A Proposal of Application for Learning about Document Structuring and Styling through Pictogram Content Creation

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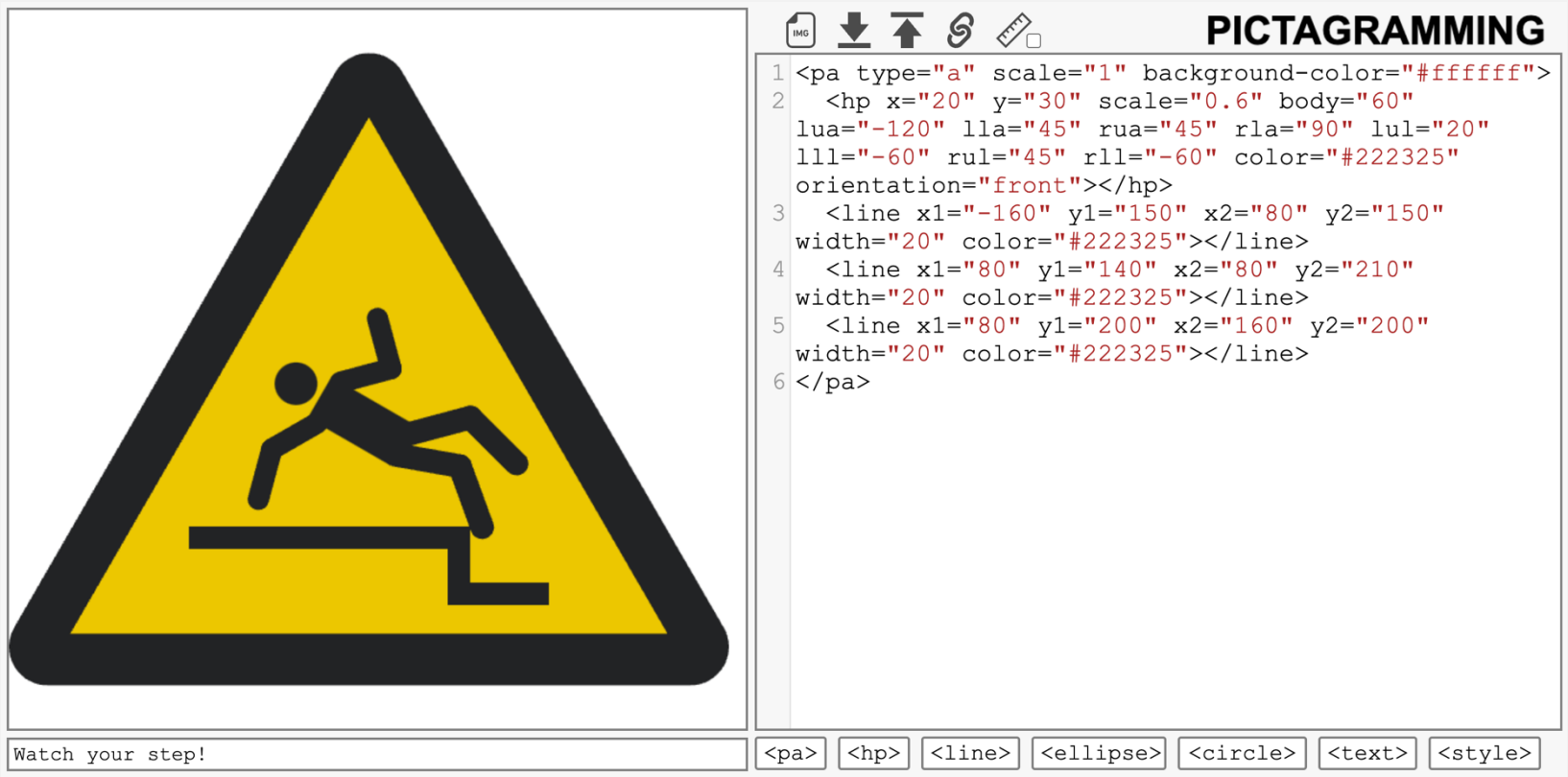
Pictagramming

Application for learning about notation of markup language and style sheet language through pictogram content creation



https://pictogramming.org/apps/pictagramming/

Outline

1. Background
2. Previous Research: Pictogramming Series
3. Pictagramming
4. Classroom Practice and Evaluation
5. Summary and Outlook

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Background

Web content creation practice in limited time

- Difficult to understand HTML and CSS
- Difficult to create high quality design content

→ Need for learning environment that users can learn about document structuring and styling efficiently

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Previous Research: Pictogramming Series

Outline

- Applications for learning programming and information design through pictogram content creation

Name

- Pictogramming = Pictogram + Programming

URL

- https://pictogramming.org/

Some versions

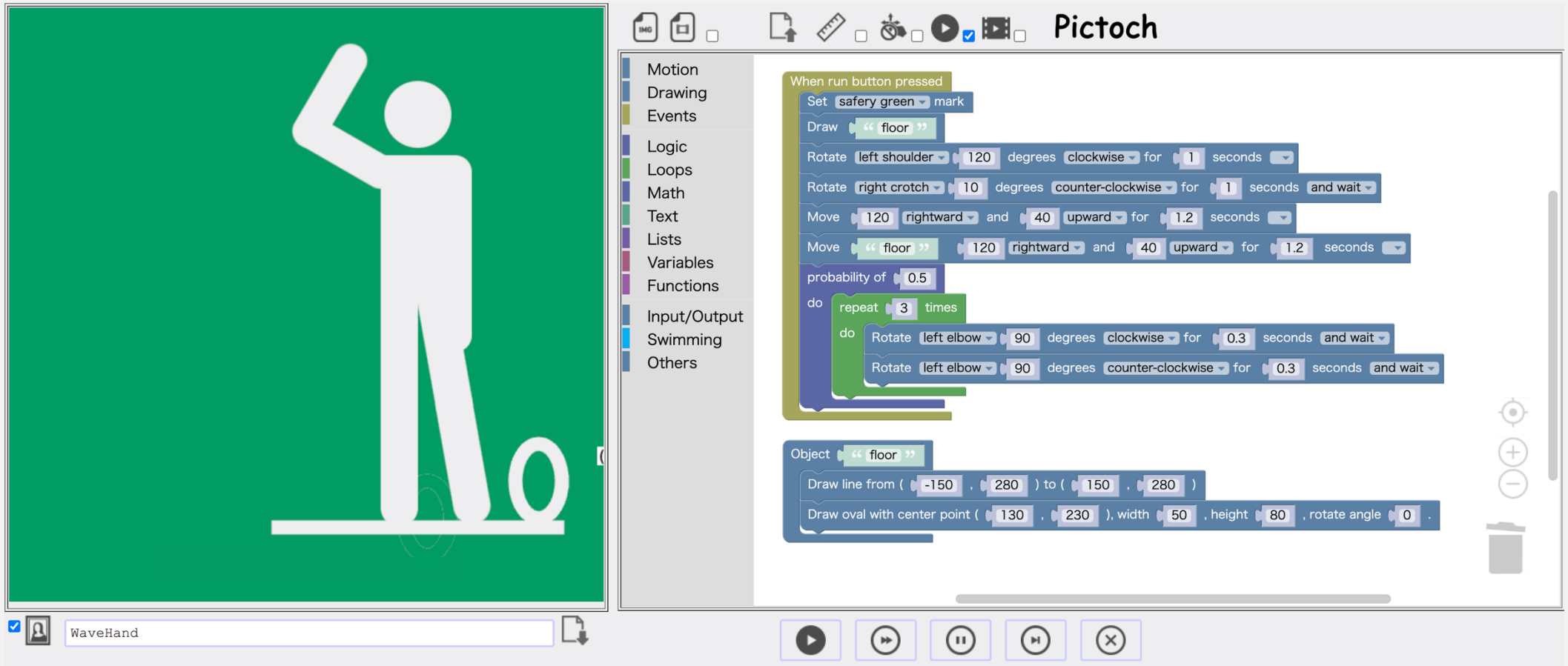
- Pseudo-language, Visual programming, Python, JavaScript, Ruby

Previous Research: Pictogramming Series

Pictogramming (pseudo-language)

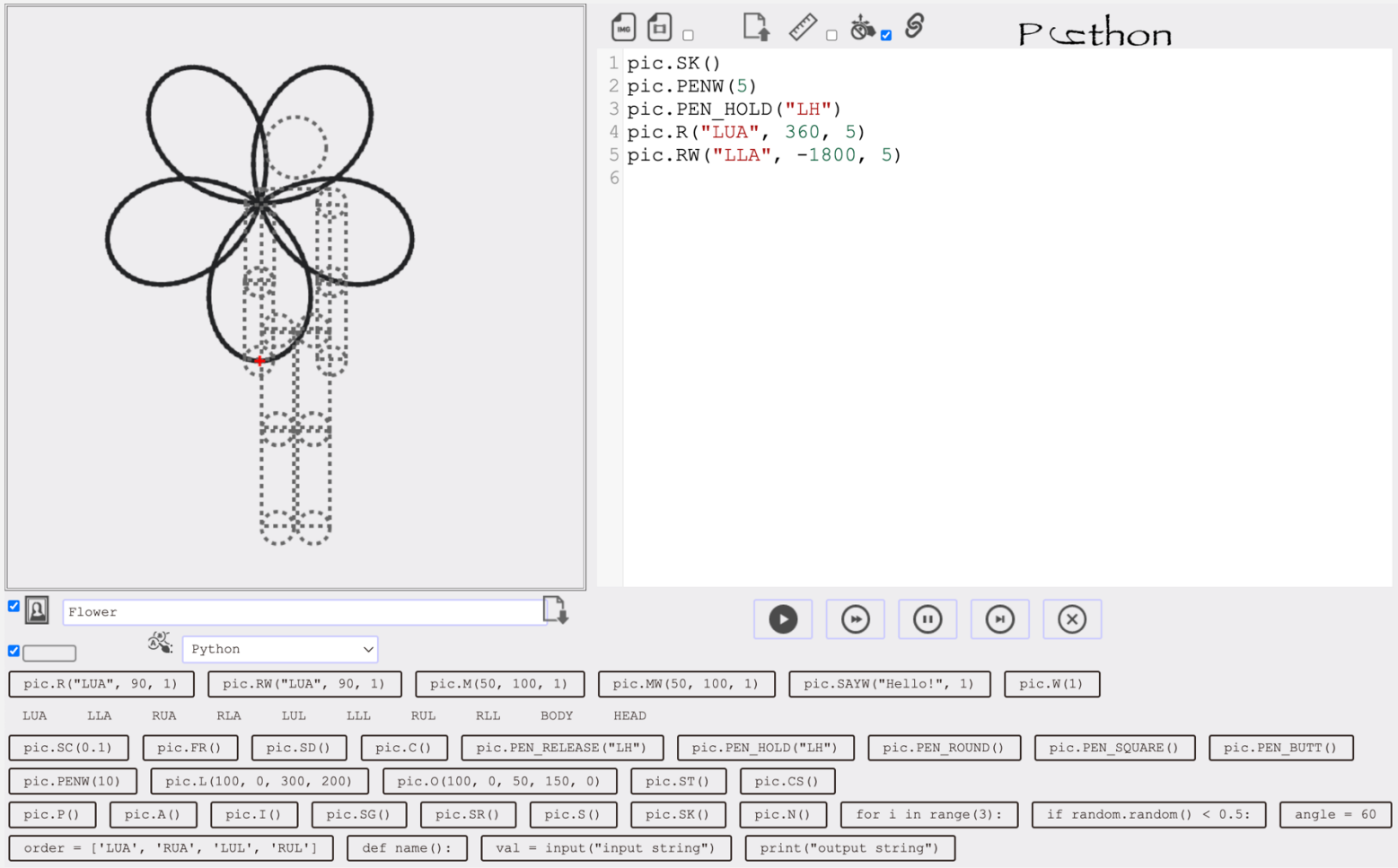
Previous Research: Pictogramming Series

Pictoch (visual programming language)



Previous Research: Pictogramming Series

Picthon (Python)



Previous Research: Pictogramming Series

If Pictogramming Series has
HTML and CSS version,
we can realize efficient and enjoyable
web production practice.

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Pictagramming

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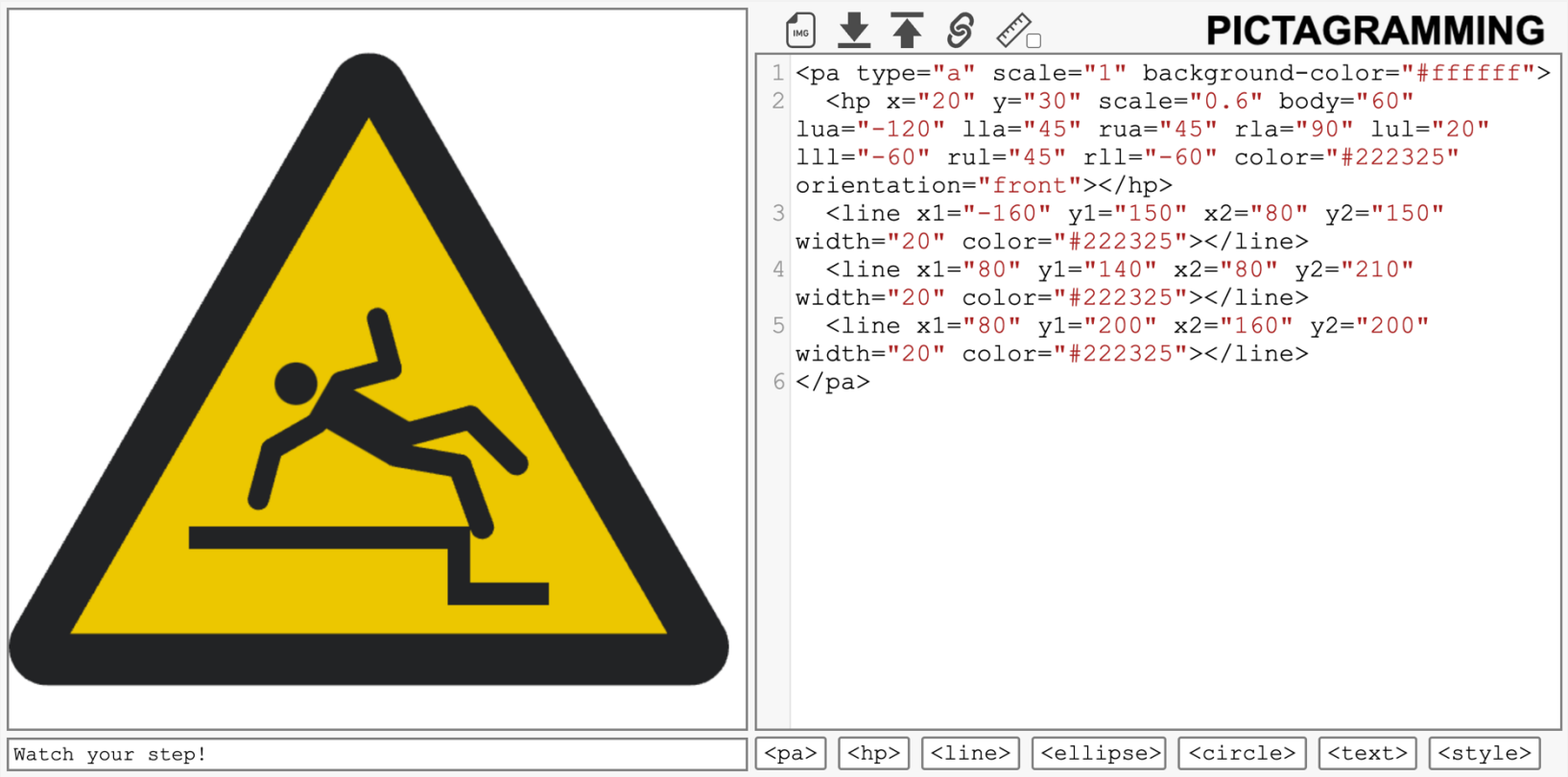


https://pictogramming.org/apps/pictagramming/

Pictagramming

Name

- Pictogram + Tag

URL

- https://pictogramming.org/apps/pictagramming/

UI

- Inherits the UI of Pictogramming Series

Function

- Download pictogram image
- Download and upload code
- Share information containing the code as URL

Pictagramming

Demonstration

https://pictogramming.org/apps/pictagramming/

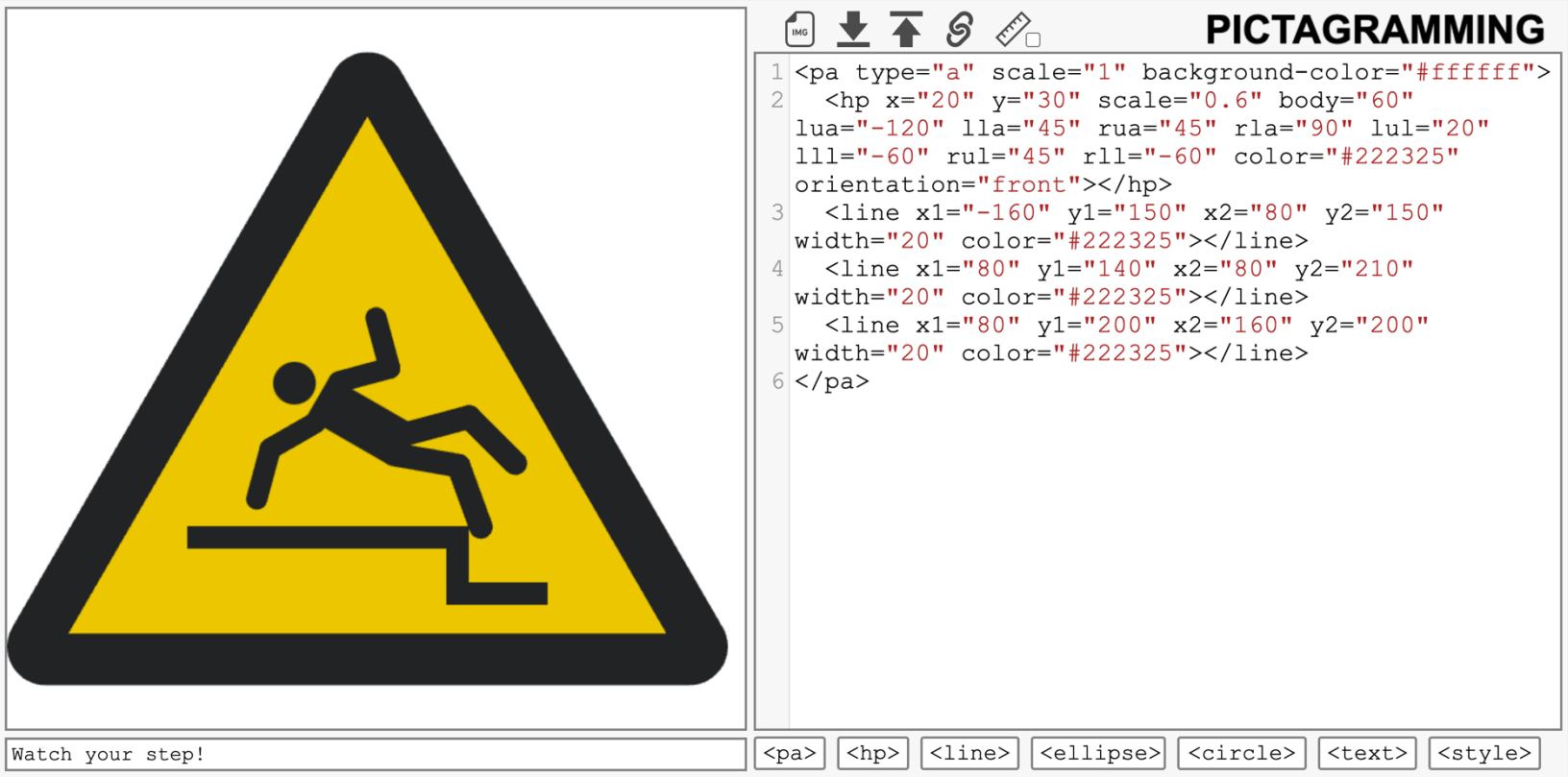
Pictagramming (HPML)

HPML (Human Pictogram Markup Language)

- Markup language for creating pictogram
- 5 tags
  1. **<pa>** : Pictogram Area
  2. **<hp>** : Human Pictogram
  3. **<line>** : Line
  4. **<ellipse>** : Ellipse
  5. **<text>** : Text

Pictagramming (Attributes of HPML)

Attributes defined based on instructions and variables of Pictogramming Series.



Pictagramming (Attributes of HPML)

List of HPML tag's attributes

- **<pa>**
  type, **scale**, **background-color**
- **<hp>**
  x, **y**, **scale**, **angle**, **body**, **lua**, **lla**, **rua**, **rla**, **lul**, **lll**, **rul**, **rll**, **color**, **orientation**
- **<line>**
  x1, **y1**, **x2**, **y2**, **width**, **color**
- **<ellipse>**
  x, **y**, **width**, **height**, **angle**, **color**
- **<text>**
  x, **y**, **color**, **font-size**, **font-family**

Pictagramming (HPML + HTML)

HTML can be used in addition to HPML to create contents including pictograms and texts.

PICTAGRAMMING

```
<div id="wrapper">
  <h1>CAUTION</h1>

  <pa type="a" scale="0.7">
    <hp x="20" y="30" scale="0.6" body="60"
lua="-120" lla="45" rua="45" rla="90" lul="20"
lll="-60" rul="45" rll="-60" color="#222325"
orientation="front"></hp>
    <line x1="-160" y1="150" x2="80" y2="150"
width="20" color="#222325"></line>
    <line x1="80" y1="140" x2="80" y2="210"
width="20" color="#222325"></line>
    <line x1="80" y1="200" x2="160" y2="200"
width="20" color="#222325"></line>
  </pa>

  <div class="message">
    <div>Watch your step!</div>
    <div>お足元にお気をつけください</div>
  </div>
</div>

<style>
div#wrapper {
```

Watch your step!

<pa> <hp> <line> <ellipse> <circle> <text> <style>

Pictagramming (CSS)

Created pictograms by specifying attributes of HPML tags.

However, Pictograms can also be created by applying CSS to HPML tags.

- Property names and values are same as HPML tags' attribute names and values, and processing is also same.
- Description using HPML tags' attributes takes priority when both HPML tags' attributes and CSS are described.

Pictagramming

Demonstration

https://pictogramming.org/apps/pictagramming/

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Classroom Practice and Evaluation

Dates

- April 26, 2024, and May 10, 2024

Subjects

- 78 fist-year university students who were taking
  “Introduction to Information Science, ” course
  in the Faculty of Social Informatics at Aoyama Gakuin University

Class schedule

- April 26, 2024
  1. Lecture on information design and pictograms (15 minutes)
  2. Explanation of how to use Pictagramming (15 minutes)
  3. Creation of original Pictagramming works (due May 10, 2024) (35 minutes)
- May 10, 2024
  4. Questionnaire survey (5 minutes)

Classroom Practice and Evaluation

Two questionnaire surveys

- Questions based on the System Usability Scale (SUS)
- Questions about class and interests in HTML, CSS, etc

Perspectives of evaluation

- Evaluation of usability by using System Usability Scale
- Evaluation of class design using Pictagramming and feasibility of implementation

Classroom Practice and Evaluation

System Usability Scale score was 56.31.

Q	Content	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	I think that I would like to use this system frequently	1	5	31	35	6
2	I found the system unnecessarily complex	4	40	16	14	4
3	I thought the system was easy to use	2	7	16	42	11
4	I think that I would need the support of a technical person to be able to use this system	2	17	21	31	7
5	I found the various functions in this system were well integrated	0	4	12	52	10
6	I thought there was too much inconsistency in this system	6	30	24	13	5
7	I would imagine that most people would learn to use this system very quickly	2	10	18	39	9
8	I found the system very cumbersome to use	3	29	22	18	6
9	I felt very confident using the system	8	16	36	14	4
10	I needed to learn a lot of things before I could get going with this system	3	15	22	32	6

Classroom Practice and Evaluation

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Classroom Practice and Evaluation

System Usability Scale score was 56.31

- Usability of Pictagramming needs to be improved, because score of 70 or higher is generally desired to satisfy minimum level of user satisfaction.

Classroom Practice and Evaluation

Result of Questions about class and interests

Q	Content	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
1	Your motivation to learn HTML was increased.	5	6	6	43	16	2
2	Your motivation to learn CSS was increased.	5	6	9	42	14	2
3	You enjoyed this class.	1	1	4	23	29	20
4	This class was difficult.	1	7	17	22	21	10
5	You agreed with the concept.	0	3	8	37	25	5
6	Your interest in web content creation has deepened.	0	6	8	28	29	7
7	Your interest in pictogram has deepened.	0	1	8	28	29	12
8	Your interest in information design has deepened.	1	2	4	26	37	8
9	You were able to create the work that you wanted to create.	1	8	13	27	23	6
10	Free to write your impressions of this class. (open question)	-	-	-	-	-	-

Classroom Practice and Evaluation

Result of Questions about class and interests

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3	You enjoyed this class.	1	1	4	23	29	20
4	This class was difficult.	1	7	17	22	21	10
5	You agreed with the concept.	0	3	8	37	25	5
6	Your interest in web content creation has deepened.	0	6	8	28	29	7
7	Your interest in pictogram has deepened.	0	1	8	28	29	12
8	Your interest in information design has deepened.	1	2	4	26	37	8
9	You were able to create the work that you wanted to create.	1	8	13	27	23	6
10	Free to write your impressions of this class. (open question)	-	-	-	-	-	-

Classroom Practice and Evaluation

Question 1 and Question 2 (willingness to learn HTML and CSS) were particularly poor results.

- Because it was information design class, not HTML and CSS.
- They doesn't feel that they were learning HTML and CSS because it was possible to create pictograms by changing the values of the codes entered by default.

Excerpts from Question 10 (open question)

- "The operation method was simple and easy to handle, and I found it interesting to create pictograms intuitively."
- "It was difficult to think of ways to make them easy to understand in creating the pictograms."
- "It was difficult at first, but as I got used to it, I enjoyed being able to create what I wanted to do."
- "It was difficult regarding the coordinates."

Classroom Practice and Evaluation

Although usability needs to be improved,
Pictagramming is expected to enable
efficient and enjoyable web production practice.

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Summary and Outlook

Summary

- Developed and evaluated “Pictagramming,” for learning document structuring and styling through pictogram content creation.
- Pictagramming can be used to realize efficient and enjoyable web production practice.

Outlook

- Improve usability.
- Repeatedly conduct classroom practice, evaluate, analyze, and verify education effectiveness.