Little Tricky Logics

Ben Greenman Sam Saarinen Siddhartha Prasad
Tim Nelson Shriram Krishnamurthi
Guiseppe De Giacomo Marco Montali

Q. Is LTL tricky?

?
Q. Is LTL tricky?
Q. Is LTLf trickier?

Lots of opinions!

Where's the data?

Quiz

https://tinyurl.com/LTLFAAAI

Quiz

https://tinyurl.com/LTLFAAAI

~15 minutes

Go for it!

Little Tricky Logics: Part II

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+18 responses

Many insightful comments

Thank You!

Summary & Results

Reject Traces

Match Traces

Describe Formulas

Write Formulas

Check Identities

Reject Traces

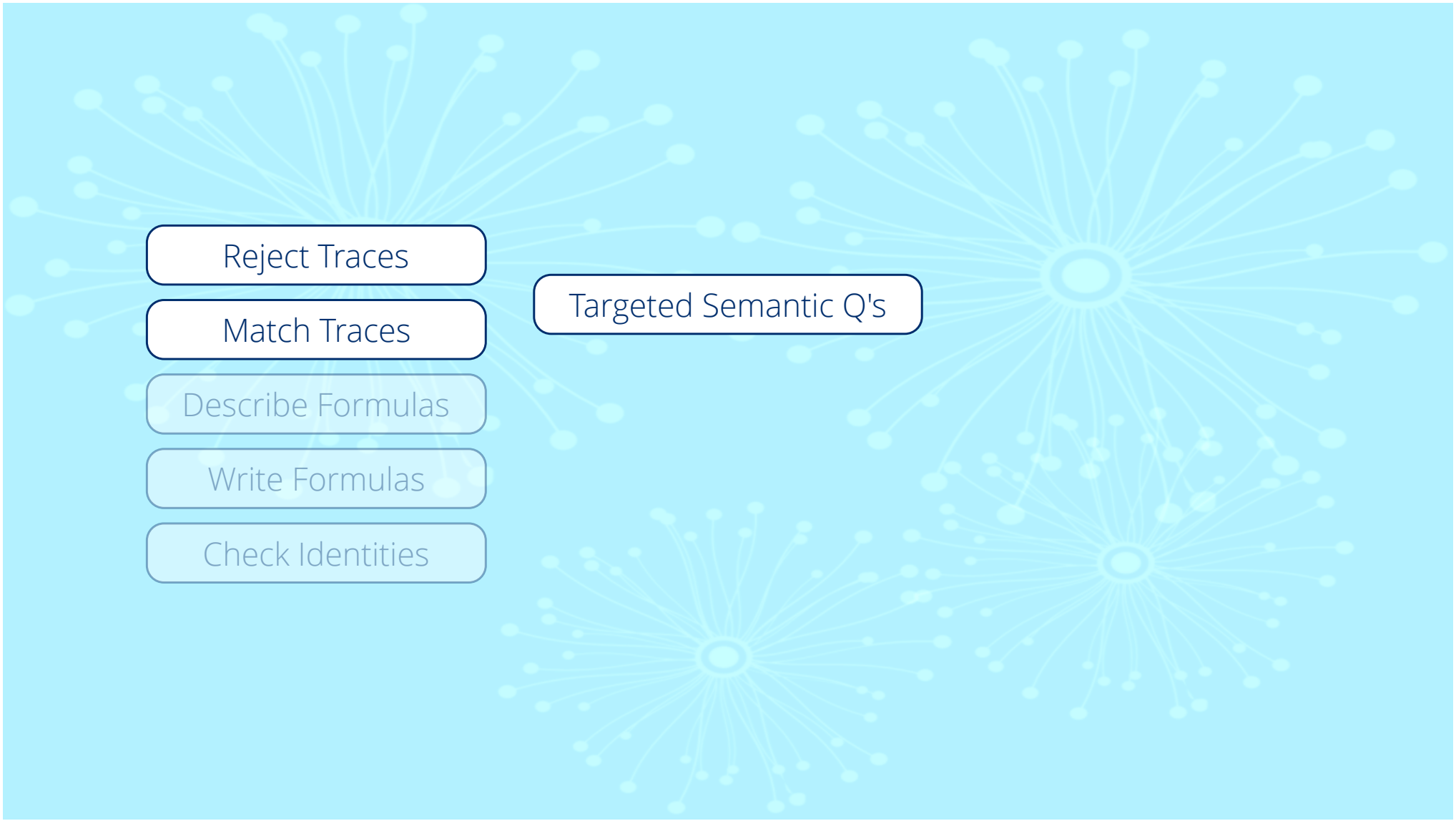
Match Traces

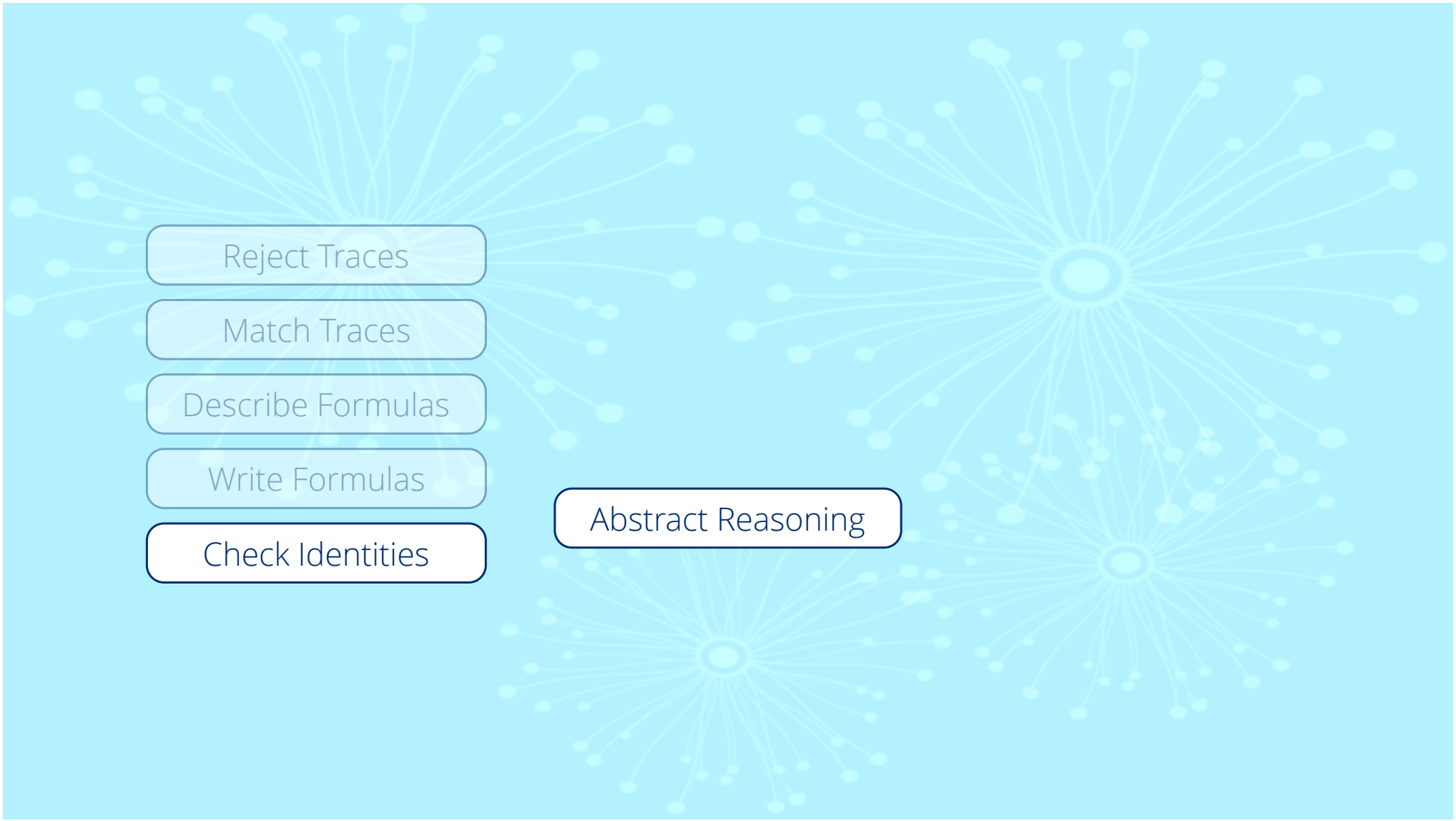
Describe Formulas

Write Formulas

Check Identities

Key Tasks


Reject Traces
Match Traces
Describe Formulas
Write Formulas
Check Identities
Targeted Semantic Q's


Reject Traces
Match Traces
Describe Formulas
Write Formulas
Check Identities
Abstract Reasoning

Reject Traces

Match Traces

Describe Formulas

Write Formulas

Check Identities

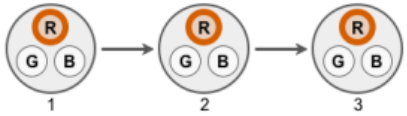
	Randomly Sampled:
Reject Traces	3 of 5
Match Traces	3 of 6
Describe Formulas	2 of 4
Write Formulas	2 of 5
Check Identities	5 of 7

Pilot test @ Oxford
Thanks Guiseppe!

You Did Great!

Review

Why does the formula `G(Red) & Xw(Xw(!Red))` reject this trace:



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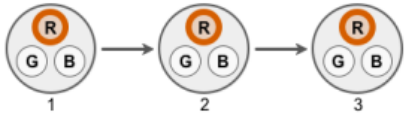
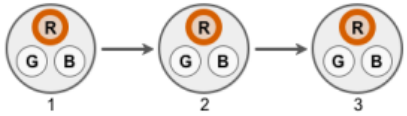


Content mismatch

Trace too long

Why does the formula `G(Red) & Xw(Xw(!Red))` reject this trace:



✗ Content mismatch

✓ Trace too long

Because no trace of length 3 can satisfy

Q. Describe in `LTLf` : `(Red U Blue) & G(Red)`

Q. Describe in `LTLf` : `(Red U Blue) & G(Red)`

✓ Red always, Blue eventually (same as LTL)

Q. Describe in `LTLf` : `G(Red => X(!Red & X(Red)))`

Q. Describe in `LTLf` : `G(Red => X(!Red & X(Red)))`

Never Red

The `X`'s require an infinite trace

Q. Specify in LTLf : Red is on exactly once.

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✓ `F(Red) & G(Red => Xw(G(!Red)))`

Q. Specify in `LTLf` : Red is on exactly once.

✓ `F(Red) & G(Red => Xw(G(!Red)))`

✗ `F(Red & Xw(G(!Red)))`

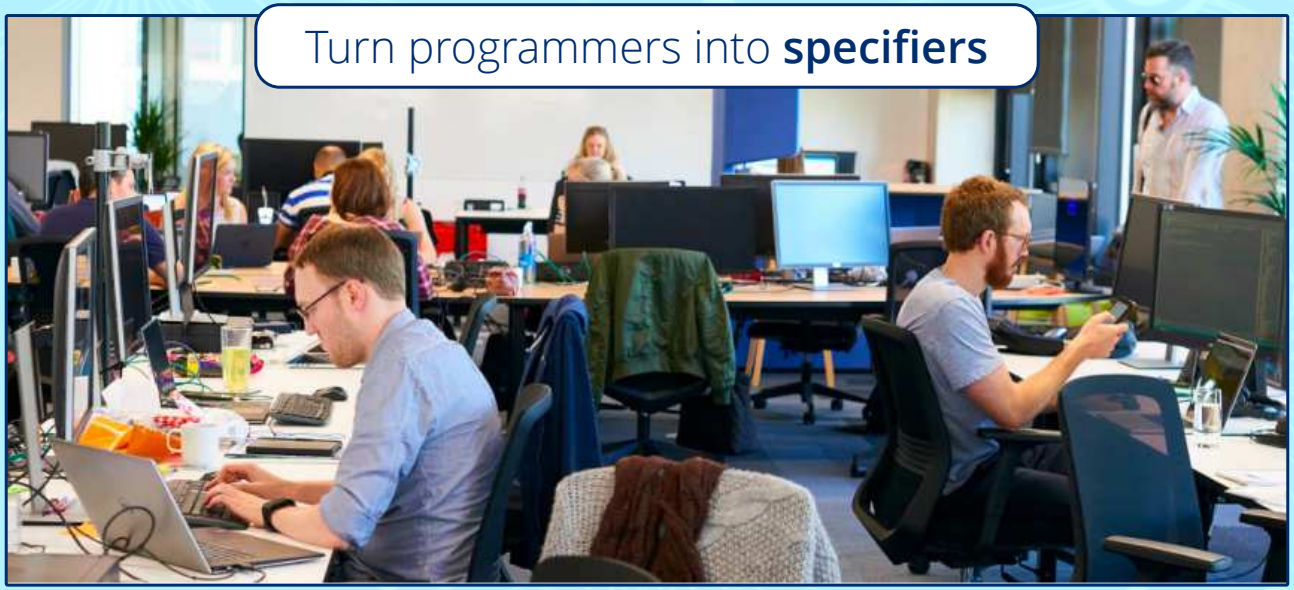
Implicit "good" behavior?

The Big Picture

Why study misconceptions?

Goal: Teach `LTLf` quickly & effectively

Turn programmers into **specifiers**



Prior Results: LTL

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Code Book + Rubric

- Bad Prop
- Bad State Index
- Bad State Quantification
- Exclusive U
- Implicit F
- Implicit G
- Other Implicit
- Weak U

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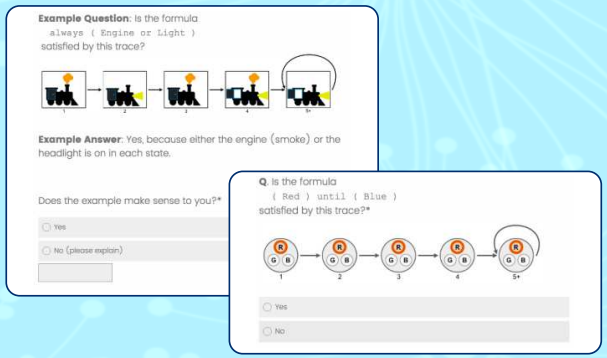
Test Instruments



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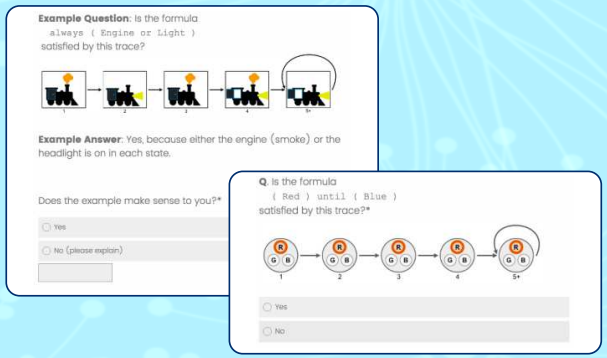

Little Tricky Logic: Misconceptions in the Understanding of LTL

Programming 7.2, 2023

REUSABLE

Prior Results: LTL

Prior Results: LTL

Tools to discover misconceptions

Siddhartha Prasad @ Brown

Next Up:

Code book & Rubric for LTLf

https://tinyurl.com/LTLFAAAI

Share with colleagues!

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benjamin.l.greenman @ gmail.com

Send complaints, receive updates