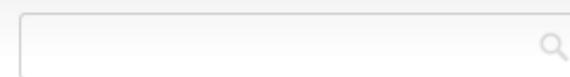


BETTING THE COMPANY (AGAIN?!) ON A GRAPH DATABASE

THE STORY CONTINUED...

Aseem Kishore
Oct 2014



What's in yours?

Share what you **have** and **want**. See what your friends **have** and **want**.

[Enter The Thingdom](#)

Identity

- » **Passionate about photography?** Show off your gear here.
- » **Love collecting movies?** Catalog your DVDs and Blu-Rays here.
- » **Hardcore gamer? (Either kind.)** List your must-haves here.

Utility

- » **Birthday coming up?** Give or get the perfect gift, without guesswork.
- » **Looking to buy?** Ask others what they think, and try before you buy.
- » **In a dorm or apartment?** Swap and share with friends and neighbors.

Fun

- » **Love online shopping?** Invite your friends and make it a party.
- » **Born to compete?** Prove you're the expert among your crew.
- » **Believe in serendipity?** Explore around and experience it for yourself.

The Thingdom

Photography [« back to everything](#)

Daniel Gasienica
@gasi

✓ Following

Profile Wall Recent Activity

155 Things 105 Haves 50 Wants

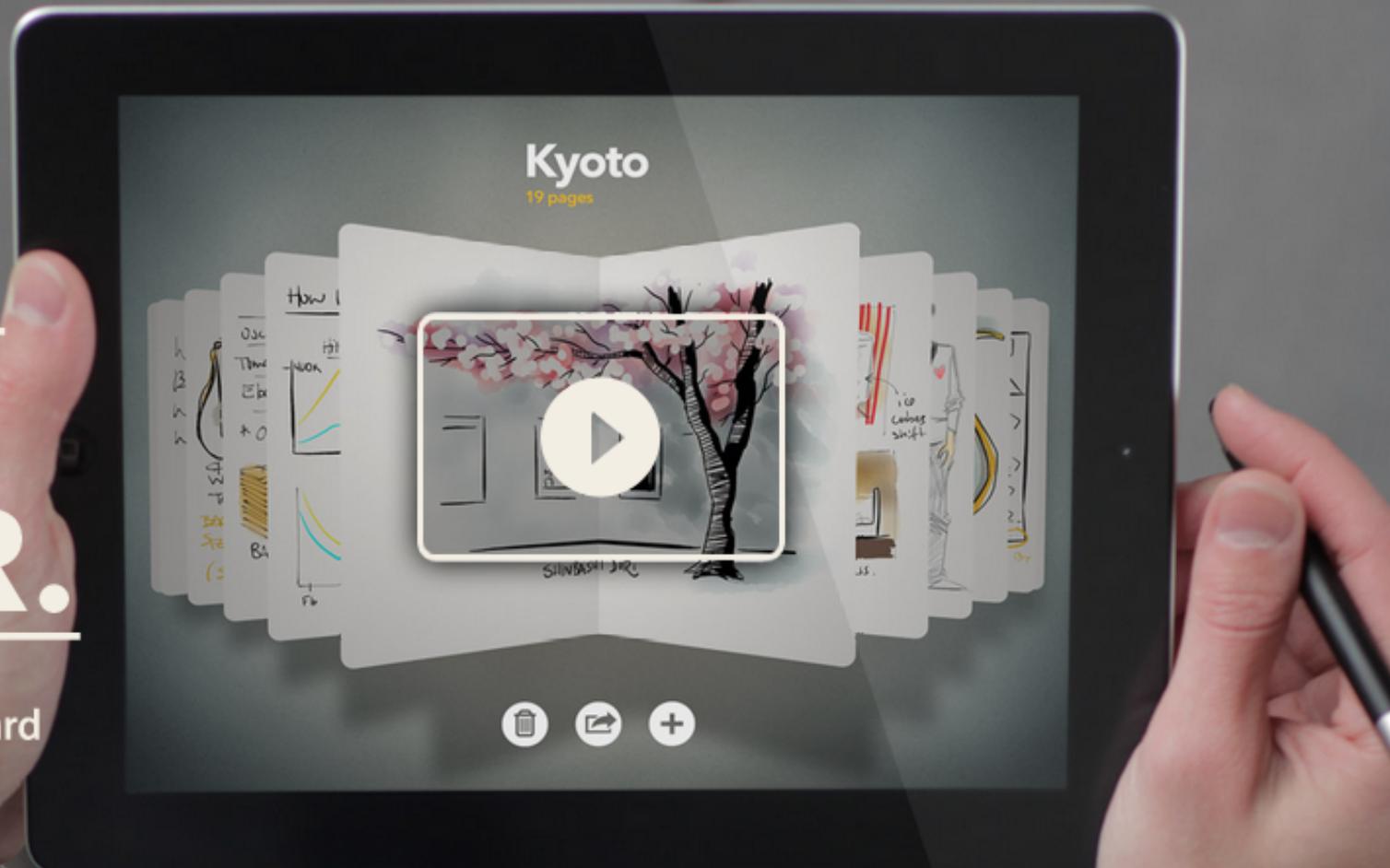


IDEAS
BEGIN
ON
PAPER.

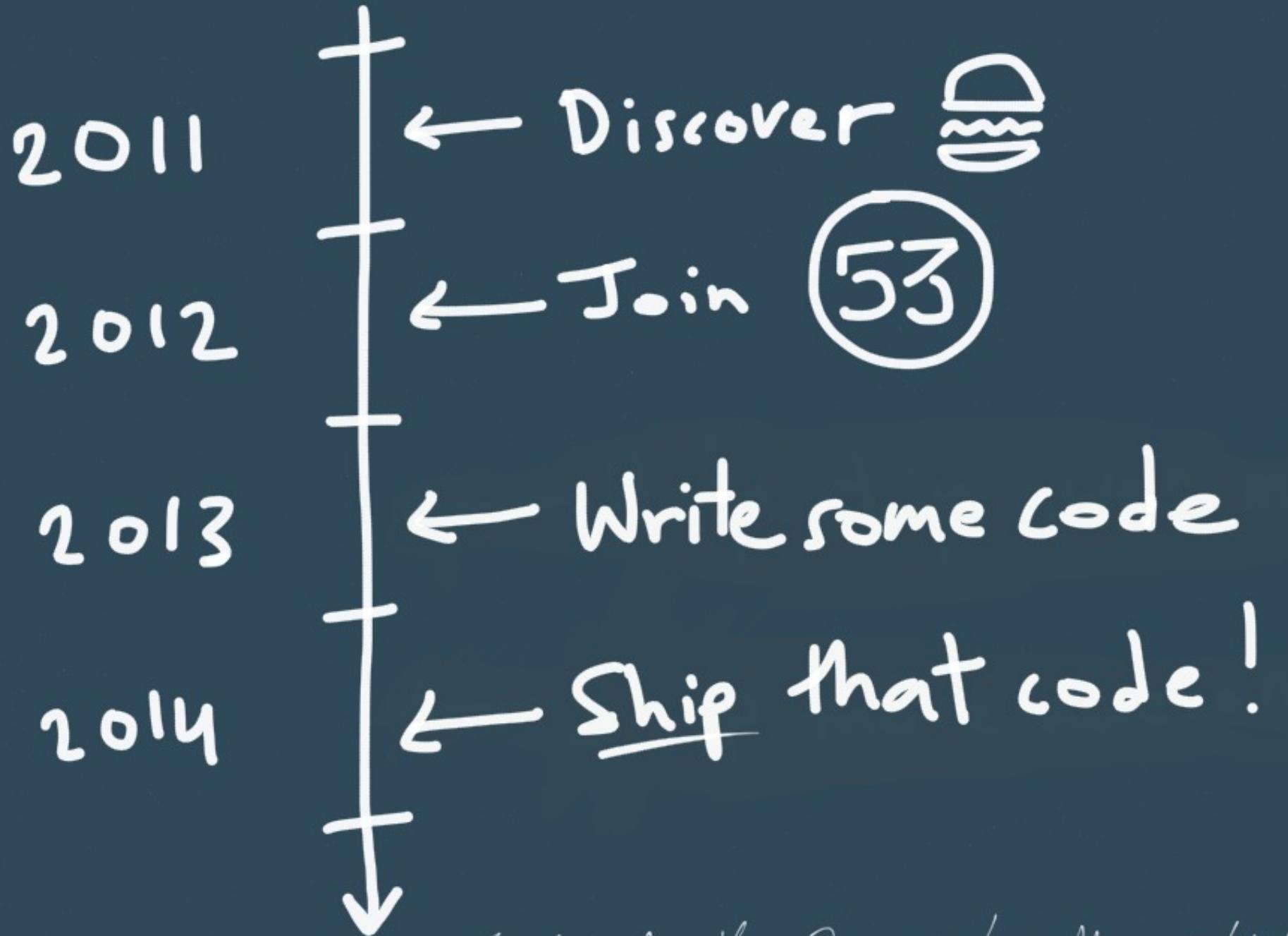


Apple Design Award
iPad Developer Showcase
2012 Winner

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Bacon
Maple
Donut

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.CREATE TOGETHER.

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Mobile

Color palette: red, blue, purple, pink, grey, white.

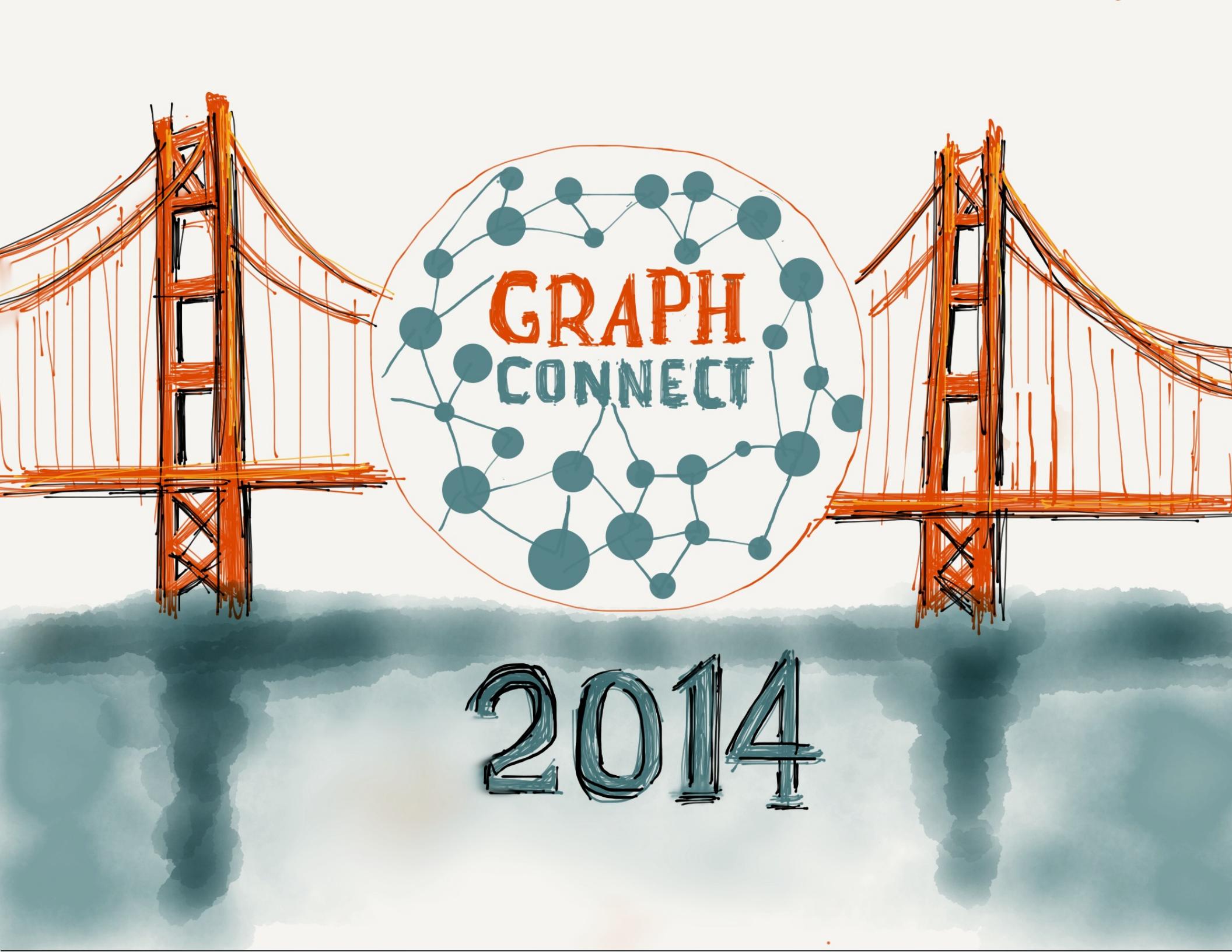
Art tools: paintbrushes, pencils, pens.

...reloading people
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the world, there is a demand for
more stringent voter ID laws.

MIX ❤️ GRAPHS

BRINGING IDEAS TOGETHER



GRAPH CONNECT

2014





GRAPH
CONNECT



2014

MIX ❤️ NE04J



No



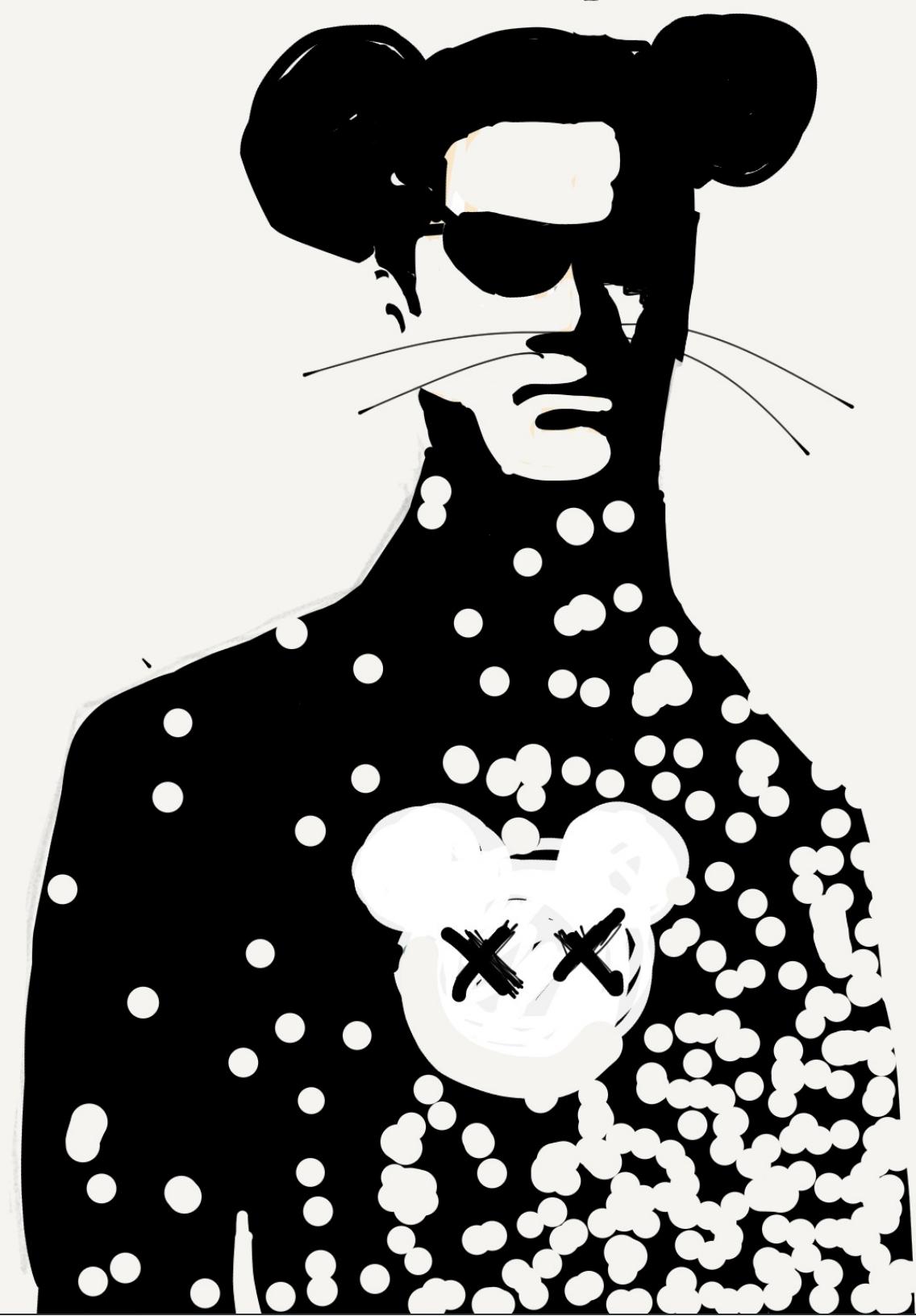














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MIX ❤️ GRAPHS

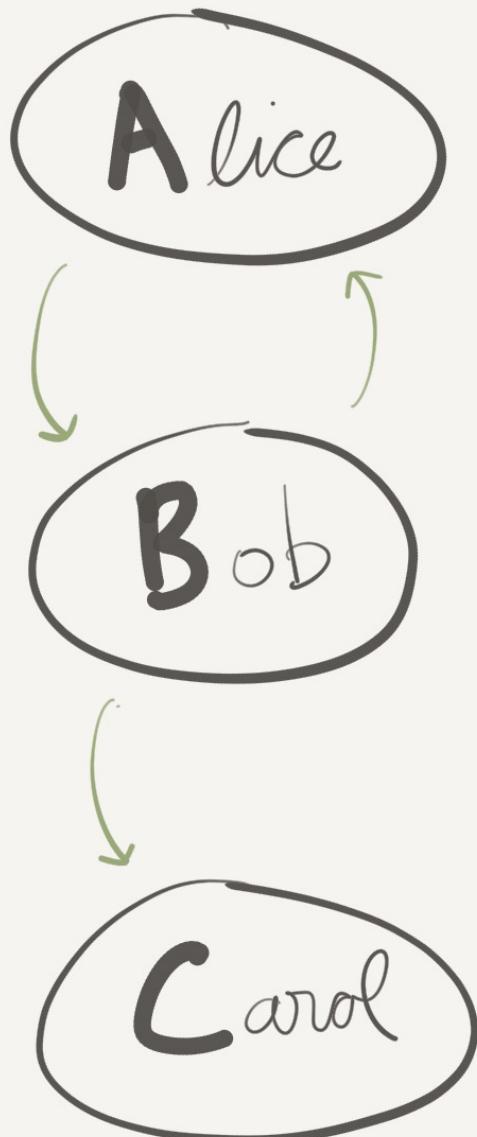
Alice

Bob

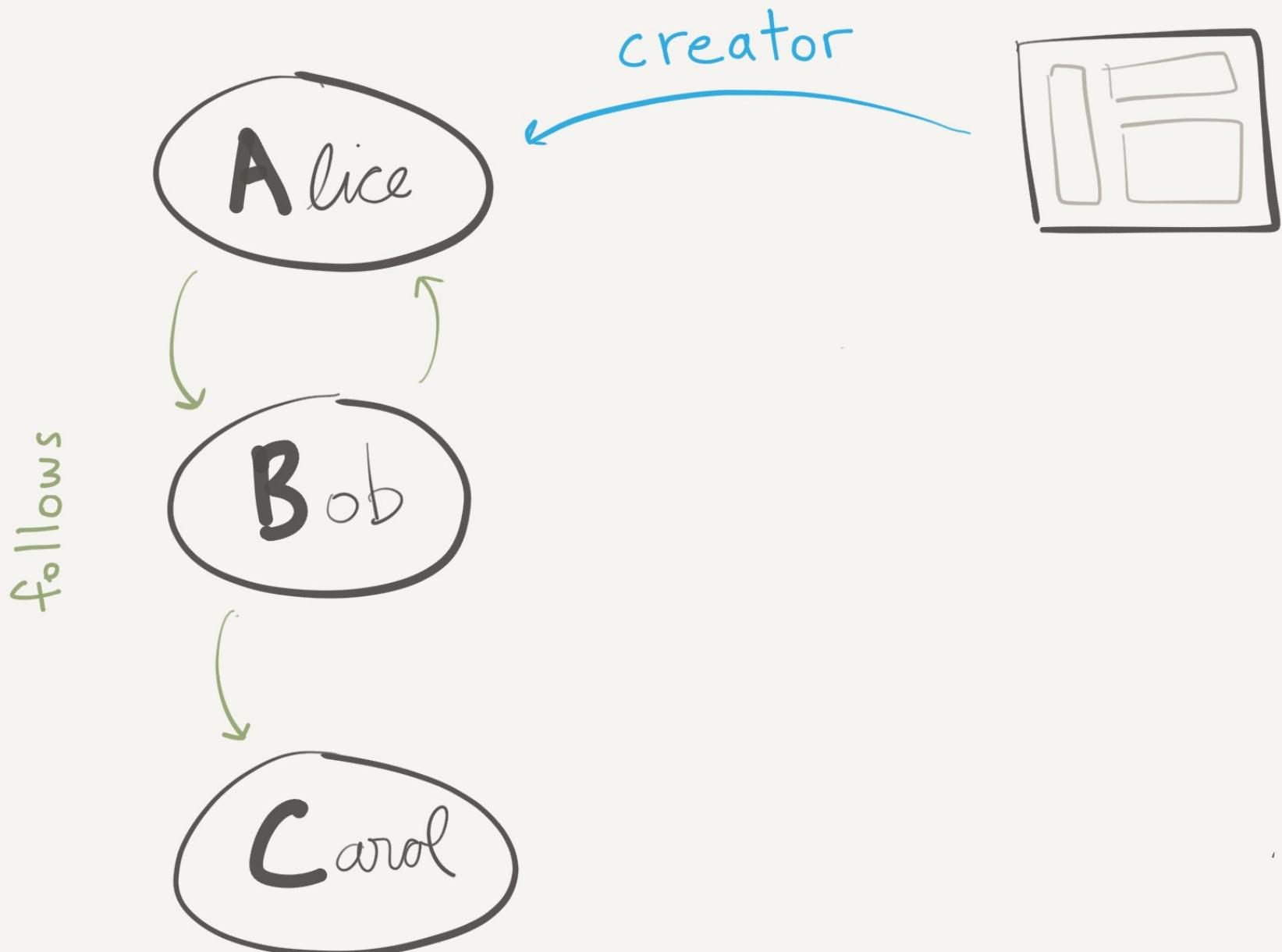
Carol

MIX ❤️ GRAPHS

follows

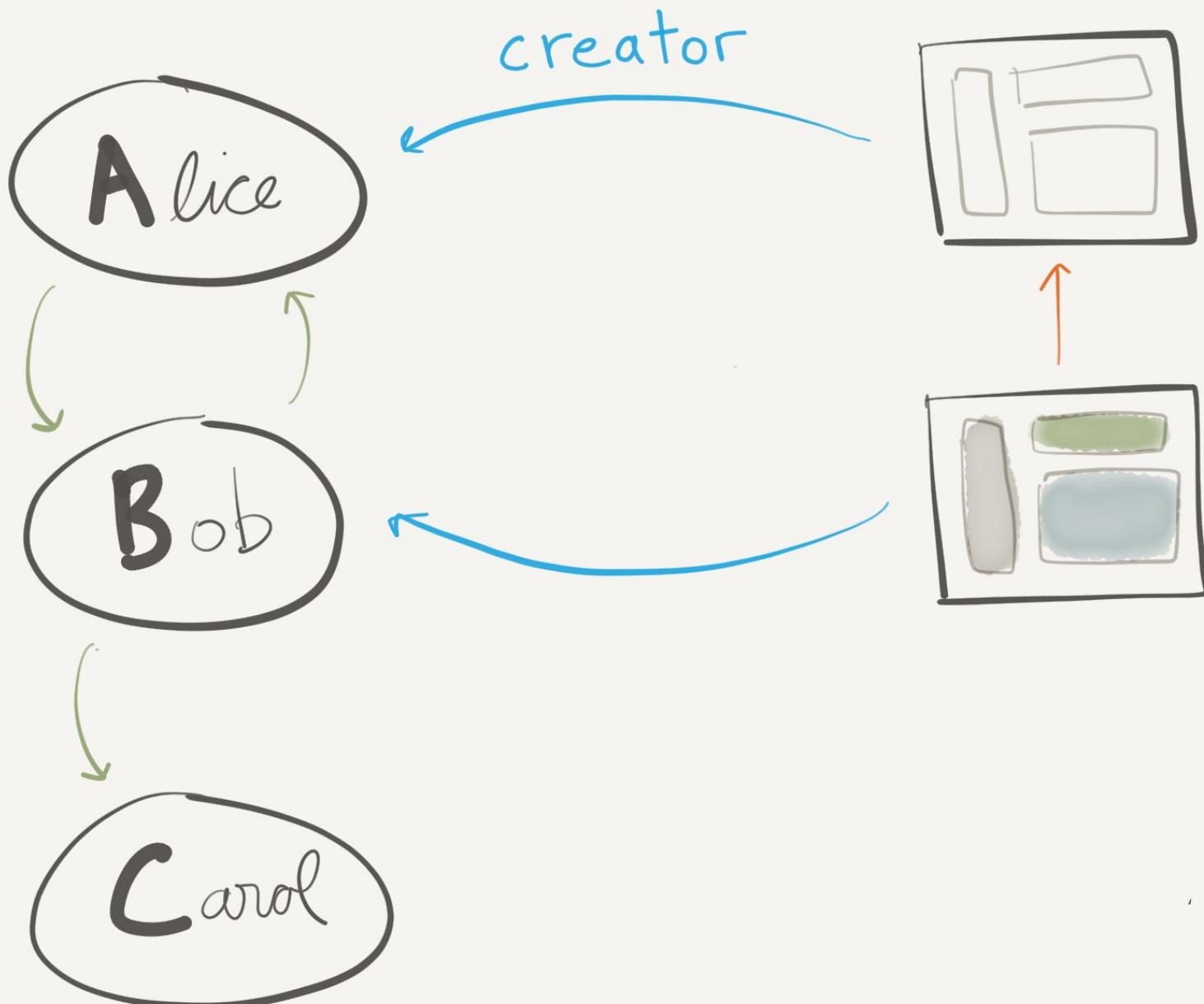


MIX ❤️ GRAPHS



MIX ❤️ GRAPHS

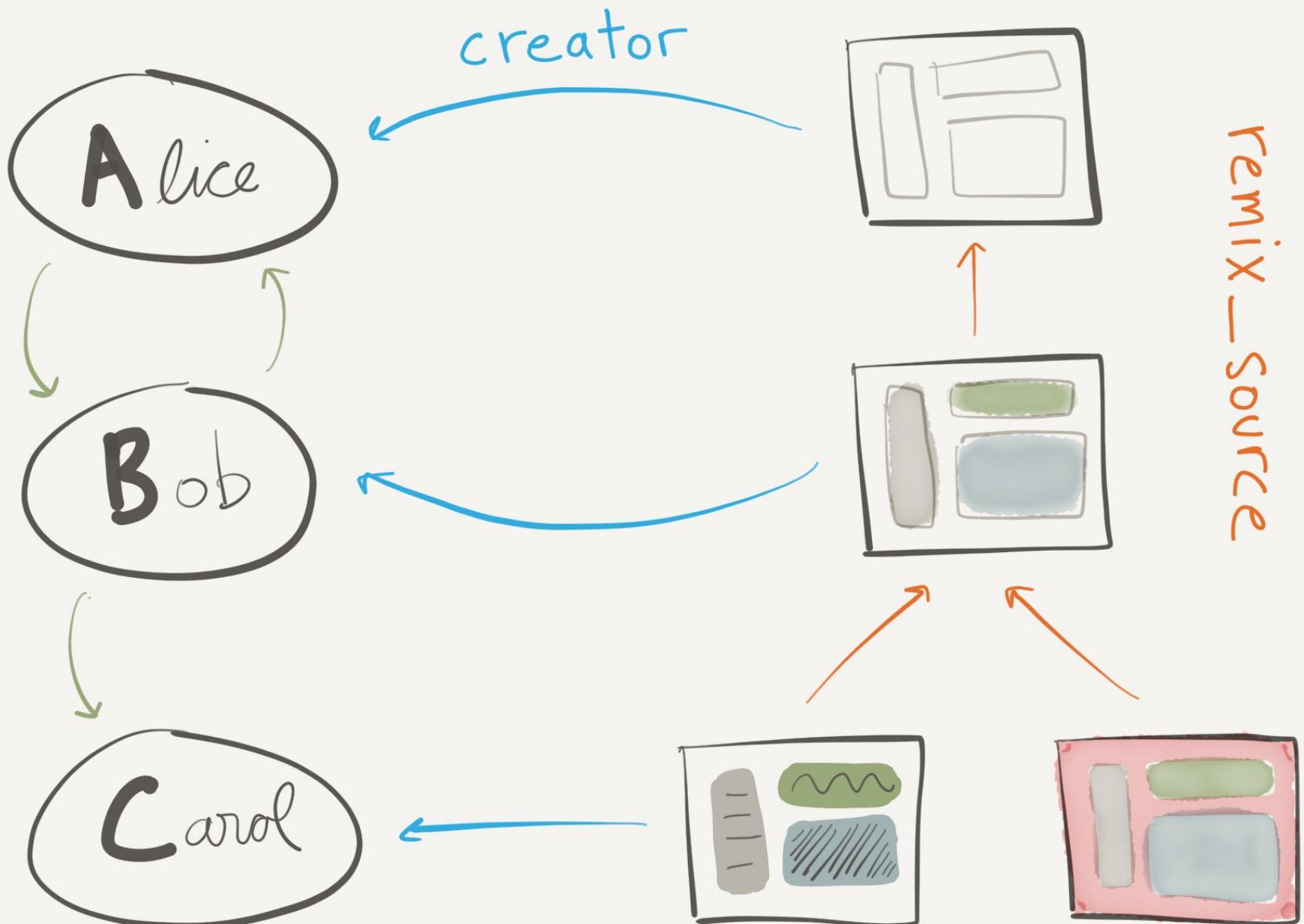
follows



remix - source

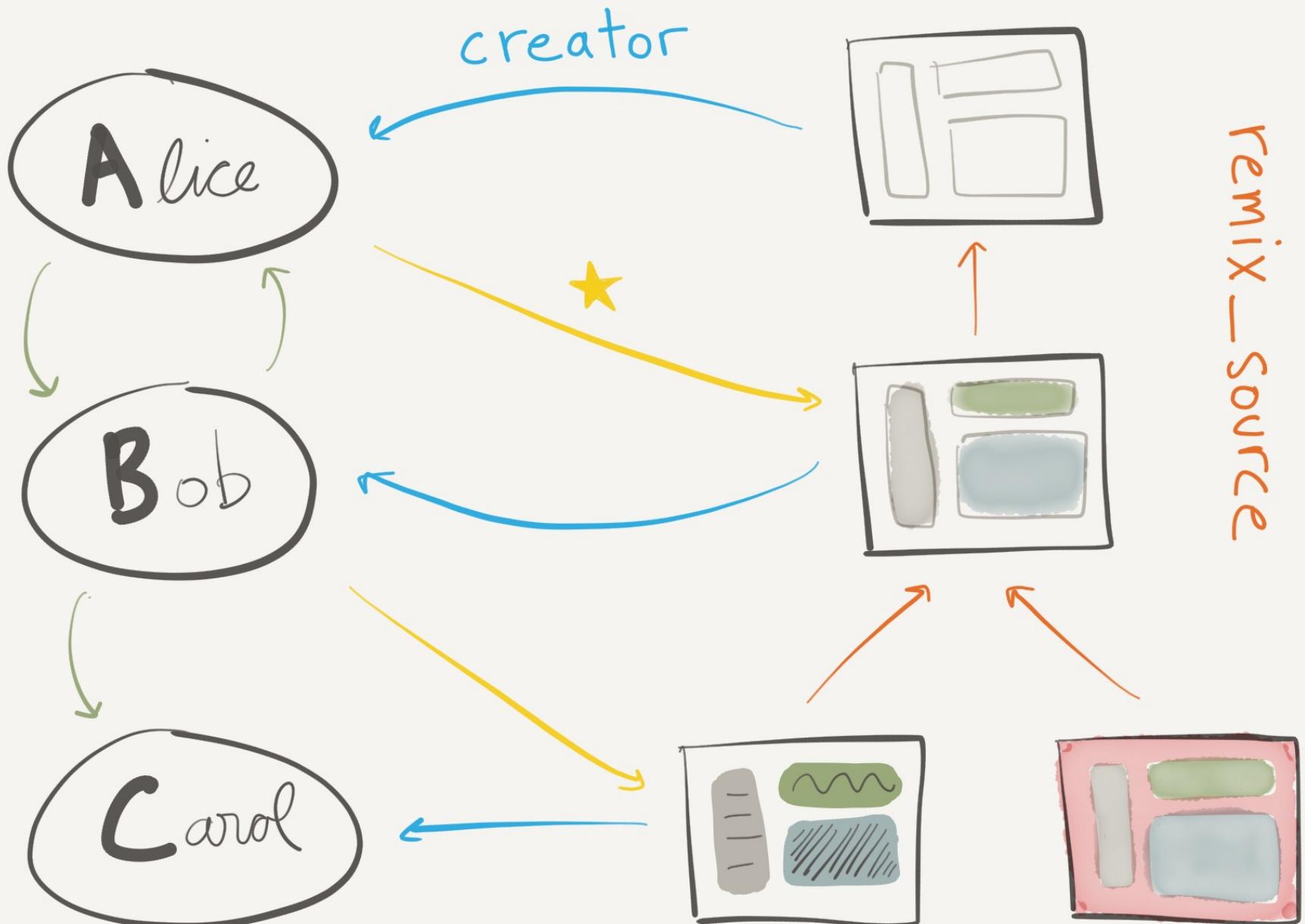
MIX ❤️ GRAPHS

follows



MIX ❤️ GRAPHS

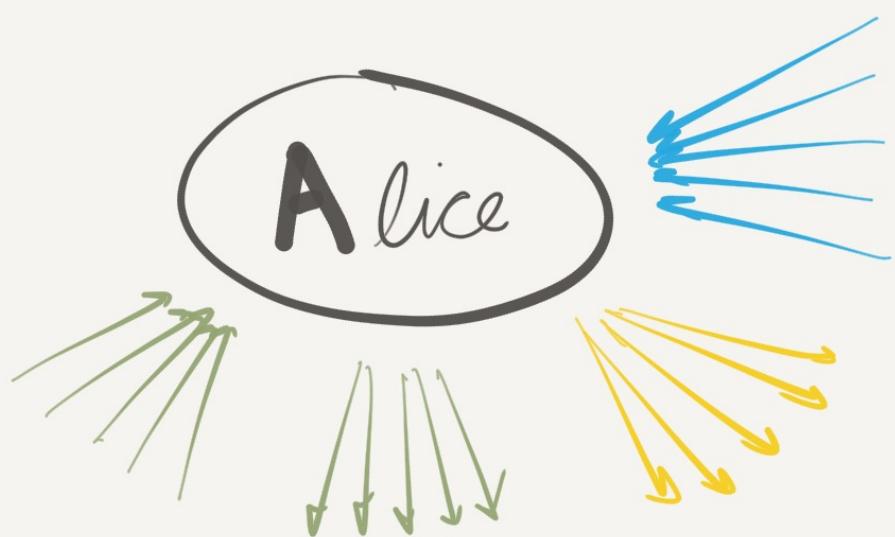
follows



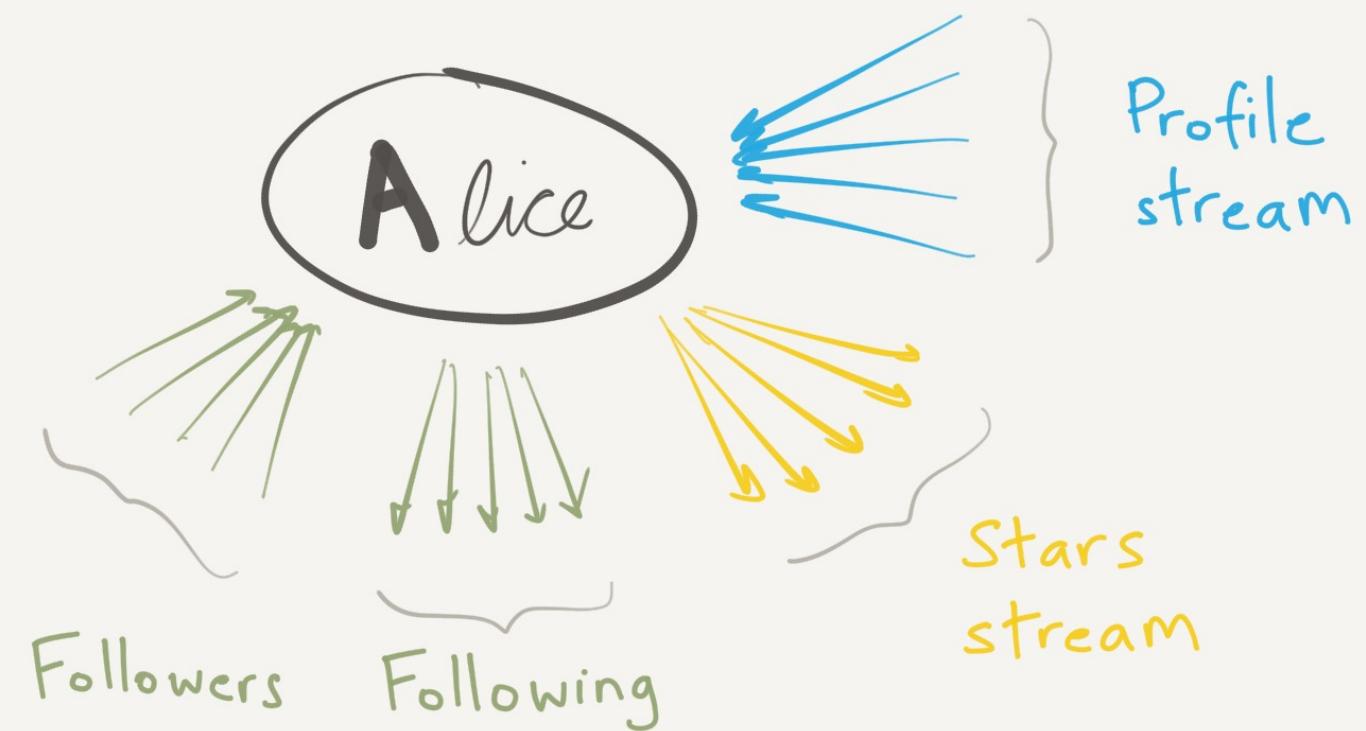
MIX ❤️ GRAPHS



MIX ❤️ GRAPHS



MIX ❤️ GRAPHS



STREAMS

```
MATCH (me:User {id: {id}})  
MATCH (me) <-[ :creator]- (creation)  
  
RETURN creation
```

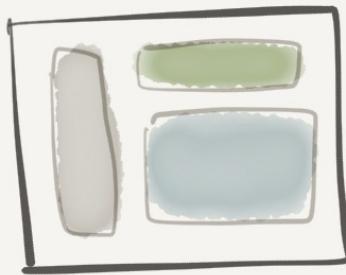
PAGINATION (BAD)

```
MATCH (me:User {id: {id}})  
MATCH (me) <-[ :creator]- (creation)  
  
RETURN creation  
ORDER BY creation.createdAt DESC  
SKIP {count} * {page - 1}  
LIMIT {count}
```

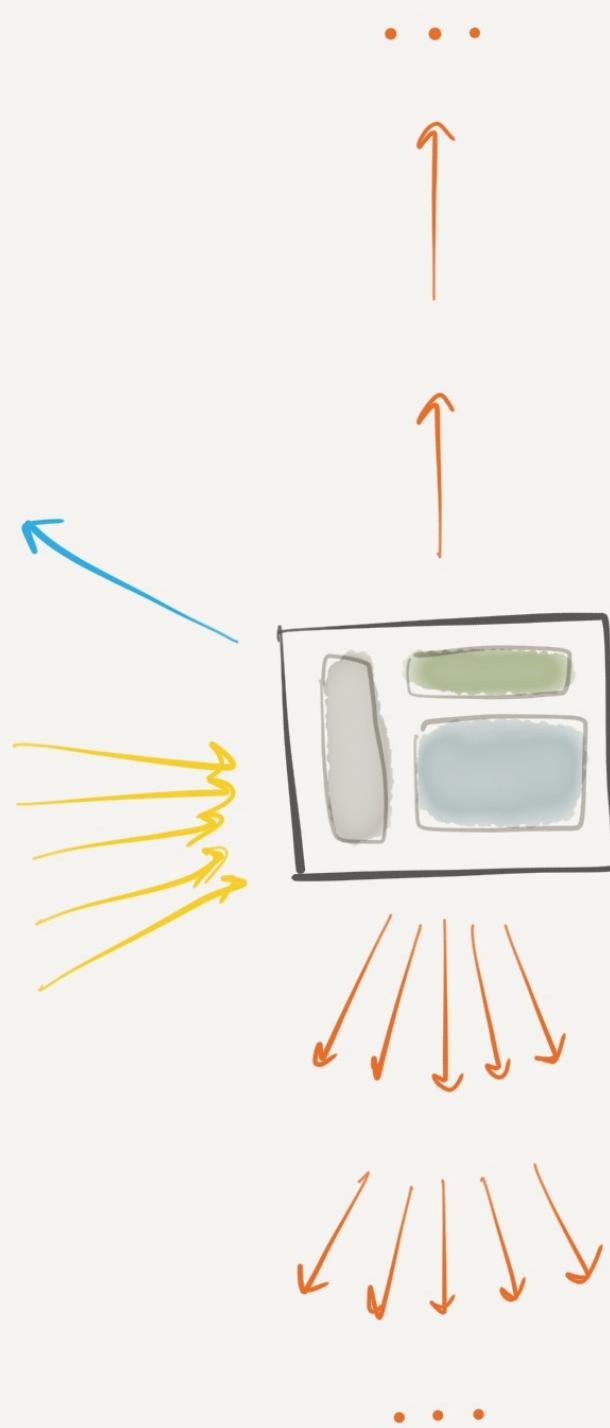
PAGINATION (GOOD)

```
MATCH (me:User {id: {id}})  
MATCH (me) <-[ :creator]- (creation)  
  
WHERE creation.createdAt < {cursorTime}  
RETURN creation  
ORDER BY creation.createdAt DESC  
LIMIT {count}
```

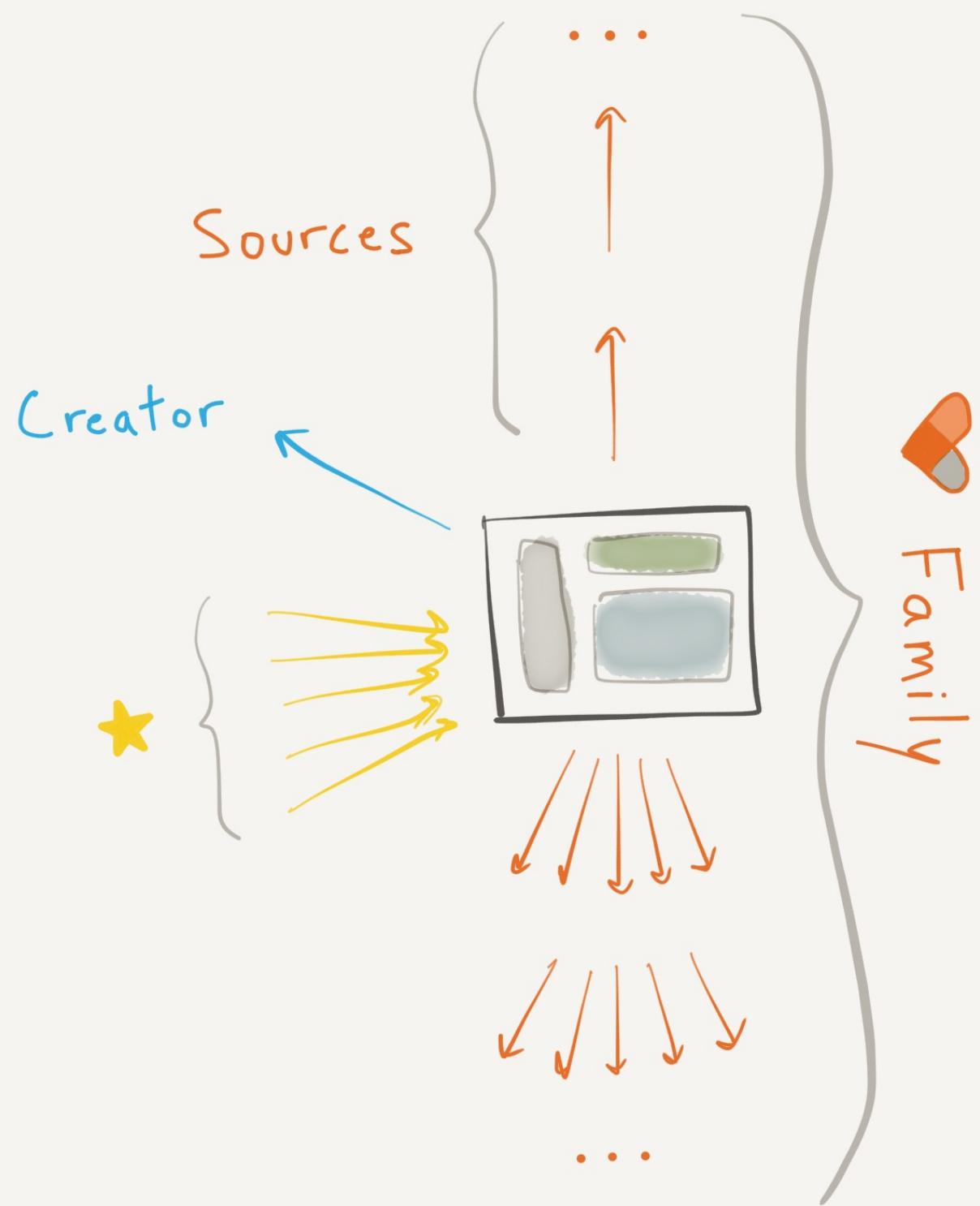
MIX ❤️ GRAPHS



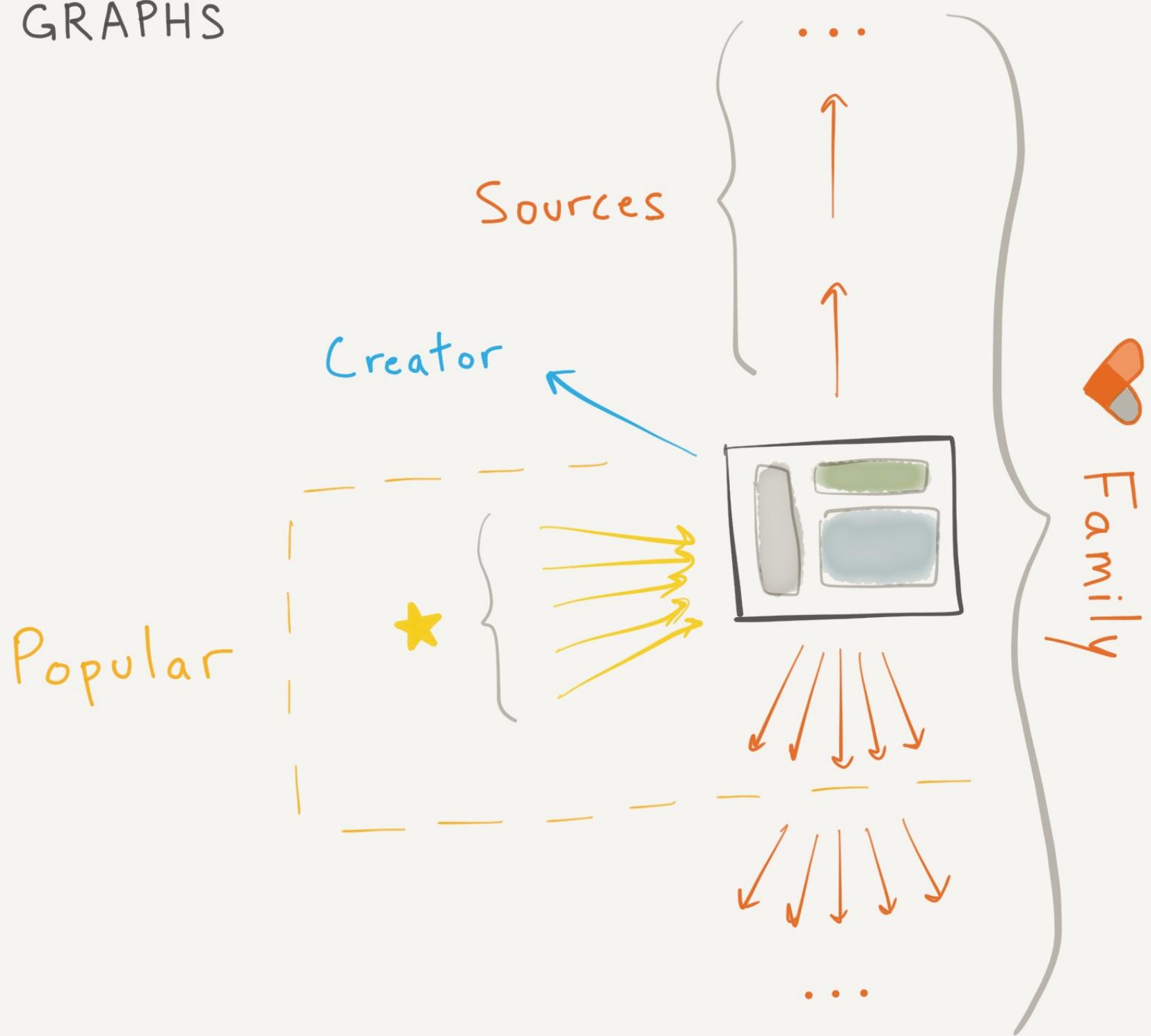
MIX ❤️ GRAPHS



MIX ❤️ GRAPHS



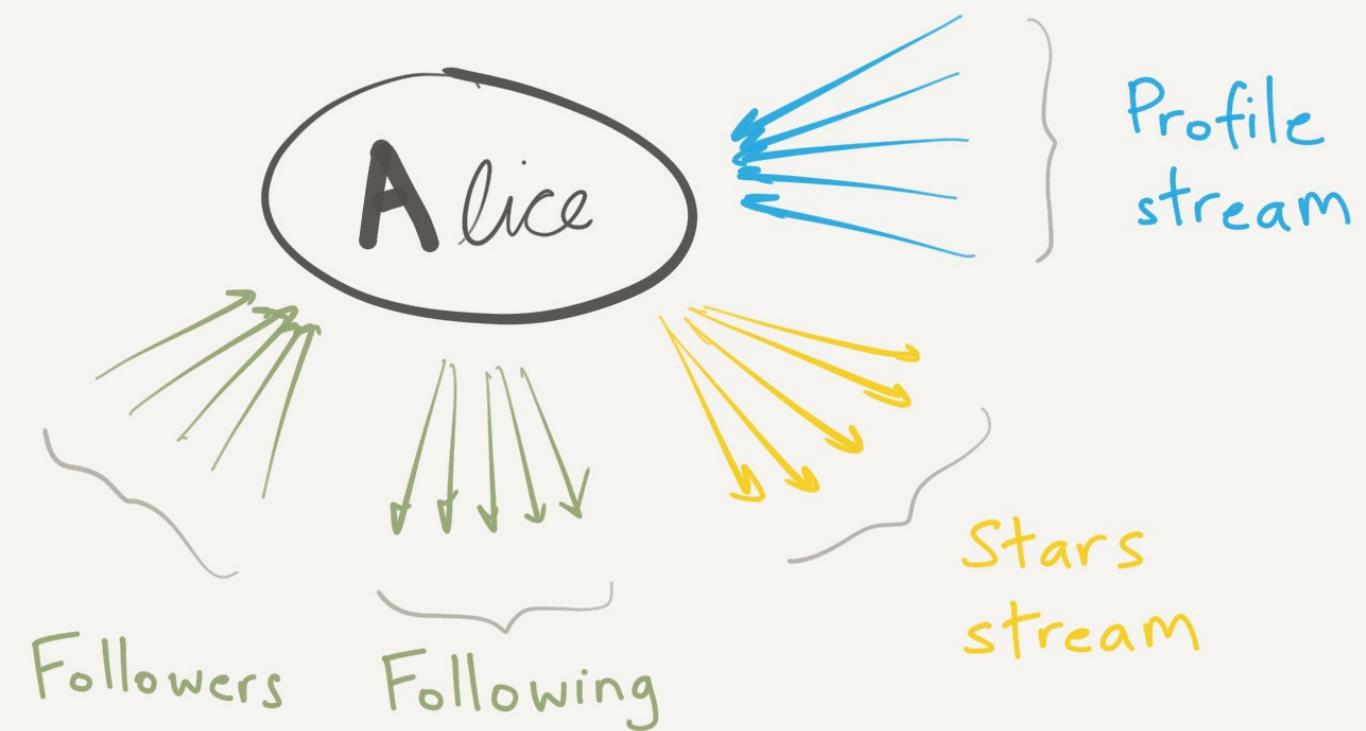
MIX ❤️ GRAPHS



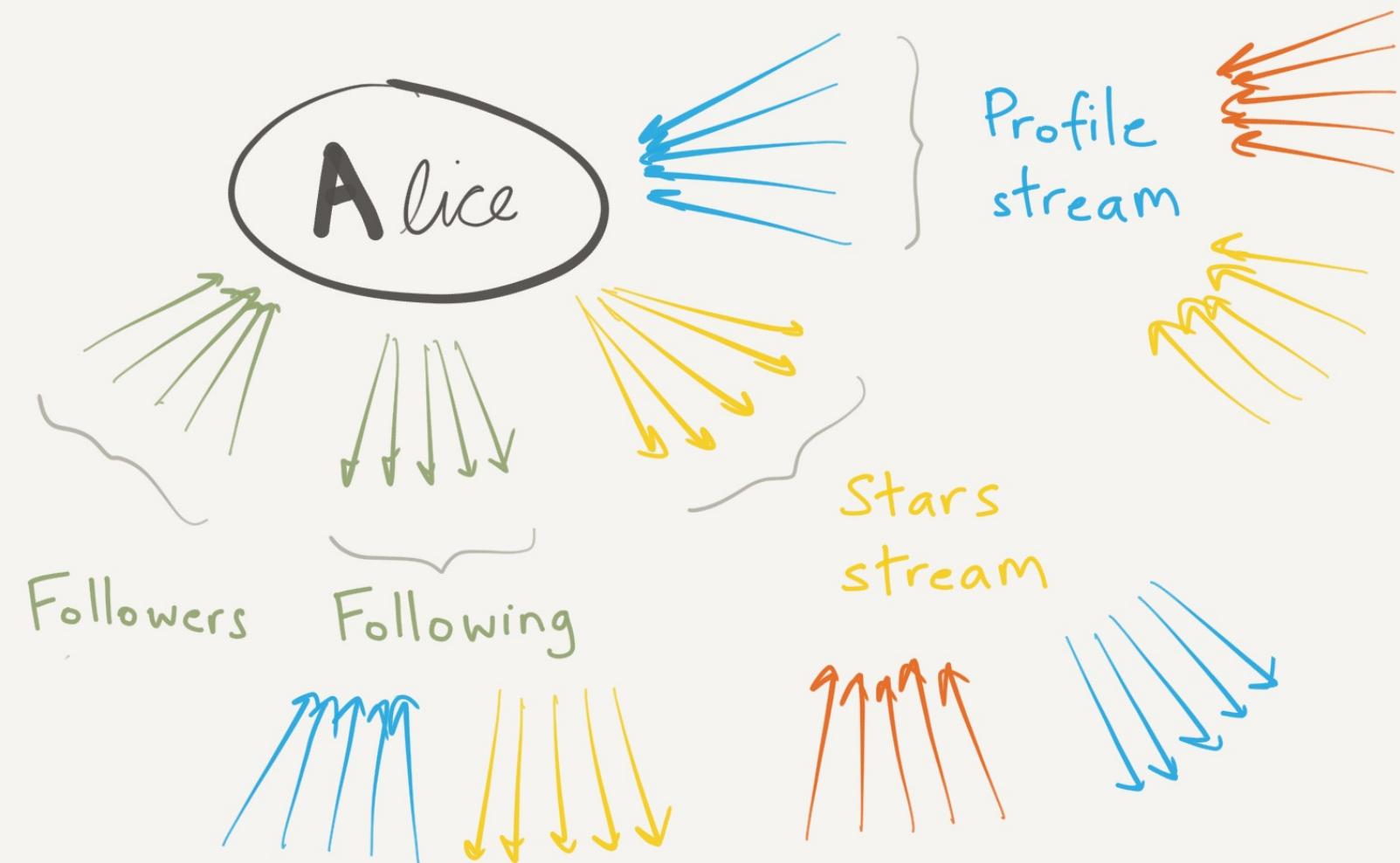
REMIX FAMILIES

```
MATCH (c:Creation {id: {id}})  
MATCH (c) -[ :remix_source*0.. ]- (relative)  
  
WHERE relative.createdAt < {cursorTime}  
RETURN relative  
ORDER BY relative.createdAt DESC  
LIMIT {count}
```

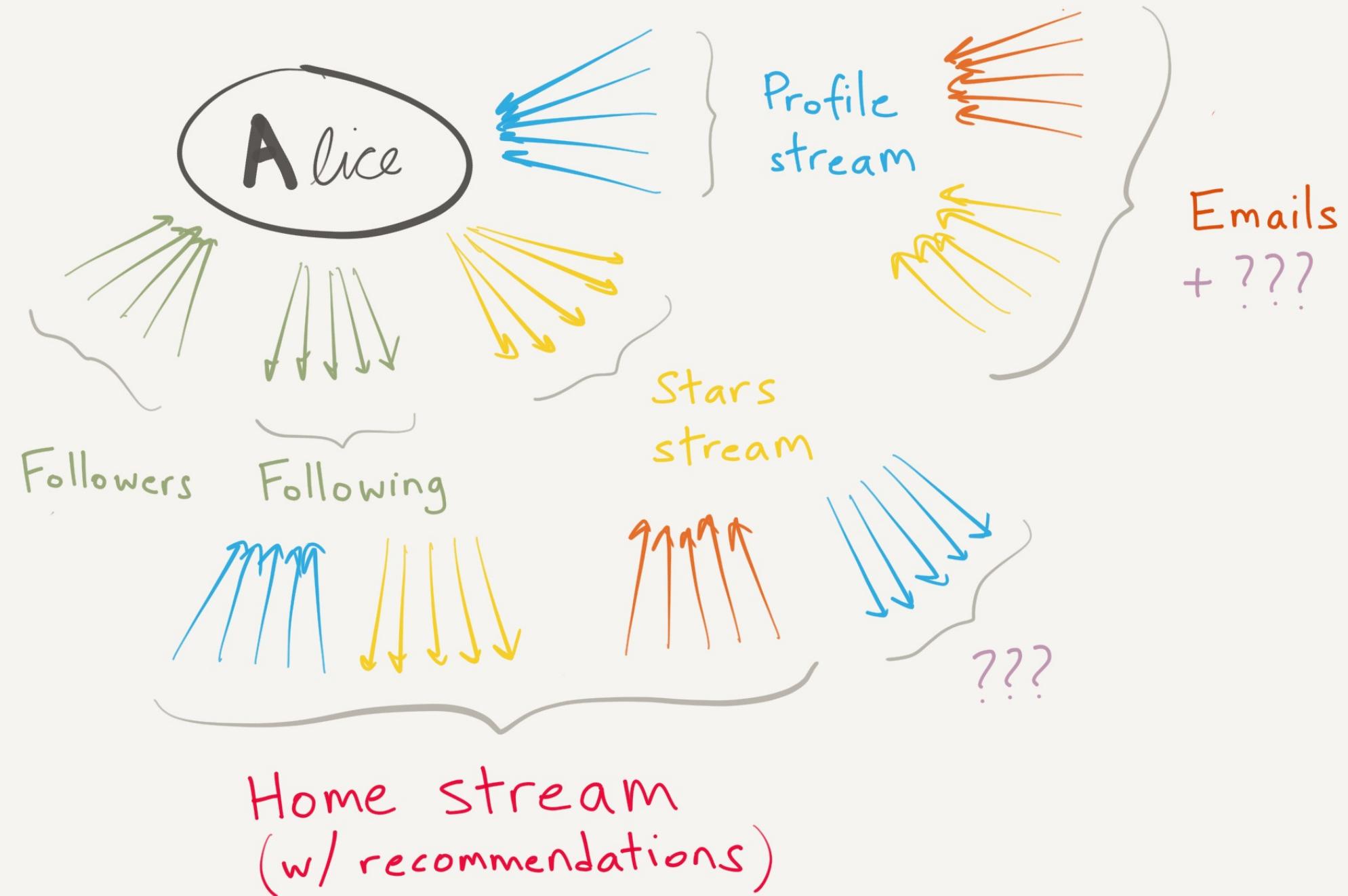
MIX ❤️ GRAPHS



MIX ❤️ GRAPHS



MIX ❤️ GRAPHS



HOME STREAM 1

```
MATCH (me:User {id: {id}})  
MATCH (me) -[:follows]-> (f) <-[:creator]- (creation)  
  
WHERE creation.createdAt < {cursorTime}  
RETURN creation  
ORDER BY creation.createdAt DESC  
LIMIT {count}
```

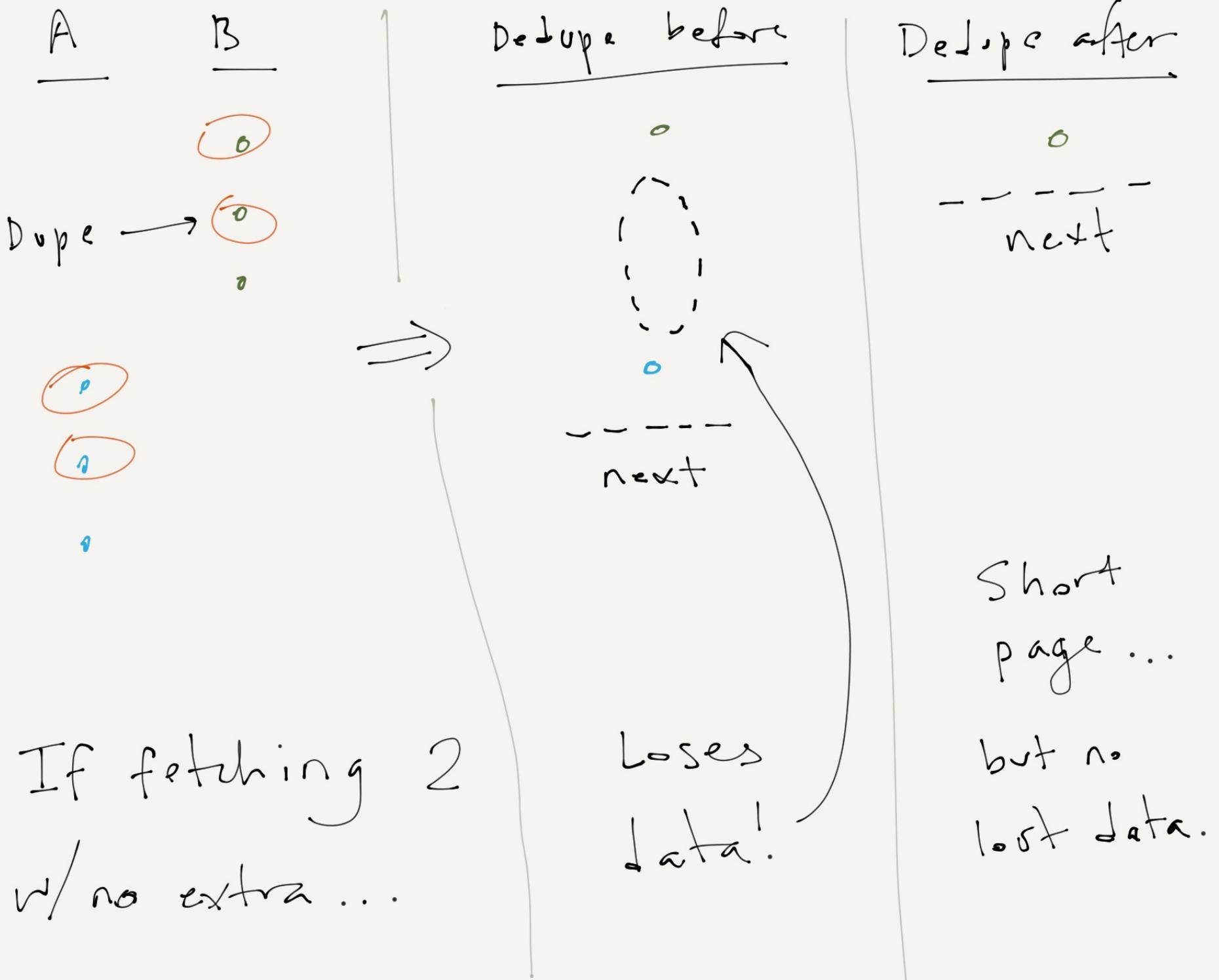
HOME STREAM 2

```
MATCH (me:User {id: {id}})  
MATCH (me) -[:follows]-> (f) -[star:starred]-> (creation  
  
WITH creation, star  
ORDER BY star.createdAt  
WITH creation, HEAD(COLLECT(star)) AS star  
  
WHERE star.createdAt < {cursorTime}  
RETURN creation, star.createdAt AS _starredAt  
ORDER BY _starredAt DESC  
LIMIT {count}
```

HOME STREAM 3

```
MATCH (me:User {id: {id}})  
MATCH (me) -[:starred]-> (c) <-[:remix_source*]- (remix)  
  
WHERE remix.createdAt < {cursorTime}  
RETURN DISTINCT remix  
ORDER BY remix.createdAt DESC  
LIMIT {count}
```

UNION?





Cypher feature request: post-UNION processing #2725

[Edit](#)[New Issue](#)[! Open](#)

aseemk opened this issue on Jul 22 · 4 comments

aseemk commented on Jul 22

Related to issue #1879, but I'd like to ask for more holistic and general support for post-UNION processing, not just limiting/skipping/ordering.

One way to look at it is very much like a `WITH` clause. Perhaps `UNION WITH` would thus be a good name for it, or maybe `UNION RESULT` to convey that you're now acting on the entire union'ed result.

Our major use case is aggregating a stream of content, where that content is queried in different ways. The important point is: we want to process the content *after* aggregation, not *before*. Without this ability with today's `UNION`, we're less efficient in some cases, and outright buggy in others.

To avoid making this description too long, I'll post an example of the problem in a comment, as well as a proposed syntax in another comment.

aseemk commented on Jul 22

Here's an example:

<http://console.neo4j.org/r/dmetem>

This example shows a simple Twitter-like setup:

Labels

None yet

Milestone

No milestone

Assignee

No one assigned

Notifications [Unsubscribe](#)

You're receiving notifications because you authored this thread.

3 participants

UNTIL THEN...

```
nodes = _(results).chain().flatten()  
    .sortBy (node) -> node._orderedAt  
    .unique (node) -> node.id  
    .reverse().value()
```

Post-processing on our server.

DEDUPING (VERY BAD)

```
MATCH (me:User {id: {id}})  
MATCH (me) -[:follows]-> (f) -[star:starred]-> (creation)  
  
WITH me, creation, star  
ORDER BY star.createdAt  
WITH me, creation, HEAD(COLLECT(star)) AS star  
  
MATCH (creation) -[:creator]-> (creator)  
WHERE NOT (me) -[:follows*0..1]-> (creator)  
  
WHERE star.createdAt < {cursorTime}  
RETURN creation, star.createdAt AS _starredAt  
ORDER BY _starredAt DESC  
LIMIT {count}
```

DEDUPING (BAD)

```
MATCH (me:User {id: {id}})  
MATCH (me) -[:follows]-> (f) -[star:starred]-> (creation)  
  
WITH me, creation, star  
ORDER BY star.createdAt  
WITH me, creation, HEAD(COLLECT(star)) AS star  
  
MATCH (creation) -[:creator]-> (creator)  
WHERE creator <> me AND NOT((me) -[:follows]-> (creator))  
  
WHERE star.createdAt < {cursorTime}  
RETURN creation, star.createdAt AS _starredAt  
ORDER BY _starredAt DESC  
LIMIT {count}
```

QUERY PROFILING

```
for key, query of queries
    echo "Query '#{key}':"

    # warm-up:
    neo4j.query query, params, _

    times = []
    for i in [1..3]
        start = Date.now()
        neo4j.query query, params, _
        times.push Date.now() - start

    # ...
    echo "Min/median/max: #{min}/#{median}/#{max} ms."
    Mean: #{Math.round mean} ms."
```

(Hat-tip Mark Needham)

HOME STREAM

0-following-ids	27 ms
1-following-shares	581 ms
2-following-features	77 ms
3-following-stars	1386 ms
4-stars-remixes	189 ms
5-shares-remixes	81 ms
All in parallel	1961 ms

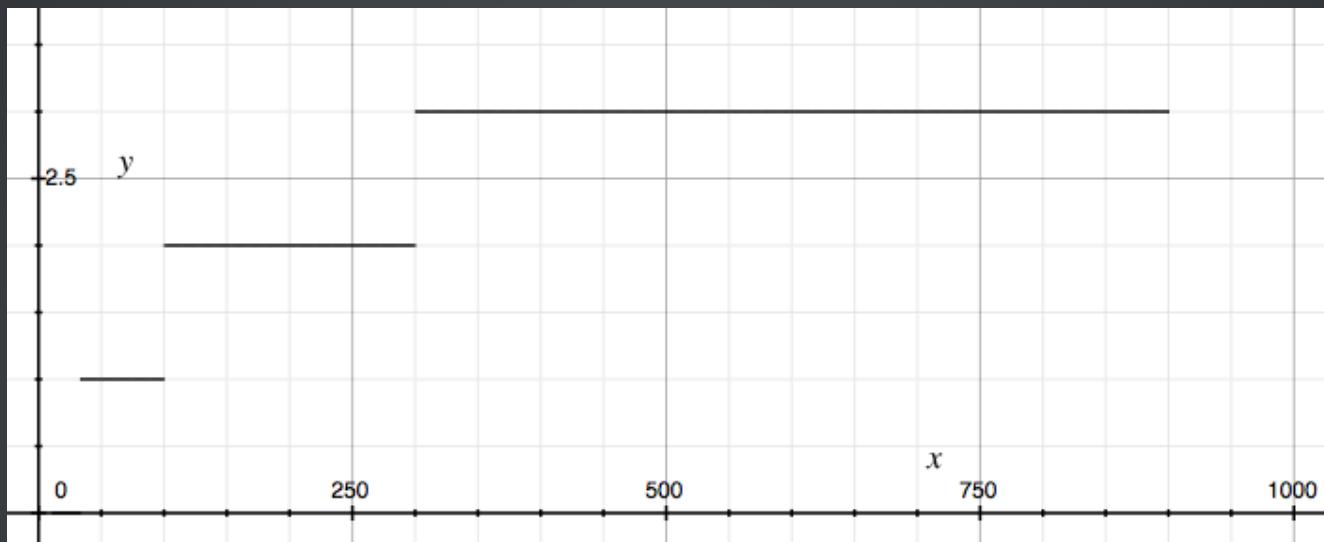
(On my aging MacBook Air, for our ~worst-case user.)

IN PRODUCTION...

query	p95_ms
User_getHomeStream_following_stars	140
User_getHomeStream_following_shares	70
User_getHomeStream_following_features	57
User_getHomeStream_stars_remixes	50
User_getHomeStream_shares_remixes	16
User_getHomeStream_following_ids	4

(But still some || mystery to unravel...)

THRESHOLD



$0 - 99 : 1$

$100 - 299 : 2$

$300 - 999 : 3$

$1000 - 2499 : 4$

$$\begin{array}{l} 0+1 \\ 1+1 \\ 2+1 \\ 3+1 \end{array}$$

We want:

$$y(1) = 1$$

$$y(100) = 2$$

$$y(300) = 3$$

$$y(99) = 1$$

$$y(299) = 2$$

$$y(999) = 3$$

Pre-shift, $y(1) = y(99) = 0$

$y(100) = y(299) = 1$ etc.

We can similarly scale.

Multiples $y(1) = y(3) = 0$

of $3.5x$: $y(3.5) = y(12) = 1$ etc.

$$\Rightarrow y = \log_{3.5} \left(\frac{3.5x}{100} \right) + 1$$

THRESHOLD

```
MATCH (me:User {id: {id}})

WITH me, TOFLOAT(CASE WHEN me.numFollowing < 1 THEN 1 ELSE me.numFollowing END
WITH me, FLOOR(LOG(3 * `me.numFollowing` / 100) / LOG(3)) AS threshold
WITH me, (CASE WHEN threshold < 0 THEN 0 ELSE TOINT(threshold) END) + 1 AS thr

MATCH (me) -[:follows]-> (following) -[star:starred]-> (creation)

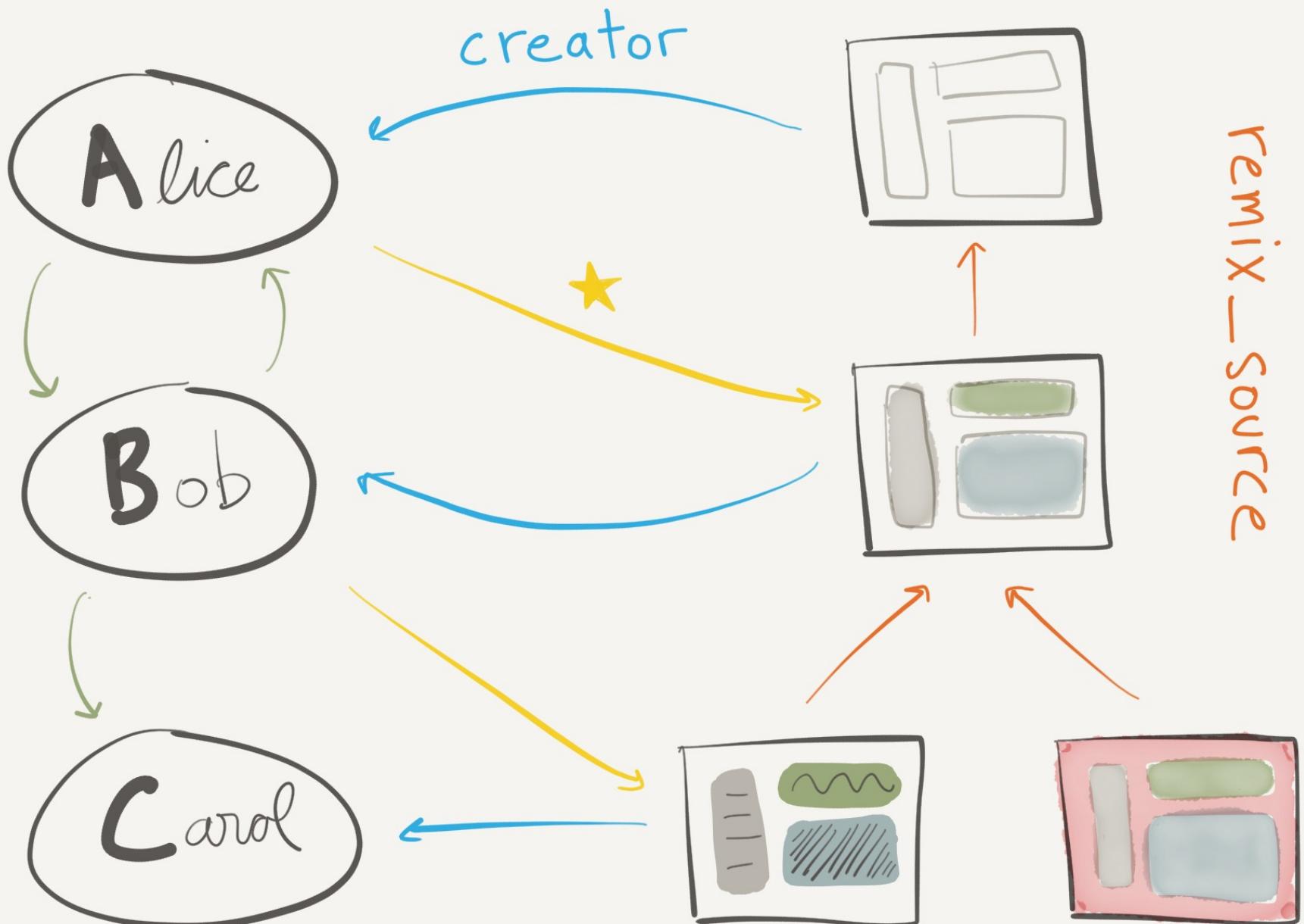
WITH creation, star, threshold
ORDER BY star.createdAt
WITH creation, COLLECT(star) AS stars, threshold
WHERE LENGTH(stars) >= threshold
WITH creation, stars[threshold - 1] AS star

WITH creation, star.createdAt AS _starredAt
ORDER BY _starredAt DESC
LIMIT {count}

MATCH (creation) -[:creator]-> (creator)
RETURN creation, creator, _starredAt
```

MIX ❤️ GRAPHS

follows



Bacon
Maple
Donut

MIX

.CREATE TOGETHER.

Watch video

Visit Mix

12 Video

Mobile

Color palette: red, blue, purple, pink, grey, white.

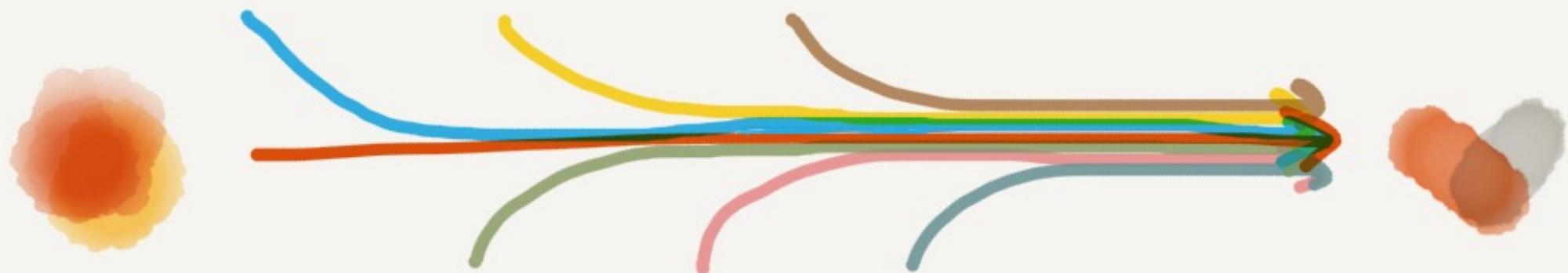
Art tools: paintbrushes, pencils, pens.

...reloading people
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for the state election
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the world, there is a demand for
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MIXING STREAMS

A COLLABORATIVE EFFORT



THANK YOU ALL!

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aseemk

(And .com too)

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YOU DON'T HAVE TO BE AN
INVENTOR TO CREATE SOMETHING NEW.
YOU JUST HAVE TO BELIEVE
THAT YOU CAN. ❤

BE
CREATIVE.

BE
GREAT.

BE
SOMETHING.

BE.



THANK  YOU