

**CS 333: Network Security and Defense**  
**The Traceroute Game - author: Jidong Xiao**

## **1 Introduction**

This in-class contest is mainly used to engage students in class, and help students to understand how traceroute, one of the most frequently used network diagnostic tool, works. Students will be divided into small groups. Students who lose in this game will not lose anything, but there will be one winning group, each student in that group will receive 3 extra credits.

## **2 Rules**

- We consider the classroom as a computer network with many computers and routers. We consider each student as an actor or actress. Students will act like either a regular computer, or a router.
- The instructor will select two students acting as the source computer and destination computer. Assume there is only one network path between the source and the destination.
- The source computer will try to "send" a ping packet to the destination computer. And the initial ttl is fixed to be 3.
- When the packet is traversing the network, students need to act as regular computers or routers correctly.
- Definition of "correct" for computers: if you are a regular computer, when a ping packet is approaching you, you just pass the packet to the next device, which could be either a regular computer or a router.
- Definition of "correct" for routers: If you are a router, when a ping packet is approaching you, you need to make a decision - if the ttl is greater than 1, you decrement the ttl by 1 and pass the packet to the next device, which could be either a regular computer or a router; if the current ttl is 1, you need to respond an error message to the sender, i.e., the source computer. The game will be restarted everytime an error message is "generated".
- Elimination Rule: One person makes one mistake, the entire group is out. After the entire group is out, the game will be restarted, and every member in the eliminated groups will act as a regular computer - meaning they just pass the packet. The last group remaining will be the winner.
- Each group will have at least one person acting like a router. During the game, everybody is expected to remember the current ttl, and reminding a teammate is not allowed.
- The instructor dictates how fast the packets should be transmitted - this determines how fast each actor/actress needs to make the decision/pass the packet.