

# First, let's try it out:

**NICK**

**SHAVE**

**DRESS**

**POCKET**

**TIDY**

**BRUSH**

**SMART**

**KEY**

**TOUCH**

**SHOWER**

**PALM**

**SHARP**

**PINCH**

**MILE**

**NEAT**

**BIRTH**

# Summer '25: Connections!

NICK

SHAVE

DRESS

POCKET

TIDY

BRUSH

SMART

KEY

TOUCH

SHOWER

PALM

SHARP

PINCH

MILE

NEAT

BIRTH

# Summer '25: Connections!

NICK	SHAVE	DRESS	POCKET
TIDY	BRUSH	SMART	KEY
TOUCH	SHOWER	PALM	SHARP
PINCH	MILE	NEAT	BIRTH

# Summer '25: Connections!

NICK	SHAVE	DRESS	POCKET
TIDY	BRUSH	SMART	KEY
TOUCH	SHOWER	PALM	SHARP
PINCH	MILE	NEAT	BIRTH

# Summer '25: Connections!

NICK	SHAVE	DRESS	POCKET
TIDY	BRUSH	SMART	KEY
TOUCH	SHOWER	PALM	SHARP
PINCH	MILE	NEAT	BIRTH

# Summer '25: Connections!

NICK	SHAVE	DRESS	POCKET
TIDY	BRUSH	SMART	KEY
TOUCH	SHOWER	PALM	SHARP
PINCH	MILE	NEAT	BIRTH

# Summer '25: Connections!

**STEAL**

NICK, PALM, PINCH, POCKET

**SHAVE**

**DRESS**

**TIDY**

**BRUSH**

**SMART**

**KEY**

**TOUCH**

**SHOWER**

**SHARP**

**MILE**

**NEAT**

**BIRTH**

# Summer '25: Connections!

## **STEAL**

NICK, PALM, PINCH, POCKET

## **DO SOME GROOMING**

BRUSH, DRESS, SHAVE, SHOWER

**TIDY**

**SMART**

**KEY**

**TOUCH**

**SHARP**

**MILE**

**NEAT**

**BIRTH**



# Summer '25: Connections!

## **STEAL**

NICK, PALM, PINCH, POCKET

## **DO SOME GROOMING**

BRUSH, DRESS, SHAVE, SHOWER

## **DAPPER**

NEAT, SHARP, SMART, TIDY

**KEY**

**TOUCH**

**MILE**

**BIRTH**

# Summer '25: Connections!

## **STEAL**

NICK, PALM, PINCH, POCKET

## **DO SOME GROOMING**

BRUSH, DRESS, SHAVE, SHOWER

## **DAPPER**

NEAT, SHARP, SMART, TIDY

## **\_\_STONE**

BIRTH, KEY, MILE, TOUCH

# Summer '25: Connections!



Puzzle master Wyna and her dog laughing at our inferiority

**STEAL**

ALM, PINCH, POCKET

**HOME GROOMING**

DRESS, SHAVE, SHOWER

**DAPPER**

SHARP, SMART, TIDY

**\_\_STONE**

, KEY, MILE, TOUCH



# Solving Connections!

BRUSH

PINCH

MILE

SMART

TOUCH

DRESS

SHAVE

KEY

TIDY

POCKET

BIRTH

PALM

NICK

NEAT

SHARP

SHOWER

# *Solving Connections!*

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

# *Solving Connections!*

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

# *Solving Connections!*

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

# *Solving Connections!*

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER



# *Solving Connections!*

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

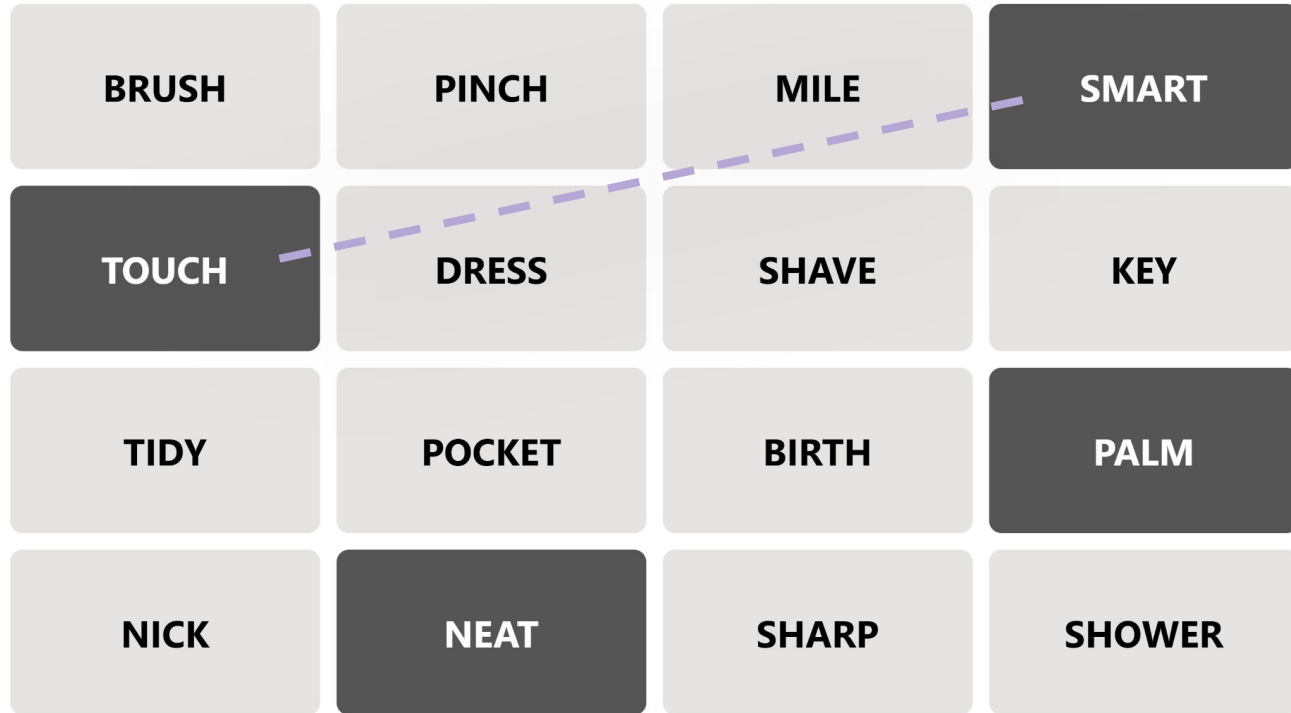
# *Solving Connections!*

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

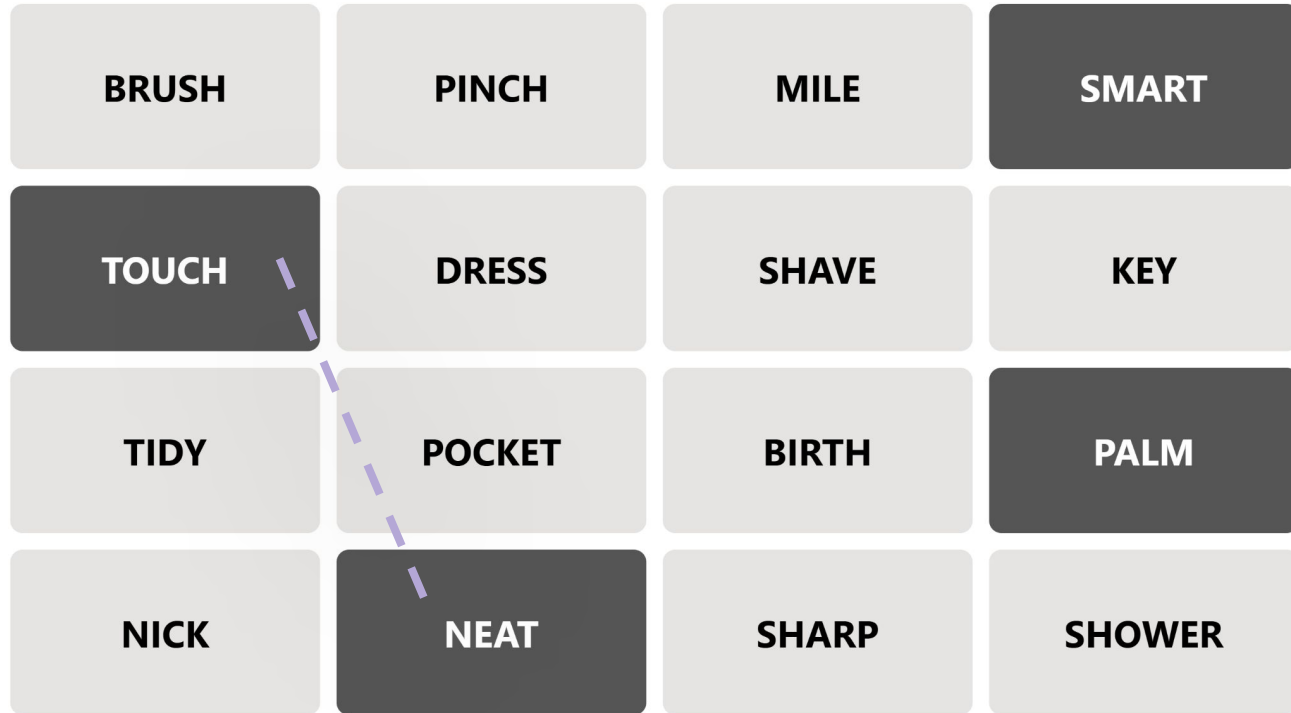
# *Solving Connections!*

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

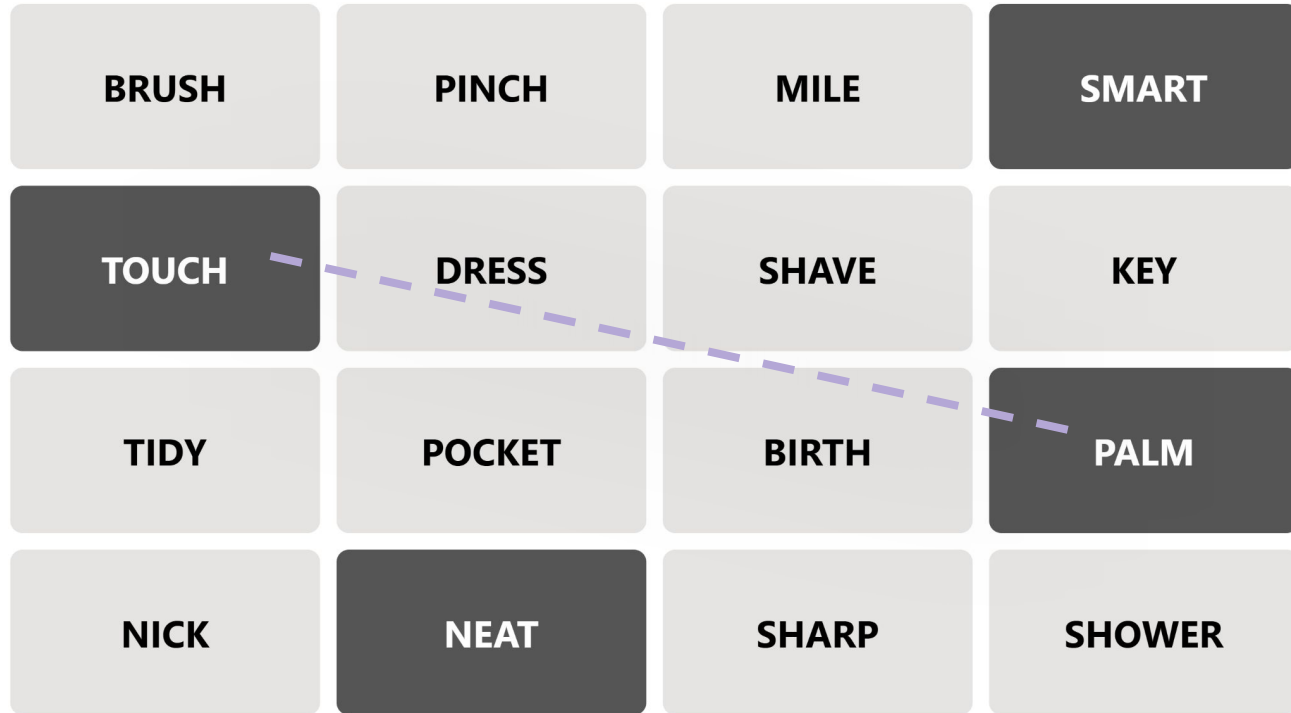
# *Solving Connections!*



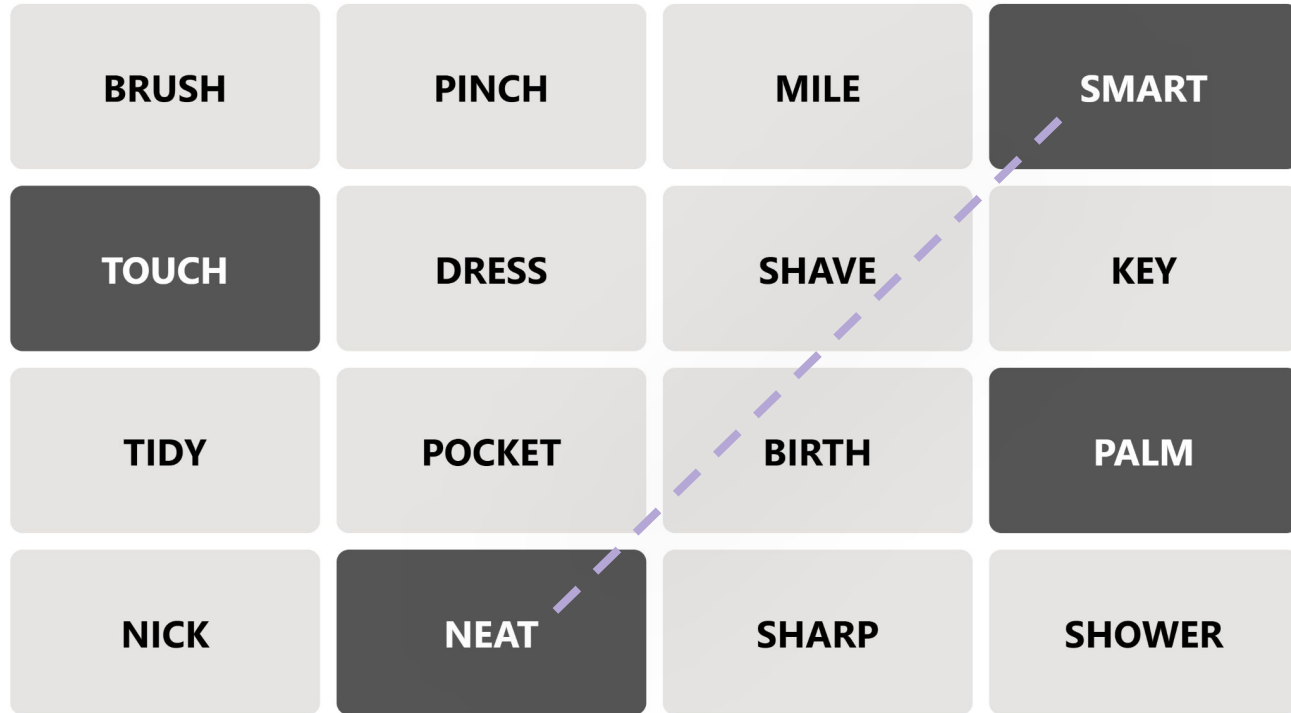
# *Solving Connections!*



# *Solving Connections!*



# *Solving Connections!*



# *Solving Connections!*

**BRUSH**

**PINCH**

**MILE**

**SMART**

**TOUCH**

**DRESS**

**SHAVE**

**KEY**

**TIDY**

**POCKET**

**BIRTH**

**PALM**

**NICK**

**NEAT**

**SHARP**

**SHOWER**



# *Solving Connections!*

## **STEAL**

NICK, PALM, PINCH, POCKET

## **DO SOME GROOMING**

BRUSH, DRESS, SHAVE, SHOWER

## **DAPPER**

NEAT, SHARP, SMART, TIDY

## **\_\_STONE**

BIRTH, KEY, MILE, TOUCH

let's focus on  
this group  
for now!

# *Solving Connections!*



# Solving Connections!

current group:

[ “brush” ]

to form a group, we need four  
similar words.

BRUSH

PINCH

MILE

SMART

TOUCH

DRESS

SHAVE

KEY

TIDY

POCKET

BIRTH

PALM

NICK

NEAT

SHARP

SHOWER

# Solving Connections!

current group:

[ “brush” ]

to form a group, we need four similar words.

if we're given the word “brush”,  
how do we find the word most similar to it?

BRUSH

PINCH

MILE

SMART

TOUCH

DRESS

SHAVE

KEY

TIDY

POCKET

BIRTH

PALM

NICK

NEAT

SHARP

SHOWER

# Solving Connections!

current group:

[ “brush” ]

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

*a quick detour:*

each word can be encoded as a list of a thousand or so numbers correlated with its meaning

this is called its *embedding*!

# Solving Connections!

current group:

[ “brush” ]

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

*a quick detour:*

each word can be encoded as a list of a thousand or so numbers correlated with its meaning

this is called its *embedding*!

“brush” -> [ -0.01645724, 0.00556806,  
-0.01460918, ..., -0.00528129,  
-0.02016928, 0.01229912 ]

# Solving Connections!

current group:

[ “brush” ]

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

*a quick detour:*

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“brush” -> [ -0.01645724, 0.00556806,  
-0.01460918, ..., -0.00528129,  
-0.02016928, 0.01229912 ]

“pinch” -> [ -0.02502958, 0.00547522,  
0.00308219, ..., 0.00761457,  
-0.01443429, 0.00258118 ]

# Solving Connections!

current group:

[ "brush" ]

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

*a quick detour:*

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-0.01460918, ..., -0.00528129,  
-0.02016928, 0.01229912 ]

"pinch" -> [ -0.02502958, 0.00547522,  
0.00308219, ..., 0.00761457,  
-0.01443429, 0.00258118 ]

"Gojo" -> [ 0.00575743, 0.00923347,  
0.00602719, ..., -0.00349531,  
-0.01574622, -0.01466718 ]



rip jogoat and fraudkuna 🙏



# Wait! Where do these numbers come from?!

**Challenge:** We know what we mean by the  
*"meaning of a word or a sentence" ...*

How do we represent this *computationally*?

From Kevin!

# Solving Connections!

current group:

[ "brush" ]

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

*a quick detour:*

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rip jogoat and fraudkuna 🙏

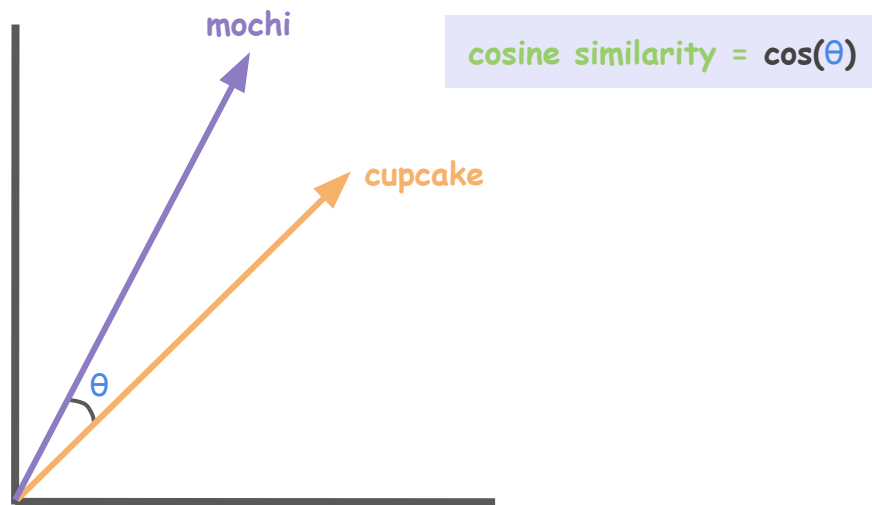
# Solving Connections!

current group:

[ "brush" ]

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

we can now quantify semantic meaning!



computing the cosine of the angle between the vectors of **mochi** and **cupcake** gives us an idea of how similar these two words are!

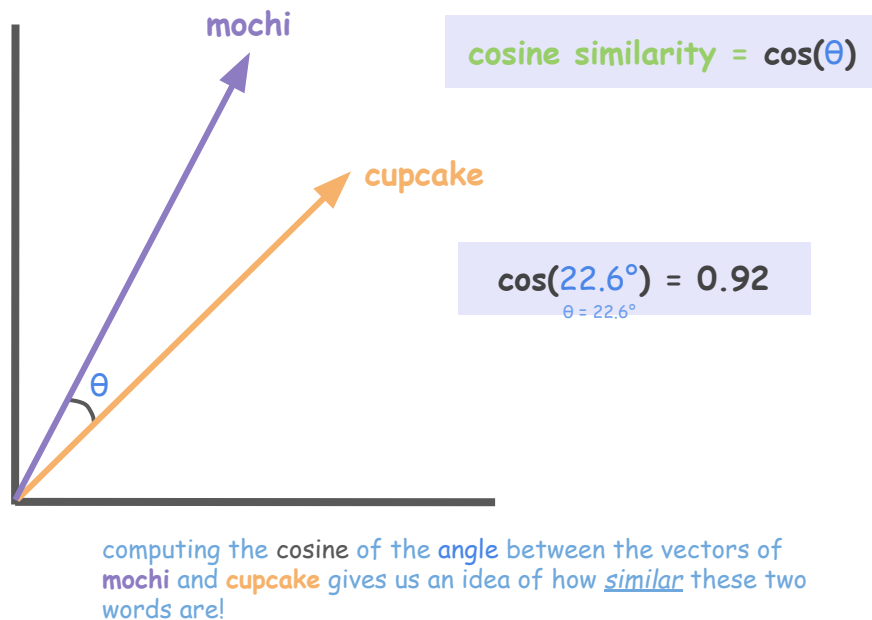
# Solving Connections!

current group:

[ "brush" ]

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
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we can now quantify semantic meaning!



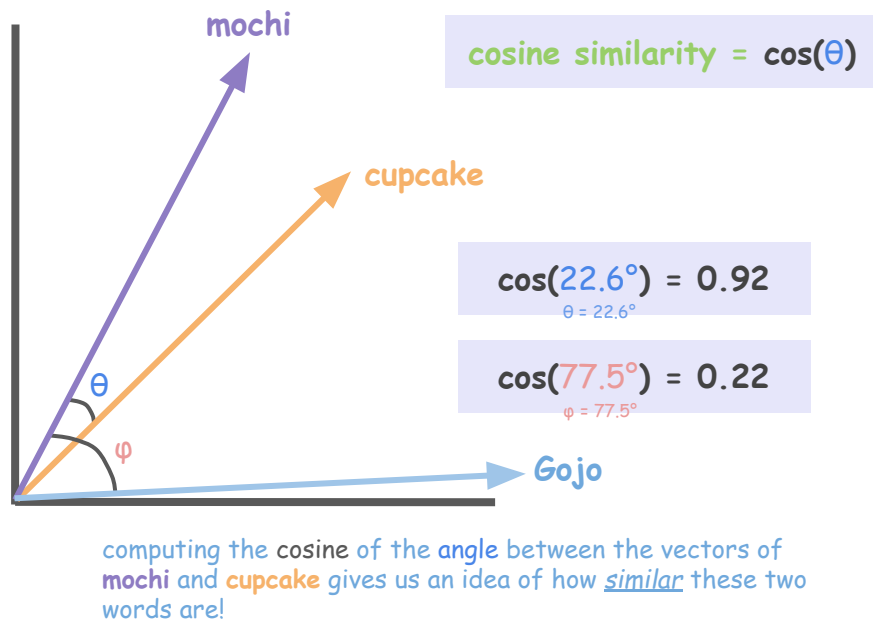
# Solving Connections!

current group:

[ "brush" ]

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

we can now quantify semantic meaning!



# Solving Connections!

`cosine_similarity("brush", every other word)`

current group:

[ "brush" , "shave" ]

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

words closest to *brush*:

1. shave : 0.433187069
2. touch : 0.404343943
3. sharp : 0.395909358
4. dress : 0.391803022
5. palm : 0.370301644
6. tidy : 0.365545869
7. shower : 0.351645449
8. smart : 0.340190449
9. pinch : 0.333210517
10. key : 0.330013010
11. birth : 0.315602717
12. neat : 0.311982945
13. mile : 0.291023022
14. pocket : 0.280039570
15. nick : 0.260040996

# Solving Connections!

*cosine\_similarity("shave", every other word)*

current group:

[ "brush" , "shave" , "shower" ]

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

words closest to shave:

1. shower : 0.443414579
2. sharp : 0.427791720
3. tidy : 0.351318709
4. pinch : 0.345400970
5. neat : 0.331289627
6. palm : 0.326569655
7. dress : 0.325805417
8. pocket : 0.287402062
9. smart : 0.270388154
10. touch : 0.260474996
11. birth : 0.239102507
12. key : 0.221870229
13. nick : 0.216678789
14. mile : 0.215445350

# Solving Connections!

`cosine_similarity("shower", every other word)`

current group:

[ "brush" , "shave" , "shower" , "dress" ]

we've formed a group!

BRUSH	PINCH	MILE	SMART
TOUCH	DRESS	SHAVE	KEY
TIDY	POCKET	BIRTH	PALM
NICK	NEAT	SHARP	SHOWER

words closest to *shower*:

1. **dress** : **0.363065770**
2. pocket : 0.298010453
3. touch : 0.297677139
4. pinch : 0.296881988
5. birth : 0.290482146
6. tidy : 0.286506916
7. sharp : 0.282095871
8. smart : 0.261799253
9. palm : 0.254501245
10. neat : 0.251521963
11. mile : 0.203786344
12. key : 0.188346438
13. nick : 0.186536711



# Solving Connections!

`cosine_similarity("shower", every other word)`

current group:

[ "brush" , "shave" , "shower" , "dress" ] 🌟

we've formed a group!

## DO SOME GROOMING

BRUSH, DRESS, SHAVE, SHOWER

PINCH

MILE

SMART

TOUCH

KEY

TIDY

POCKET

BIRTH

PALM

NICK

NEAT

SHARP

words closest to *shower*:

1. **dress** : **0.363065770**
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10. neat : 0.251521963
11. mile : 0.203786344
12. key : 0.188346438
13. nick : 0.186536711

# Solving Connections!

*we continue this process until we have four groups of four...*

**DO SOME GROOMING**  
BRUSH, DRESS, SHAVE, SHOWER

**PINCH**

**MILE**

**SMART**

**TOUCH**

**KEY**

**TIDY**

**POCKET**

**BIRTH**

**PALM**

**NICK**

**NEAT**

**SHARP**

# Solving Connections!

how does our greedy heuristic fair?

brush	shave	shower	dress
nick	sharp	smart	neat
pocket	pinch	touch	palm
tidy	key	birth	mile

## STEAL

NICK, PALM, PINCH, POCKET

## DO SOME GROOMING

BRUSH, DRESS, SHAVE, SHOWER

## DAPPER

NEAT, SHARP, SMART, TIDY

## STONE

BIRTH, KEY, MILE, TOUCH

# Solving Connections!

how does a refined (?!) greedy heuristic fair?

+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+
	brush		shave		sharp		smart									
+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+
+	dress		shower		touch		pinch									
+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+
+	nick		key		neat		tidy									
+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+
+	pocket		palm		mile		birth									
+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-	+

## STEAL

NICK, PALM, PINCH, POCKET

## DO SOME GROOMING

BRUSH, DRESS, SHAVE, SHOWER

## DAPPER

NEAT, SHARP, SMART, TIDY

## —STONE

BIRTH, KEY, MILE, TOUCH

# Solving Connections!

how does a beam search algorithm fair?



+-----+-----+-----+-----+	
palm   pocket   pinch   touch	
+-----+-----+-----+-----+	
+-----+-----+-----+-----+	
shave   brush   shower   dress	
+-----+-----+-----+-----+	
+-----+-----+-----+-----+	
tidy   smart   neat   sharp	
+-----+-----+-----+-----+	
+-----+-----+-----+-----+	
birth   nick   key   mile	
+-----+-----+-----+-----+	

## STEAL

NICK, PALM, PINCH, POCKET

## DO SOME GROOMING

BRUSH, DRESS, SHAVE, SHOWER

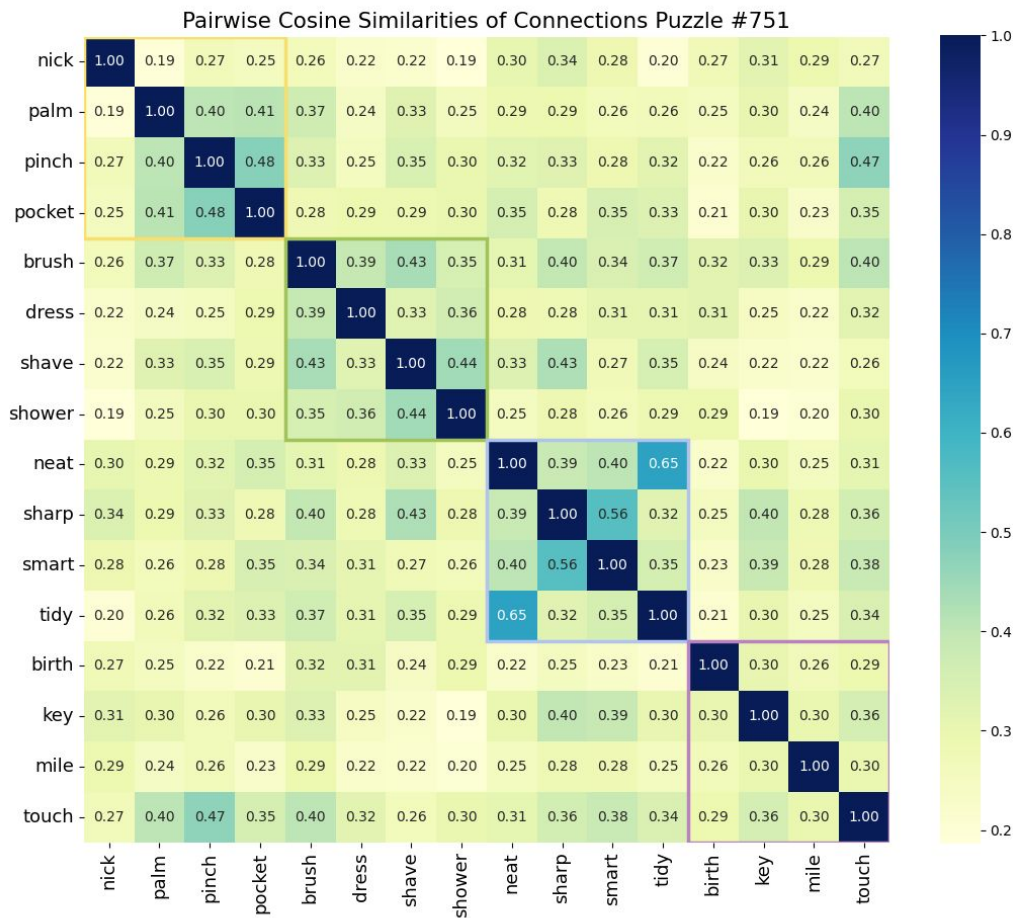
## DAPPER

NEAT, SHARP, SMART, TIDY

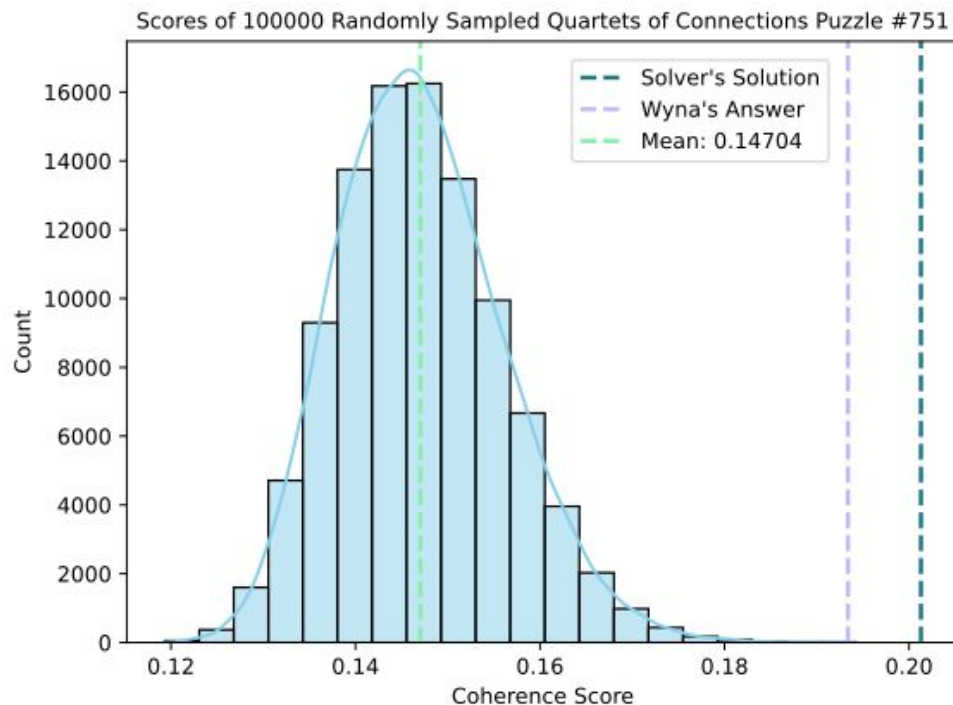
## \_\_\_STONE

BIRTH, KEY, MILE, TOUCH

# Solving Connections!



# Solving Connections!



# *Solving Connections!*

## **GATHERING SPOT OUTSIDE A RESIDENCE**

DECK, PORCH, STOOP, YARD

## **LOWDOWN**

DISH, DOPE, INFO, SCOOP

## **KINDS OF REELS**

BLOOPER, DEMO, HIGHLIGHT, SIZZLE

**DROOP**

**GOOF**

**SNOOP**

**LAD**