SunoikisisDC Digital Classics, May 31, 2018

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Programming Through Latin

```
1.  Dehinc numerus sit: 0 ↵
2.  dum ( numerus minus quam 10 )
3.  incipit
4.      numerus augeatur modo: 1 ↵
5.  exit
```

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UF | ONLINE LEARNING INSTITUTE

UF | Department of CLASSICS

Questions

- How can we integrate computer literacy into Liberal Arts curricula?
- How can we motivate students and scholars acquire coding skills?
- What are the best practices for teaching computer programming to novices?

Rise of Digital Humanities

- 2/3 of the NEH funded Digital Humanities projects involve open-source computer code.
- APIs (Application Programming Interfaces) have been developed for Database queries, Lexicographic analysis, GIS mapping, 3D structural analysis, etc.

Rise of Digital Humanities

- Open-Source APIs for the Advancement of the Humanities
- Is it accessible to humanities scholars?

Integrating Computer Programming into Liberal Arts

- Alan Perlis argued that computer science should be part of a liberal education.
- Explicitly, he argued that all students should learn to program.
- Early 1960's

Integrating Computer Programming into Liberal Arts

- Discussion topic
- since ‘60s

- Fein 1961
- Perlis 1962
- Licklider 1962
- DeBruijn et al. 1963
- Brandon 1962
- Buckingham 1965

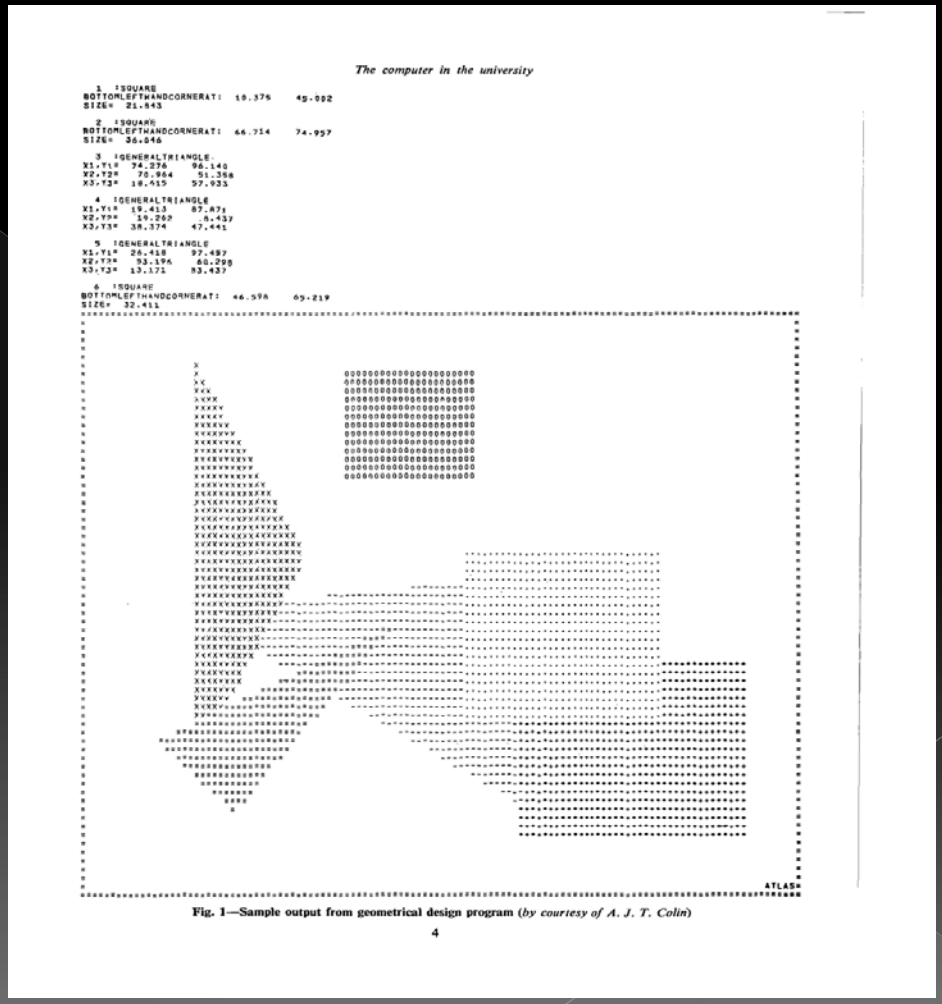

Fig. 1—Sample output from geometrical design program (*by courtesy of A. J. T. Colin*)

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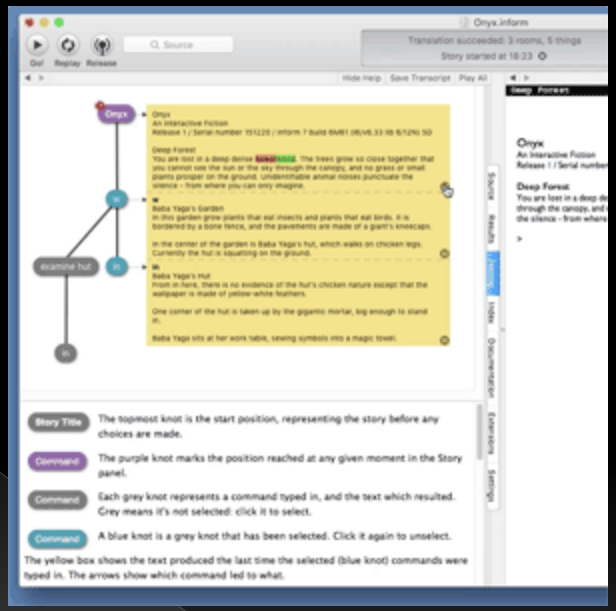
Integrating Computer Programming into Liberal Arts

- Today?
- Current topic in humanities forums.
- Discussions on “The Humanist”
  - Procedural Languages
  - Teaching Coding in Humanities

- M. Meteas (2005) “all students, engineering and liberal arts students alike, should have a two-semester computer science sequence in their freshman year."

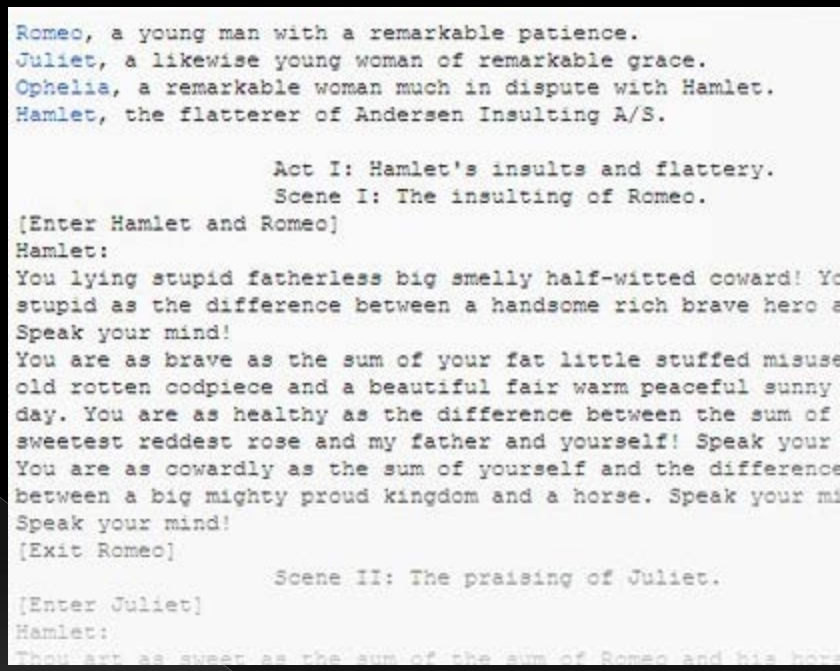
Projects

- Inform7
- **Inform** is a design system for interactive fiction based on natural language.



Projects

- SPL
- “Shakespeare Programming Language” (SPL) is an esoteric programming language, which was designed to make programs appear to be similar to Shakespearean plays.



```
Romeo, a young man with a remarkable patience.
Juliet, a likewise young woman of remarkable grace.
Ophelia, a remarkable woman much in dispute with Hamlet.
Hamlet, the flatterer of Andersen Insulting A/S.

                    Act I: Hamlet's insults and flattery.
                    Scene I: The insulting of Romeo.
[Enter Hamlet and Romeo]
Hamlet:
You lying stupid fatherless big smelly half-witted coward! Yo
stupid as the difference between a handsome rich brave hero a
Speak your mind!
You are as brave as the sum of your fat little stuffed misuse
old rotten codpiece and a beautiful fair warm peaceful sunny
day. You are as healthy as the difference between the sum of
sweetest reddest rose and my father and yourself! Speak your
You are as cowardly as the sum of yourself and the difference
between a big mighty proud kingdom and a horse. Speak your mi
Speak your mind!
[Exit Romeo]
                    Scene II: The praising of Juliet.
[Enter Juliet]
Hamlet:
Thou art as sweet as the sum of the sum of Romeo and his hors
```

Projects

- Metafor
- Visualizing stories as code

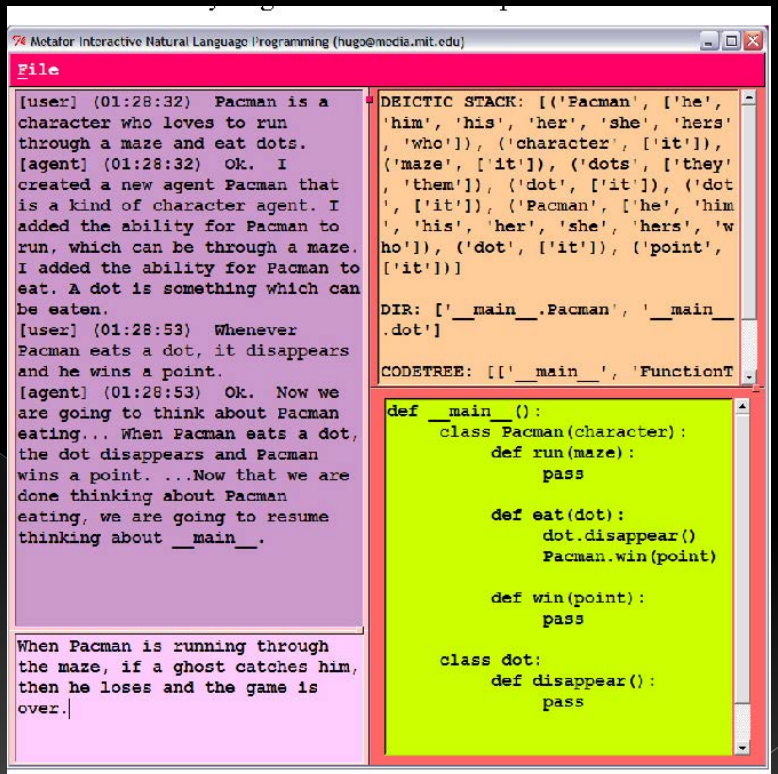


Figure 1. A screenshot of Metafor. Clockwise from the lower left

Questions

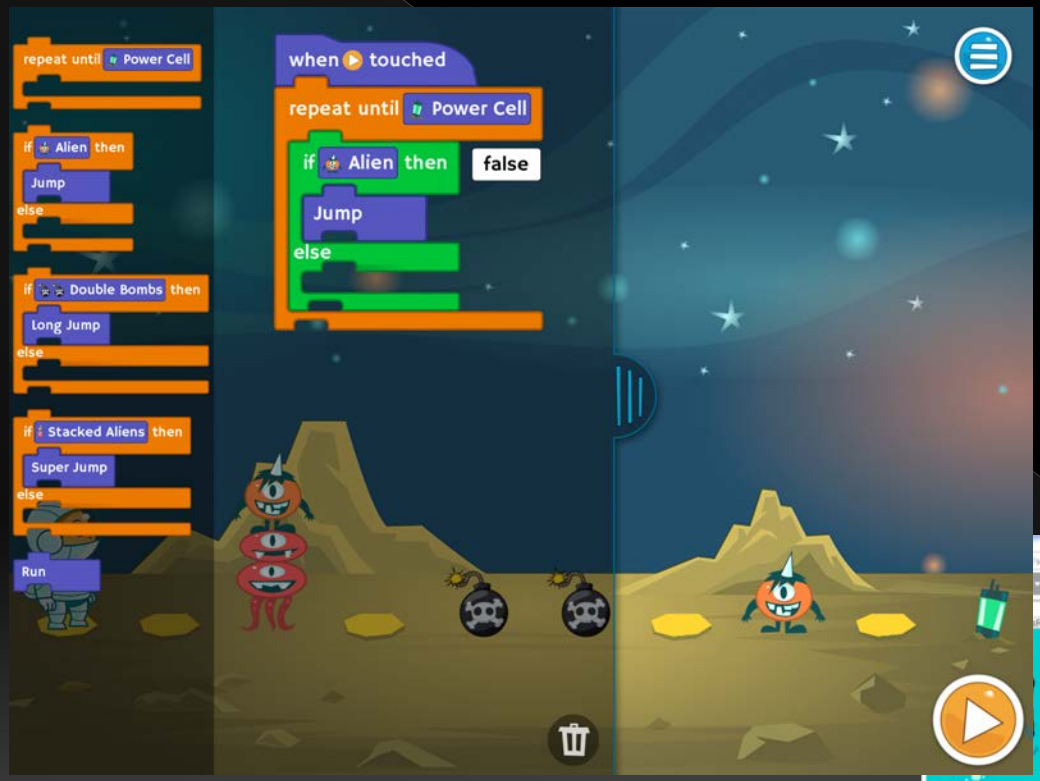
- Can these tools motivate students and scholars of any discipline in the Humanities?
- Can the students learn how to code in a real programming language? (Python, R, JavaScript, …)

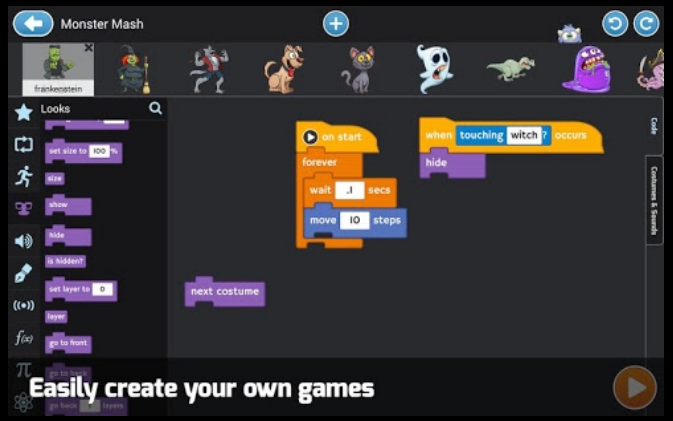
Teaching coding to novices

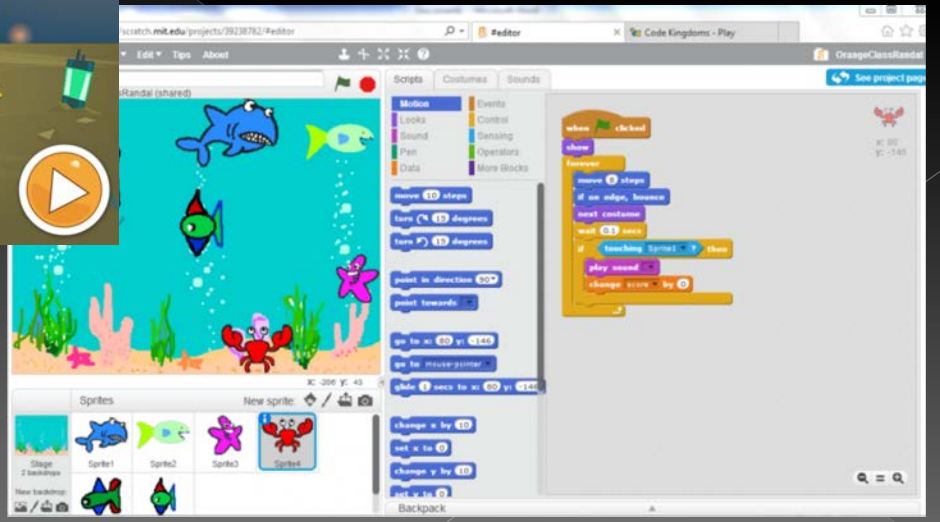
- Well-studied topic
- Several approaches
- Main focus on K-12 education

Tangible User Interfaces

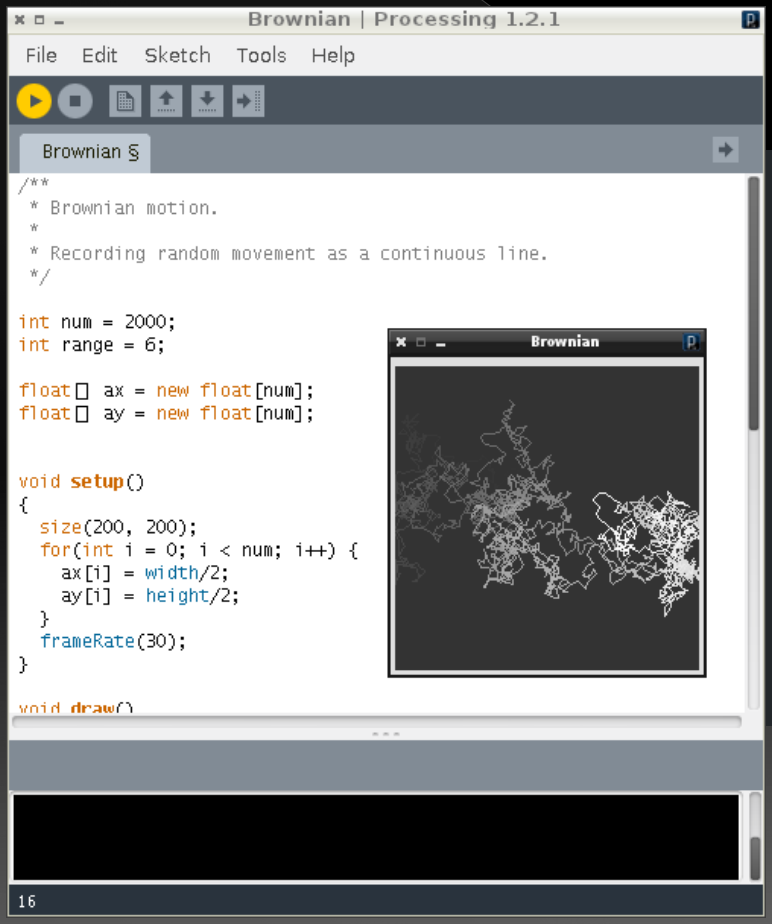
Graphical User Interfaces

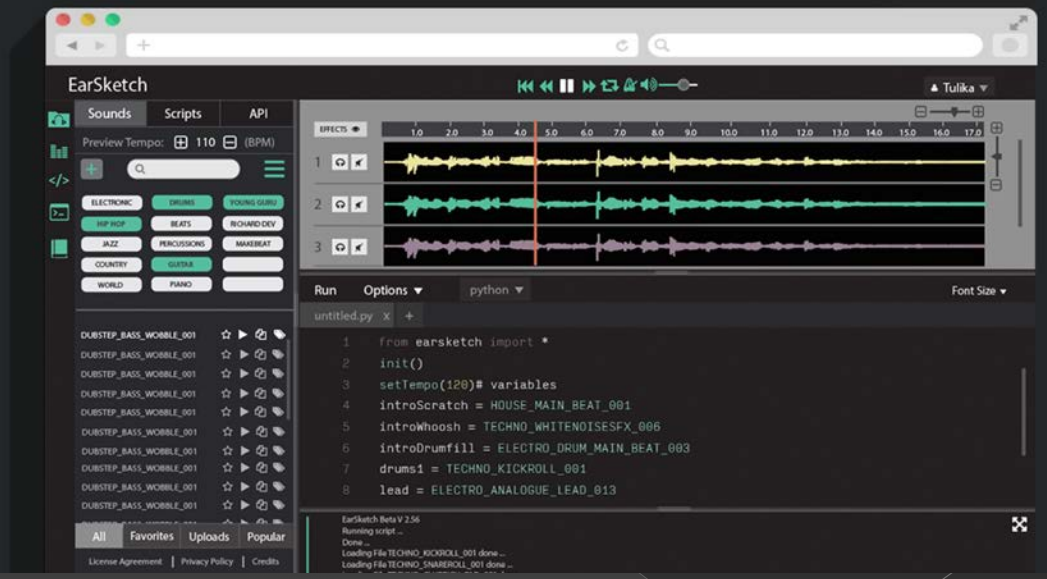






Text Editing Interfaces





Questions

- How can we integrate computer literacy into Liberal Arts curricula?
- How can we motivate humanities students and scholars acquire coding skills?

Text-replacement method

- Introduced by Barmpoutis et al. 2017
  - Replaces every token in a programming language
  - With a visual or textual explanation
- Advantages:
  - Hides the jargon from the beginners
  - Students can read the logic of a program
  - Try and Error environment
  - Uses real programming languages

Question for you

- Do you know coding?
- …even very basic knowledge is fine
- …on any programming language

Question for you #2

- Can you understand this statement?
- `not:(or:|! be:)`

Question for you #3

- What about this?

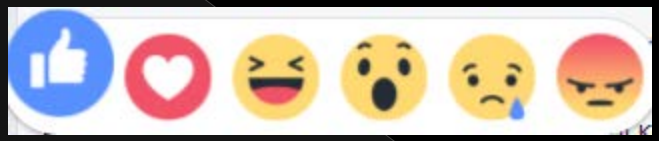
- not ☹ or 😐 ! be ☺

- Also…

COMMAND+P
CTRL+ALT+DELETE
….
Chinese Logograms

Motivation

- Revolution of social media
- Wide use of emoticons from all ages



- Student survey after 15 weeks of lessons:
  - How to type a smiley face? :)
  - How to type a comment in programming? //
  - 98% vs. 75%

Re-inventing the text editor for emoticon-like scripting

```
var main = function ()
{
  var start = true ;
  var robot = new Avatar ( ) ;
  robot . position_x += 2.5 * speed ;
  robot . jump ( ) ;
}
```

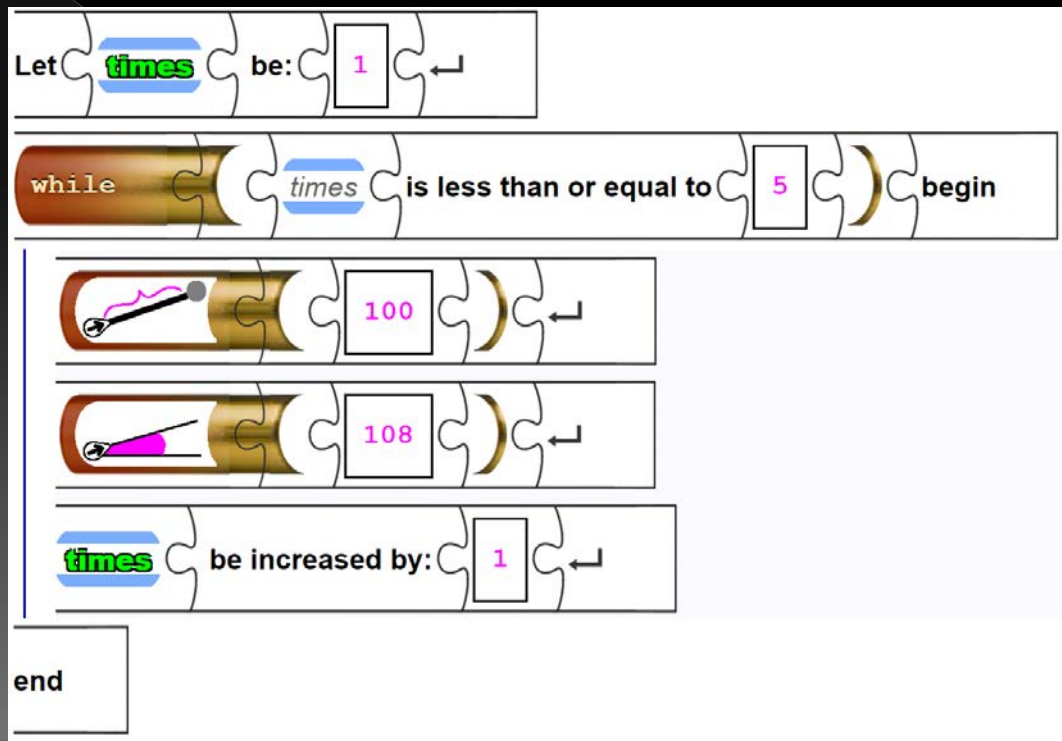
Let **main** be the following process: ( )
begin
  Let **start** be: true ↵
  Let **robot** be: a new object of type **Avatar** ( ) ↵
  robot of **position_x** be increased by: 2.5 x *speed* ↵
  robot do jump ( ) ↵
end

Let main be the following process:
begin
  Let start be:
  Let robot be: Avatar
  robot of position_x be increased by: 2.5 x speed
  robot of jump
end

Geomerty

- Draw a pentagon
- 5th grade standard CCSS.MATH.CONTENT.5.G.A.1&2

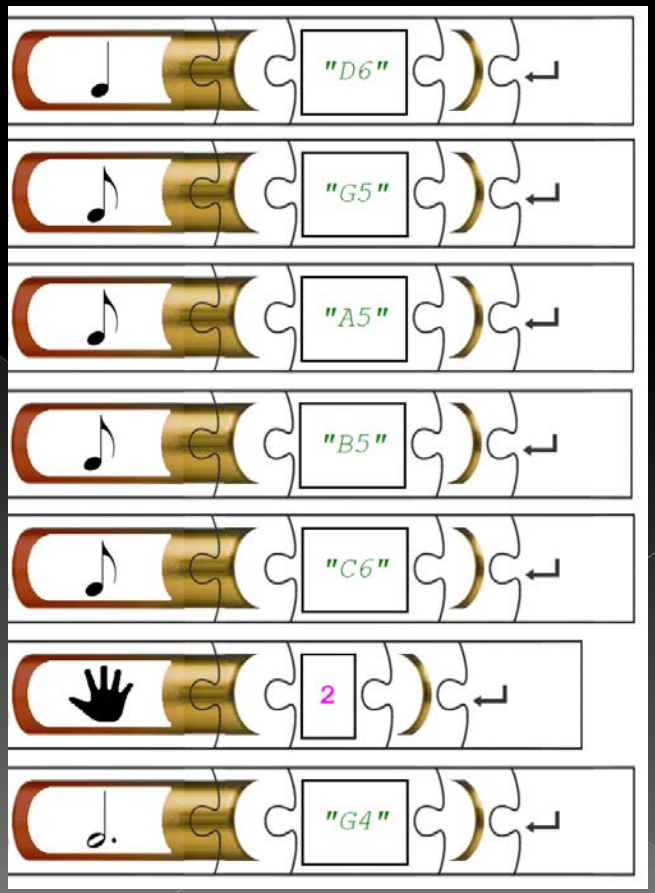
```
1. var times=1;
2. while(times<=5) {
3. move(100);
4. turn(108);
5. times+=1;
6. }
```



Music

- Minuet in G major, BWV ANH. 114
- 5th grade core standard MU:Pr4.2.5b

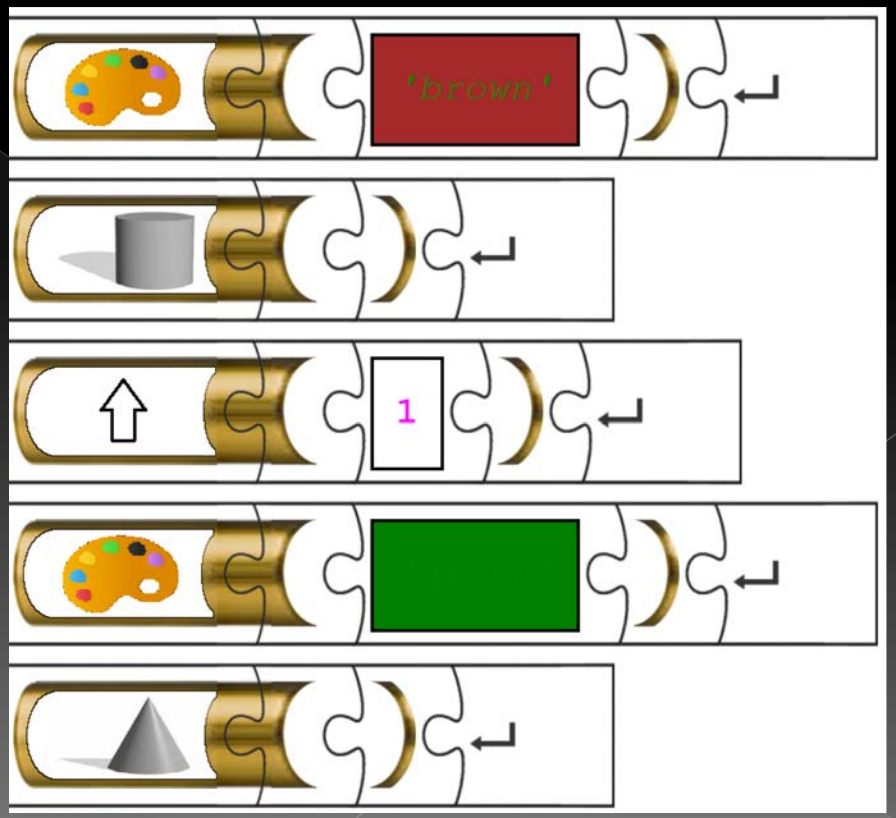
```
1. quarterNote("D6");
2. eighthNote("G5");
3. eighthNote("A5");
4. eighthNote("B5");
5. eighthNote("C6");
6. track(2);
7. halfNoteDot("G4");
```



3D Art

- Build the 3D model of a pine tree
- 6th grade standard CCSS.MATH.CONTENT.6.G.A.4

```
1. color('brown');
2. cylinder();
3. moveUp(1);
4. color('green');
5. cone();
```



User Testing
Quantitative data collection

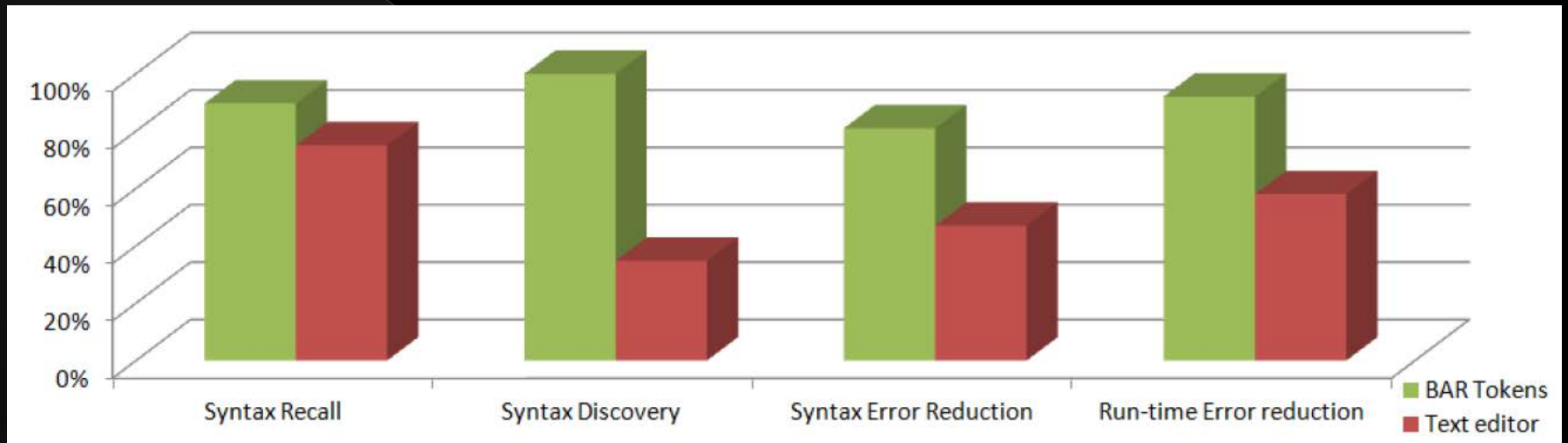
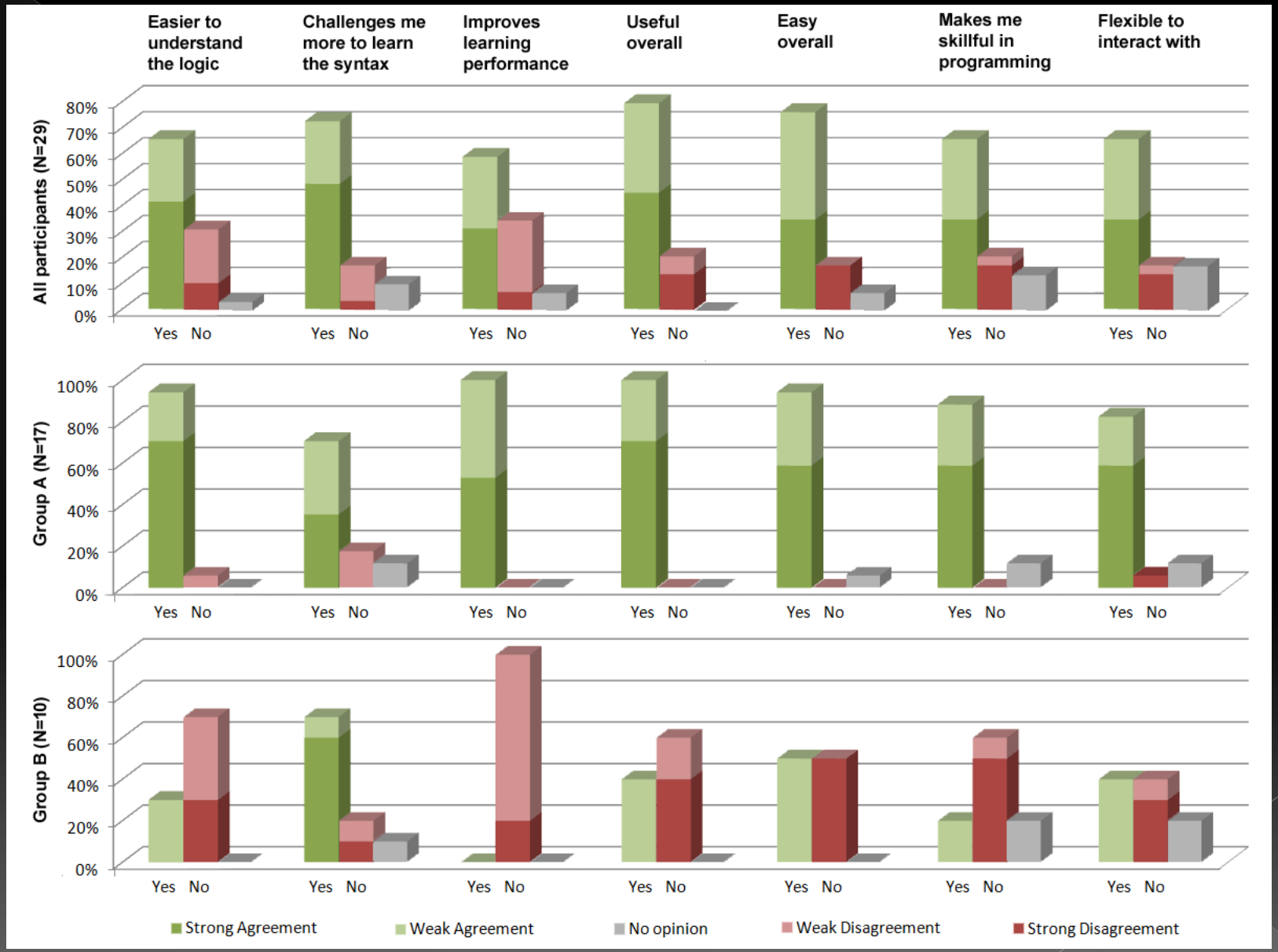


Fig. 5. The percentages of successful syntax recall, new syntax discovery, and error reduction that correspond to the proposed method versus traditional text editors.


Easier to understand the logic
Challenges me more to learn the syntax
Improves learning performance
Useful overall
Easy overall
Makes me skillful in programming
Flexible to interact with
All participants (N=29)
Group A (N=17)
Group B (N=10)
80%
70%
60%
50%
40%
30%
20%
10%
0%
100%
Yes
No
Strong Agreement
Weak Agreement
No opinion
Weak Disagreement
Strong Disagreement

Use in the Humanities?

- Use natural languages as the bridge between Liberal Arts and Coding

- Disciplines that study languages
- Disciplines that use languages as tool
- Disciplines that use language for creative writing and critical thinking

- Natural Languages is the common element.

Text replacements?

JavaScript

```
1.  var number = 0 ;
2.  while ( number < 10 )
3.  {
4.      number += 1 ;
5.  }
```

English

```
1.  Let number be: 0 ↵
2.  while ( number is less than 10 )
3.  begin
4.      number be increased by: 1 ↵
5.  end
```

Latin

```
Dehinc number sit: 0 ↵
dum ( number minus quam 10 )
incipit
    number augeatur modo: 1 ↵
exit
```

Ancient Greek

```
Ὁρίσωμεν ὅτι το number ᾖ: 0 ↵
ὅσον ( το number ἐλάττον τοῦ 10 )
ἀρχή
    το number αὐξάνηται κατά: 1 ↵
τέλος
```

Questions

- Is straight alignment possible?
- Grammar or Syntax problems?
- Noun declension?
- What natural languages can be used?
- What programming languages can be used?

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Thank you!
Questions?

```
1.  Dehinc numerus sit: 0 ↵
2.  dum ( numerus minus quam 10 )
3.  incipit
4.      numerus augeatur modo: 1 ↵
5.  exit
```