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Rancang Bangun Pengendali Hoist Pada Miniatur *Rubber Tyred Gantry Crane*

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DOSEN PEMBIMBING: EKO PRAMUNANTO,S.T.,M.T.

2016

Pembahasan

- Latar Belakang
- Permasalahan
- Tujuan
- Batasan Masalah
- Perancangan Alat
- Pengujian dan Analisa
- Kesimpulan

Latar Belakang

- Kecelakaan saat memindahkan kontainer di terminal petikemas sering terjadi karena terbatasnya penglihatan operator.
- Menimbulkan kerugian finansial sampai mencelakaan orang yang disekitar.

Sumber : PT. TPS Surabaya tanggal 29 Januari 2016

Permasalahan

pengaturan level ketinggian saat mengangkat kontainer masih manual berdasarkan intuisi dari operator.

maka dibutuhkan pengaturan level secara otomatis untuk menghindari kecelakaan tersebut.

Tujuan

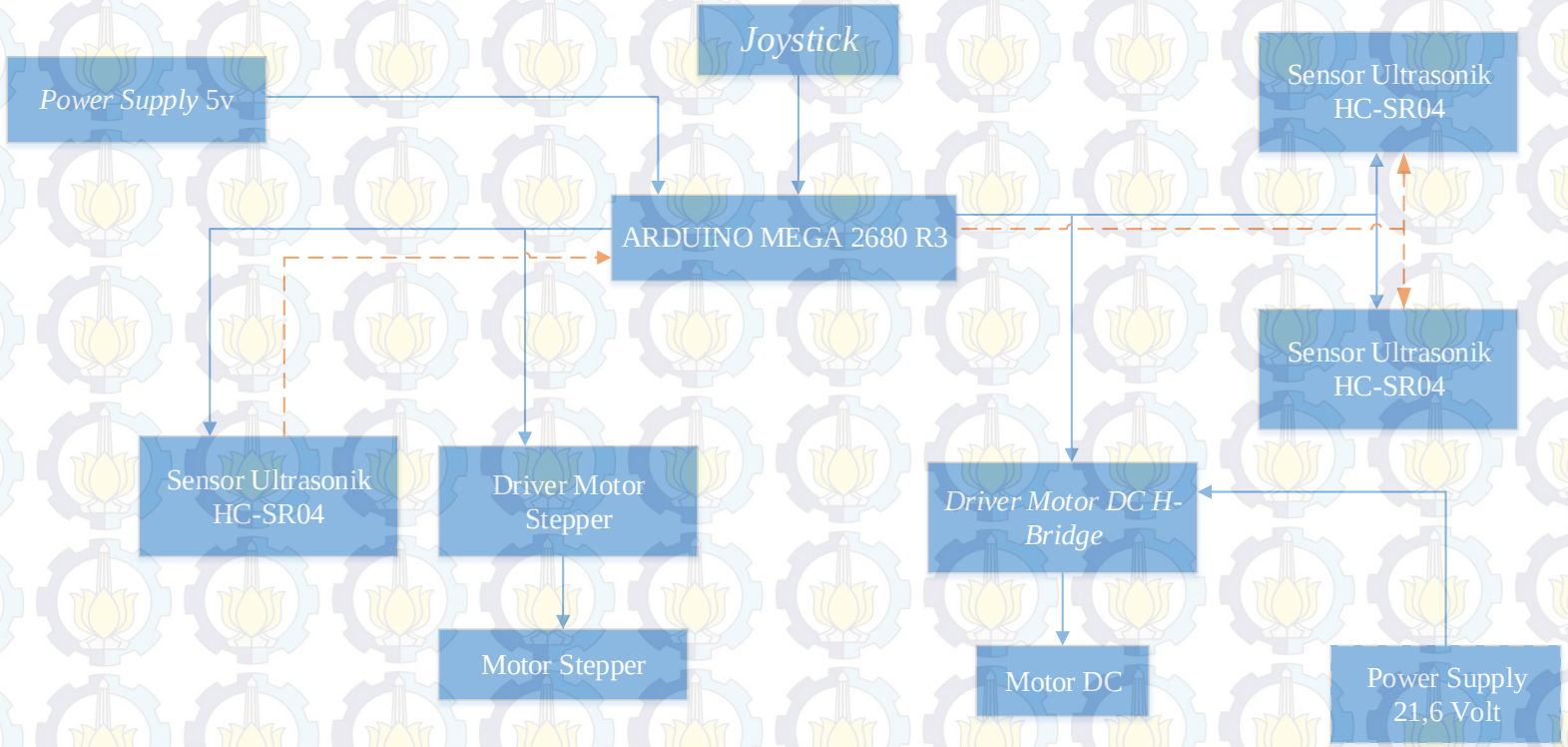
- merancang miniatur *Rubber Tyred Gantry Crane* yang dapat melakukan pengereman *hoist* secara otomatis berdasarkan level ketinggian yang diberikan.

Batasan Masalah

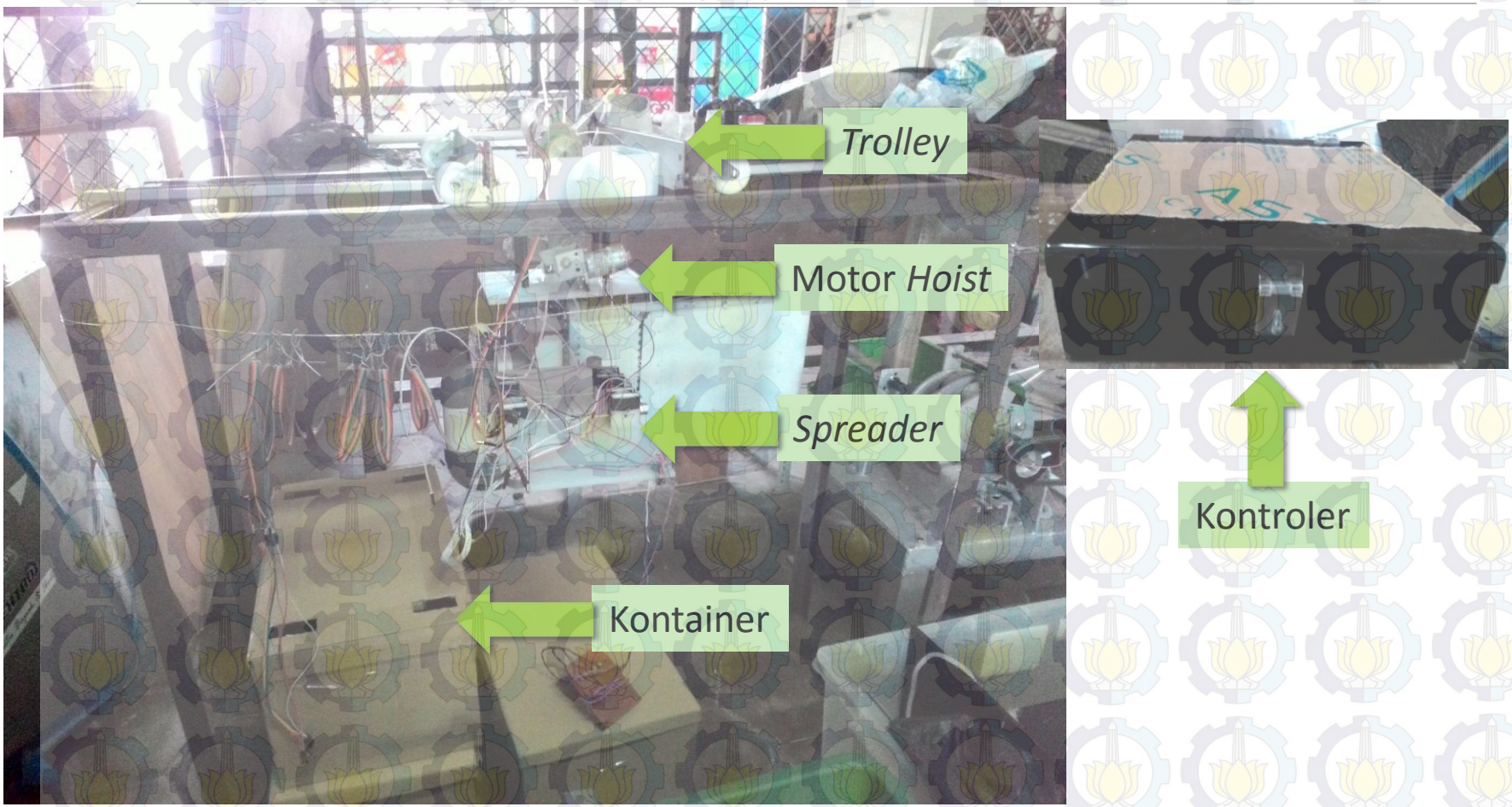
- Tidak dapat berjalan (tidak beroda)
- Menggunakan arduino mega 2560
- Tidak memiliki anti *sway*

Perancangan Alat

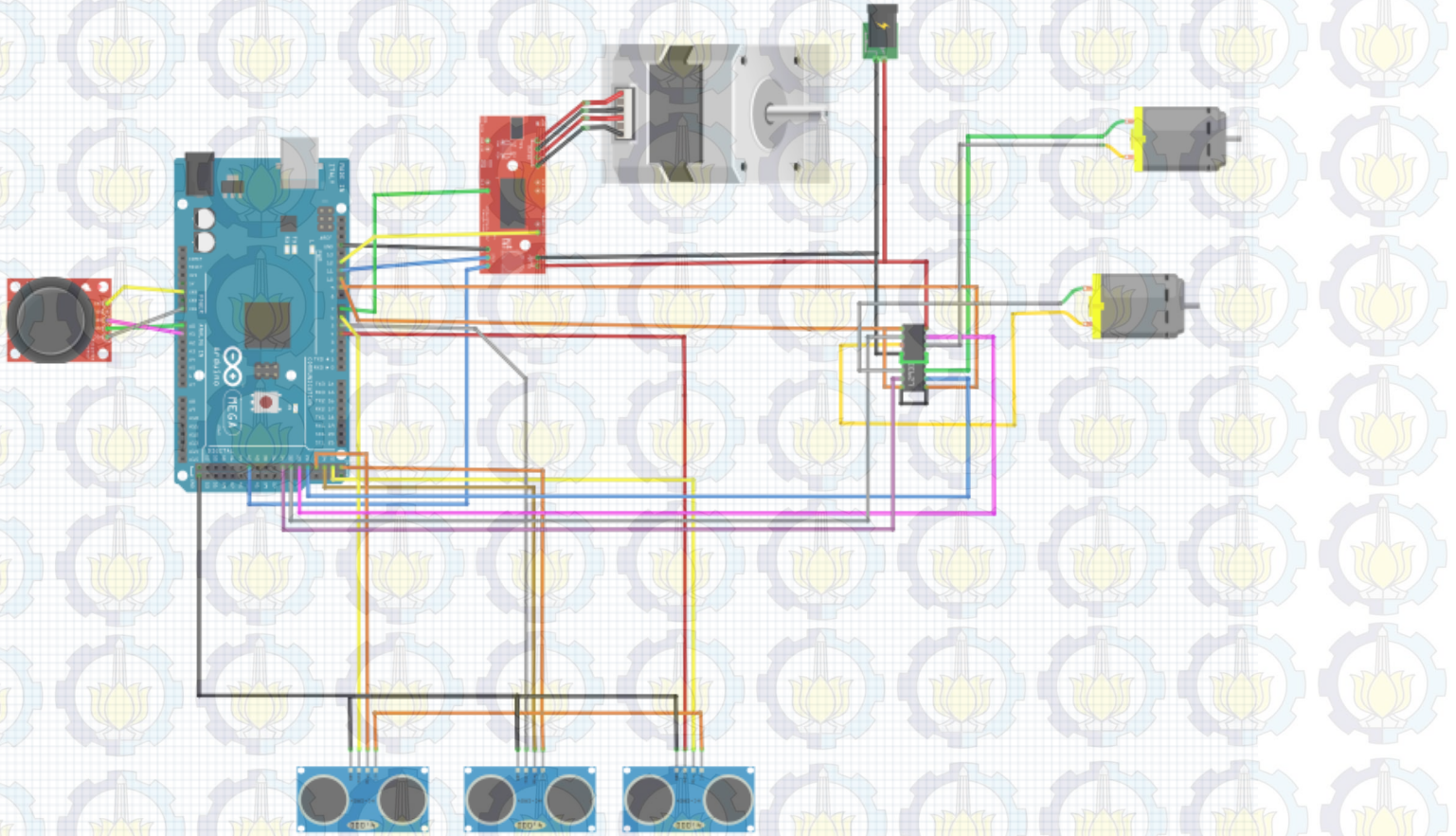
Diagram Fungsional Alat



Hardware



Perancangan Elektrik



B. Model Answer Generator

A function that takes a **Problem Instance** and generates a **Model Answer**.

Calculate 23 + 40	63
Calculate $a + $b	
[a = 23, 56 ; b = 123]	$ (a + b)
Calculate 56 + 123	179

C. User Interface

A mechanism that a user interacts with to create a **Student Answer**.

Calculate 23 + 40

- ○ 53
- ◉ 63
- ○ 27

63

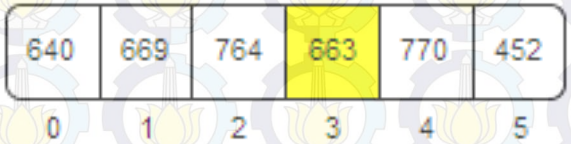
D. Answer Evaluator

A function that compares the **Student Answer** to the **Model Answer** to determine correctness.

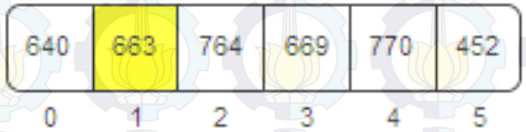
- String comparison
- Activity log comparison for interactive exercises

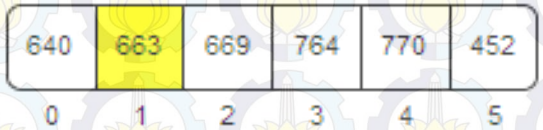
D. Answer Evaluator

Perform insertion sort

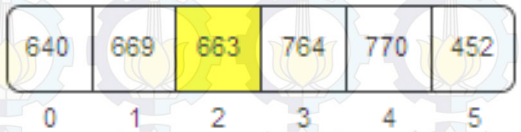


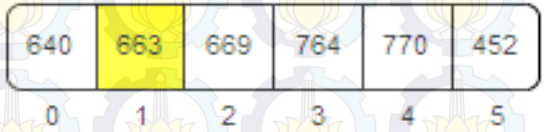
Model Answer





Student Answer





Incorrect!!!

E. Variables

These carry information from the **Problem Template** to the **Model Answer Generator**.

Calculate ~~$a~~ + ~~$b~~

56 123

[a = 23, 56 ; b = 123]

Model Answer

$ (~~a~~ + b)

56 + 123

= 179

Outline

- Background and Motivation
- Problem
- **Dynamic Problems**
- Related Work
- Claims
- QBANK – Functions and Features
- QBANK – Demos
- Usability Study and Feedback
- Future Work

Dynamic Problem

- Problems that support parameterization or **variables.**

Problem template	Is today $day?
Variables	$day = “Monday”, “Tuesday”, “Wednesday”
User Interface	○ True ○ False
Model Answer Generator	($day == “Monday”) ? True : False
Problem Instance	Is today Tuesday?
Student Answer	○ True ● False
Answer Evaluator	String comparison(Model Answer, Student Answer)

False False

=> True (Correct!!)

Significance of dynamic problems

Effective learning

- Large database of practice questions.
- Test questions should have similar level of difficulty.
- Same questions for all students could result in unfair practices.
  - Copy the solution.
  - Memorize answers.

Significance of dynamic problems

Challenges

- Takes a lot of time
- Ensuring same level of difficulty would require using the same question with different values. (Redundancy)
- Ensuring correctness of solution is tedious.

Solution → Dynamic Problem Authoring

Authoring Tools

Tools that used for editing or creating content.

PROBLEMS

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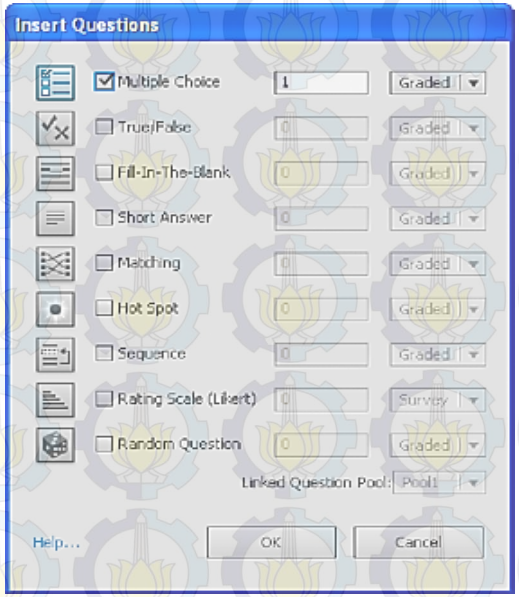
Related Work

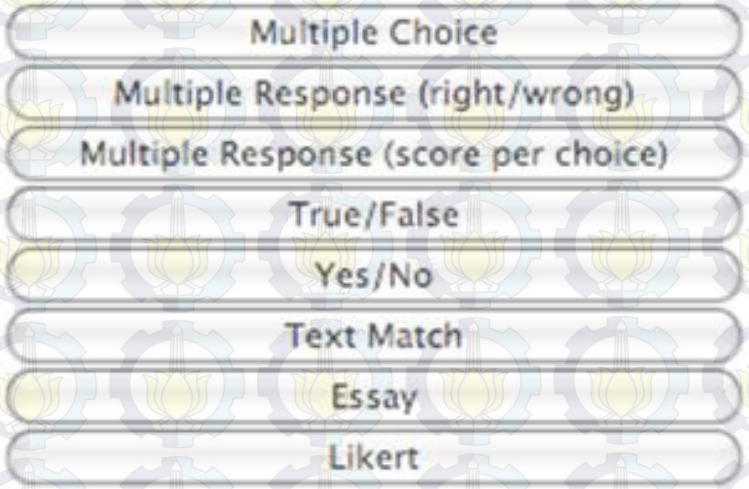
- Learning Management Systems
  - Blackboard, Moodle
- Generic Problem Authoring Tool
  - Adobe Captivate, Question Mark

Related Work

Adobe Captivate

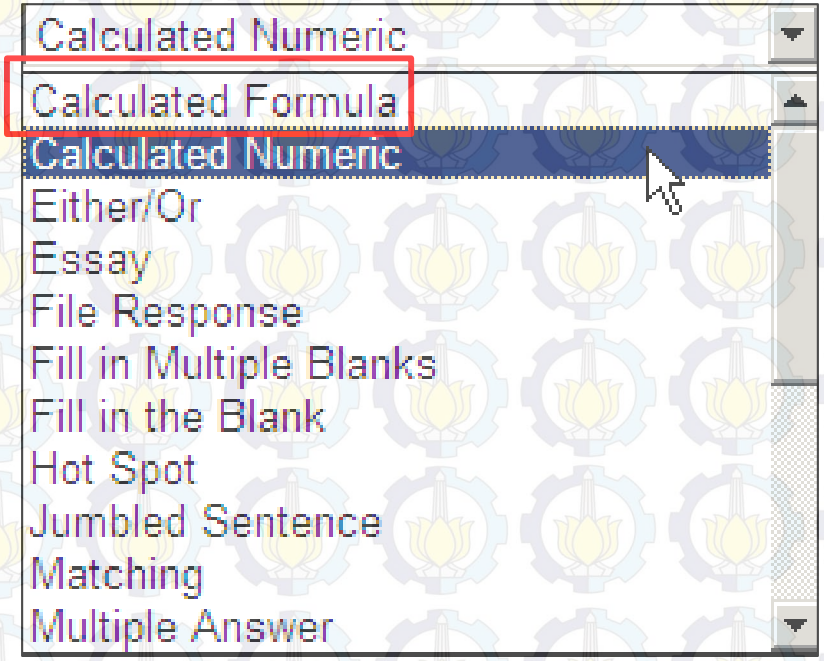


Question Mark



Related Work

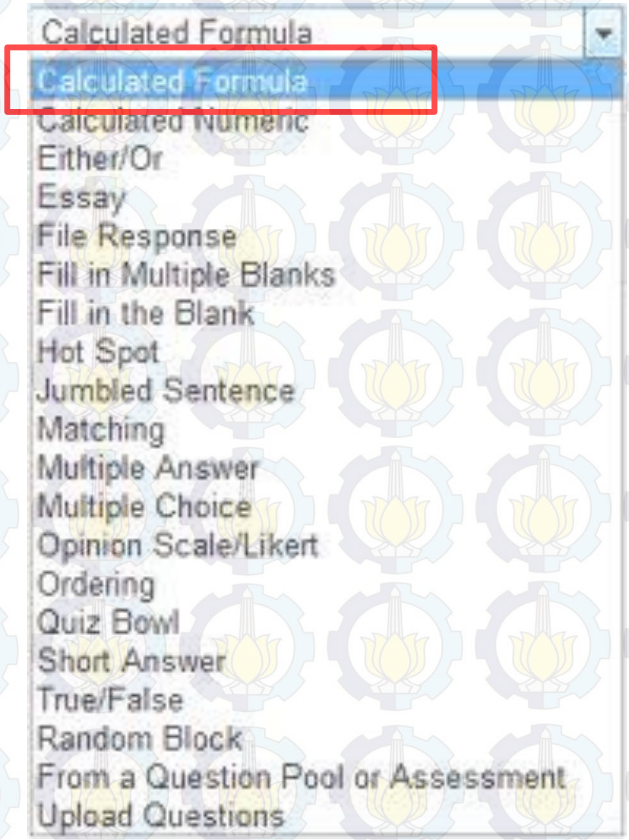
Blackboard



- Limited to 5 variables.
- The values have to be individually added to the list.
- Only supports Mathematical calculations.

Related Work

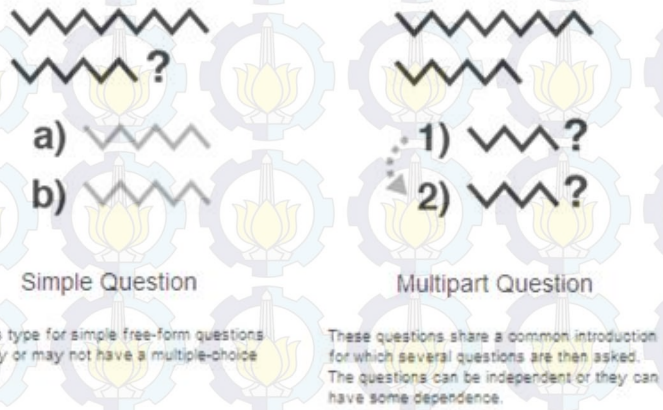
Moodle



- Dataset of values have to be individually added.
- Limited to 100 different values for a variable.
- Only supports Mathematical calculations.

Related Work

QuadBase



- Has an option for Dynamic questions but still not implemented yet.

Khan Academy Exercise Framework

Pros

- Supports the use of variables (text , numbers)
- Complex Problem types {Interactive graphs, geometry}
- Written in HTML which supports any functionality that can be written in JavaScript{Visualizations, Mouse interactions, etc}

Khan Academy Exercise Framework

Cons

- Need programming expertise.
- Simple questions also need a lot of code to work correctly.
- No consistent problem authoring format defined.

Static MCQ

```
<!DOCTYPE html><html data-require="math math-format word-problems spin">
<head>
<title>Insertion_sort_MCQ</title>
<script src="../../lib/jquery.min.js"></script>
<script>urlBaseOverride = "../../ODSAkhan-exercises/";</script>
<script src="../../lib/khan-exercise-min.js"></script>
</head>
<body>
<div class="exercise">
<div class="vars"></div>
<div class="problems">
<div id="problem-type-or-description">

<p class="question">We know that the worst case for Insertion Sort is about <code>n^2/2</code>, while the average case is
    about <code>n^2/4</code>. This means that:</p>

    <div class="solution">
        <var>"Both of the Above"</var>
    </div>
    <ul class ="choices">
    <li>
        <var>"The growth rates are the same"</var>
    </li>
    <li>
        <var>"The runtime in the average case is about half that of the worst case"</var>
    </li>
    <li>
        <var>"None of the above"</var>
    </li>
    </ul>
    <div class="hints">
    <p>"Think of the behaviour of every pass through the inner
       for loop of the insertion sort if keys are equal."</p>
</div></div></div></div>
</body>
</html>
```

Hyper Text Markup Language file length : 1262 lines : 39 Ln : 37 Col : 1 Sel : 0 | 0 UNIX ANSI as UTF-8 INS

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- **Claims**
- QBANK – Functions and Features
- QBANK – Demos
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Claims

- Dynamic problems are advantageous.
- Existing tools lack support for dynamic problem authoring.
- Khan Academy Exercise Framework is powerful but not user friendly.

QBANK

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- **QBANK – Goals and Features**
- QBANK – Demos
- Usability Study and Feedback
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Goals

- Build an intuitive user friendly interface for users with different levels of programming expertise.
- Consistent user interface for different problem types based on **Problem** definition.
- Capability of exporting **Problems** in different formats.

Features

- Supports Dynamic Problem Authoring
- Supports Authoring Domain Specific – Khan Academy Exercise
- Export authored problems in generic CSV format and in specific Khan Academy Exercise format.

Problem Types

- Static multiple choice problem
- Dynamic problems – List and Range type of values that variables can take
- Summative problems
- Tool specific problem – Khan Academy exercises

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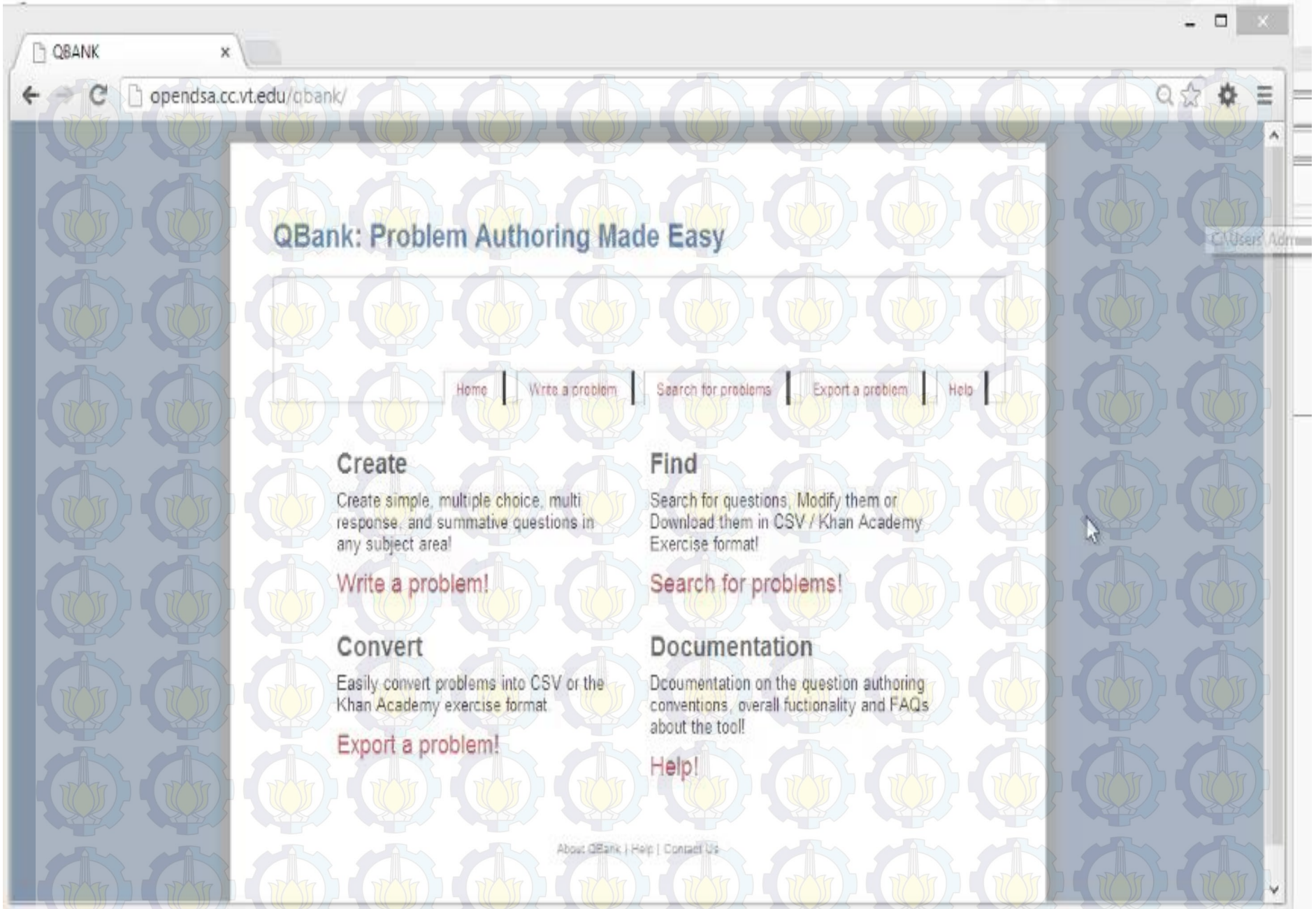
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Export a problem
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Write a problem!
Find
Search for questions, Modify them or Download them in CSV / Khan Academy Exercise format!
Search for problems!
Convert
Easily convert problems into CSV or the Khan Academy exercise format
Export a problem!
Documentation
Documentation on the question authoring conventions, overall fuctionality and FAQs about the tool!
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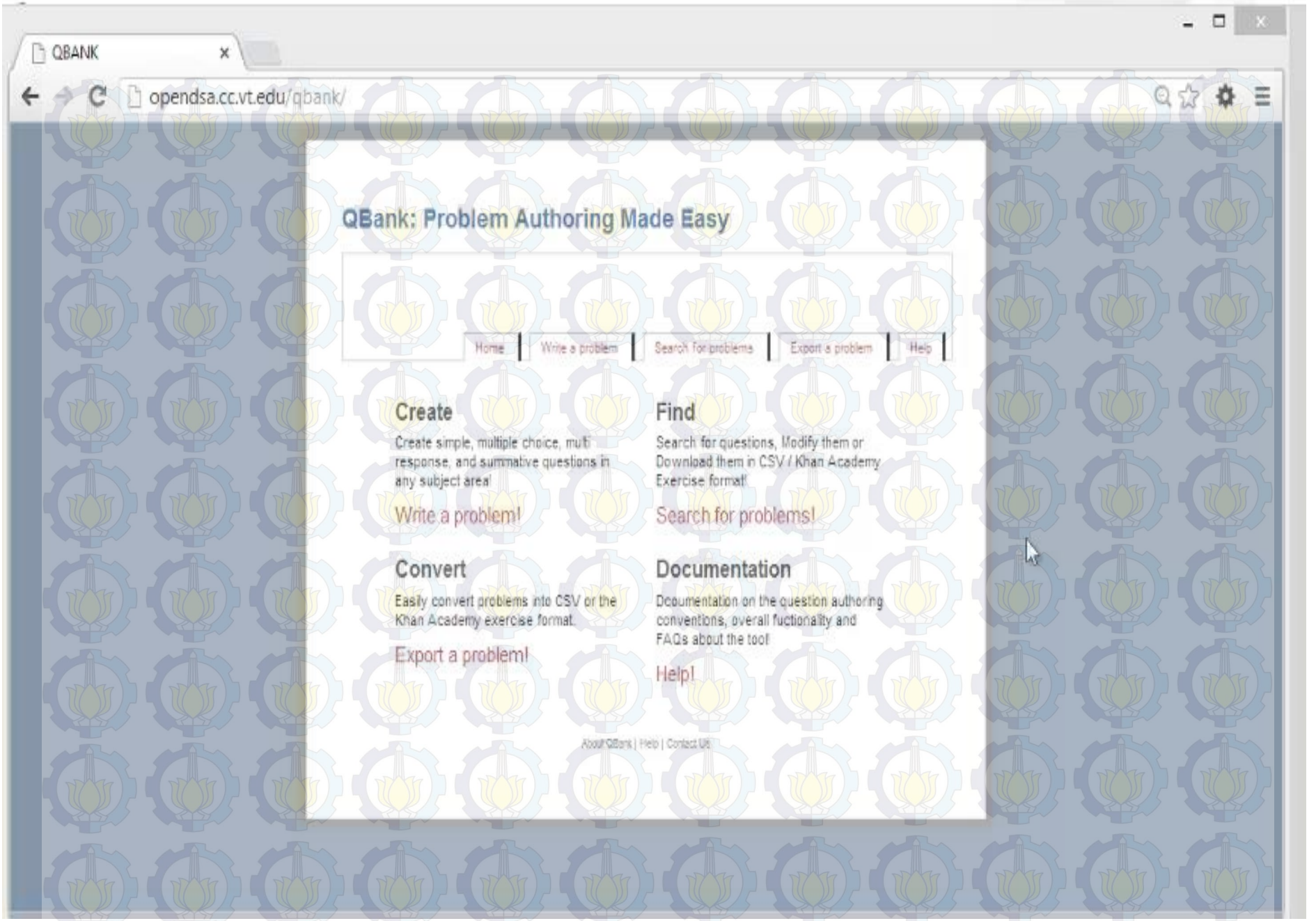
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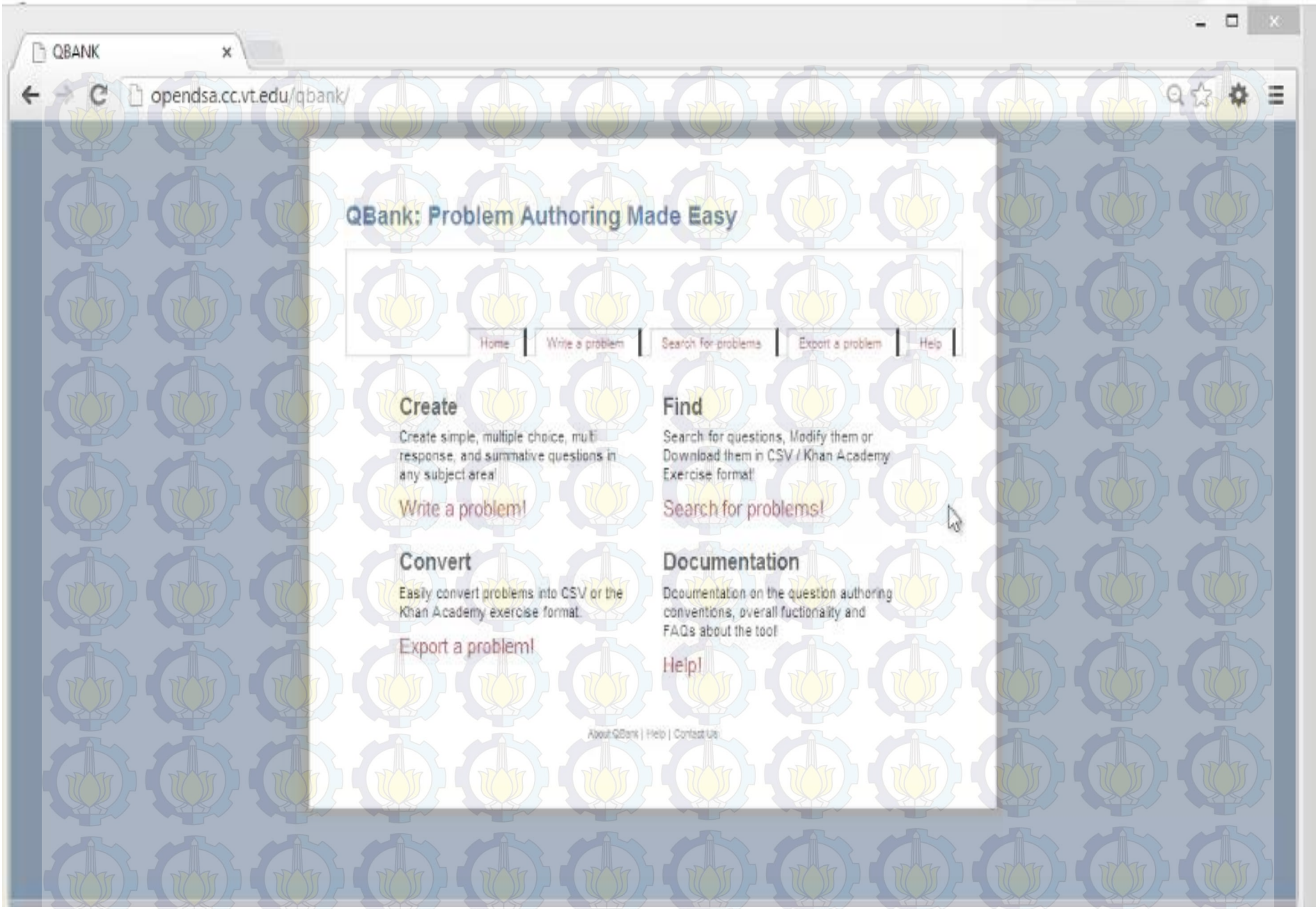
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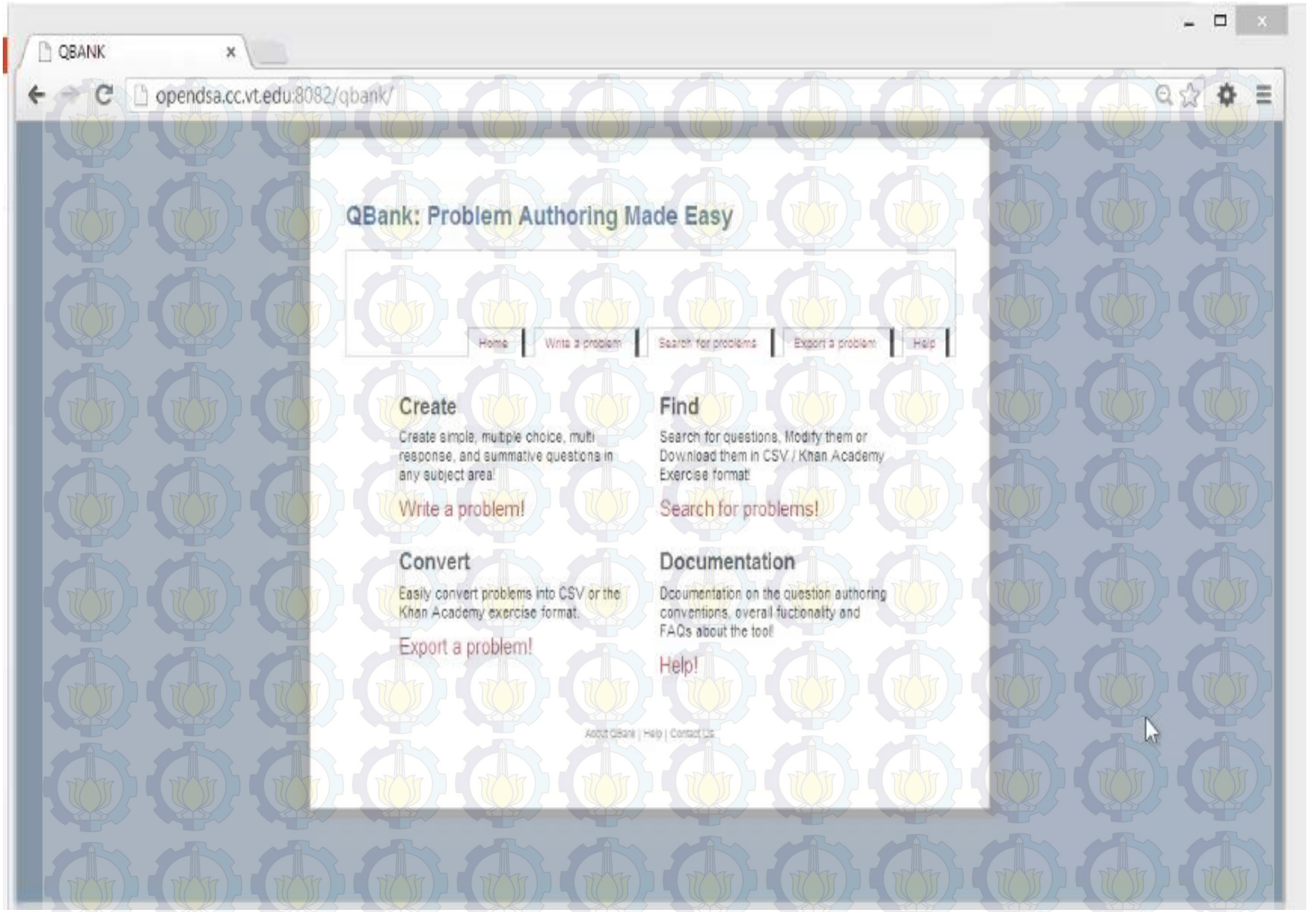
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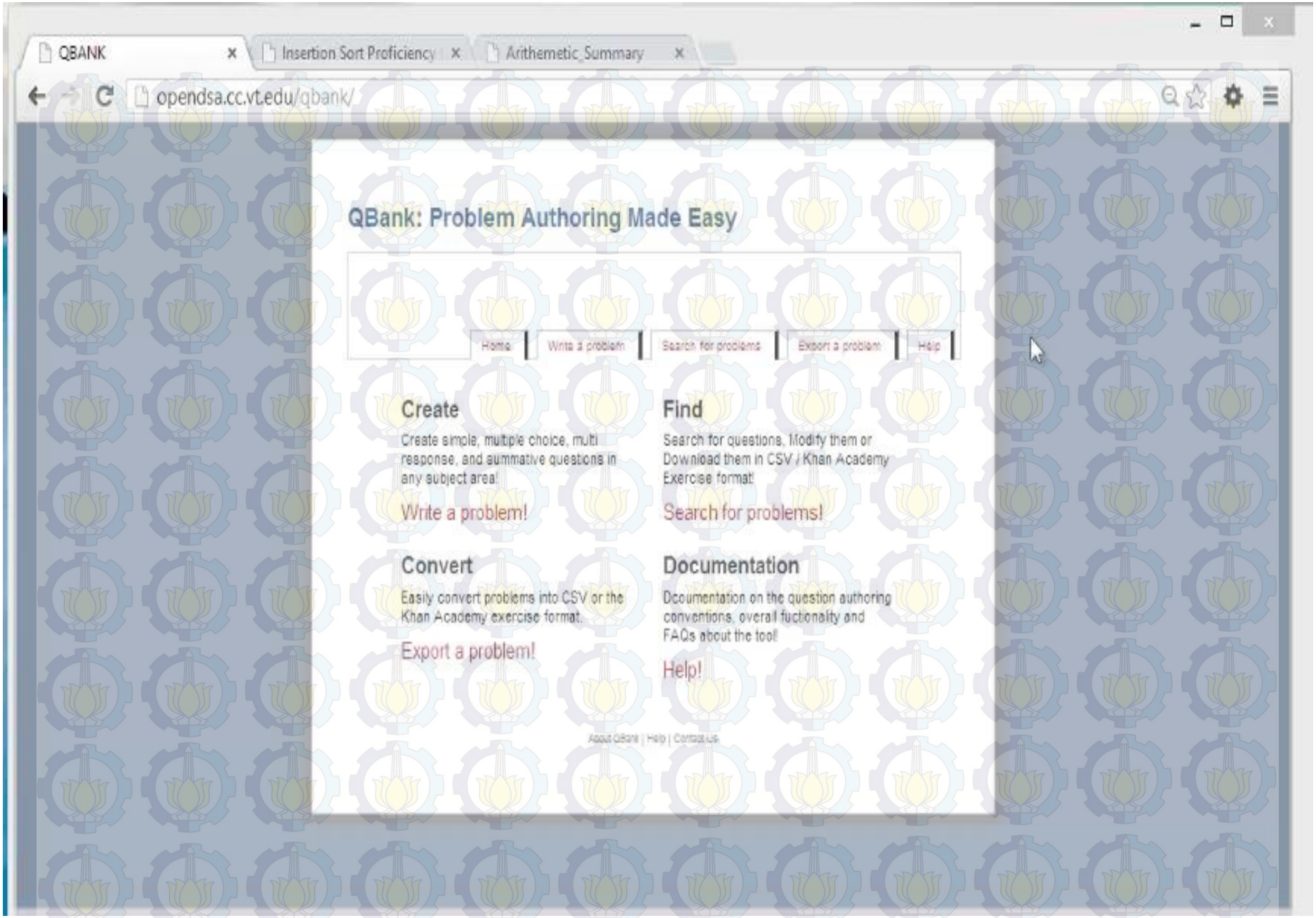
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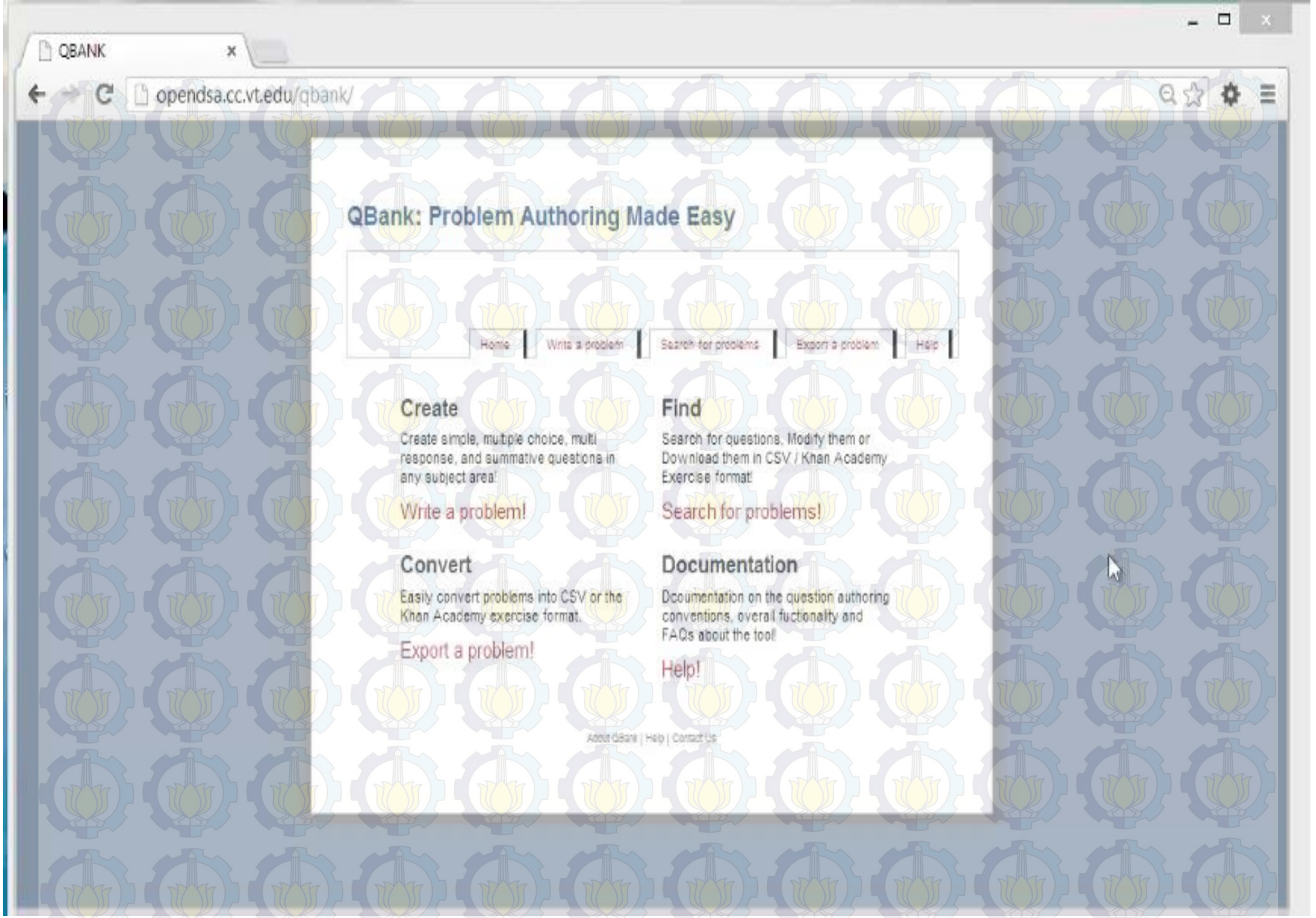
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Usability Study

- To evaluate the capability of QBank to author dynamic problems.
- To determine if the user interface is intuitive and easily navigable.
- To compare the effectiveness of QBank in comparison with other authoring tools/frameworks that the participants previously used.
- To study the usefulness of providing export to a generic CSV format and a specific Khan Academy Exercise format.

Feedback

- Specialized support for dynamic problem authoring was highly appreciated
- Problem type specific user interfaces made it easy for the users to navigate and focus on the content of the problem (not overwhelmed by extraneous details to a problem type)
- In comparison to other tools, the consistency of UIs across problem types and the extra features to make dynamic problem authoring easy were seen to be very helpful
- Generic CSV format lets problems to be imported into other publishing tools (Moodle, Blackboard, QuestionMark, etc)

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Conclusion and Future Work

- Consolidation of interfaces
- User accounts
- Version control
- Rich text area editors
- Intelligent syntactic editors for Tool-specific problems.

Thank you!!!!

Special mentions:

Dr. Cliff Shaffer

Eric Fouh

QUESTIONS ???