Cultural evolution and software development

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About me

Studied cultural evolution in the Psychology Dept at UW-Madison.

Starting thinking about software development as a “model organism”.

Hoping to convince you that **legacy code isn’t as bad as you think.**

How long does it take to run 400 meters?

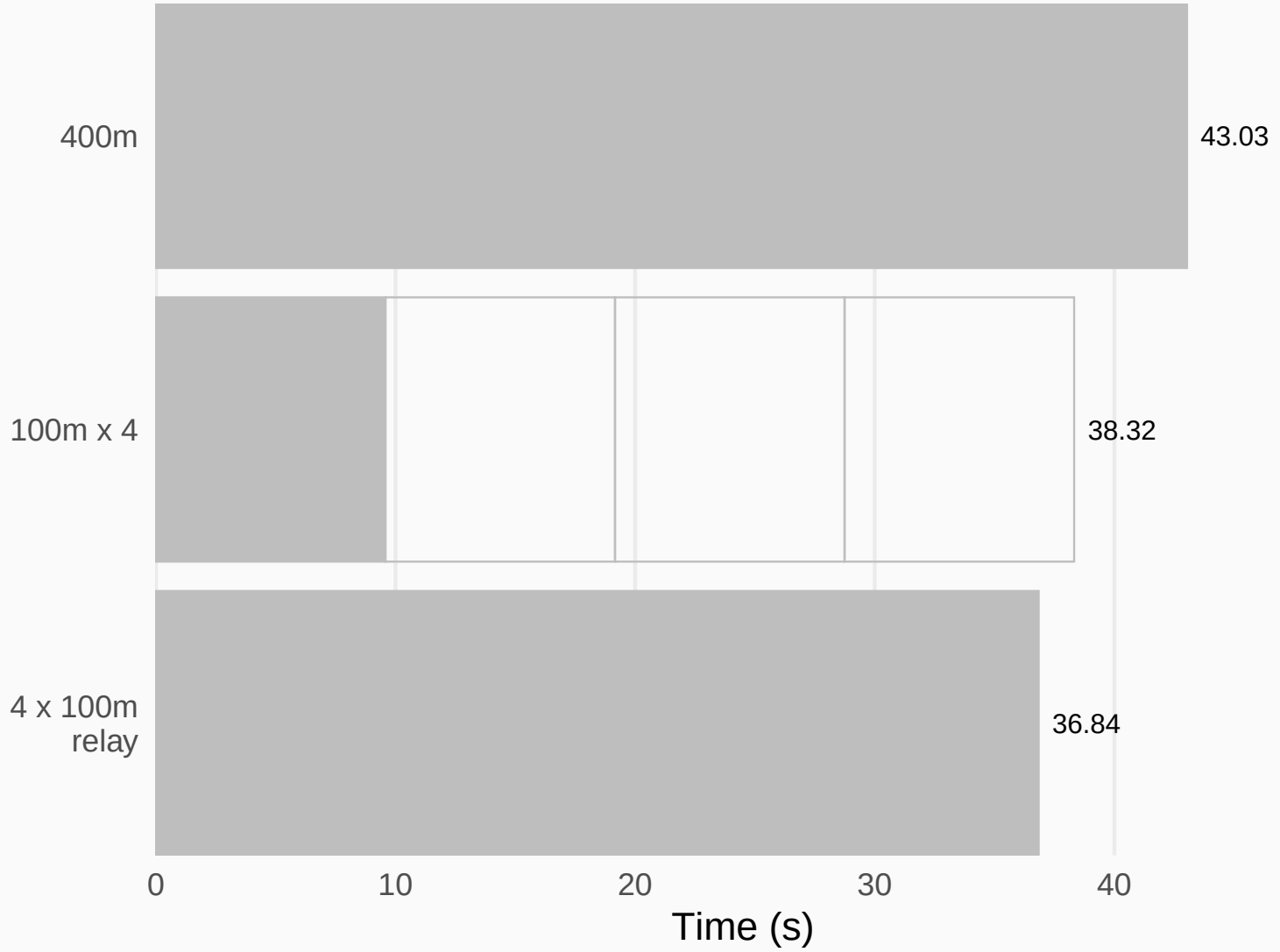


Figure 1: World record sprint times. Data from Wikipedia.

Why is a relay strategy effective for running races?

Each runner has less distance to run.

Only one runner has to accelerate from zero.

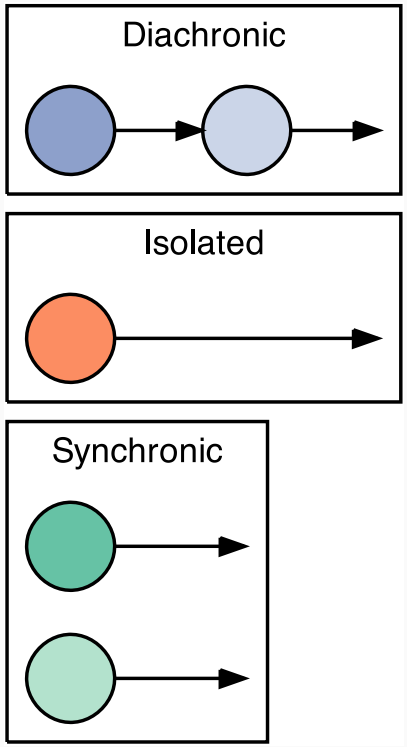
Each person gets a head start on running.

Is a relay strategy effective for problem solving?

The baton is a tool or other solution to a problem.

Passing the baton would seem to give a head start, but how much?

How do we know whether a relay strategy is effective?



Is teamwork effective for problem solving?

Surprisingly, “assembly bonus effects” are rare in psychology.

- Collective memory
- **Wason selection task**

Wason selection task

Each card has a number on one side, and a patch of color on the other.

> If a card is even on one side, then it's red on the other.

Which cards do we need to flip over to prove it?

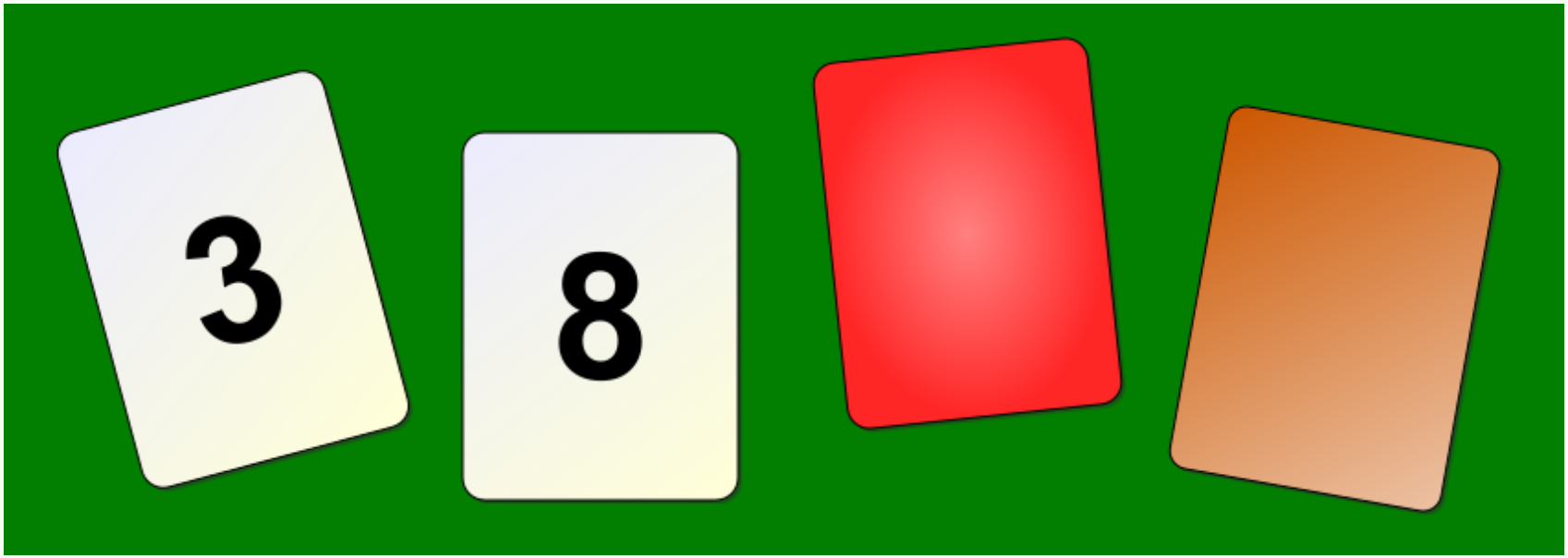


Figure 2: Wason selection task, from Wikipedia.

Wason selection task

Each card has an age on one side, and a beverage on the other.

> If a person is under 21, they should be drinking soda.

Which two cards do we need to flip to prove it?

Figure 3: Wason selection task, from Wikipedia.

Teamwork is good for exploration / exploitation

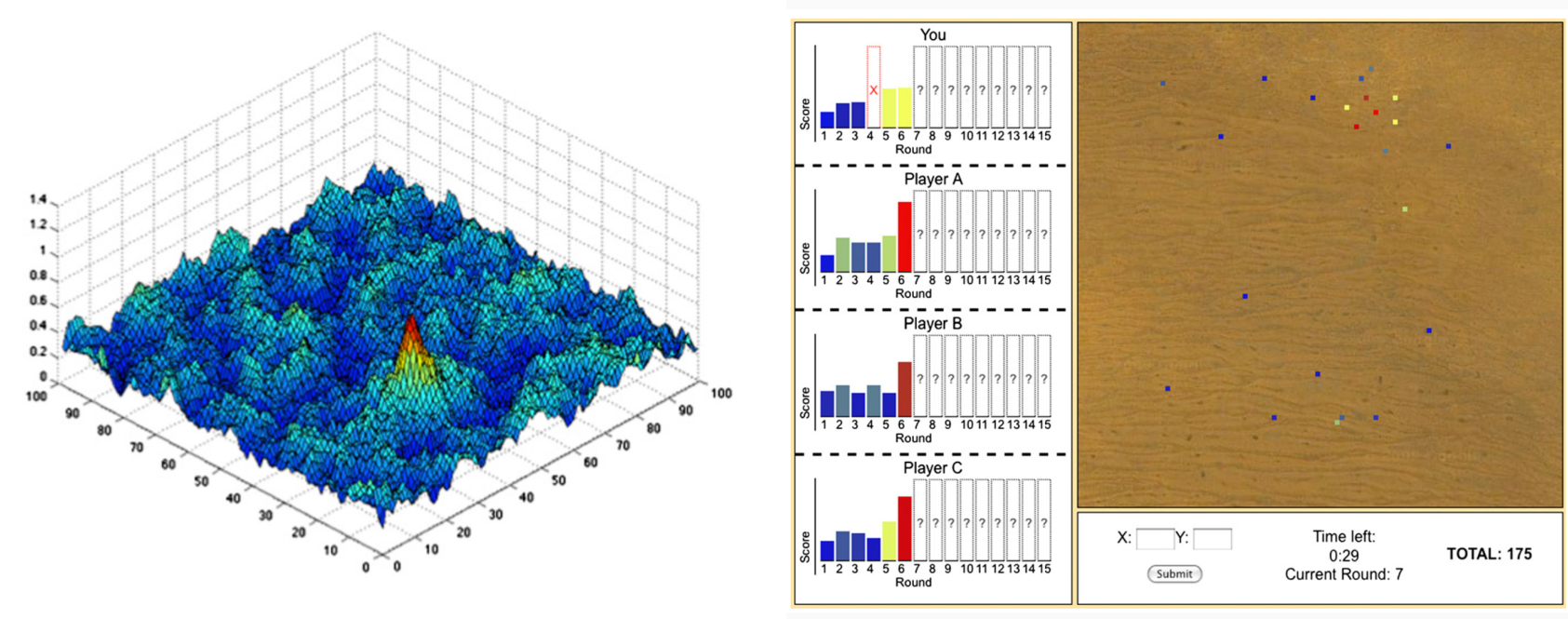
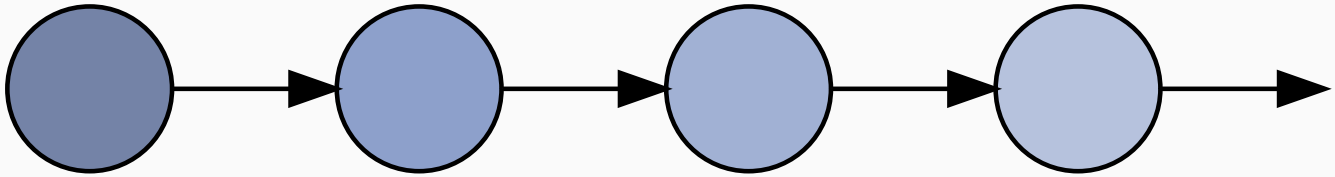


Figure 4: Wildcat Wells experiment (Mason & Watts, 2012, “Collaborative learning in networks”).

When is a relay strategy effective for problem solving?



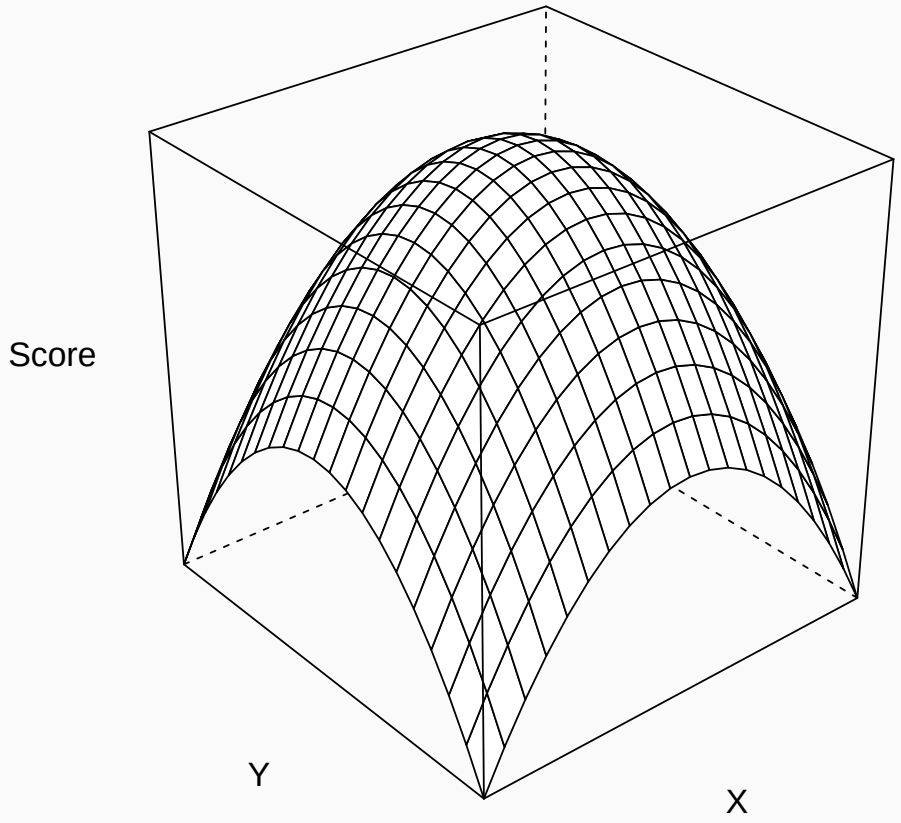
1. A relay strategy can remediate the costs of fixation.
2. A relay team with complementary skills is “greater than its parts.”

Solving a problem as climbing a hill

A problem solver exists as a point in the landscape.

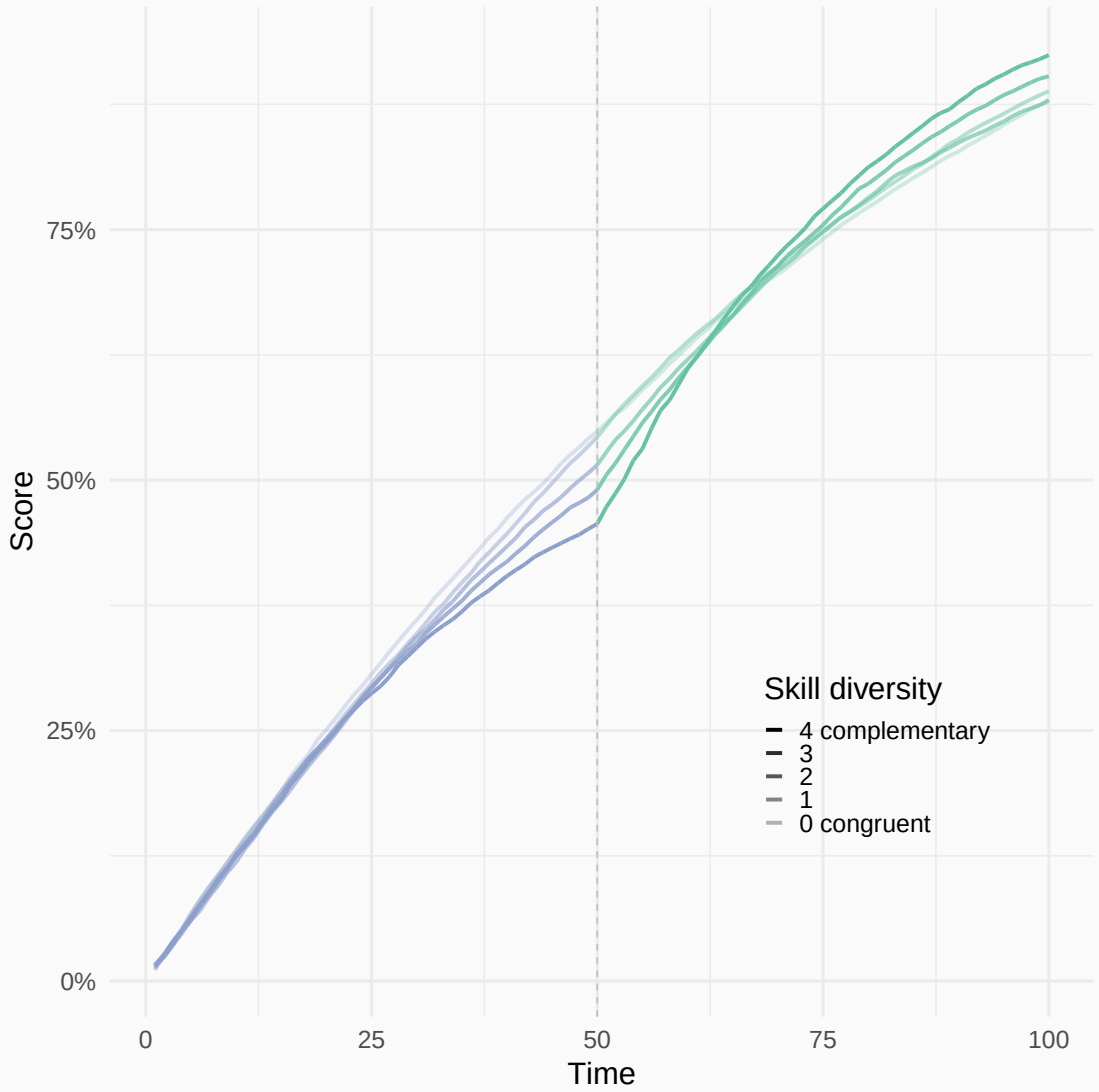
They can see some distance in X and Y.

Each time step they try to move up the hill.

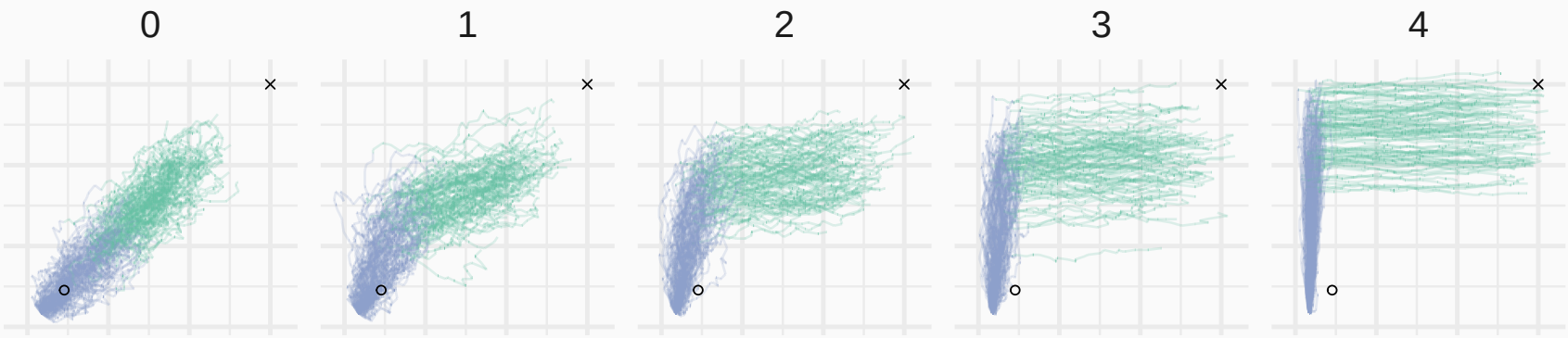


Visualizing complementary skills

Results


75%
50%
25%
0%
Score
0
25
50
75
100
Time
Skill diversity
4 complementary
3
2
1
0 congruent

Explanation

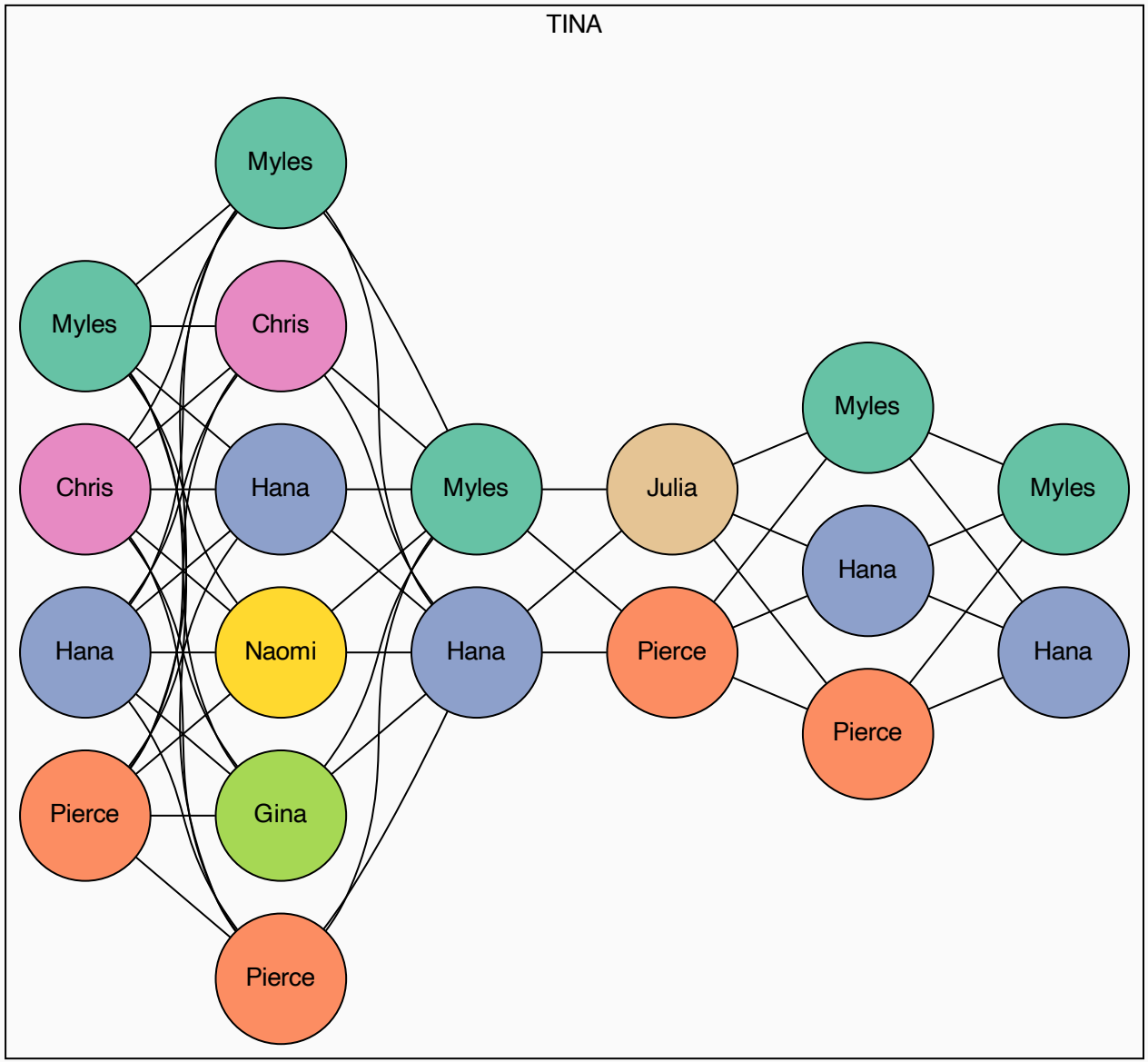


Complementary codebases

Proposal: Rebrand legacy codebases as “complementary.”

Is this why solving problems in different languages is so valuable?

Real teams blend all forms of teamwork



Human culture as a really long relay race

Why are humans effective problem solvers?

- We evolved specialized intelligences.
- **We developed systems of cultural inheritance**.

Lost European explorer experiments

[S]tarvation on nardoo is by no means unpleasant, but for the weakness one feels, and the utter inability to move oneself, for as the appetite is concerned, it gives me the greatest satisfaction.

Figure 5: The nardoo aquatic fern, native to Australia.

Lost Software Crafter experiments

- Trying to follow an out-of-date README to set up a dev machine.
- Googling a problem that may or may not be related to my IDE.
- Completing an 8th Light apprenticeship solely from the syllabus.

Running these long bash commands is by no means unpleasant, but for the errors they generate, and the utter inability to serve the app at localhost:8080, for as my mechanical keyboard is concerned, it gives me the greatest satisfaction.

Crafters are experts at cultural inheritance.

Programming languages were invented for humans.

Open source software removes a huge barrier to entry.

DevOps practices make it easier for the next generation.

Why do crafters care about tooling?

```
# dp-toolchain
dp ssm tina/dev
```

Why legacy code isn’t as bad as you think

Working software is a valuable cultural artifact.

Rebrand it as “complementary code’ ’!

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github.com/pedmiston/miniconf21