

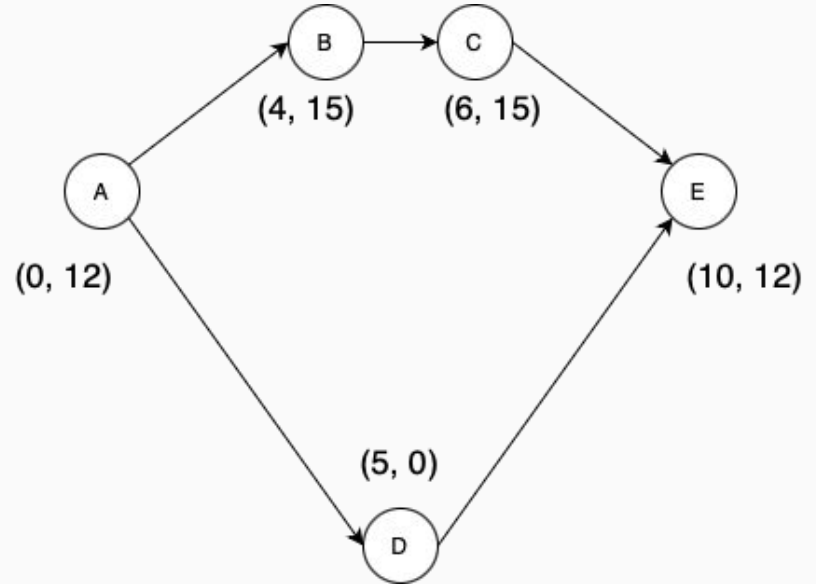
# CSE 250 Recitation

October 21~22 : Graph Representations, PA2



# PA2: Getting Started

- What is the adjacency list for the graph to the right?
- What might make this graph good for testing?
- What are some things you can add to the graph to improve your tests?

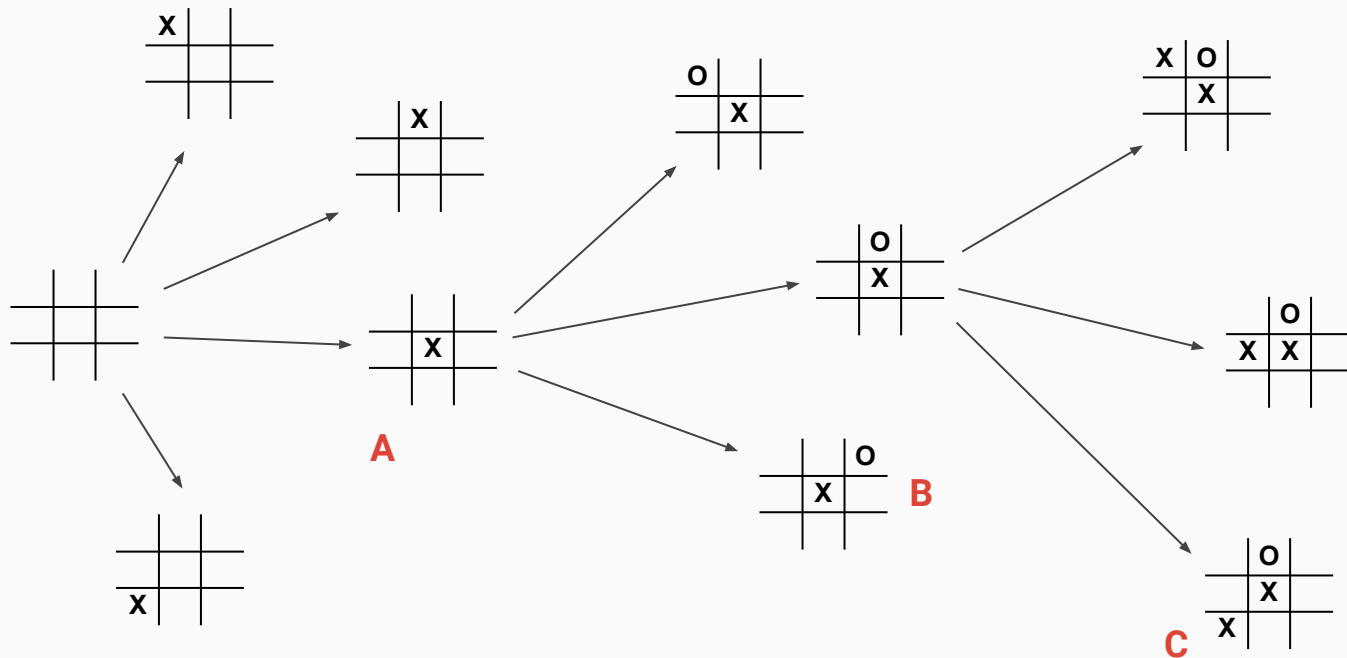


# Graphs

How can the following things be represented as graphs? (ie. What would a vertex represent? What would an edge represent? What kind of work would we be using the graph for?)

- A street map of Buffalo
- Twitter
- Wikipedia
- A game of Tic-Tac-Toe

# Tic Tac Toe Example



**Note:** This does not show all edges / vertices...

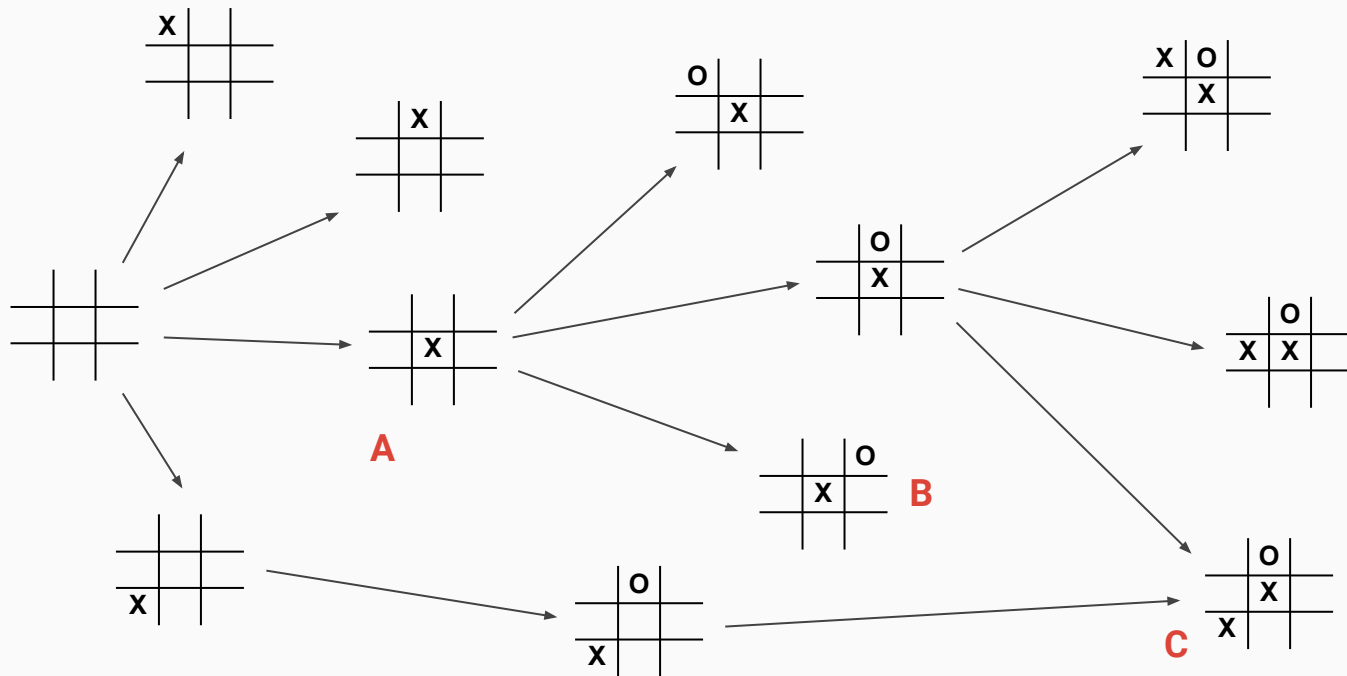
**What is the out degree of the vertex for the empty board?  
What about the in degree?**

**What is the out degree of the vertex labeled A? B?**

**How many edges are in the full graph?**

**Is the in degree of every non-starting node 1?**

# Tic Tac Toe Example



**Note:** This does not show all edges / vertices...

**What is the out degree of the vertex for the empty board? 9**  
**What about the in degree? 0**

**What is the out degree of the vertex labeled A? B? 8, 7**

**How many edges are in the full graph? 9!**

**Is the in degree of every non-starting node 1? No ie C**

# Graph Representations

**Given the following edge list:**

- How many outgoing edges does C have?
- Create an adjacency list for this graph.
- What was your algorithm?
- What was its runtime?

|      |      |
|------|------|
| DtoH | EtoF |
| CtoE | BtoC |
| AtoD | FtoB |
| HtoE | StoB |
| StoA | CtoA |
| CtoD | FtoG |
| AtoS | AtoC |
| HtoG | EtoH |

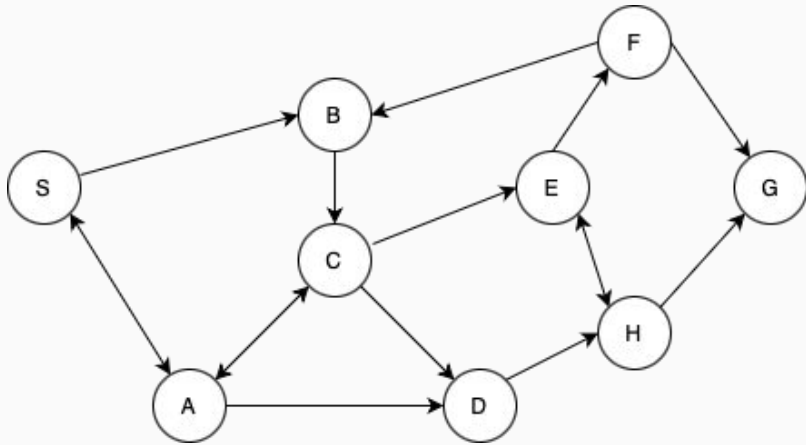
# Graph Representations

**Given this adjacency list:**

- How many outgoing edges does C have?
- How long did it take you to figure that out compared to the EdgeList version?

|   |                  |
|---|------------------|
| S | StoA, StoB       |
| A | AtoS, AtoC, AtoD |
| B | BtoC             |
| C | CtoA, CtoD, CtoE |
| D | DtoH             |
| E | EtoF, EtoH       |
| F | FtoB, FtoG       |
| G |                  |
| H | HtoE, HtoG       |

# Graph Traversal



1. Insert an arbitrary starting node into the [TODO]
2. While the [TODO] is not empty:
  - a. Remove a node from the [TODO]
  - b. For each of its outgoing edges:
    - i. Add unvisited destinations to [TODO]
    - ii. Mark unvisited destinations visited

**Try the above with TODO as a:**

- **Stack** (DFS)
- **Queue** (BFS)



# Blooket

<https://dashboard.blooket.com/set/671187ff89af11f1de5ad489>