

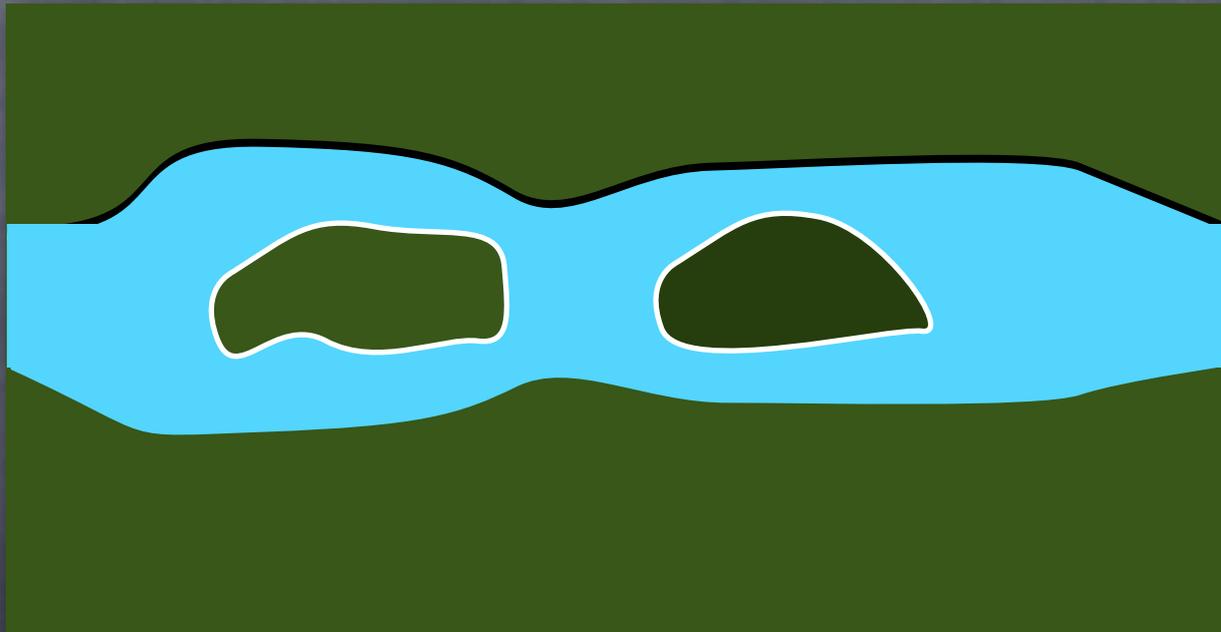
Discrete Structures

Lecture 0

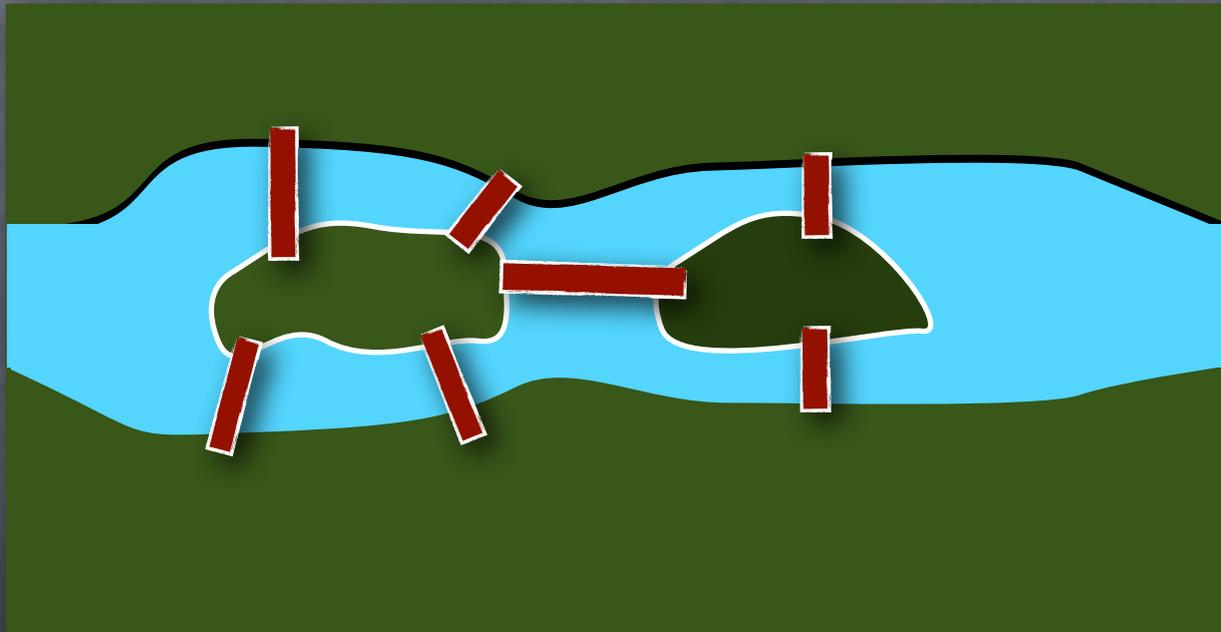
Discrete Structures (Intro to Mind Bending)

Lecture 0

Bridges of Königsberg

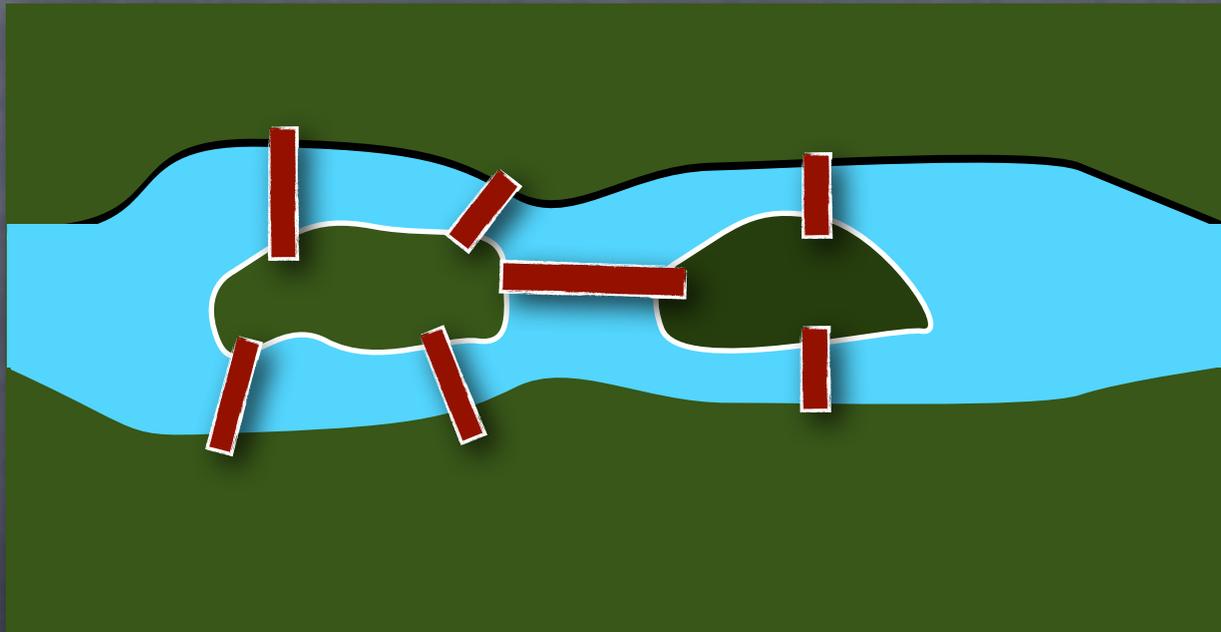


Bridges of Königsberg



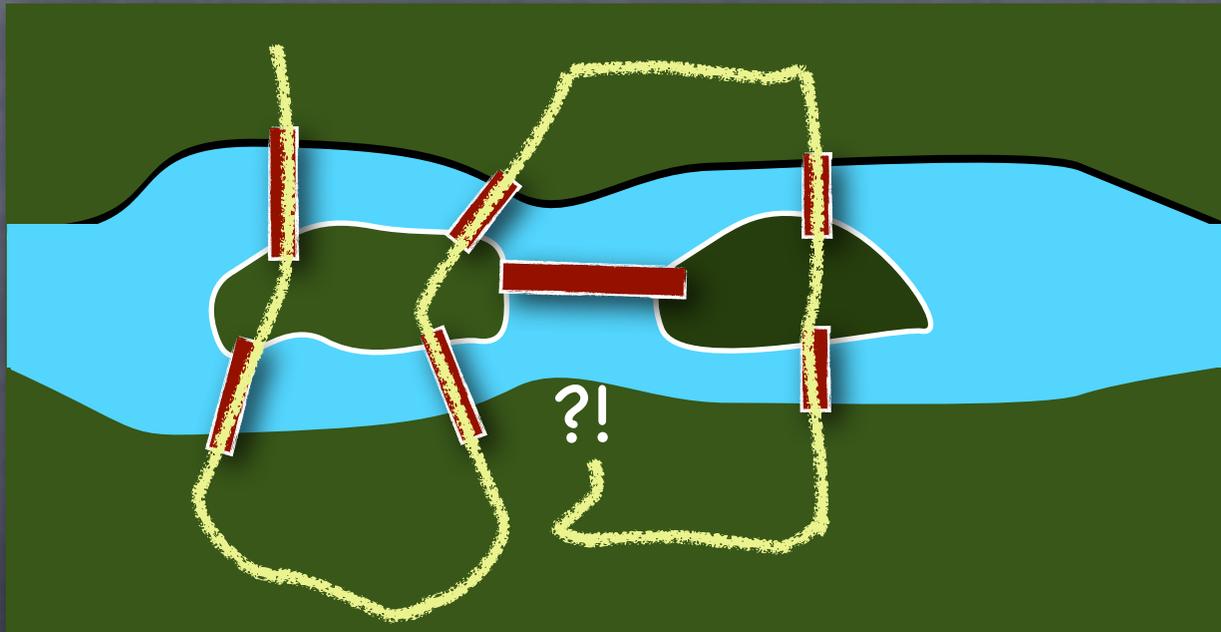
Bridges of Königsberg

- Cross each bridge exactly once



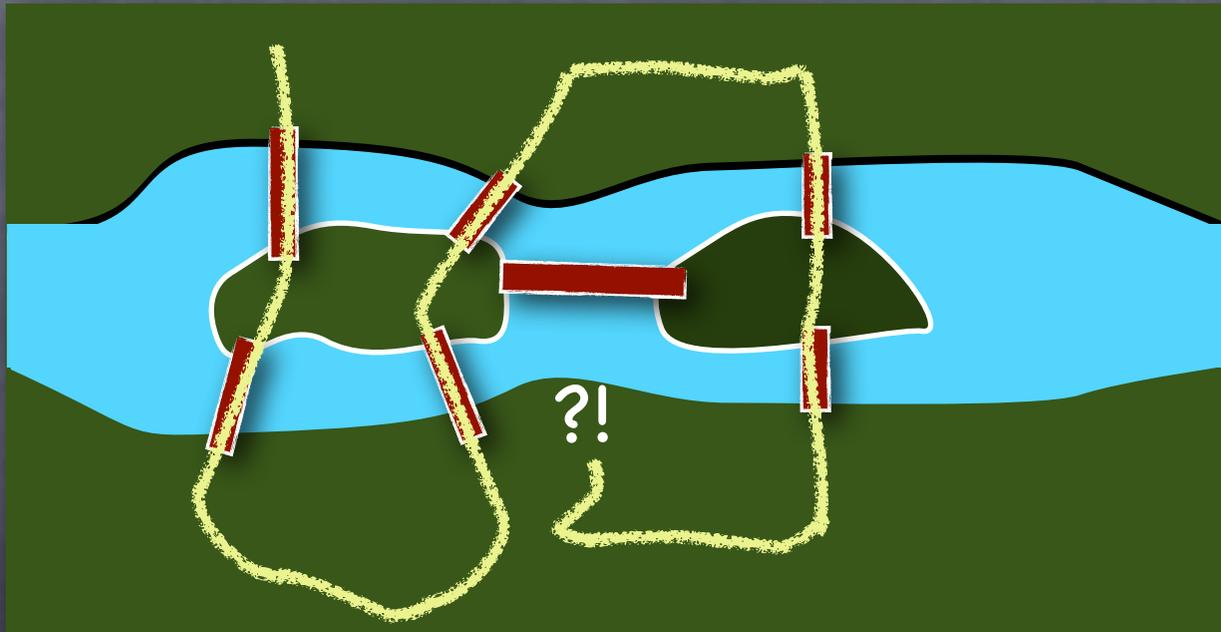
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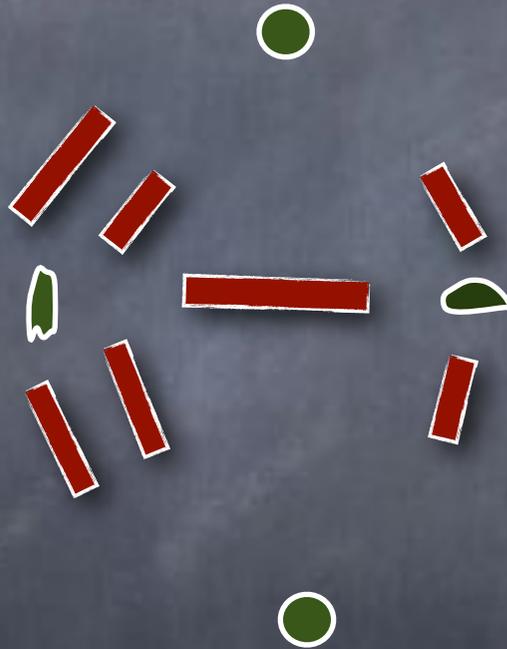
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- Is it impossible? How do we know for sure?

Bridges of Königsberg

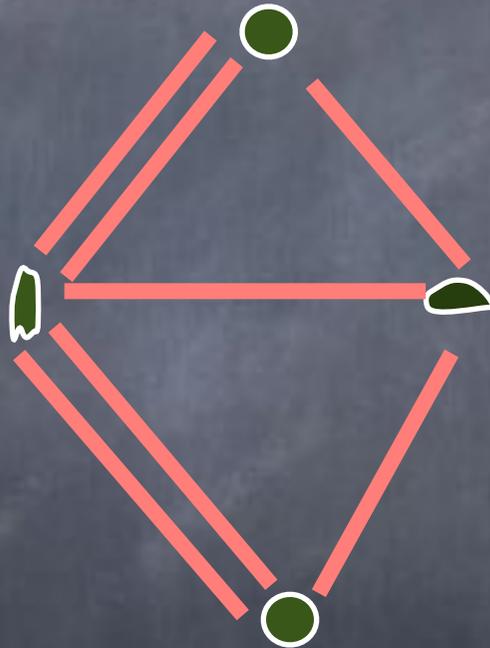
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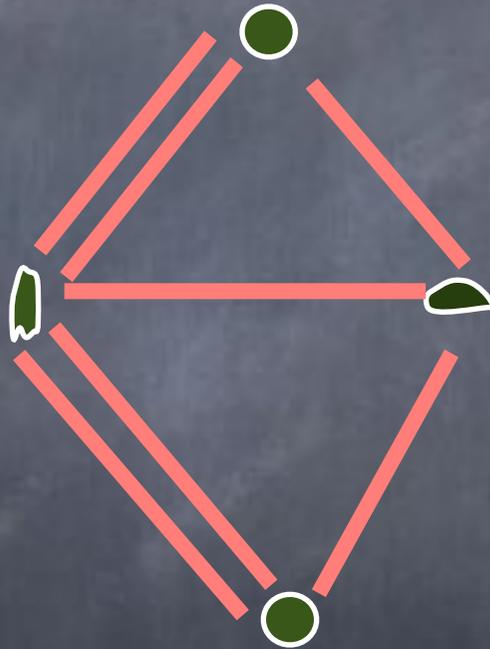
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Bridges of Königsberg

- Cross each bridge exactly once



- Is it impossible? How do we know for sure?

Discrete Stuff

- Graphs
- Patterns, Symmetry
- Numbers
- Logic, reasoning
- (Discrete) Algorithms
- Digital computers...



Zen and The Mechanics of CS 173

Zen and The Mechanics of CS 173

- The art of “Mind Bending”

Zen and The Mechanics of CS 173

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 - Practice, practice, practice → Mind Expanding

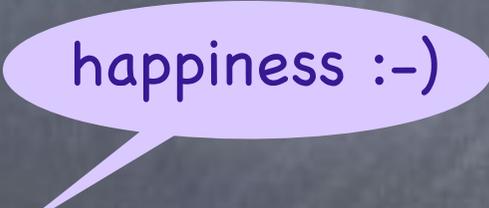
Zen and The Mechanics of CS 173

- The art of “Mind Bending”
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 - Your efforts will pay off in this and subsequent courses, and in job interviews, and jobs...

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- But do pay heed to the mechanics!

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- 

The Mechanics of CS 173

The Mechanics of CS 173

Learning
a concept

The Mechanics of CS 173

Pre-lecture preparation!
Reading/video clips → Short quiz

Learning
a concept

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Pre-lecture preparation!

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Lecture & Discussion

Explanation, discussion, Q&A

Learning
a concept

The Mechanics of CS 173

Pre-lecture preparation!

Reading/video clips → Short quiz

Lecture & Discussion

Explanation, discussion, Q&A

Homework/Quizzes

Pondering, wondering

Learning
a concept

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Exam

Just to incentivize you...

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In a later course

Re-encountering, relearning
(Thank you 173!)

Learning
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Even later

By now, second nature!

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Learning
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Zen

Learning to
learn!

Basic skills

More Mechanics

More Mechanics

- Already well-prepared for the course?

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 - Consider taking the proficiency exam instead! This Saturday afternoon (conflict: Tomorrow+Thu evening)

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- Also, come talk if you have any special circumstances
- Office hours, homeworks, other mechanics, TBA!

More Mechanics

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- Couldn't register?

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- Couldn't register?
 - Please check the "COULDN'T REGISTER" column in the sign up sheet (circulating)

Pigeonholes & Parties

Pigeonholes & Parties



www.reddit.com/r/UIUC/comments/1t4rry/uiuc_a_party_school/

UIUC a party school? (self:UIUC)

submitted 4 months ago by [Banks24](#)

I'm an incoming freshman and I've heard mixed responses, can anyone tell me if UIUC have a huge party scene?

15 comments share

all 16 comments

sorted by: best

- [\[-\] matmaks2001](#) [Senior, CompE](#) 23 points 4 months ago
You decide your own level of involvement.
[permalink](#)
- [\[-\] rhlsawing](#) [@your friendly merry an's server](#) 22 points 4 months ago
yes.
[permalink](#)
- [\[-\] Jankaka](#) [Curselex DE](#) 19 points 4 months ago
Depends on your major. Everyday is a party for engineers.
[permalink](#)
- [\[-\] logged_in_for_this](#) [CompSci](#) 16 points 4 months ago
Comp Sci major standing by, nothing like partying into the night working on an mp

Pigeonholes & Parties



The screenshot shows a Reddit post on the website www.reddit.com. The post title is "UIUC a party school?" and it was submitted 4 months ago by user Baise24. The post content asks, "I'm an incoming freshman and I've heard mixed responses, can anyone tell me if UIUC have a huge party scene?". There are 16 comments, sorted by "best".

Comments shown:

- [-] matmank2001 Senior, CompE 23 points 4 months ago: "You decide your own level of involvement." (permalink)
- [-] rblawing [u]your friendly merry and's server 22 points 4 months ago: "yes." (permalink)
- [-] Jankaka [u]Curselex DE 19 points 4 months ago: "Depends on your major. Everyday is a party for engineers." (permalink)

At the bottom of the screenshot, there is a text box containing the text: "nothing like partying into the night working on an mp".

Pigeonholes & Parties

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How many of your “friends” are at the party?
(Everyone has at least one person at the party
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- There will be at least two who have the same number of friends at the party!



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- But Why?

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- There will be at least two who have the same number of friends at the party!
- If there are 4 people in the party, for each person, the number of friends at the party is 1, 2 or 3.



Pigeonholes & Parties

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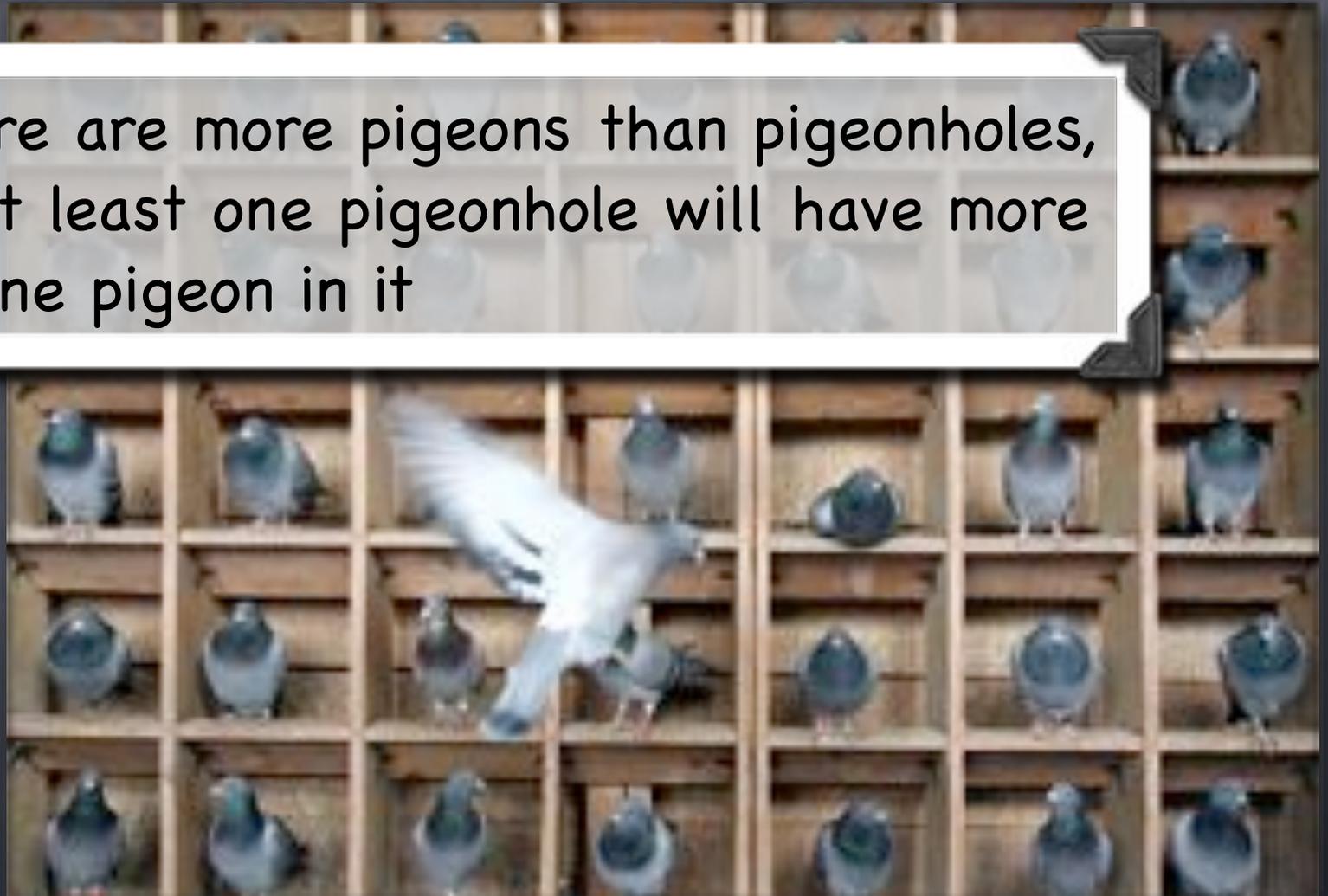
- There will be at least two who have the same number of friends at the party!
- If there are 4 people in the party, for each person, the number of friends at the party is 1, 2 or 3.
 - There are 4 of you, and everyone needs to pick a number. There are only 3 numbers to pick from...

The Pigeonhole Principle



The Pigeonhole Principle

If there are more pigeons than pigeonholes, then at least one pigeonhole will have more than one pigeon in it



Pigeonholes & Parties

- So, suppose you go to a party and there is a game: How many of your "friends" are at the party?
(~~Everyone has at least one person at the party that they count as a friend.~~)

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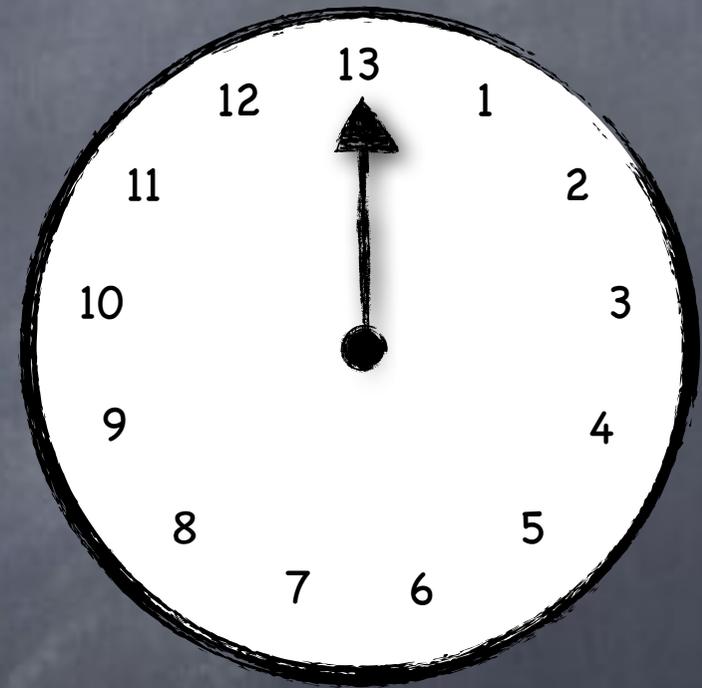


- There will be at least two who have the same number of friends at the party!

Point to ponder

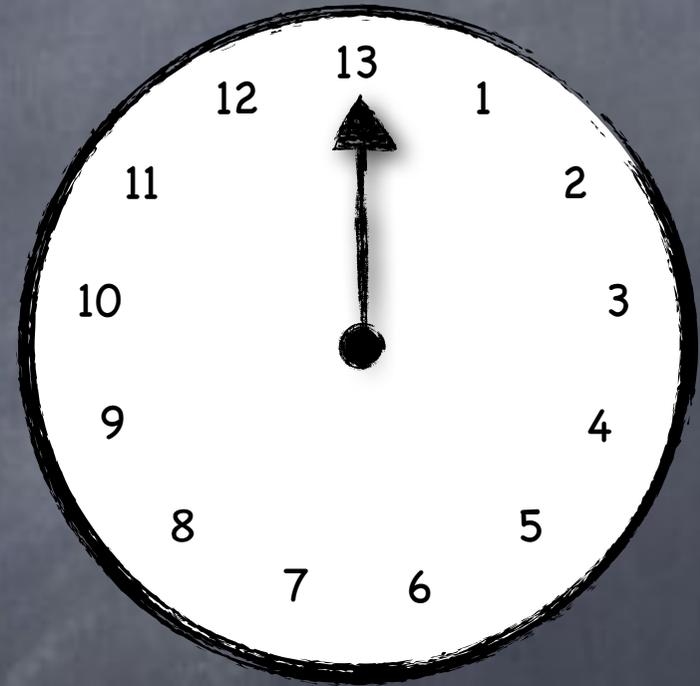
What if this is not the case? Can you show the claim still holds?

The Skippy Clock



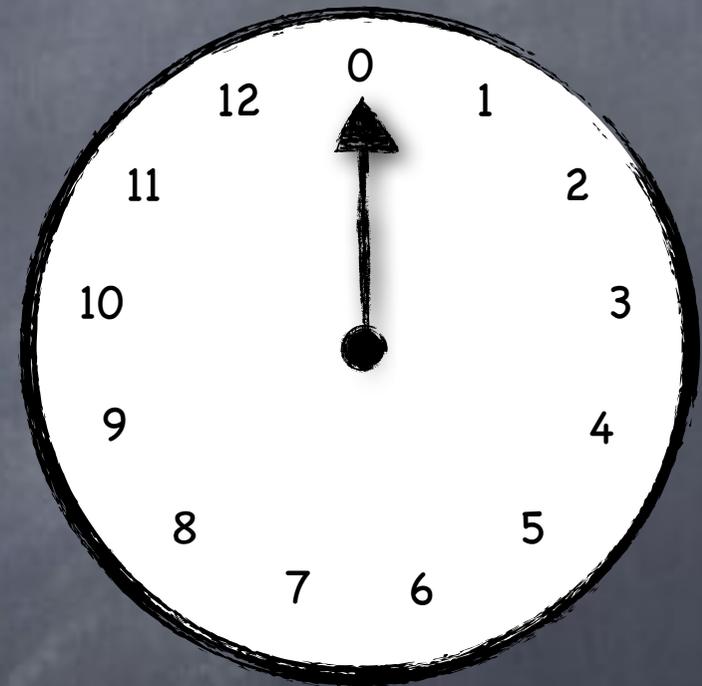
The Skippy Clock

- Has 13 hours on its dial!



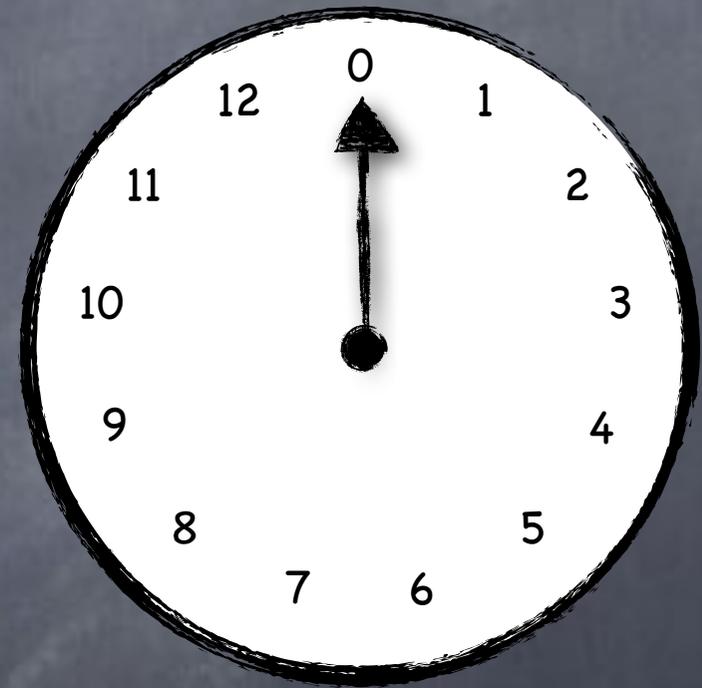
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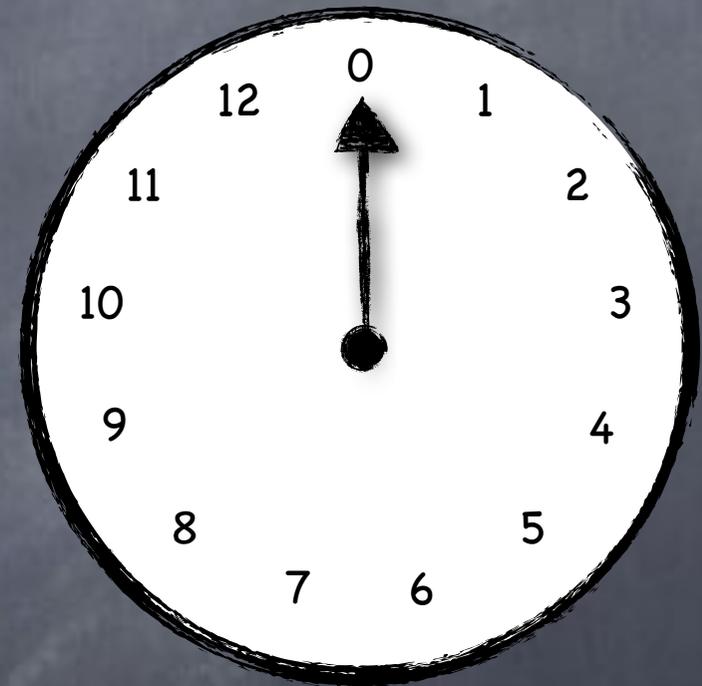
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- Has 13 hours on its dial!
- Needle moves two hours at a time



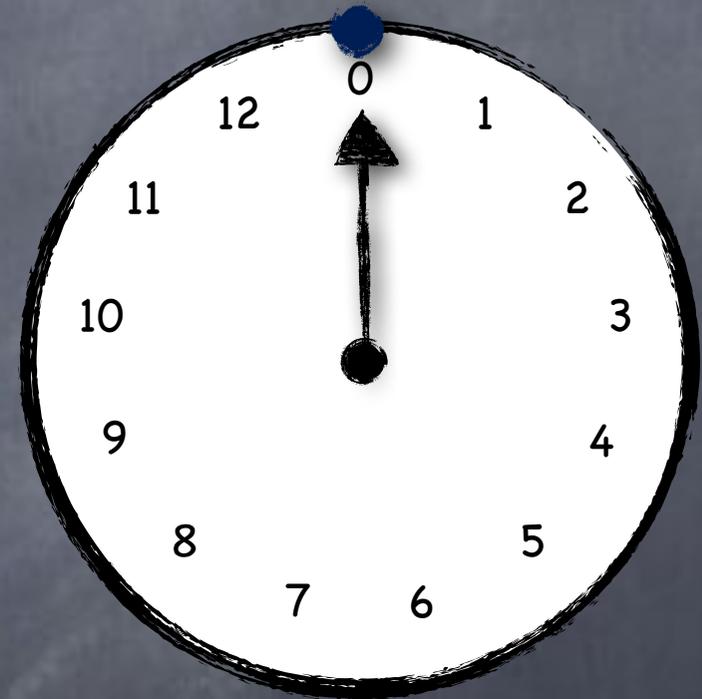
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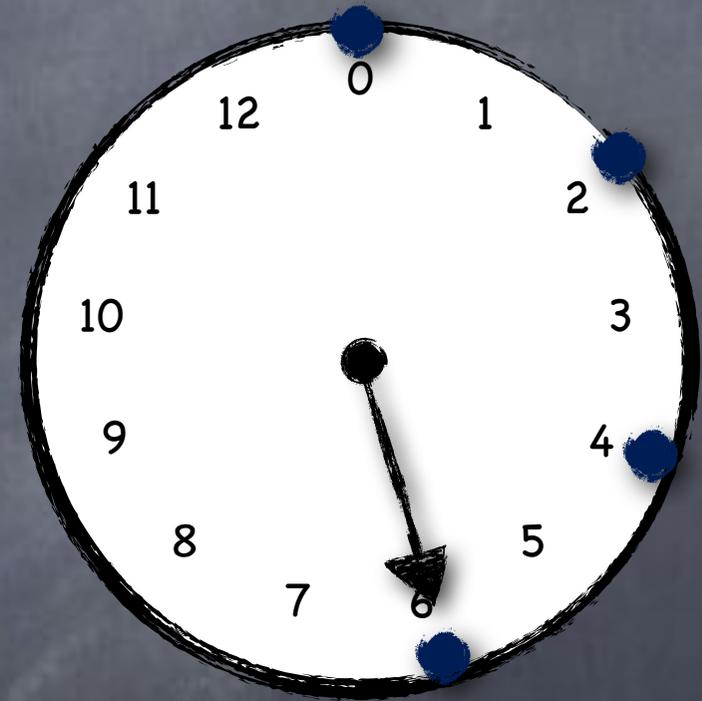
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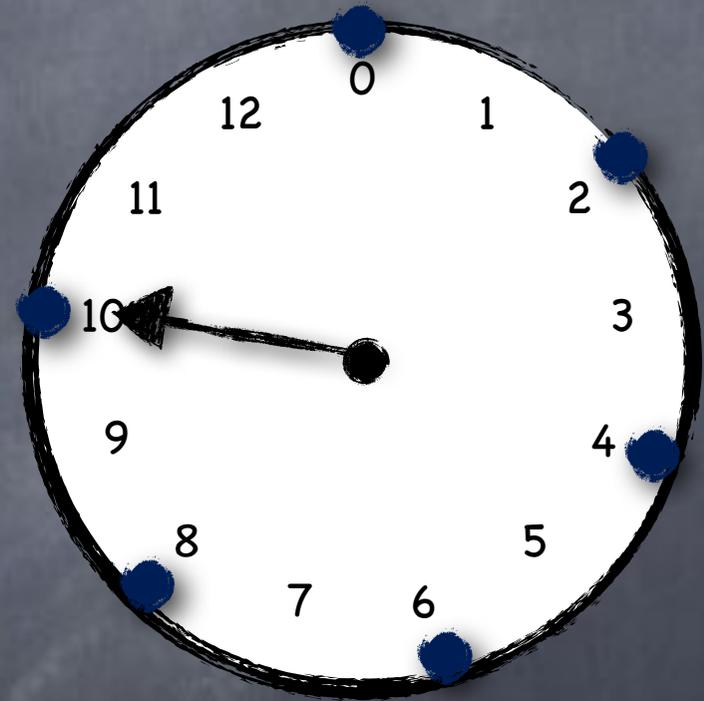
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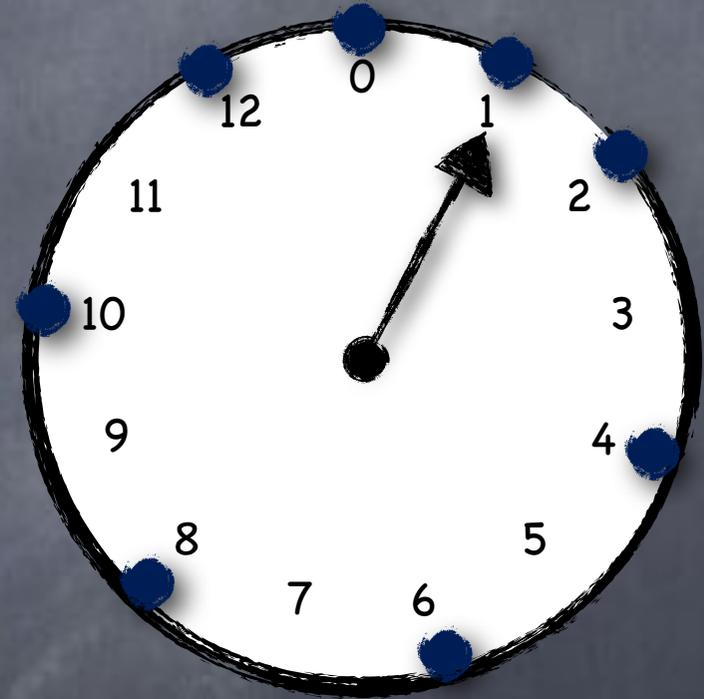
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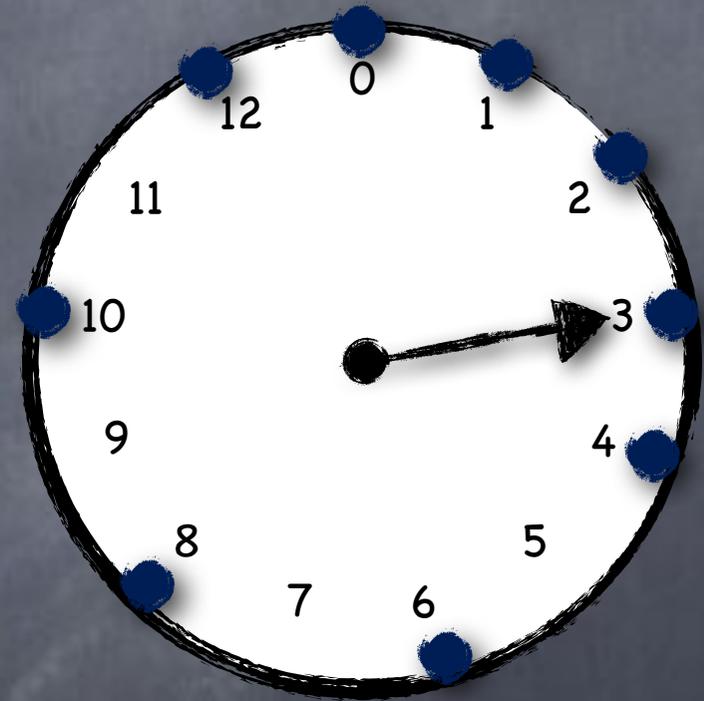
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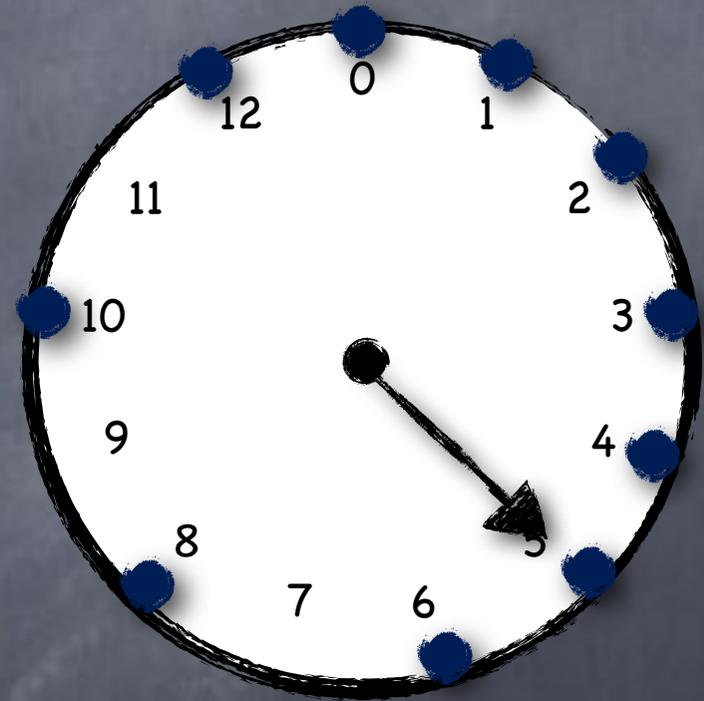
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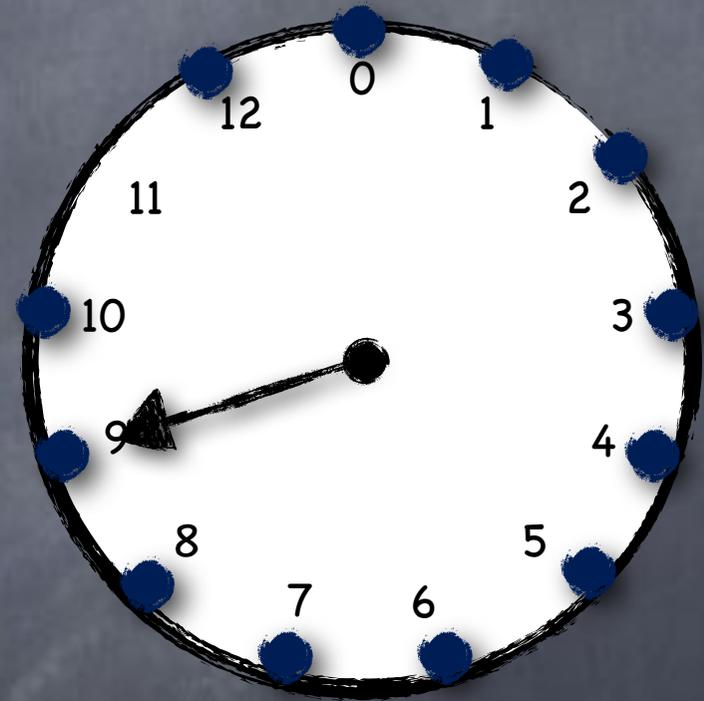
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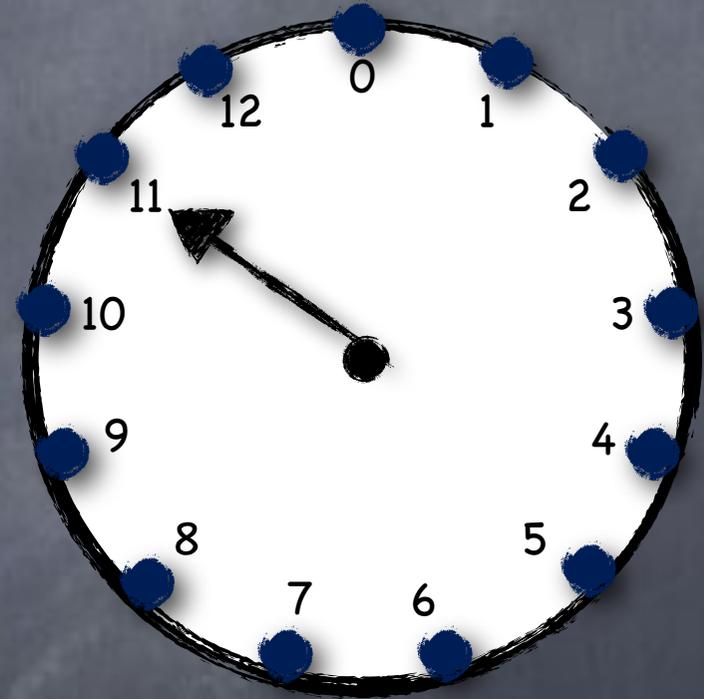
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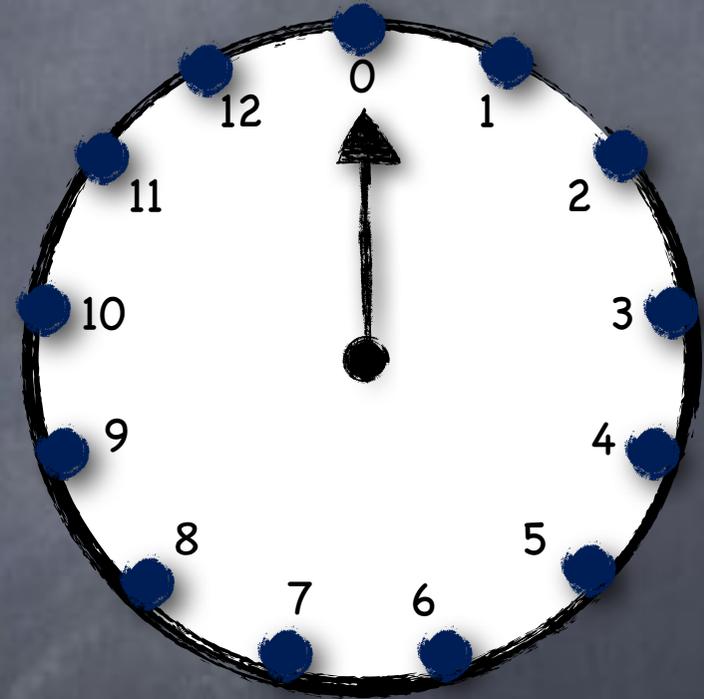
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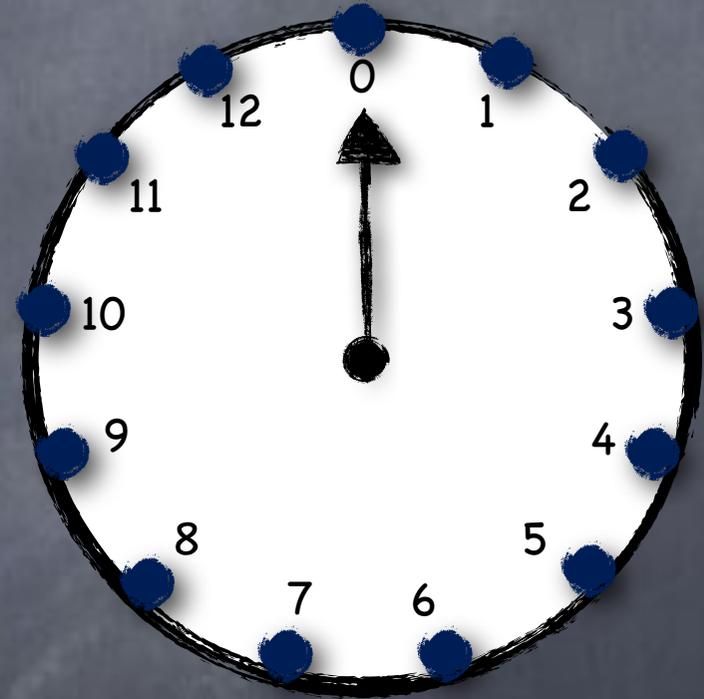
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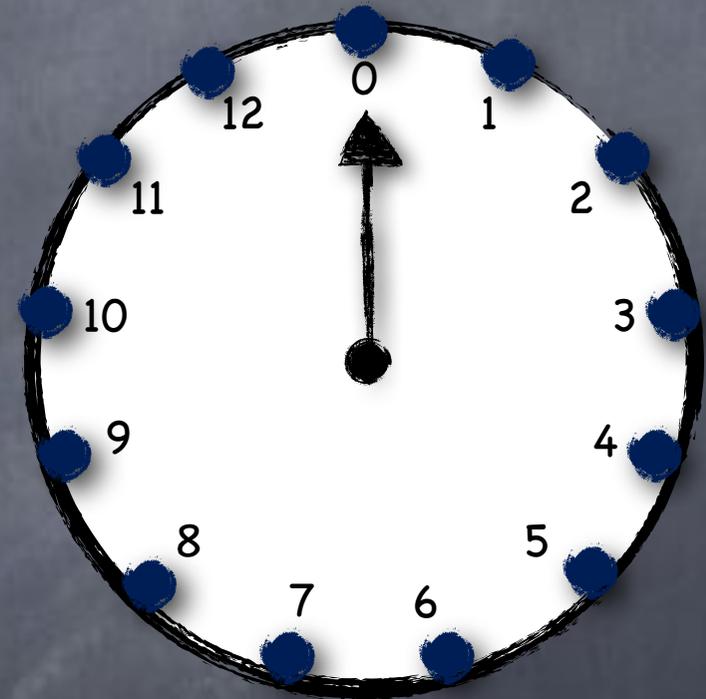
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 - Reaches all of them!



The Skippy Clock

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- Which all numbers will the needle reach?
 - Reaches all of them!



Points to ponder

What if the clock had 12 hours?
What if the needle moved 5 hours
at a time?

173

173

- Welcome to CS 173!

173

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- First topic: Logic

173

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- TO-DO:

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