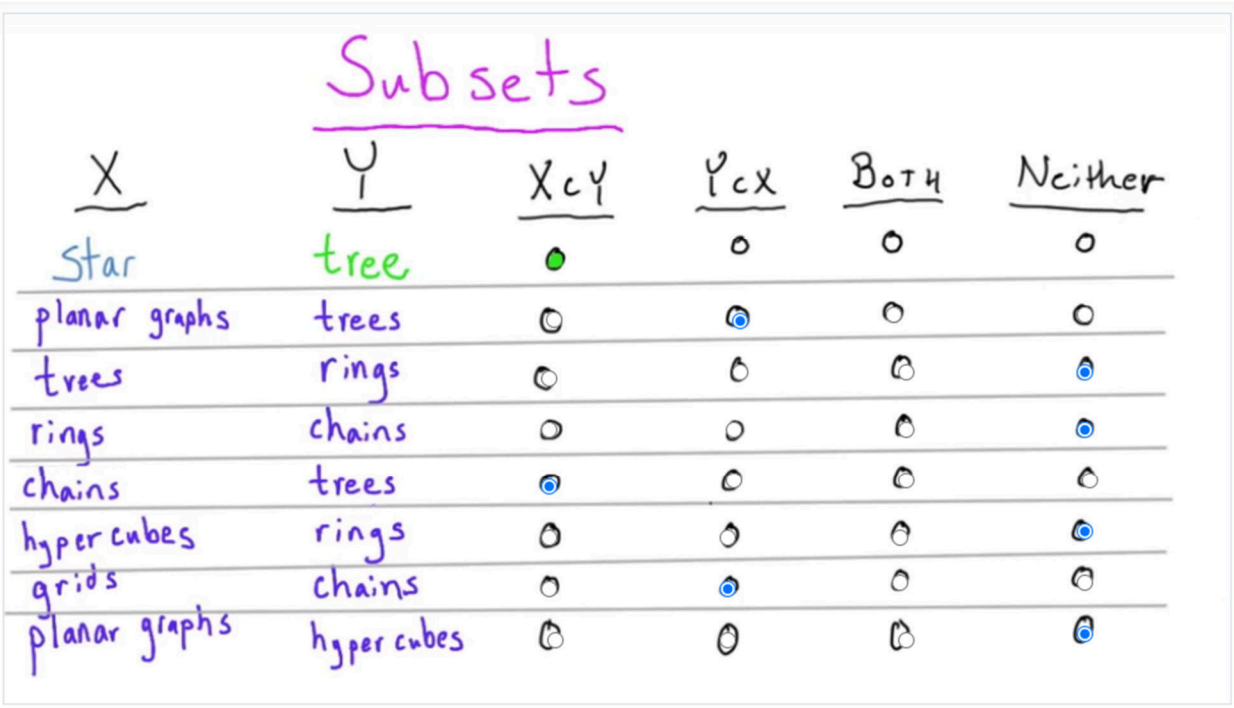
Star Network

```
def star_network(n):
    # return number of edges
    return n-1

print star_network(5)
```

Subsets



Function Comparison

Function Comparision

$4n^2 + (\log n)^7 + 9n(\log n)^2 + n^{\frac{2}{3}}$ is

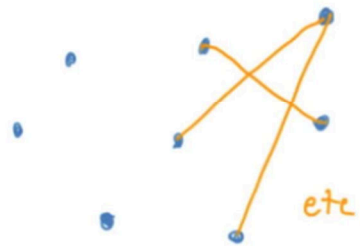
- [x] $\Theta(n^2)$
- [ ] $\Theta((\log n)^7)$
- [ ] $\Theta(n^{\frac{2}{3}})$
- [ ] $O(n)$
- [x] $O(n^2)$
- [x] $O(n^3)$

Planar Graphs

Planar Graphs

Draw yourself a planar graph with 8 nodes and 15 edges.

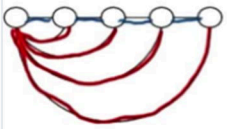
How many regions does the graph have? 9



Combination Locks

Combination Lock

A "combination lock" graph on n nodes consists of the edges in a chain **and** the edges in a star, with the left end of the chain as the center of the star. Here's the five node version:

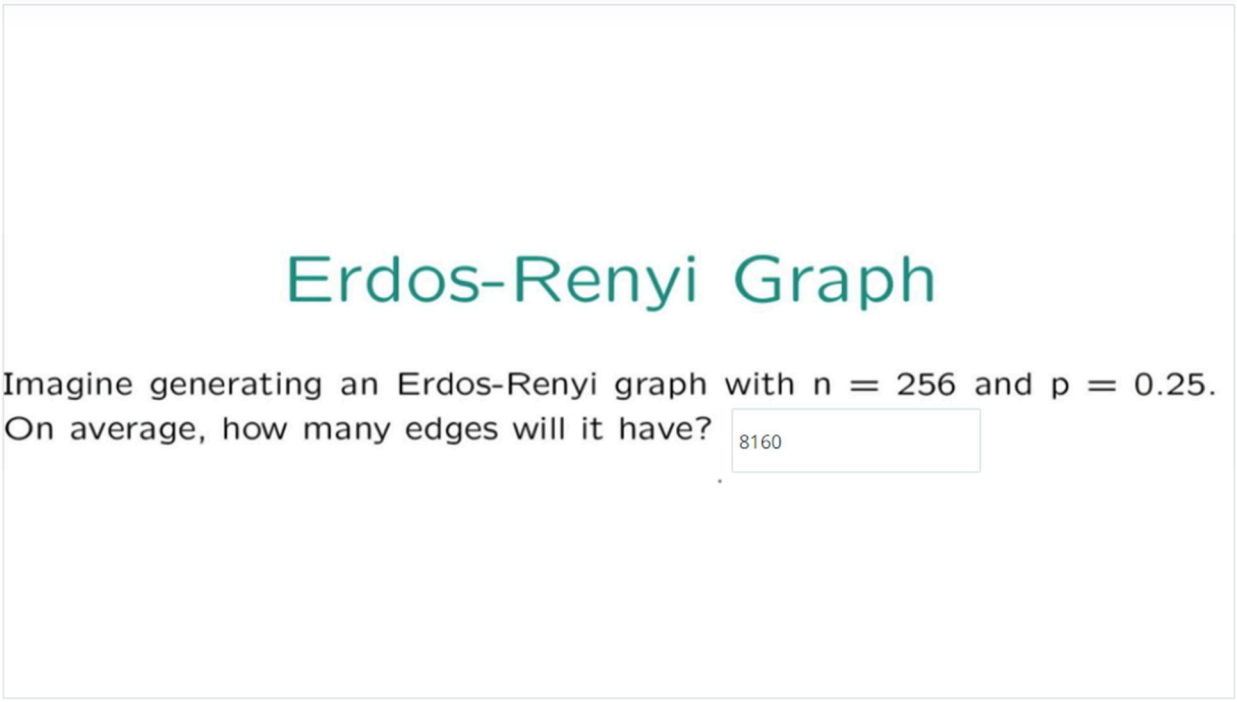


The number of edges is
- $\Theta(n)$
- $\Theta(n \log n)$
- $\Theta(n^2)$

Make a Combination Lock

```
10 def create_combo_lock(nodes):
11     G = {}
12     # your code here
13     make_link(G, nodes[0], nodes[1])
14     for a in range(2,len(nodes)):
15         make_link(G, nodes[a-1], nodes[a])
16         make_link(G, 0, nodes[a])
17     return G
18
```

Erdos-Renyi


Erdos-Renyi Graph
Imagine generating an Erdos-Renyi graph with n = 256 and p = 0.25.
On average, how many edges will it have?
8160