

# **MeLQS: Mathematics e-Learning Questions Specification**


***– a common base for sharing questions  
among different systems***

Kentaro Yoshitomi, Mitsuru Kawazoe (Osaka Prefecture University),  
Takahiro Nakahara (Sangensha LLC.),  
Tetsuo Fukui (Mukogawa Women's University),  
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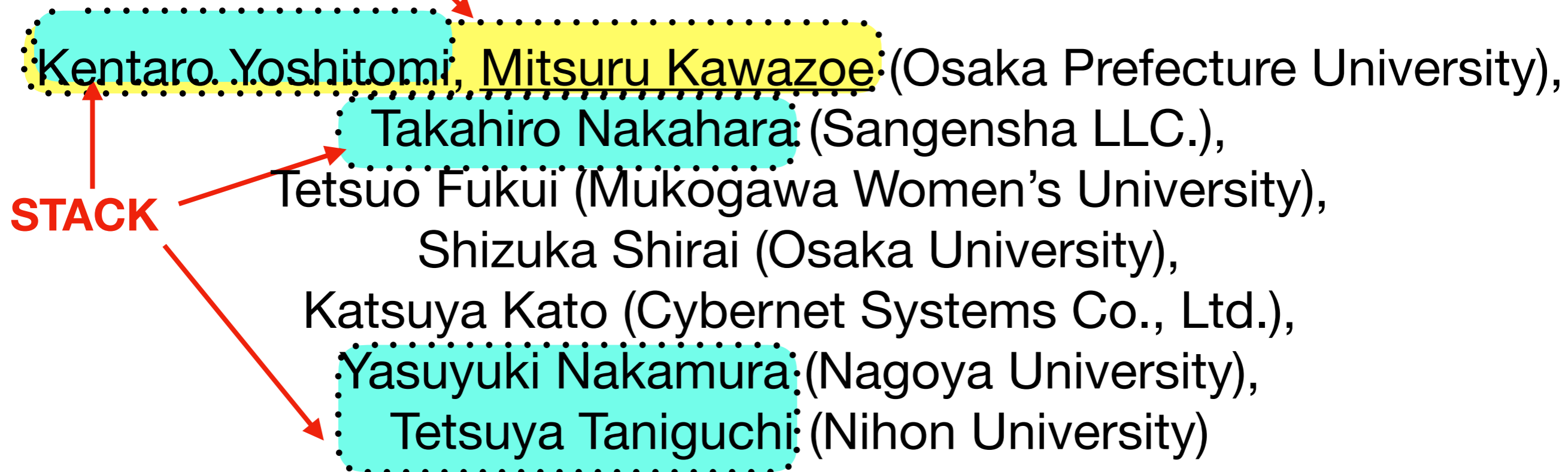
**Mathematica (Mathematica-based e-learning system)**

  
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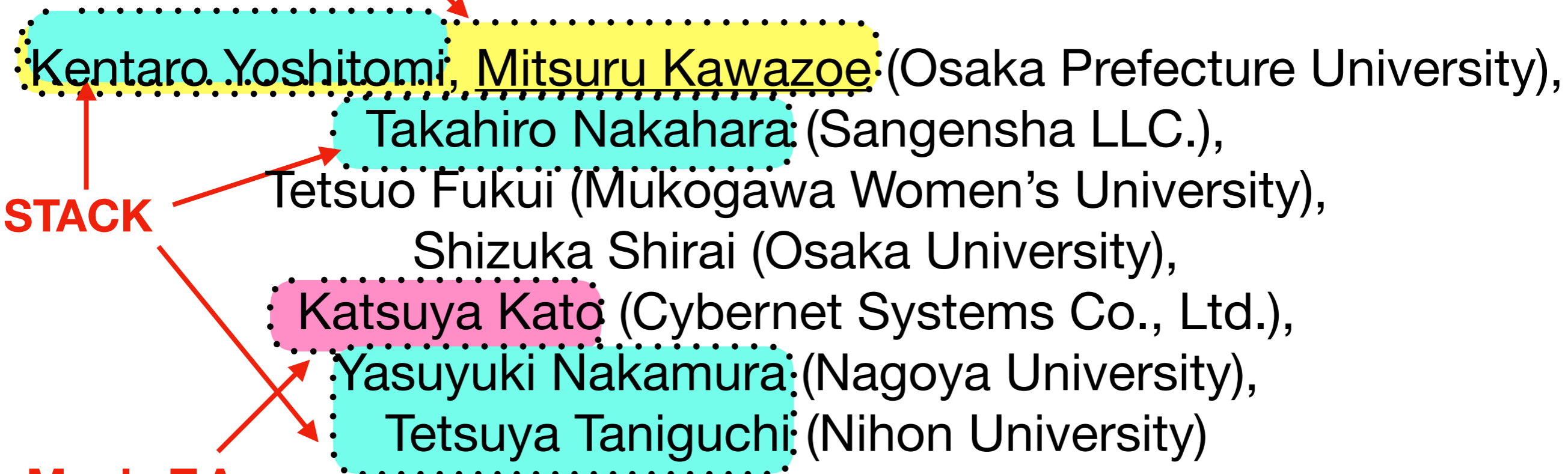
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**STACK**

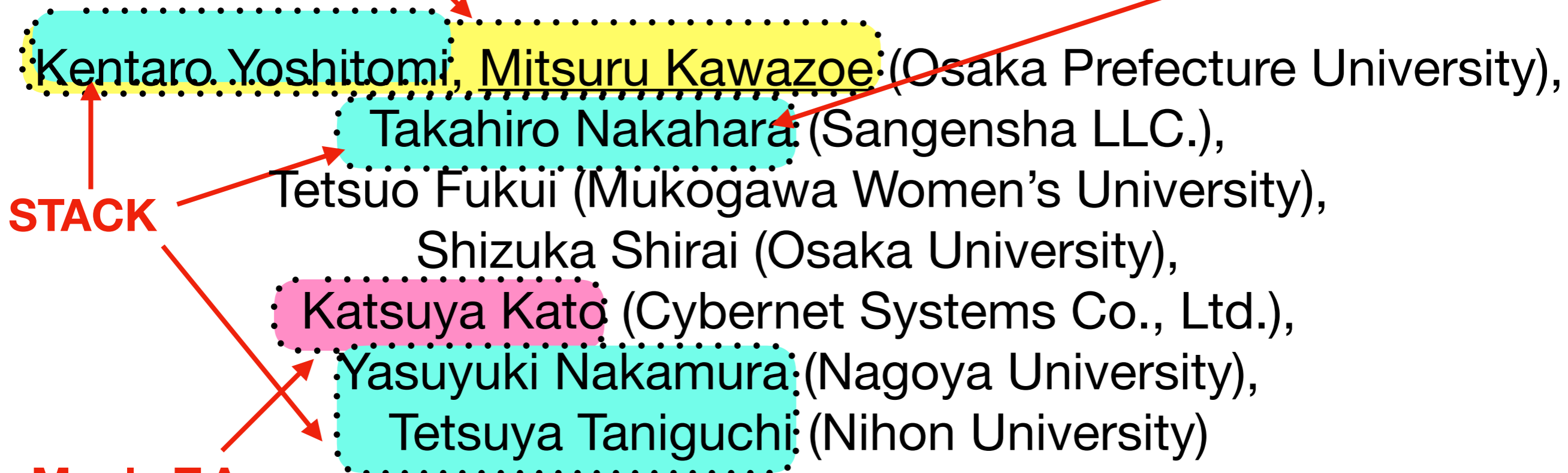
**Maple T.A.**

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**Moodle**



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**STACK**

**MathTOUCH**

**Maple T.A.**

# Background

- There are so many different and independently developed math e-learning systems.
- Due to the non-compatibility between the systems, the contents should be developed and implemented independently in each system.
- Contents development is a hard work. Math teachers engaged in the work often say “***Please Join Us!!***”
- If we can share the resources of contents among different systems, we can connect the communities of contents developers for different systems, and it would contribute to the diffusion of math e-learning systems.

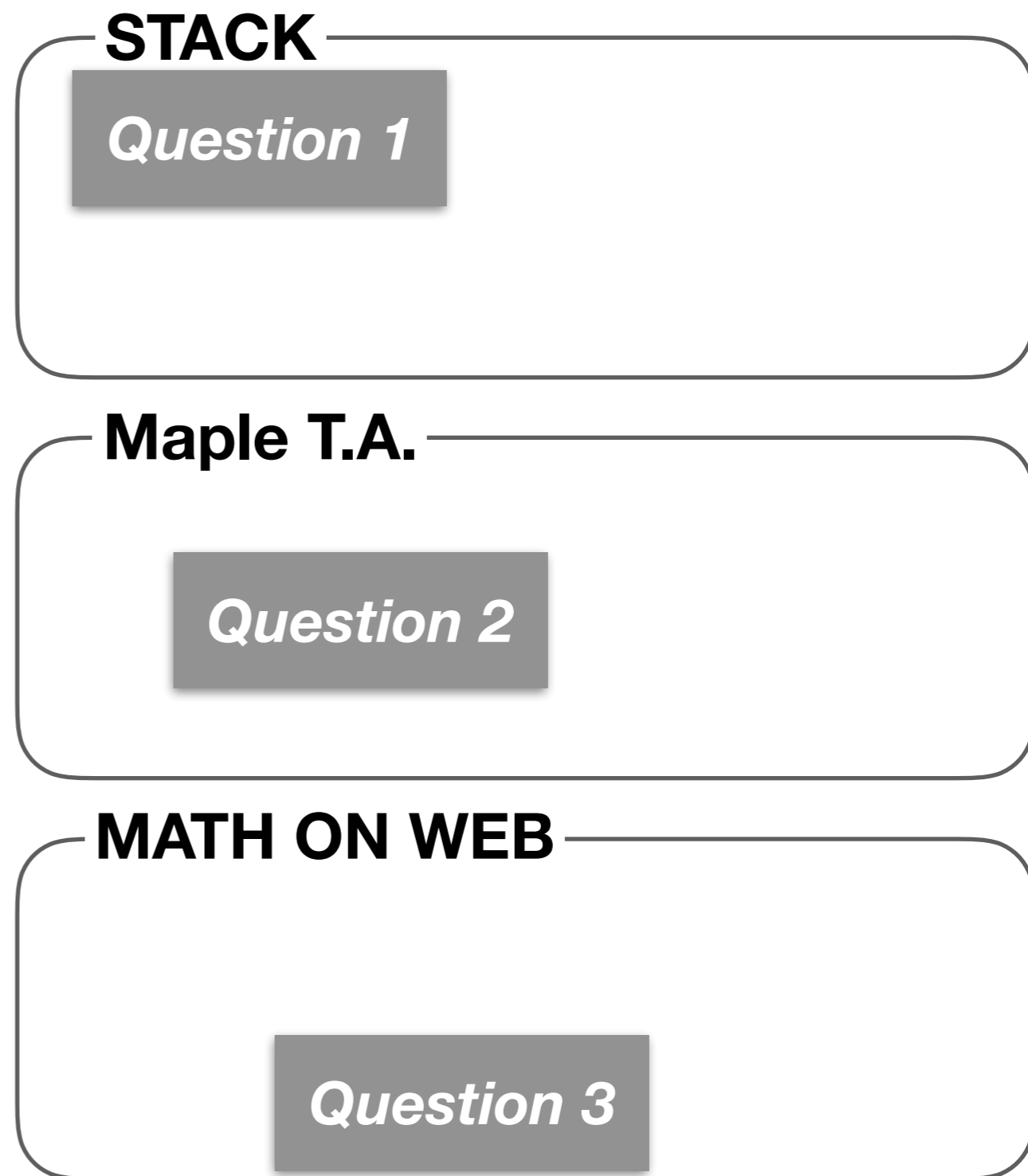
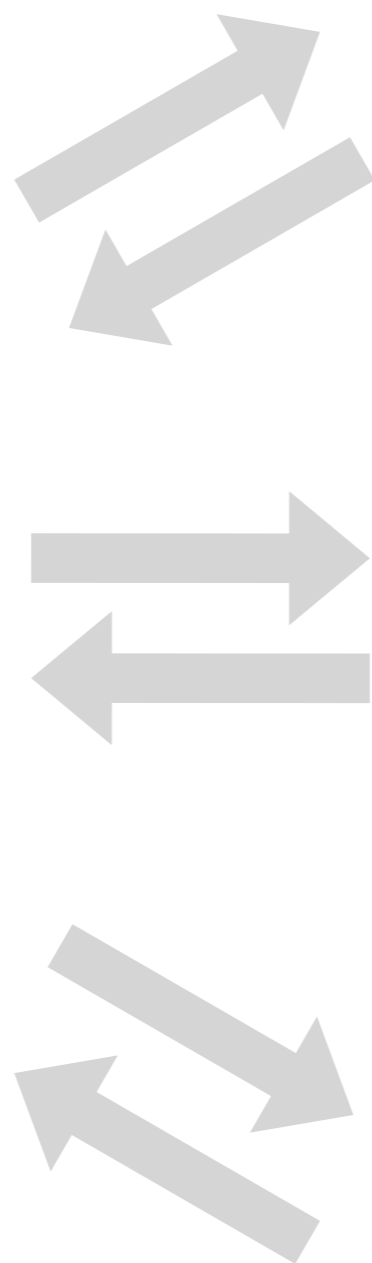
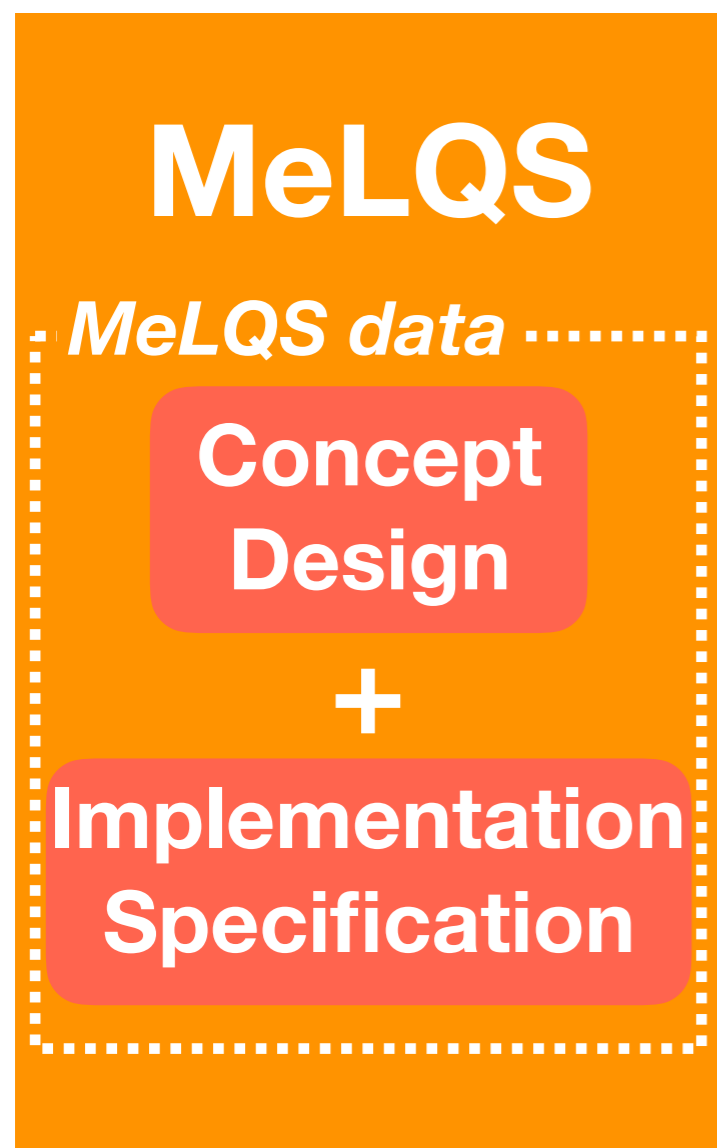
# Observation (STACK, Maple T.A., MATH ON WEB)

(Kawazoe & Yoshitomi, EAMS2016)

- CAS-based math e-learning/assessment systems have a common structure:
  - Question = Text + Math Equations
    - Math equations are (randomly) selected from a stored list or generated with CAS program
  - Answer Box = HTML Form
  - Marking Algorithm = CAS Program
    - Submitted answers are analyzed with CAS program
  - Some systems give appropriate feedback according to the result of marking. (e.g. STACK, MATH ON WEB)



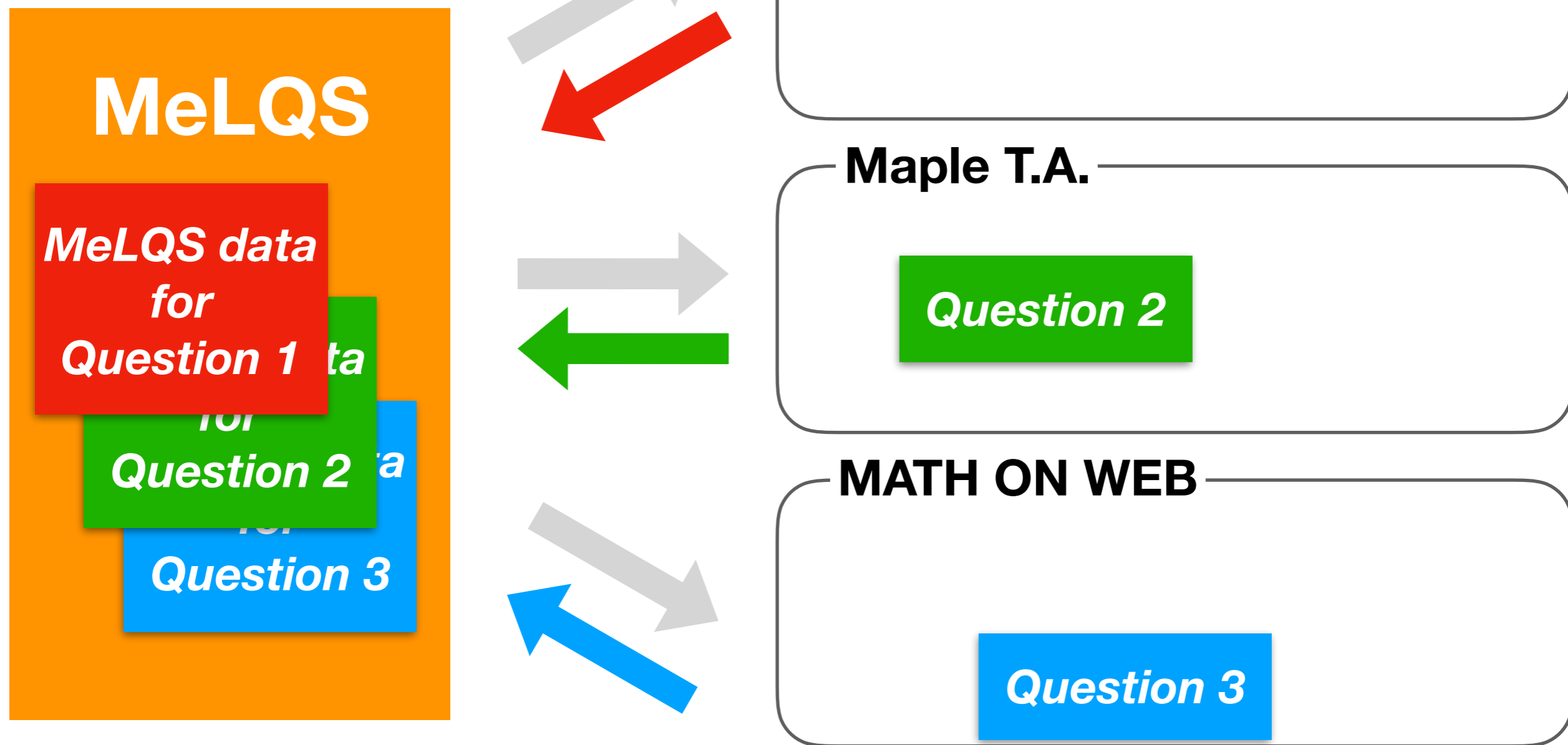
# Key Idea



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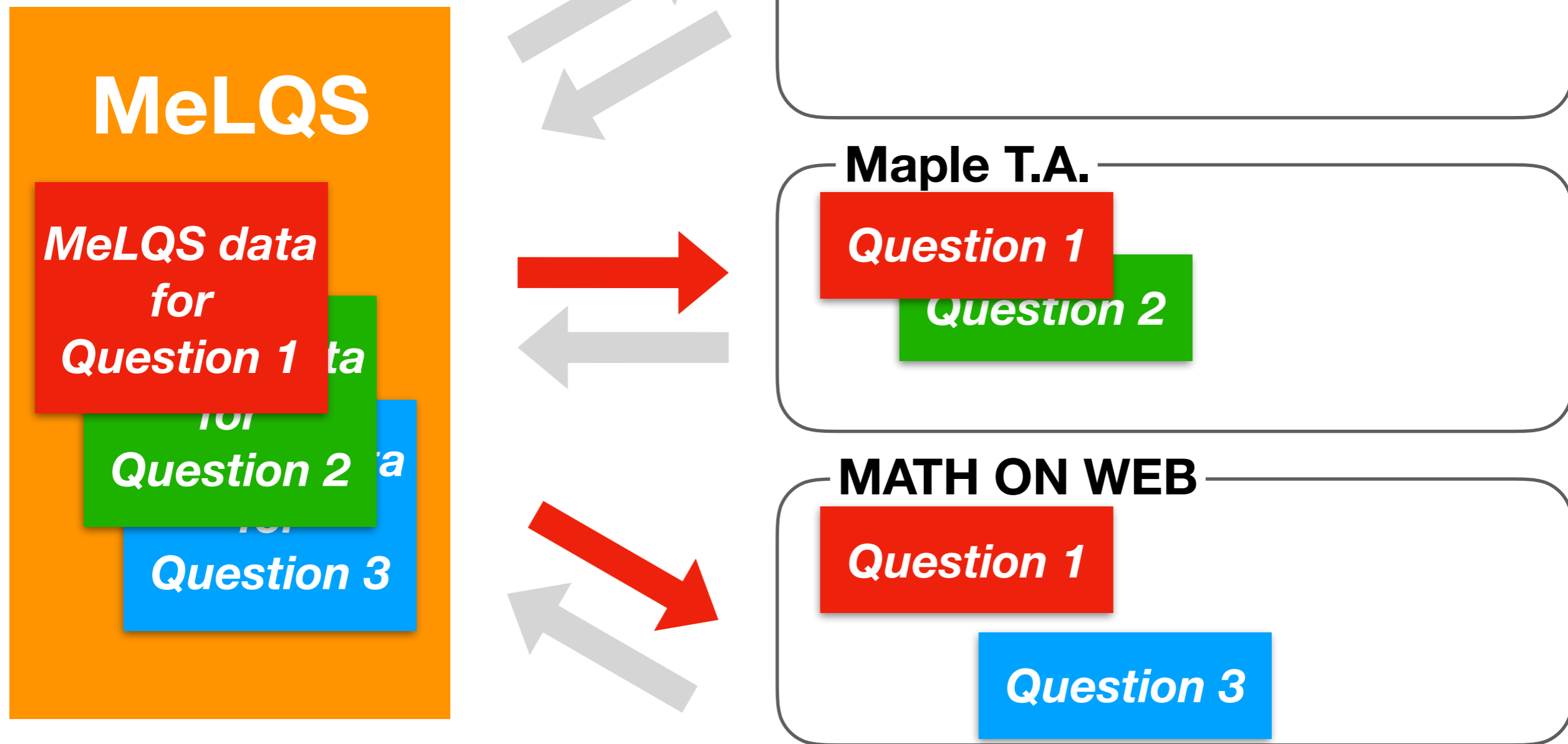
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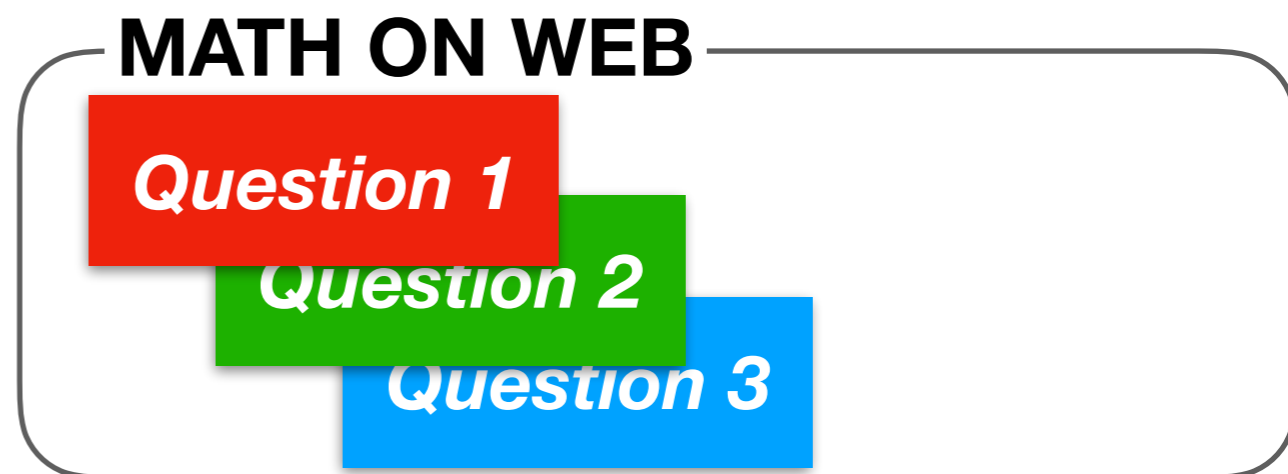
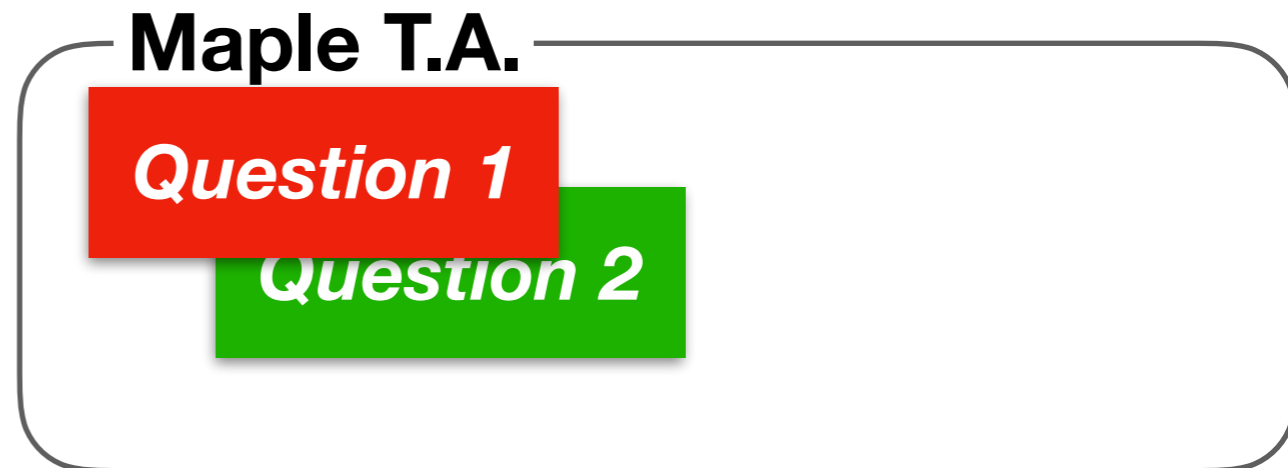
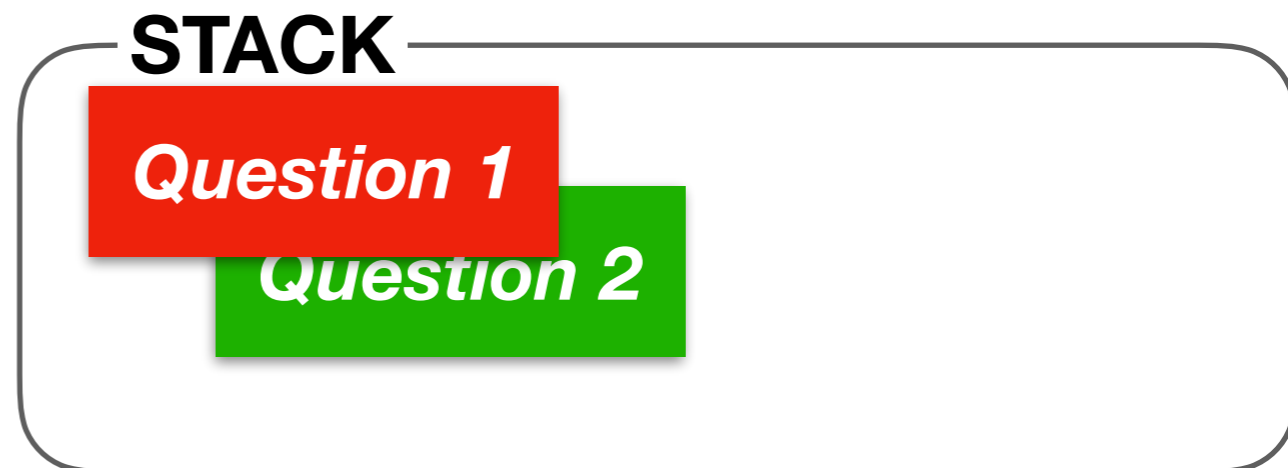
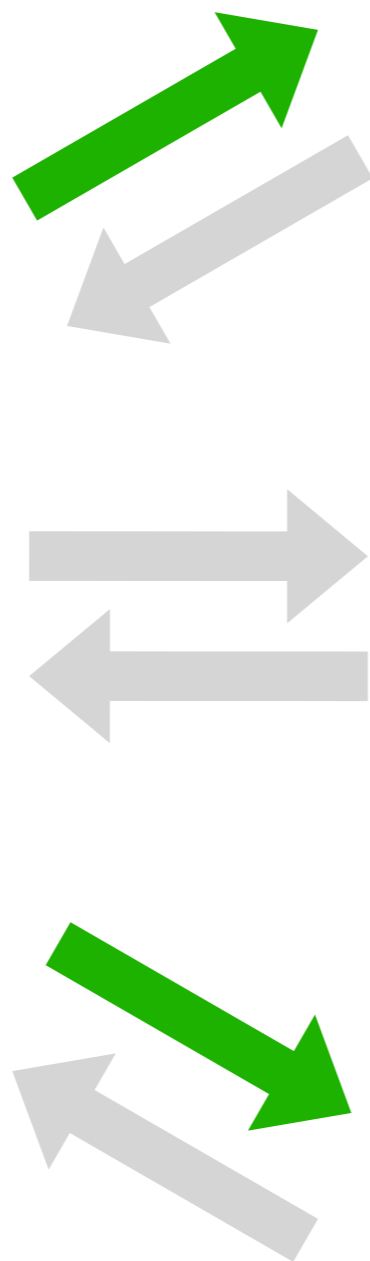
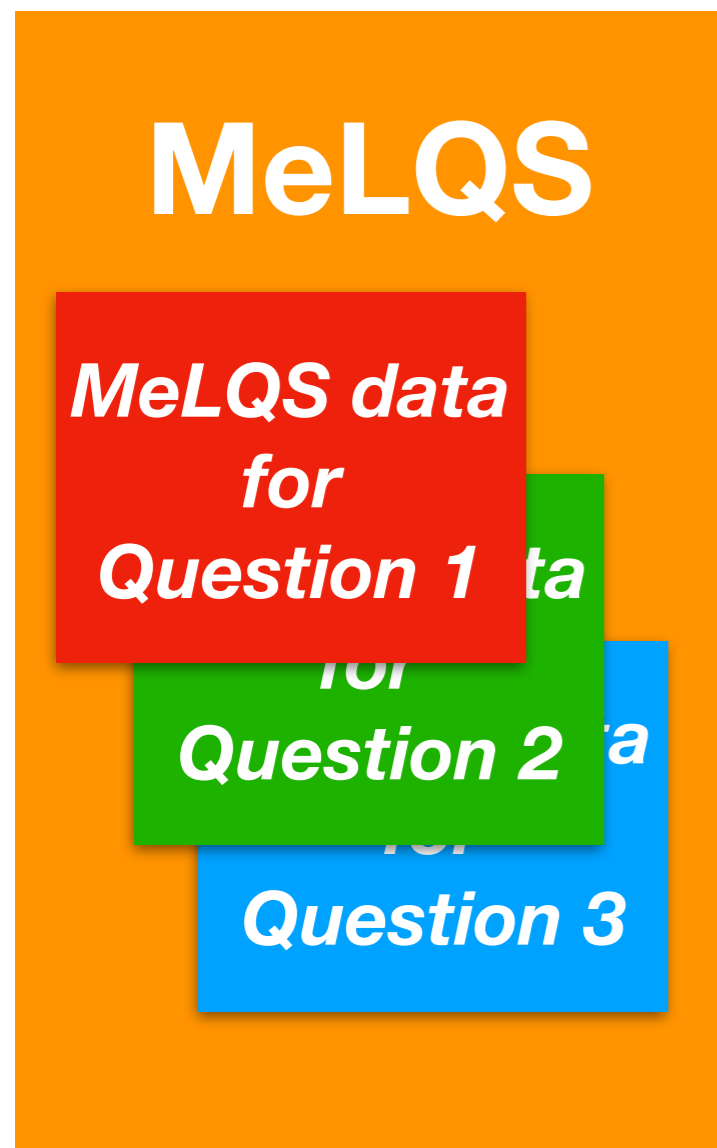
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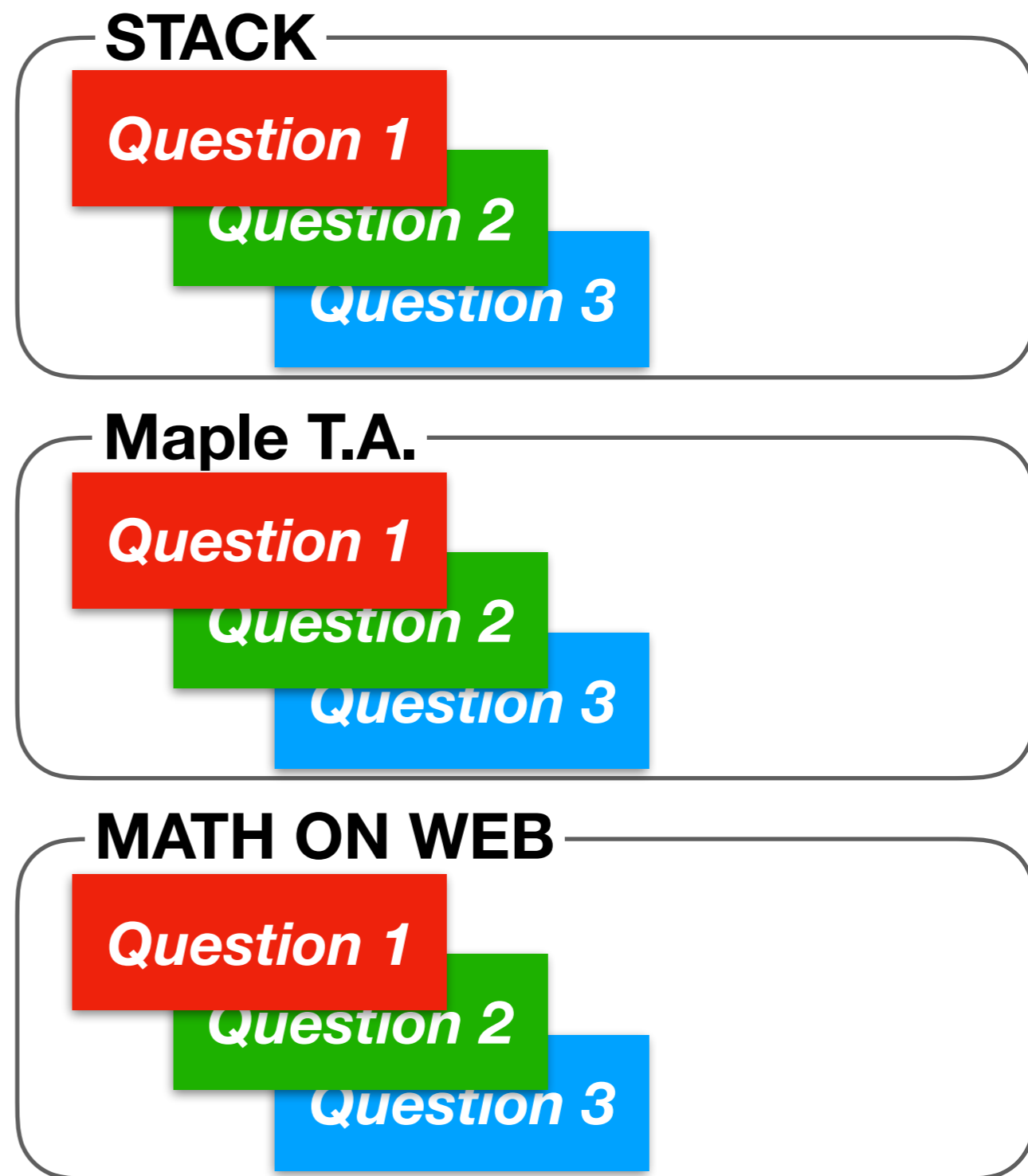
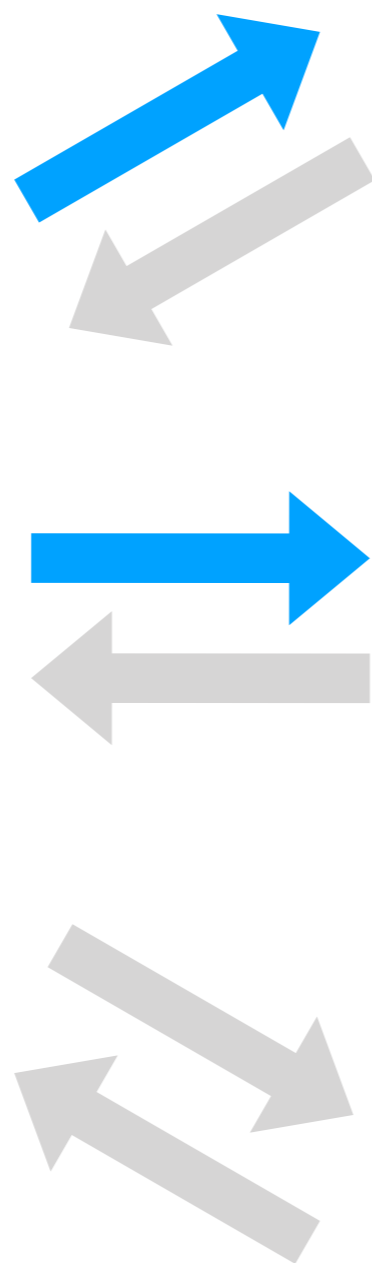
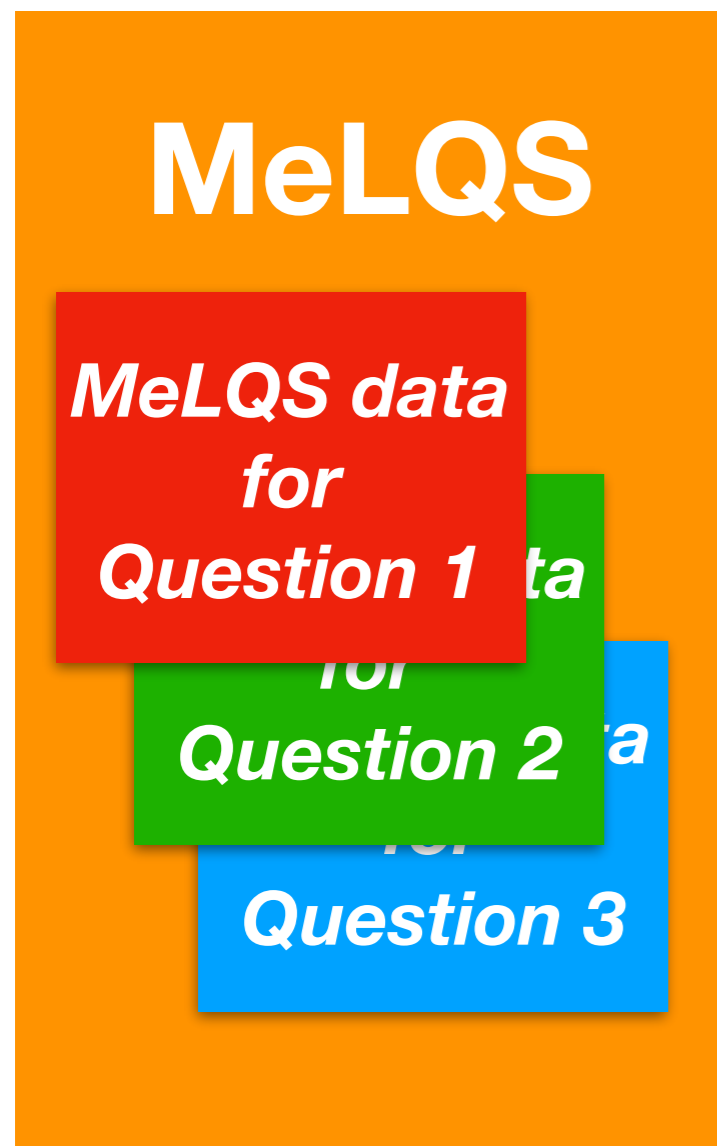
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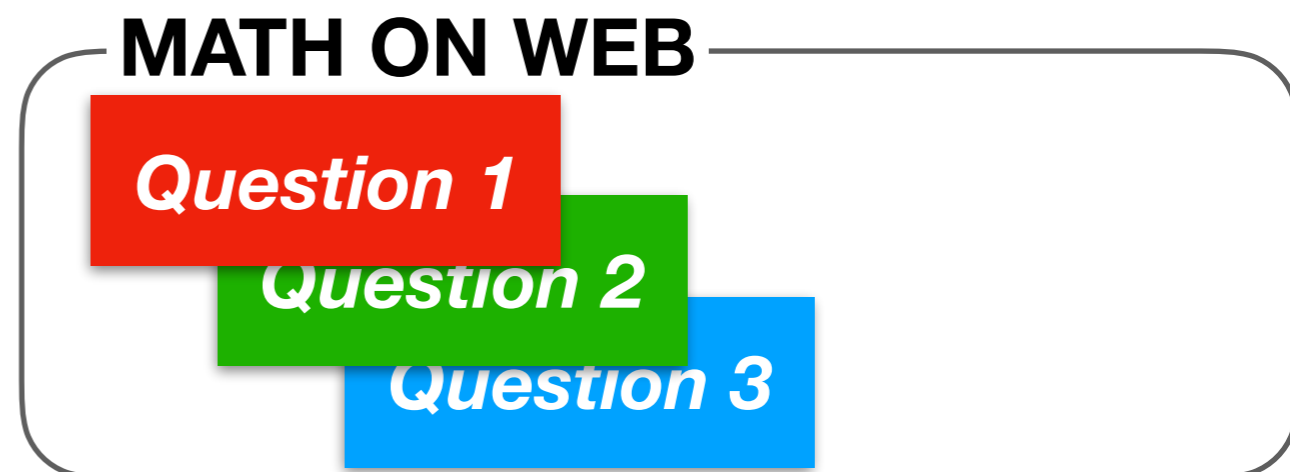
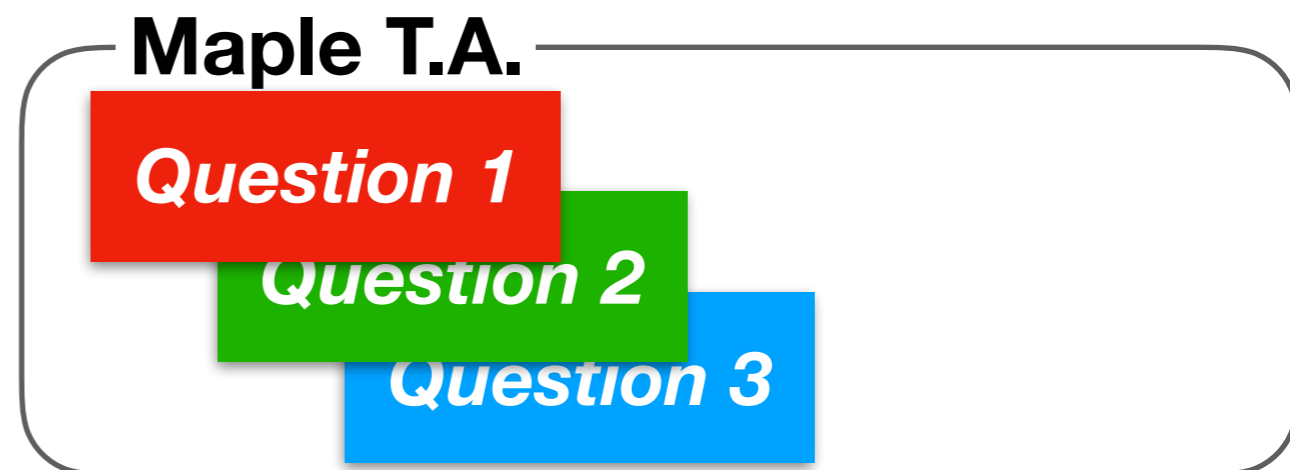
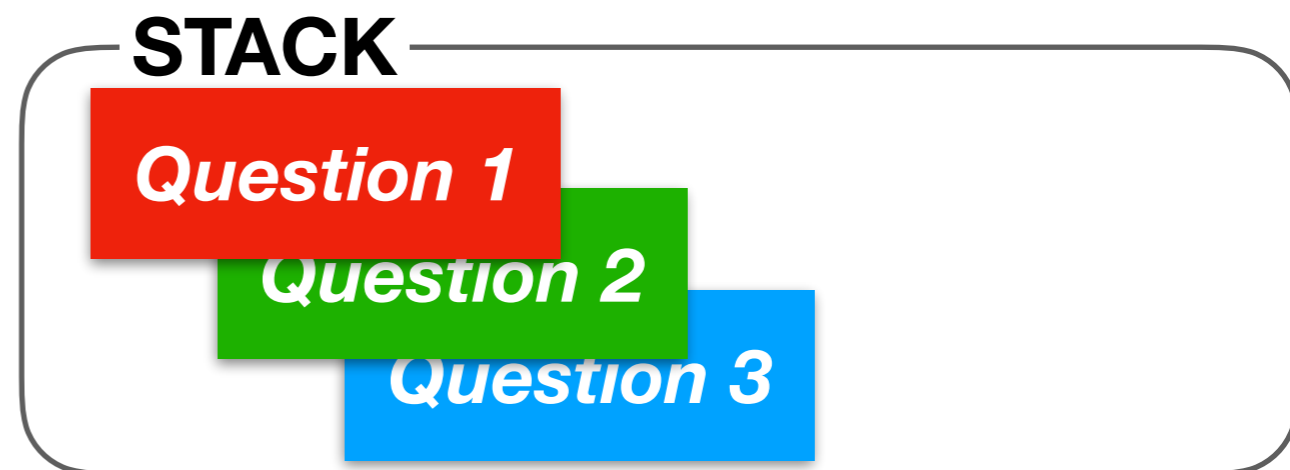
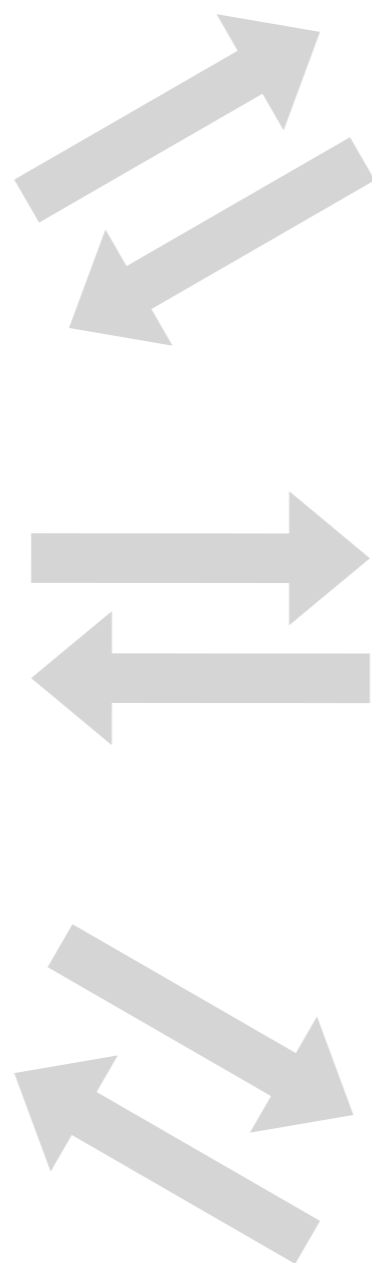
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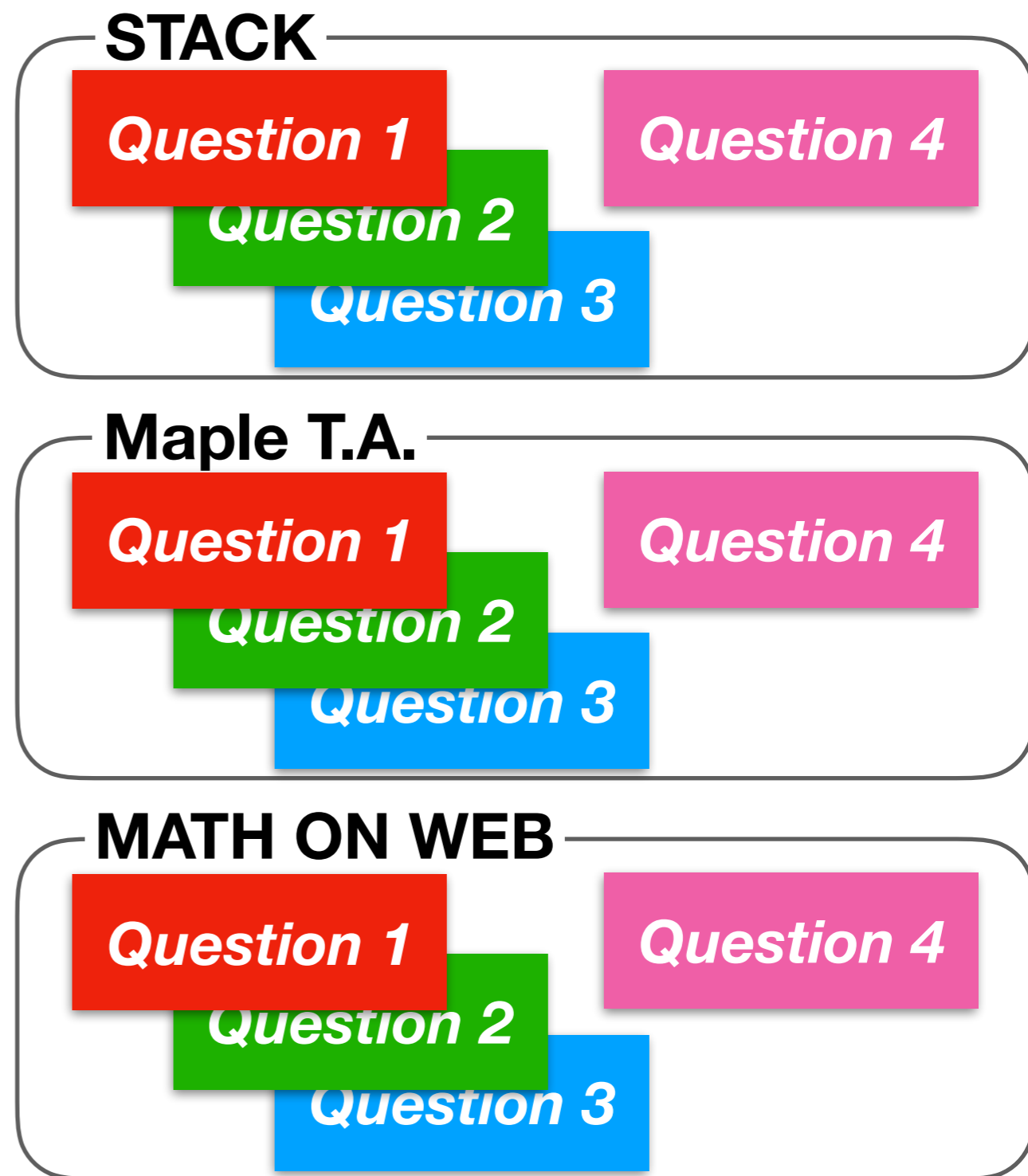
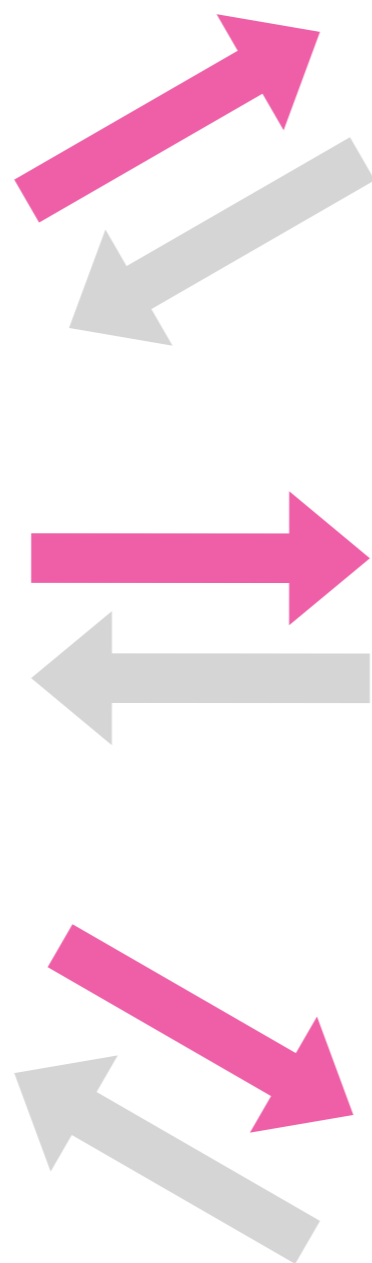
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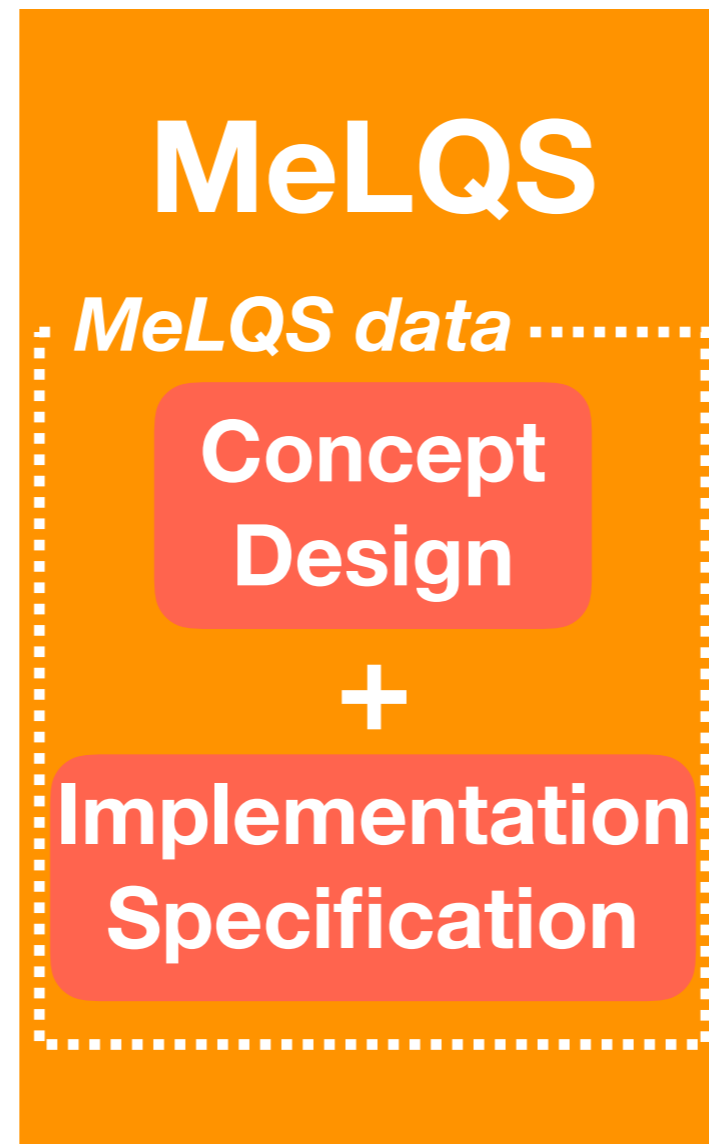
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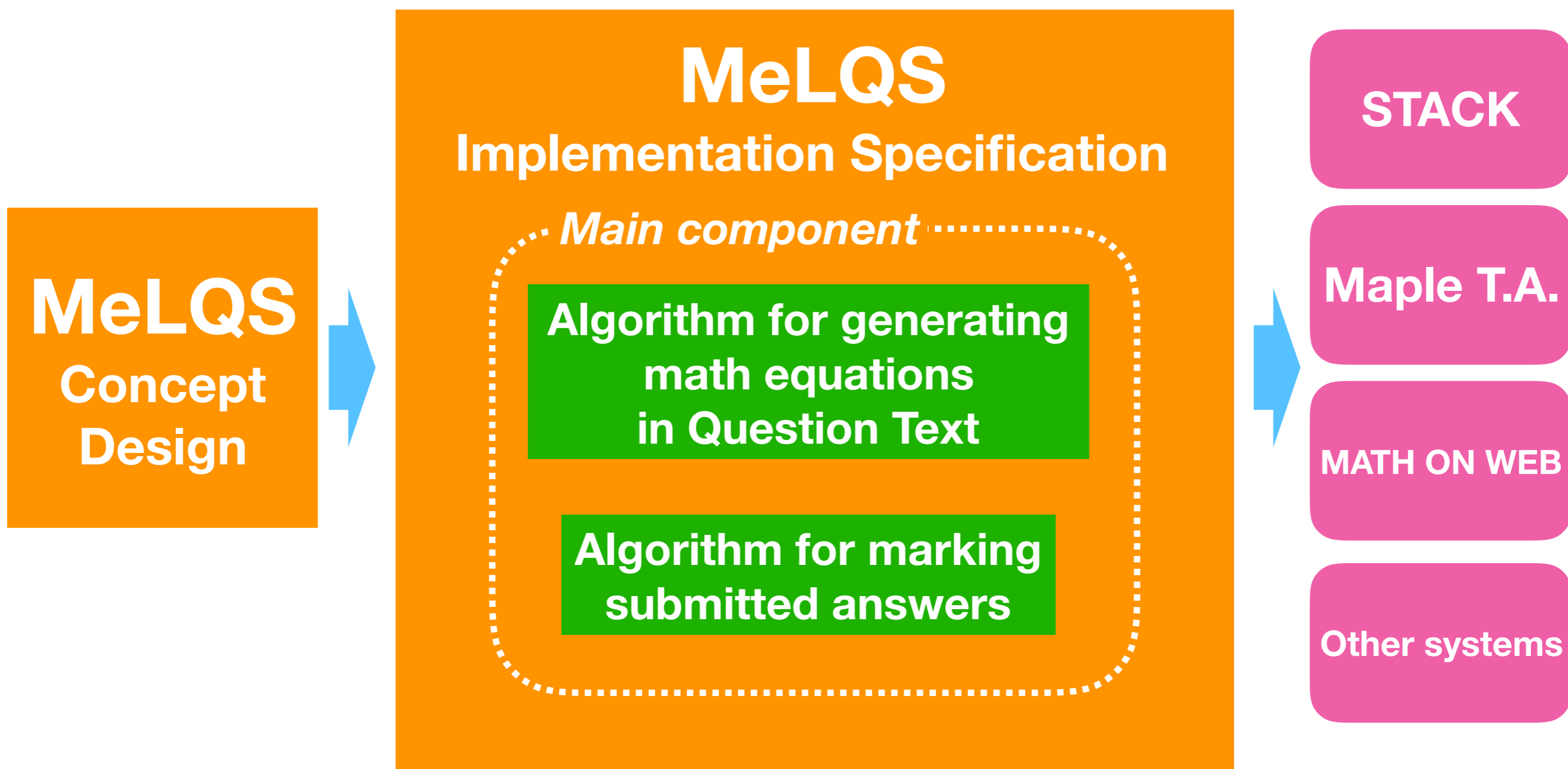




# Concept Design

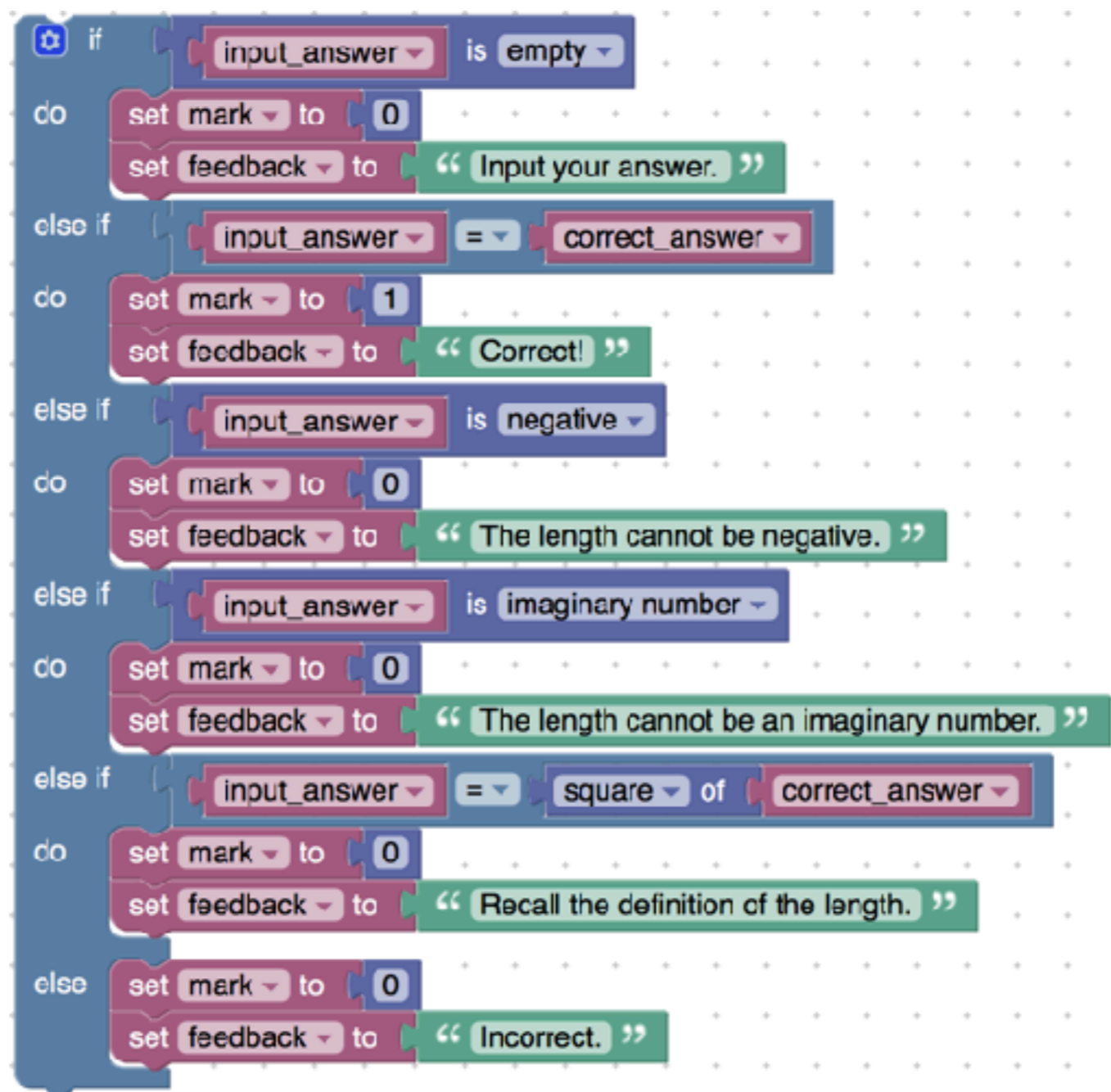
# Demo

# Implementation Specification (in progress)



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**MeLQS**  
Concept  
Design



STACK

Maple T.A.

MATH ON WEB

Other systems

**Marking Algorithm in Implementation Specification**

# Current status of our project

- We have developed an authoring tool for describing *Concept Designs* as a Moodle plugin.
- We are planning to implement a math input interface MathTOUCH (Fukui & Shirai, EAMS2016) to the authoring tool so that teachers can edit mathematical expressions more intuitively.
- *Implementation Specification* is now in progress.
- MeLQS will be provided as a cloud service, hopefully within a few years.

**MeLQS Project**  
*info@melqs.org*

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