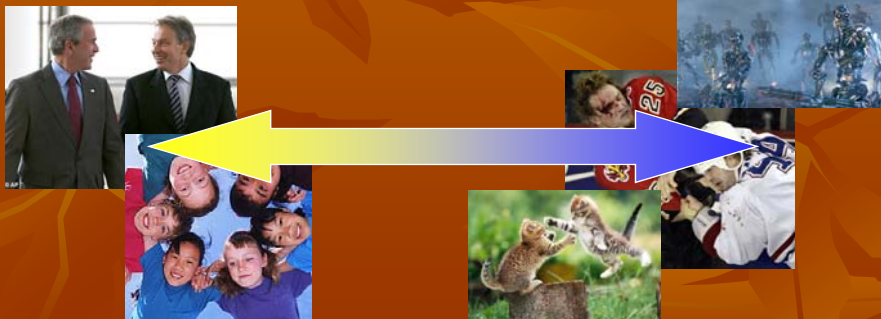
Challenges in MANIAC

- A much more complex and dynamic game
 - Multiple players
 - Dynamic and repeated game
 - Incomplete information
- Hard to model and discover the optimal solution



Our Solutions

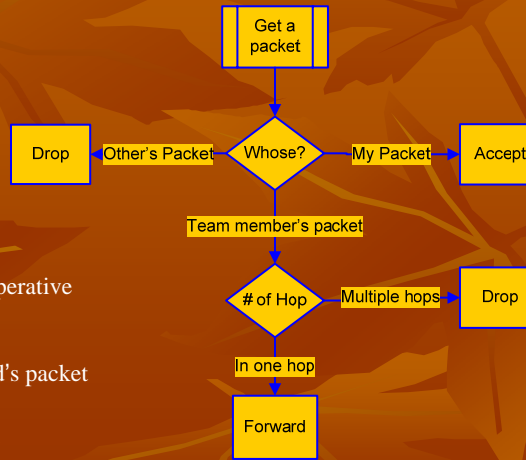
- A set of strategies under different levels of cooperation



Version 1: Absolutely Non-cooperative Strategy

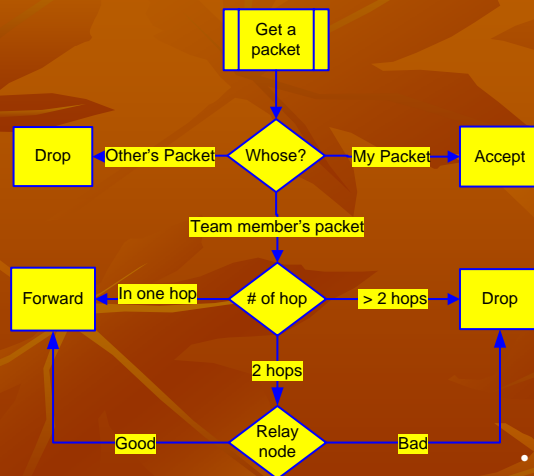


- Assume everybody non-cooperative
- We act non-cooperative
- Only forward one-hop friend's packet

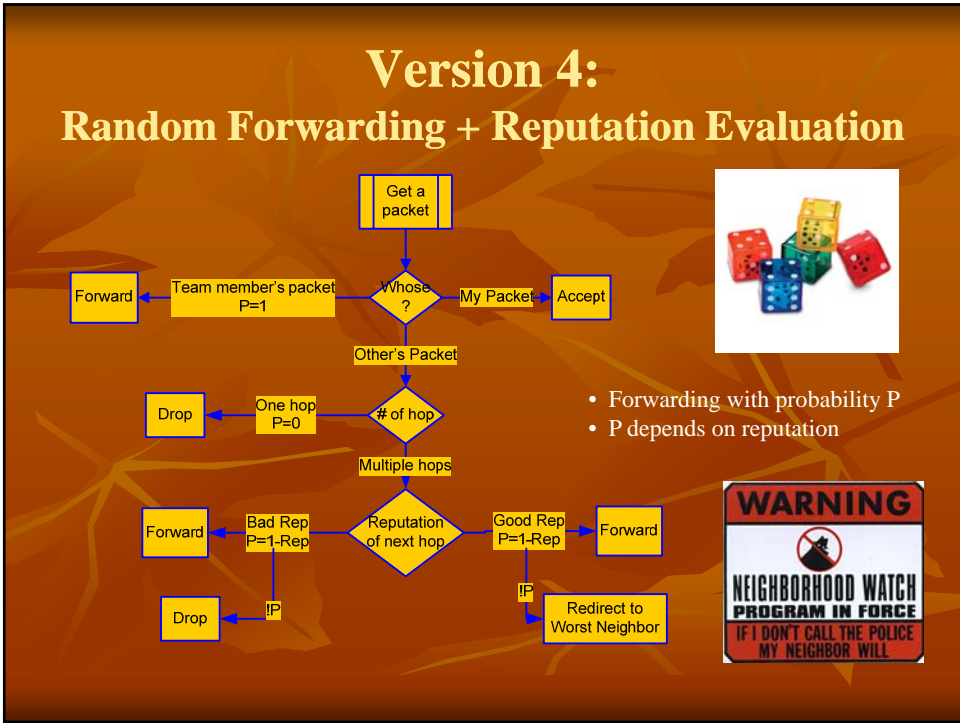
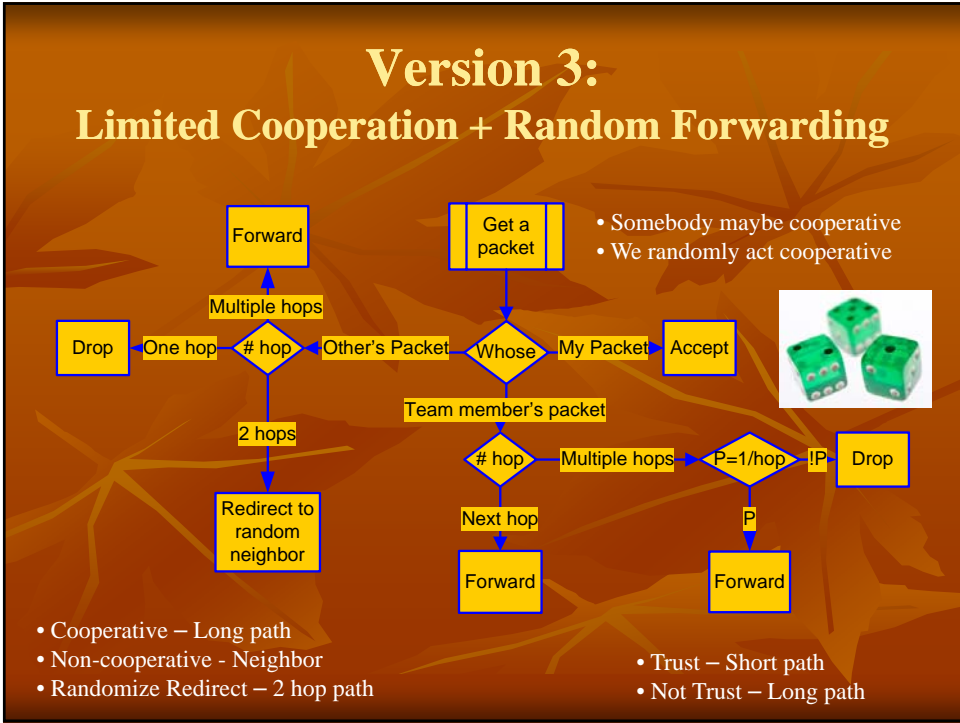


Version 2 : Non-cooperative + Neighbor Evaluation

- Others maybe cooperative
- We still act non-cooperative



- We evaluate neighbors
- Forward two-hop friend's packet if the relay neighbor is good



Version 4: Random Forwarding + Reputation Evaluation

■ Reputation Evaluation

Very limited information
Hard to get accurate reputation

■ Detect forwarding:

- Neighbor u transferred a packet to v
 - v is friend or myself, $\text{rep}(u)+=10$
 - v is dest, $\text{rep}(u)+=5$
 - v is not dest, $\text{rep}(u)+=1$



■ Detect drop (sometimes)

- if v is not dest and did not send out, $\text{rep}(v)=-10$

■ Detect redirect (seldom)

- if the packet destined to both v's and your neighbor and v sent the packet to other nodes, $\text{rep}(v)=-5$

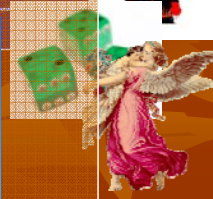
Summary

Version 1

Version 2

Version 3

Version 4



Which one to use?

- Decide after see others' strategies?
- Randomly Pick?
- Pick the one without bugs!

Thank you!