



**LINUX PLUMBERS CONFERENCE 2021**  
DIVERSITY, EQUITY, & INCLUSION  
MINICONFERENCE

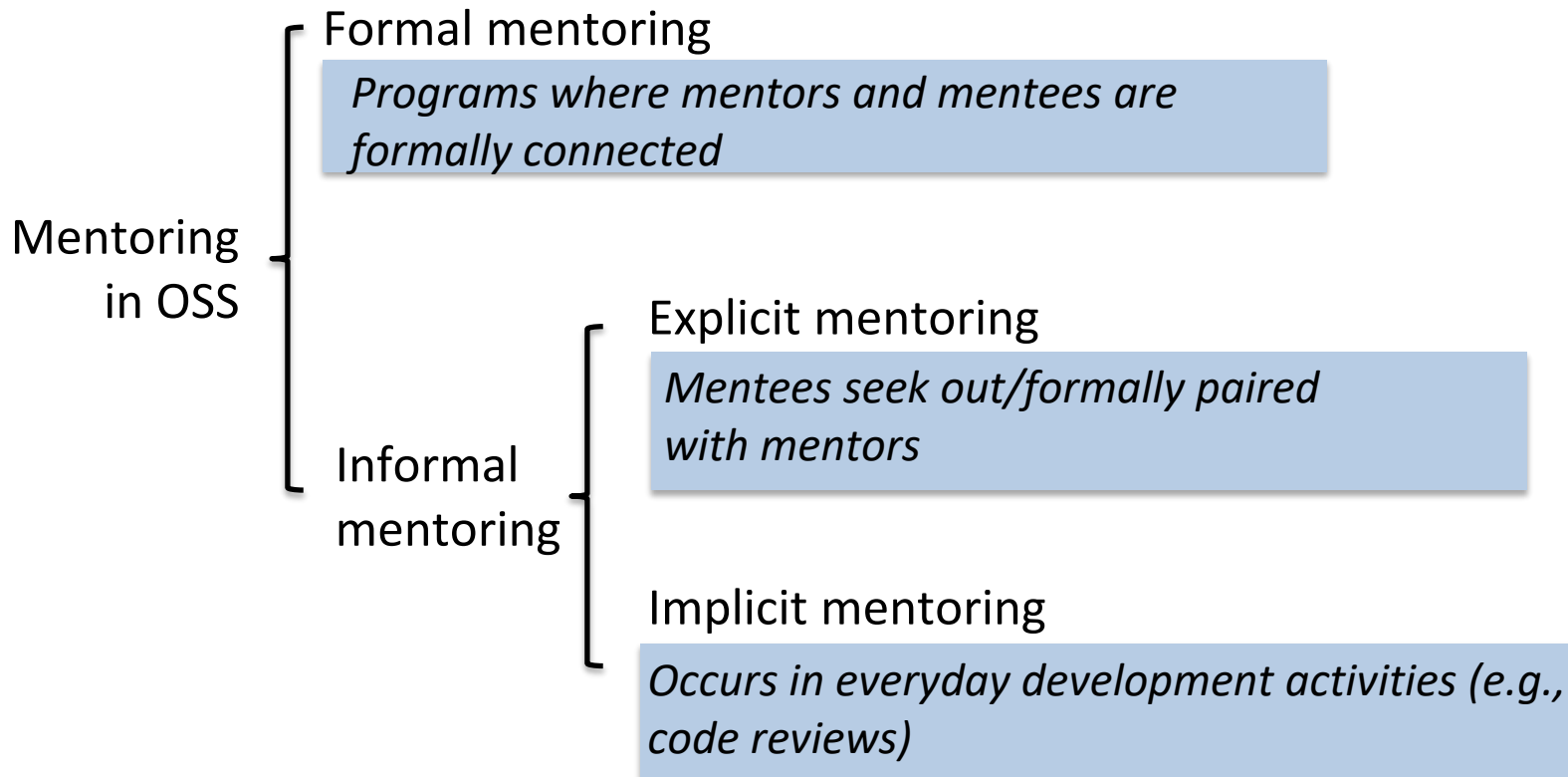
# **Mentoring at scale: Acknowledging Implicit Mentoring**

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@asarma



# Mentoring in OSS



# Implicit Mentoring

# Implicit mentoring

**Implicit mentoring** can be defined as “mentoring that occurs in *everyday development activities* such as code reviews, where a mentor provides an *underlying explanation* when providing suggestions, instructions, or mechanisms to address errors”

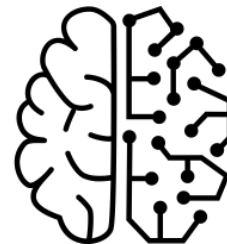
# We define, we mine, we classify



37 repositories



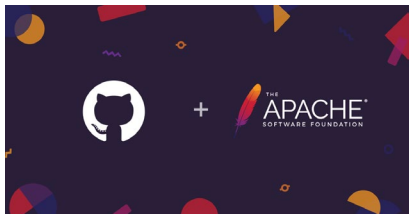
97,444  
Pull Request (PR)  
comments  
11,634 contributors



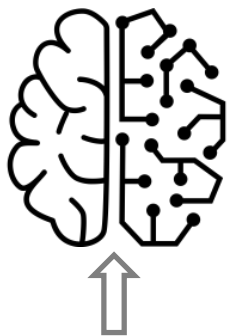
Machine learning  
classifier



Training data through  
manual labeling



# Training the ML classifier



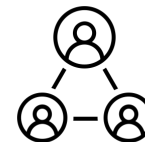
Explanations accompanying  GitHub PR Comments

	Mentoring Action	PR_comment sample
Rule 1	Instruction	M-284: "...run [tool] on the project before creating a PR. You would have noticed [problem]..." B-553: " I would still duplicate [action] like I did in [certain PR] because it's widely used in [tests]. Maybe this could be removed after [situation]."
Rule 2	Suggestion	I-1376: " Would you mind just doing [action] again to kick off [framework]? I think [framework] is just not happy when it has a lot of loads."
Rule 3	Mechanisms to fix errors	

# Implicit mentoring is widespread



Day-to-Day Activities



- 30.27% of Pull-Request included implicit mentoring.
- 25.24% of contributors served as implicit mentors.

# Features of implicit mentoring



Of the 29,502 PRs:  
dyadic (65.15%),  
triads (22.79%)  
>quadrads (12.06%).  
“it takes a village...”



More than dyadic



It is not just top to down, also including  
**bottom up** (13.08%),  
and **peer to peer** (<6  
months diff, 34.14%).



More than top to down



Implicit mentoring is  
**interest driven**;  
can it be **drive-**  
**by mentoring?**



Is topical



**Does gender play a role?**

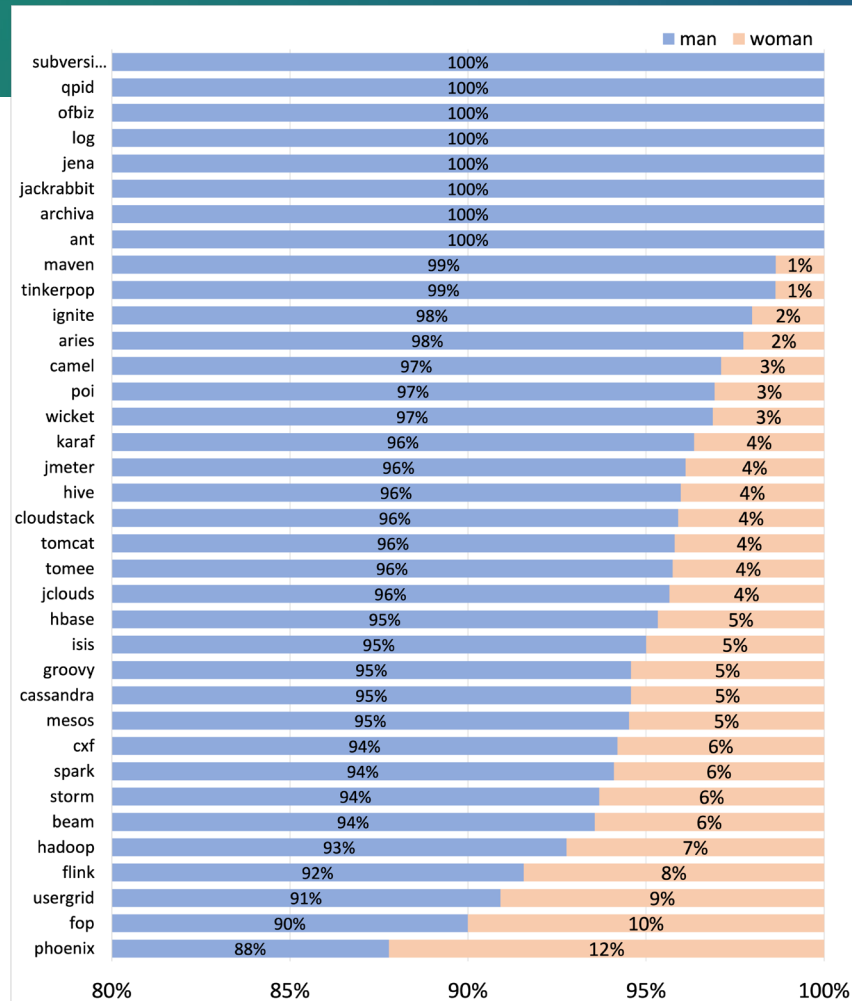
# Identifying gender

## Used NameSorML API

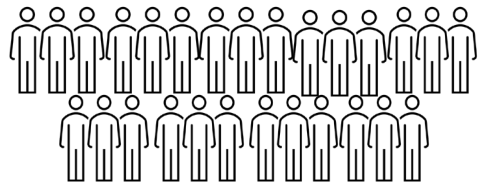
- First & last names
- Geographical location
- >90% confidence



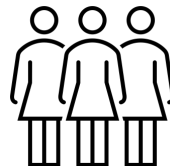
[https://www.namsor.com/?\\_ga=2.167230650.527668813.1632441804-97789108.1632441804](https://www.namsor.com/?_ga=2.167230650.527668813.1632441804-97789108.1632441804)



# Gender and implicit mentoring?



Men: 94.43%



Women: 5.57%



Implicit mentors:  
94.70%



Implicit mentors:  
5.30%

- Men perform implicit mentoring more often.
- Proportionality test (7% more,  $p\text{-value} < 0.001$ ), but low effect size

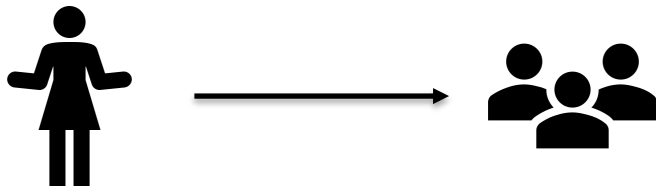
# Homophily preferences of implicit mentoring



	Overall	Top -> Down		Peer -> Peer		Bottom -> Up	
W -> W	316	55	0.20%	209	1.14%	52	0.89%
W -> M	453	125	0.46%	179	0.98%	149	2.55%
M -> W	1642	839	3.08%	735	4.02%	68	1.17%
M -> M	48982	26256	96.26%	17162	93.86%	5564	95.39%
Total	51393	27275		18285		5833	

Homophilic mentoring **surpassed** cross-gender mentoring for top->down, peer -> peer, and bottom -> up mentoring with large effect size.

# Do mentors “reach across the aisle”?



In the few cases of cross-gender implicit mentoring **women tend to cross gender boundaries** more often (56%) than men (p-value<0.001, d=1.39) .

# Discussion

# Discussion

- Why is there homophily in implicit mentoring via code review?
  - Does this mean fewer women get mentored?
- How to acknowledge implicit mentoring?
  - Would we retain more mentors if they are acknowledged formally?
- What other “invisible work” are we missing?
  - Would acknowledging invisible /non-coding work attract and retain more women in OSS?



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# Thank you!

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Thank you to Interviewees and team



and

