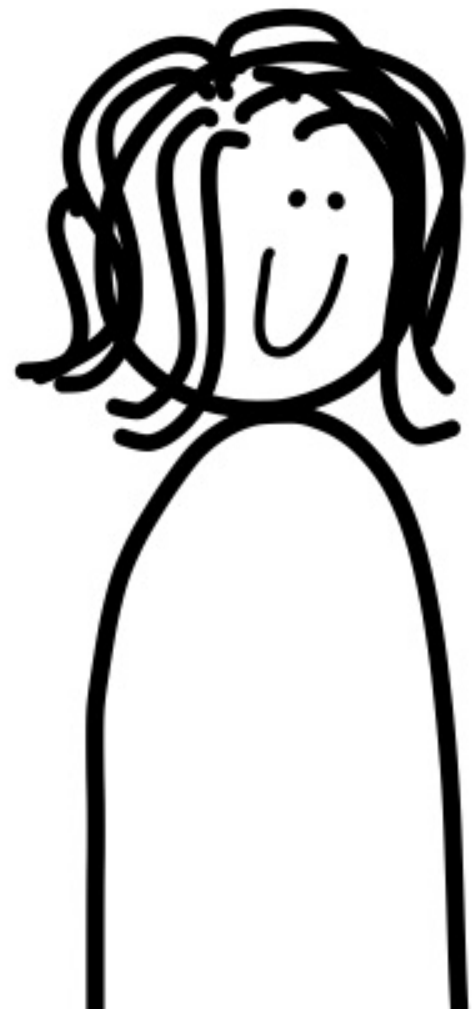


Hedy: A gradual Programming Language

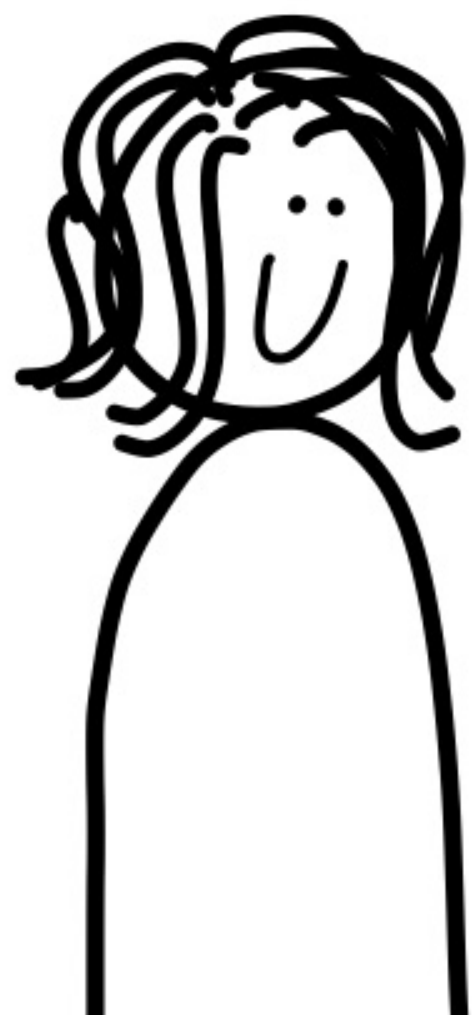


Felienne Hermans

Hedy is gradual

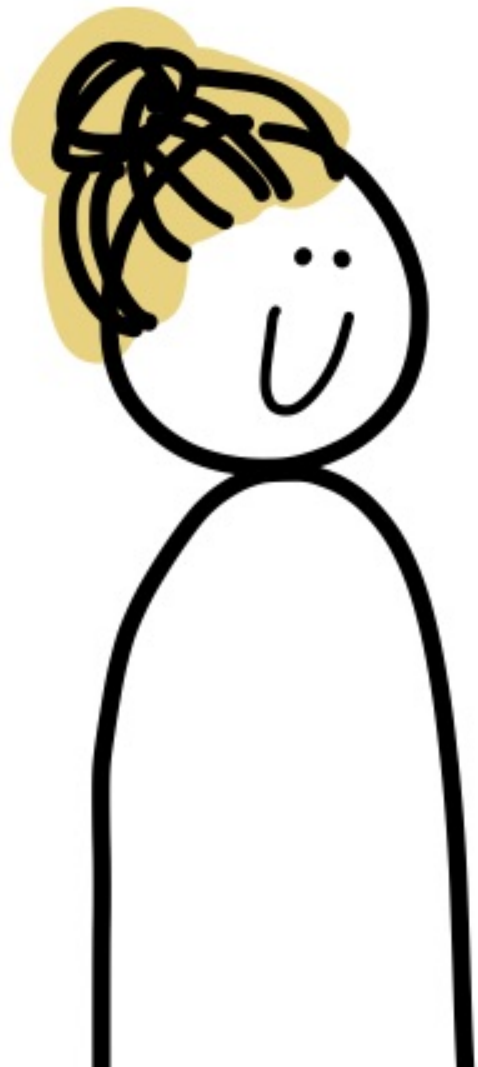
multi lingual

built for teaching



Felienne Hermans

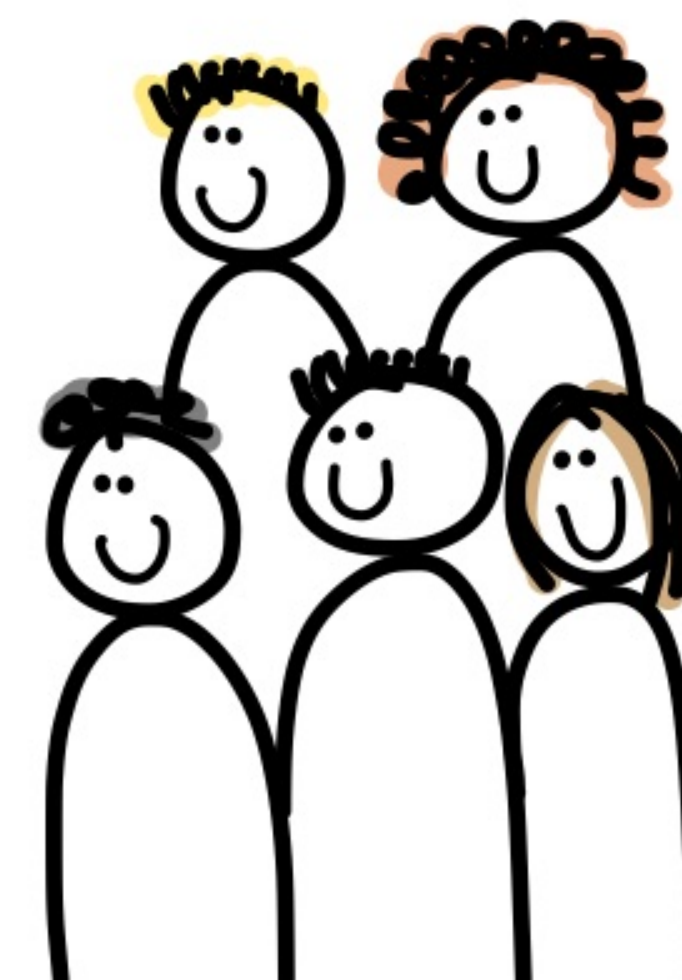
How to teach programming?



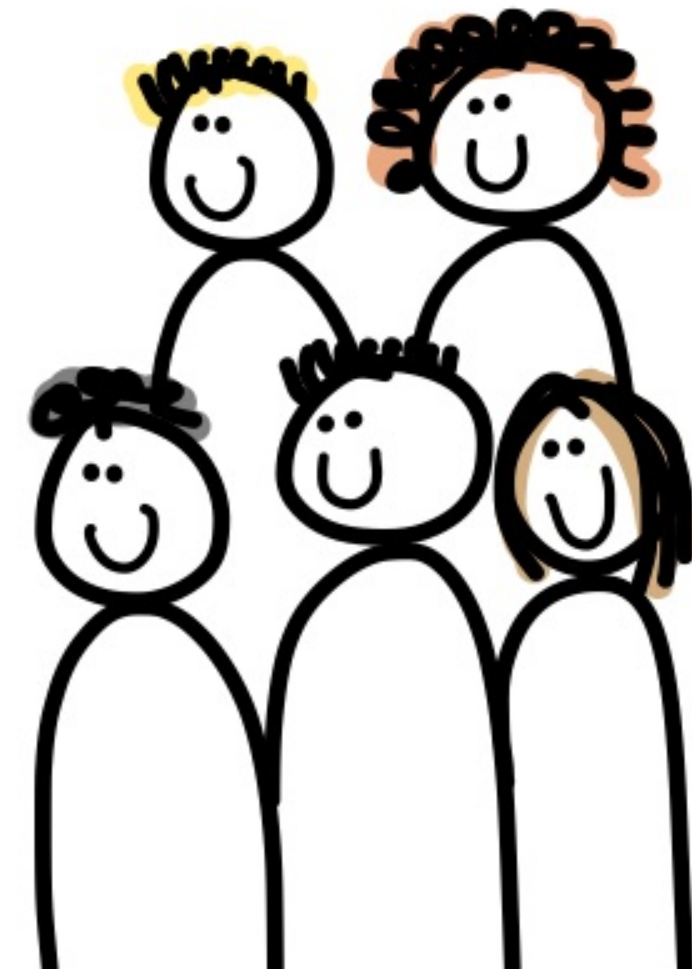
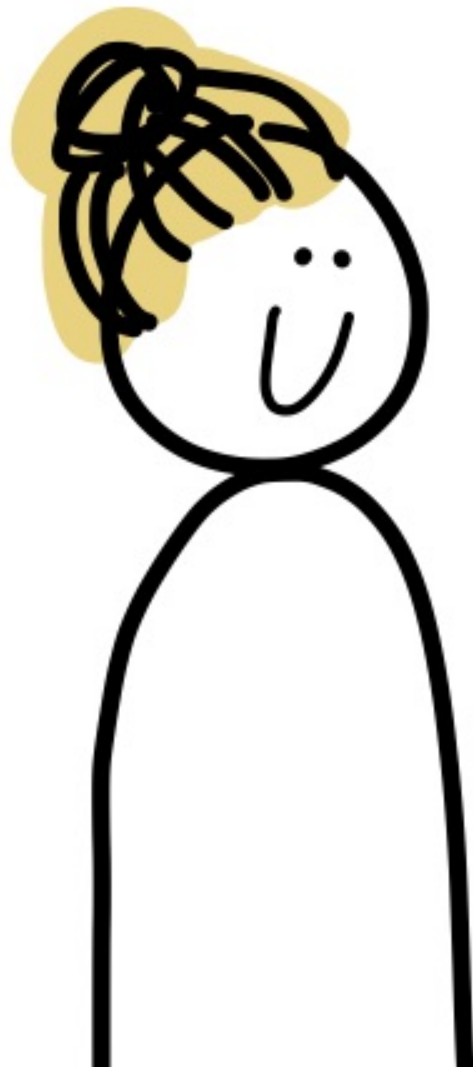
2013

middle schoolers

age 10 - 14



We'd love to learn
programming



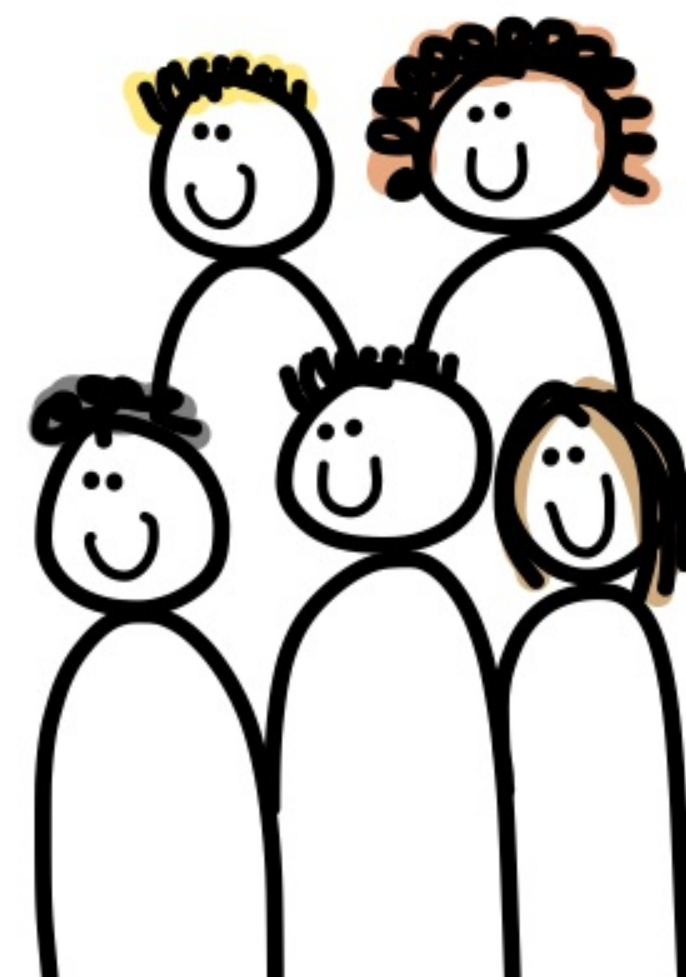
I'll teach you

/



We'd love to learn
programming

\

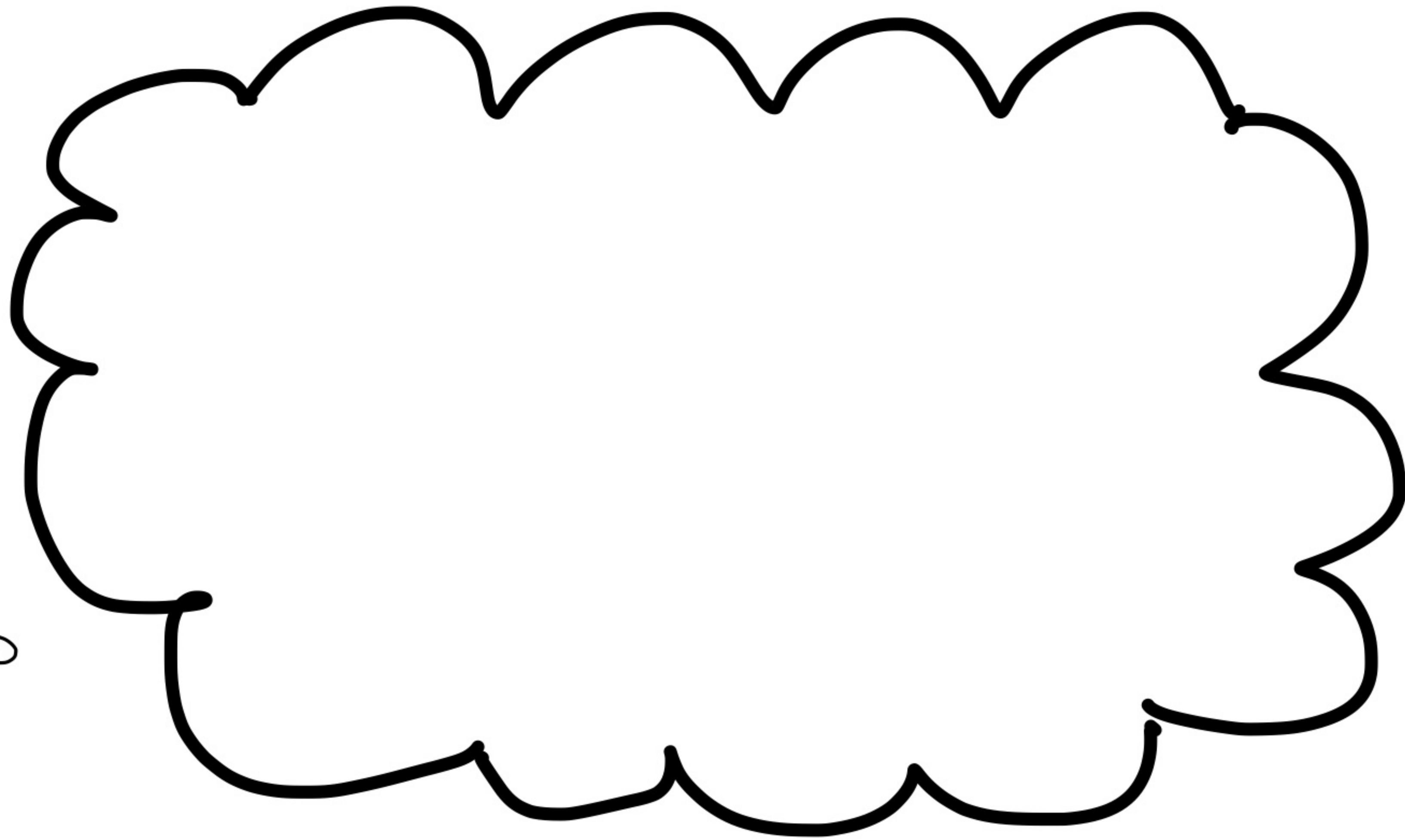




o

o

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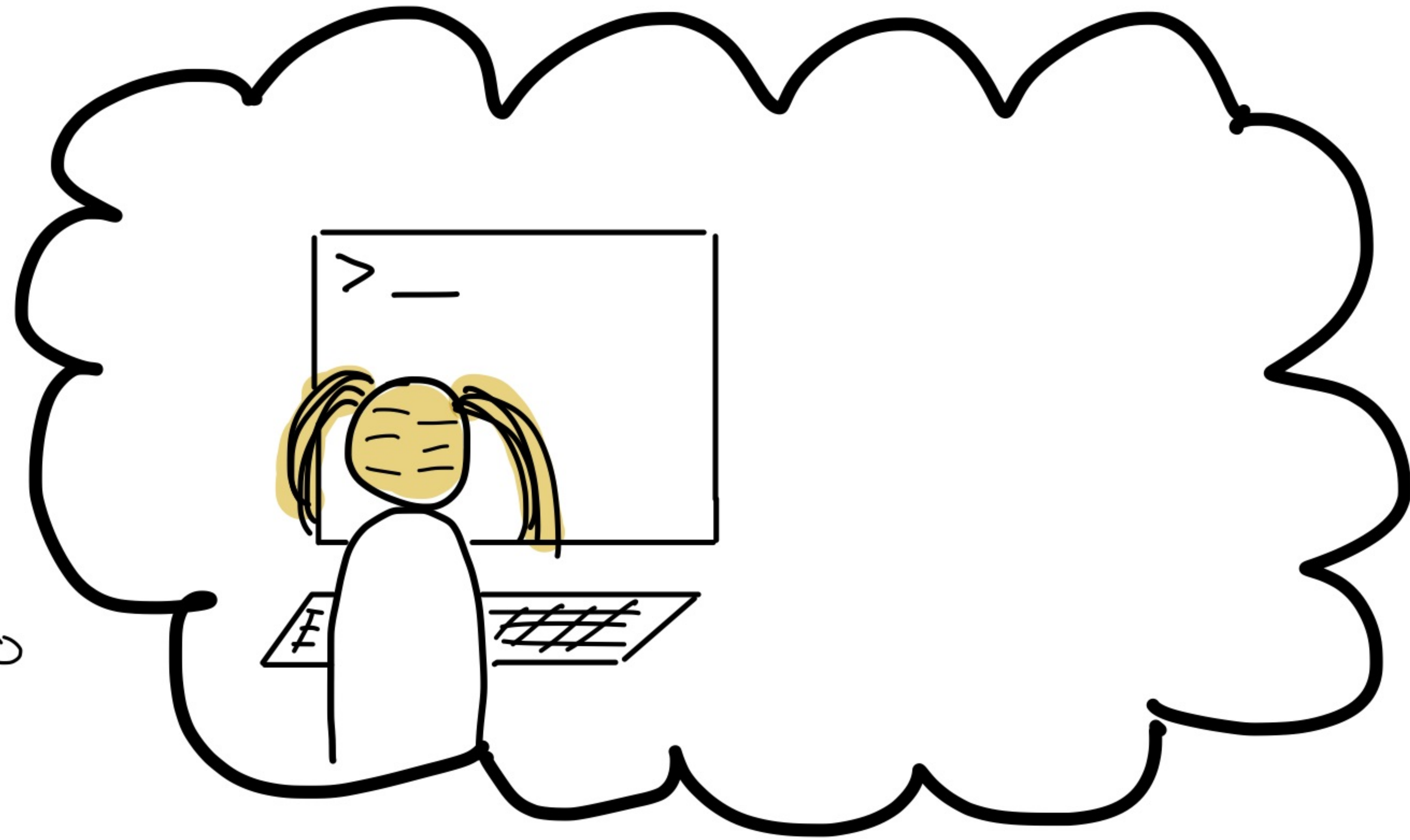


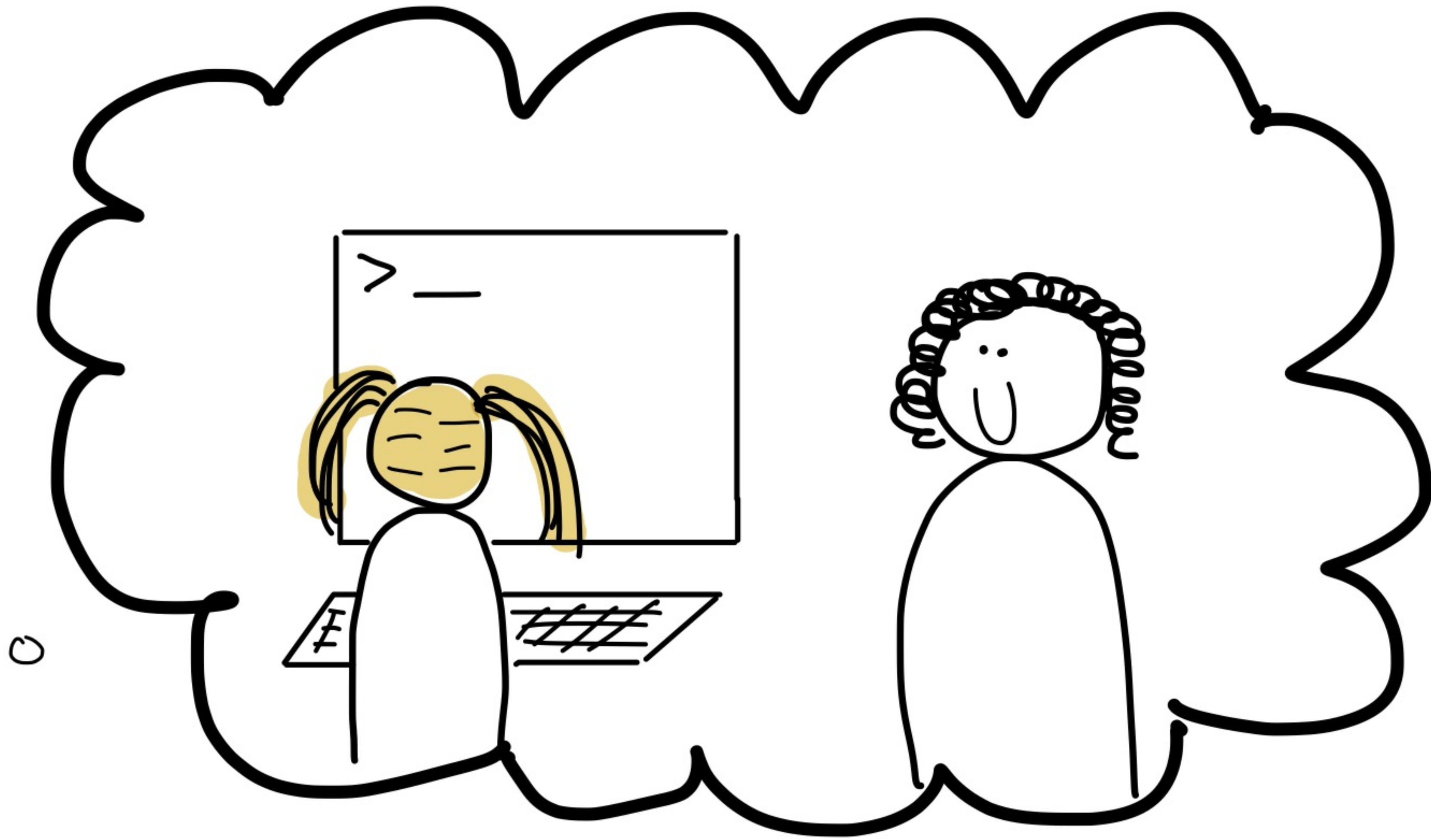


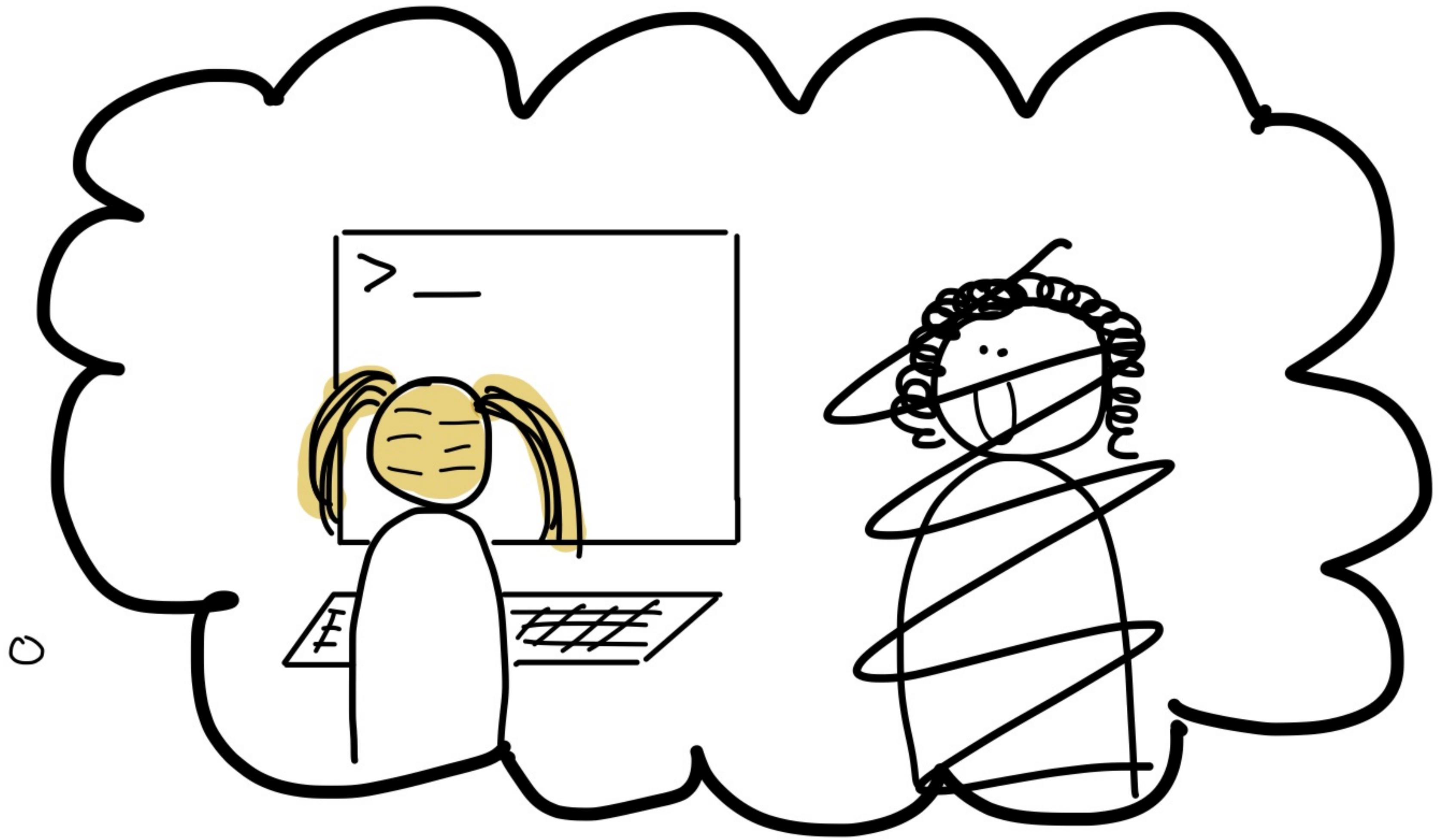
o

o

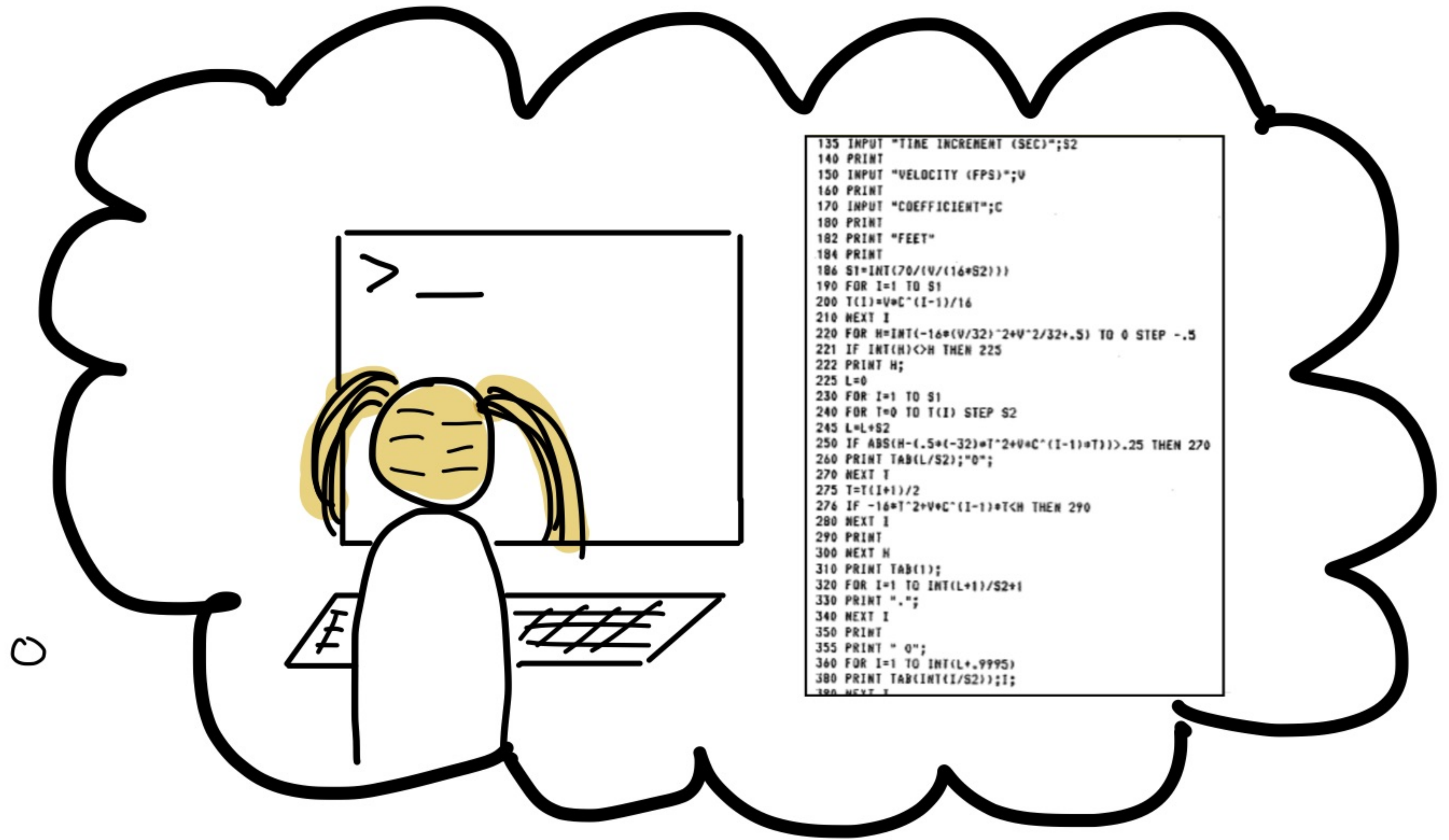
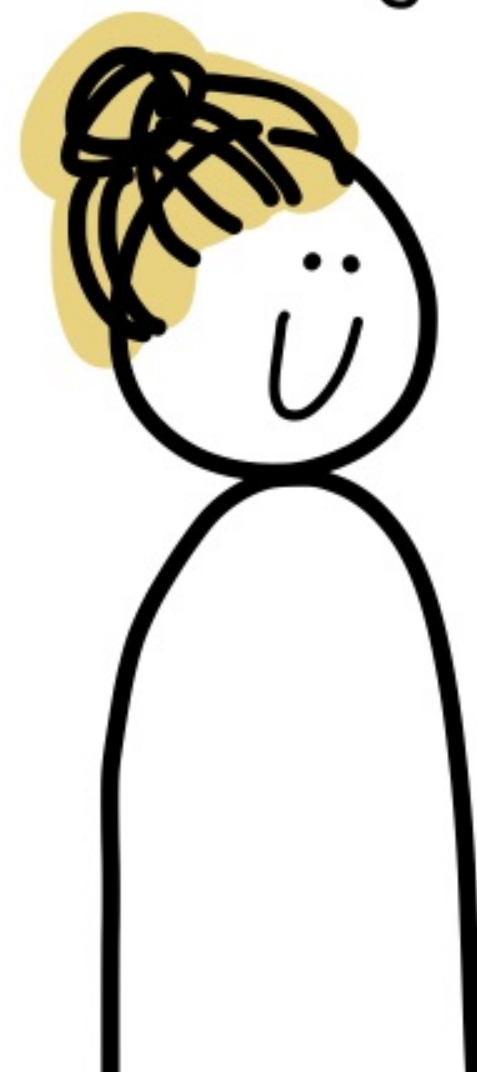
o



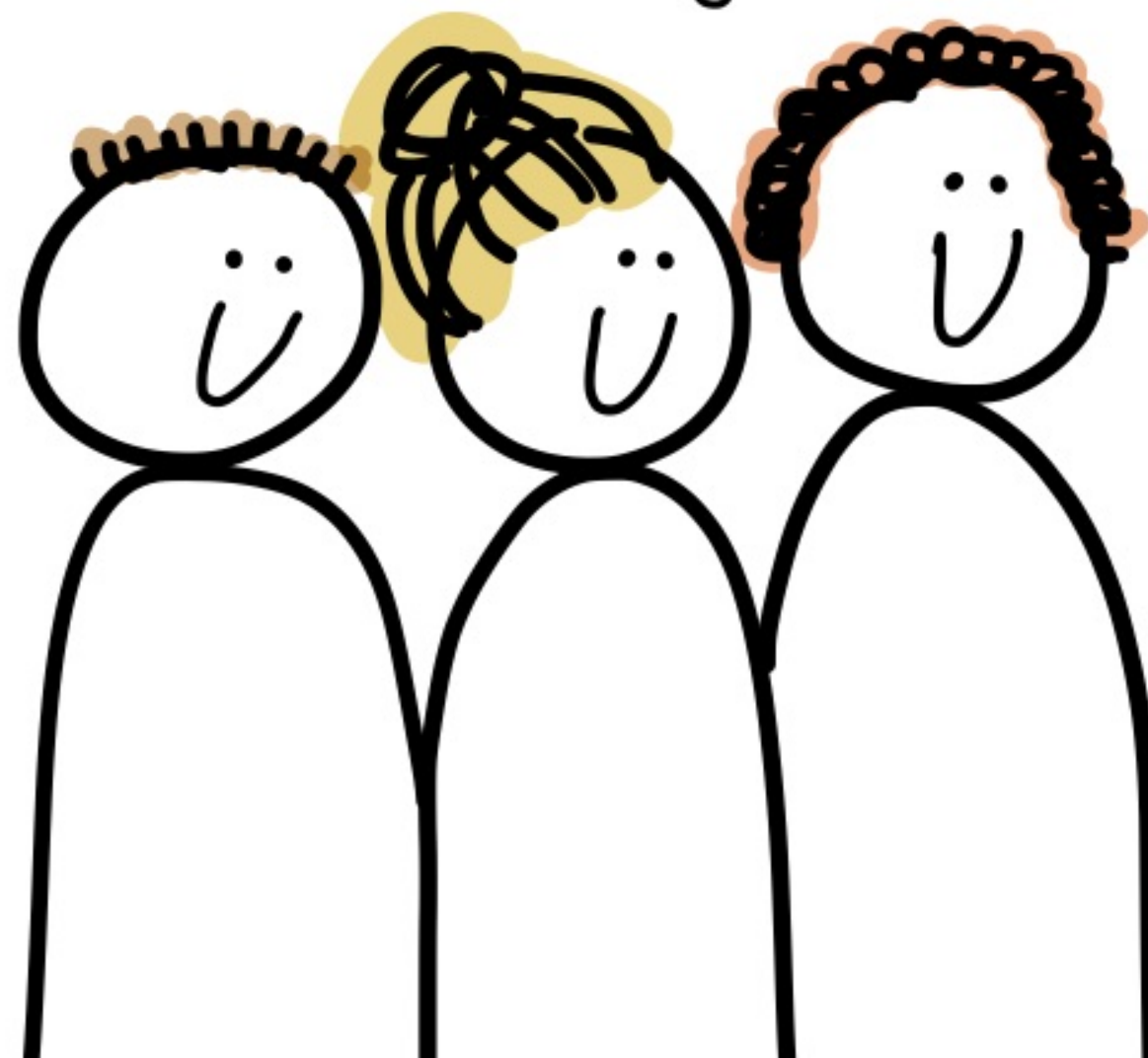






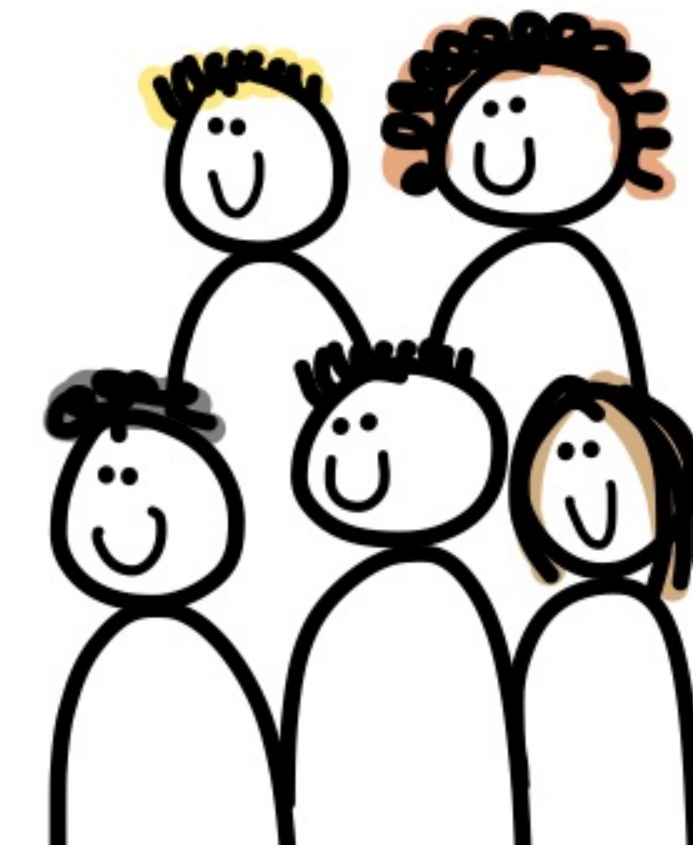
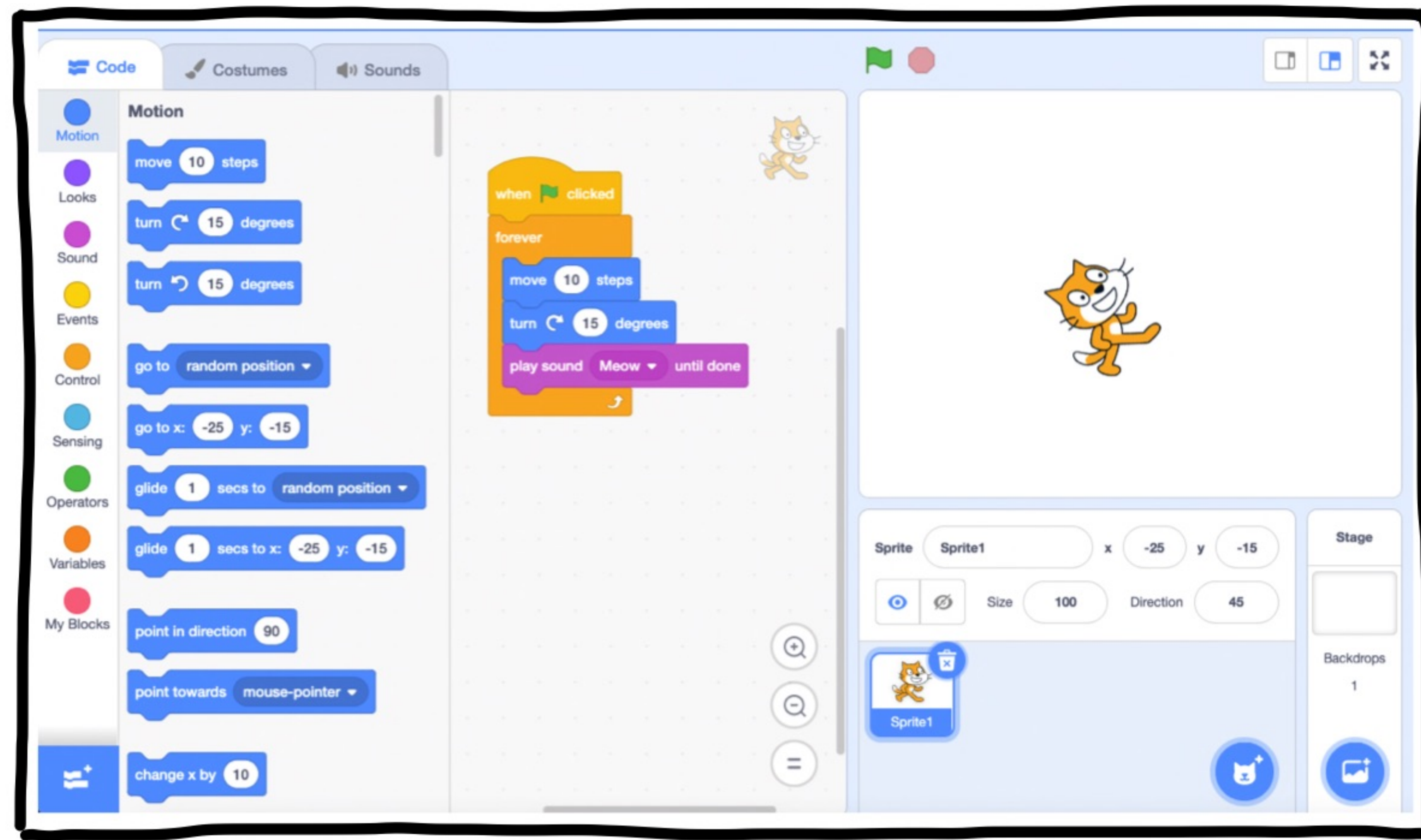


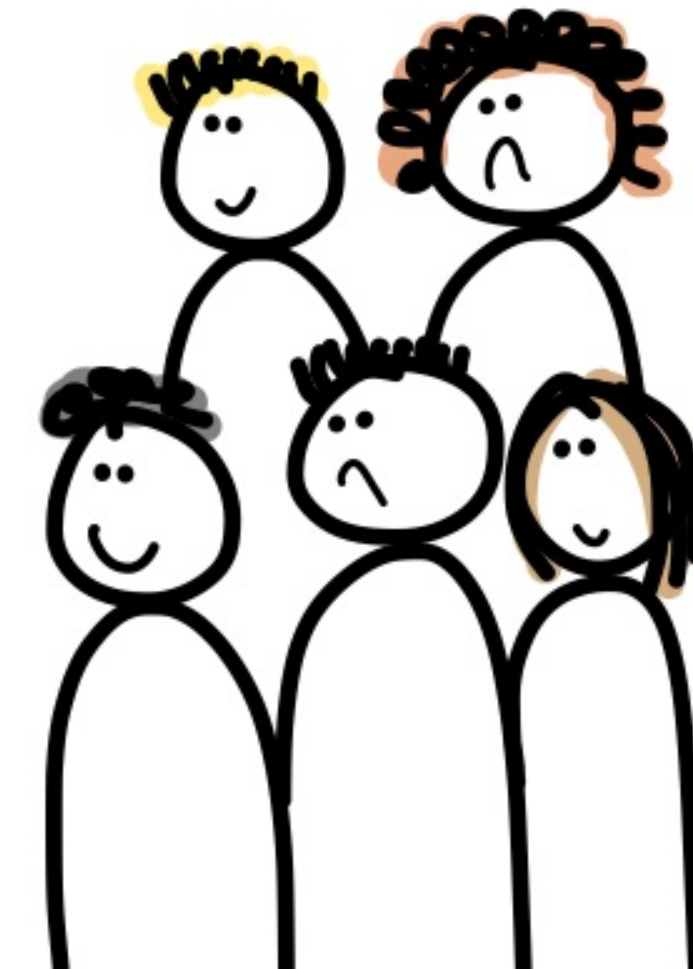
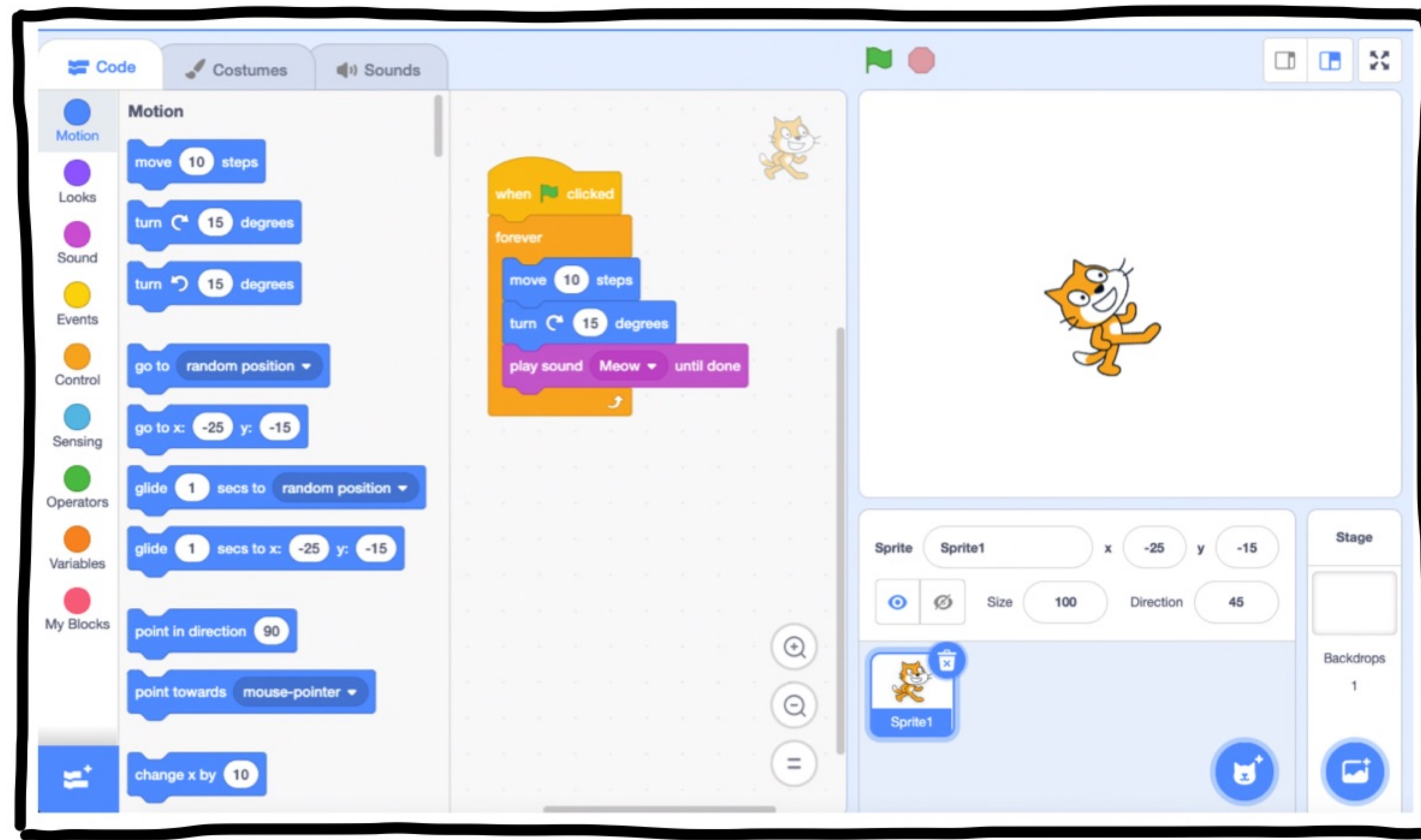
Compilers are
lovely teachers

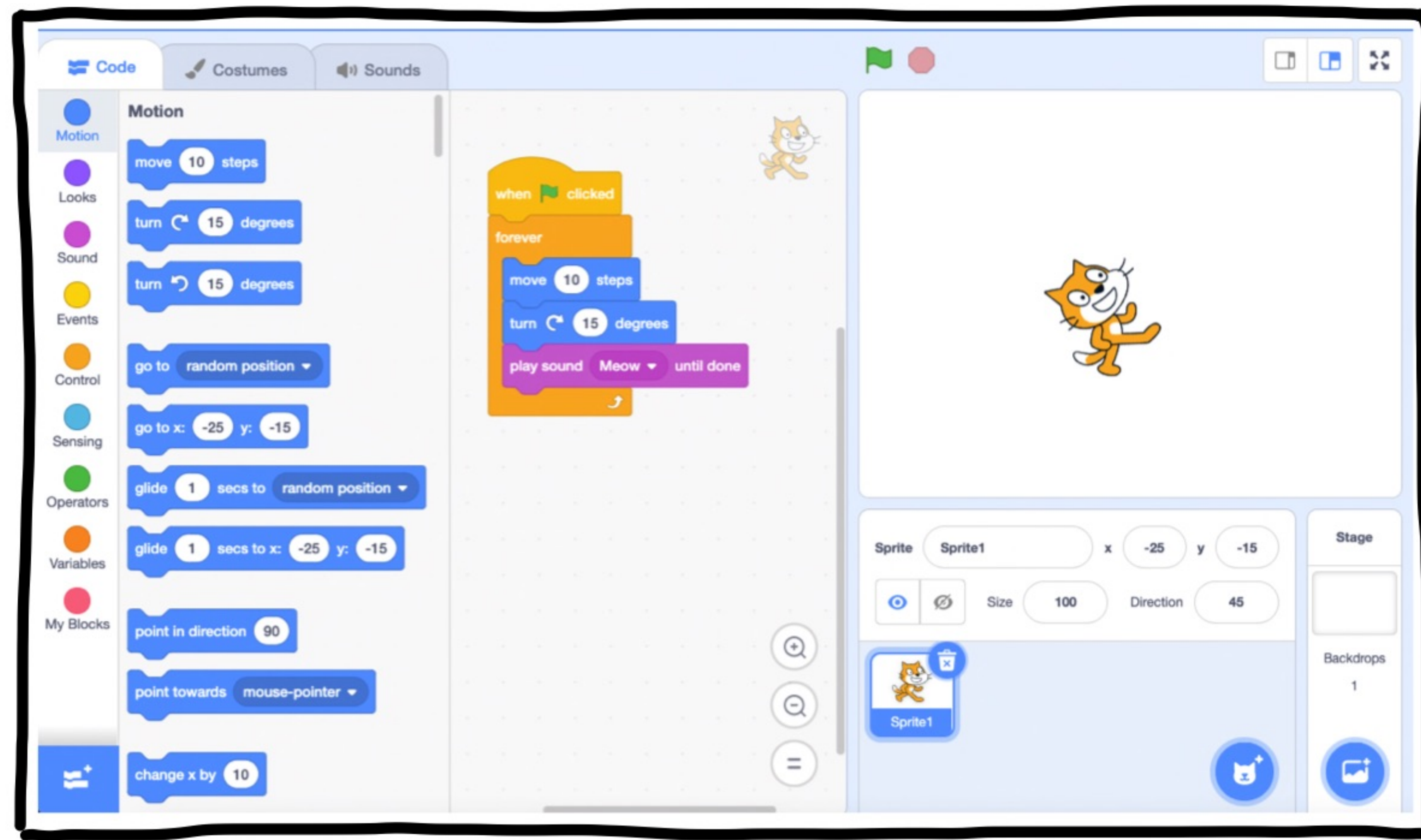


Compilers are
lovely teachers

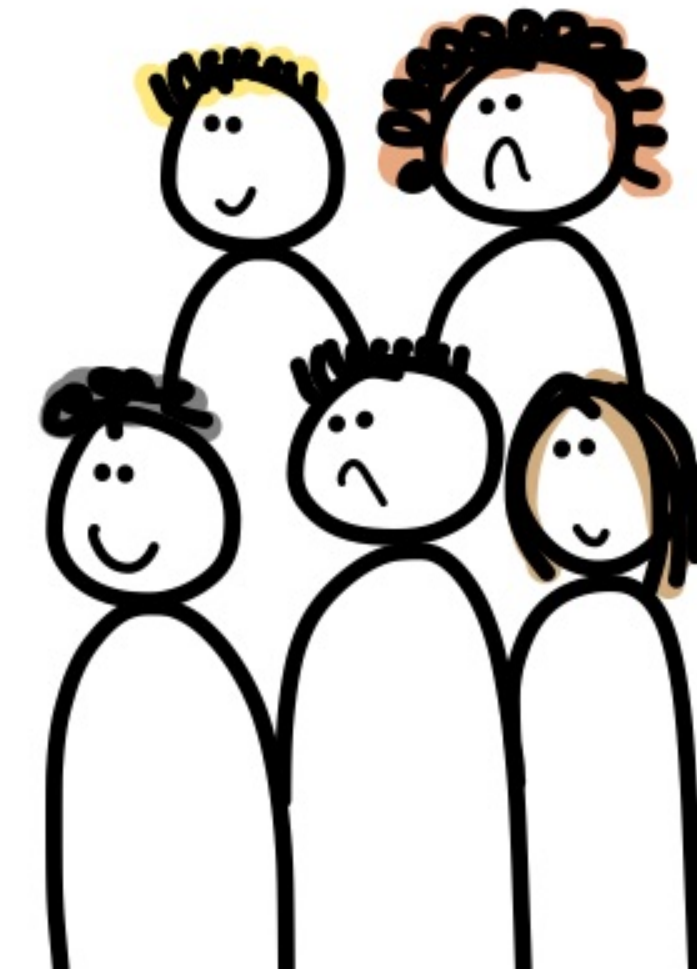


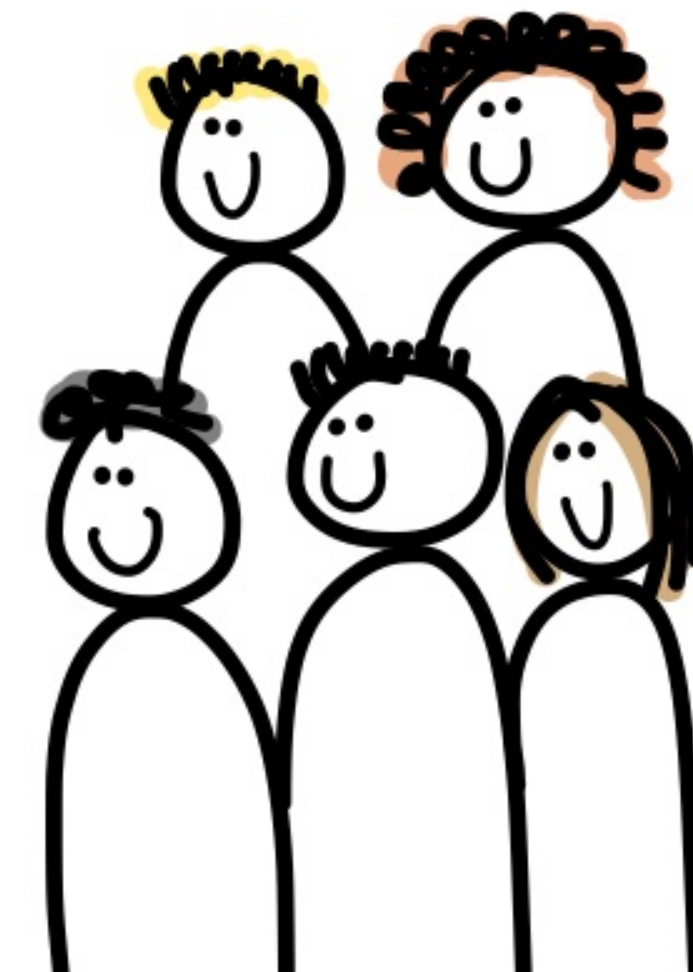
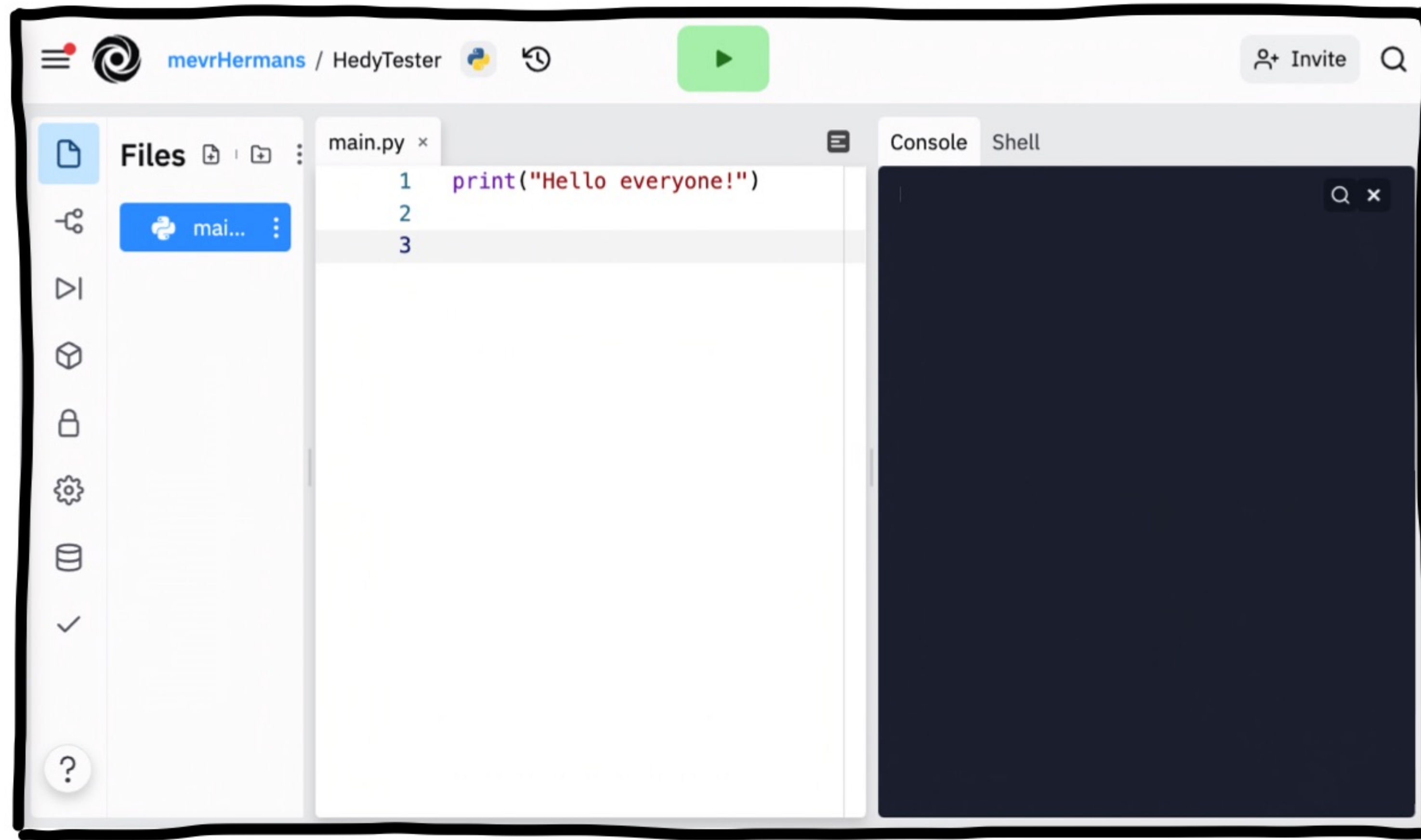


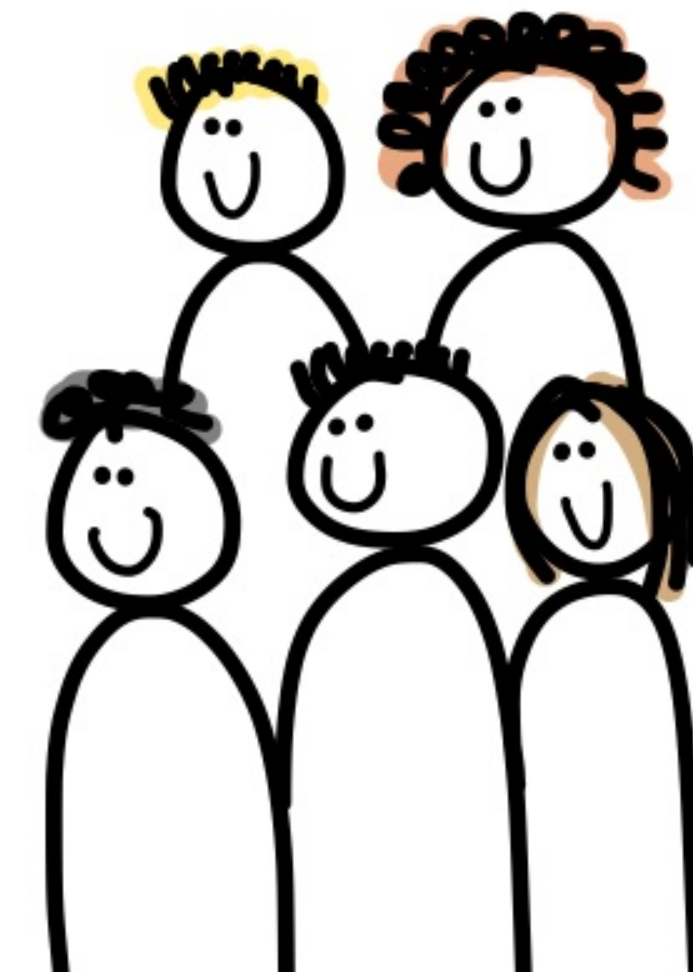
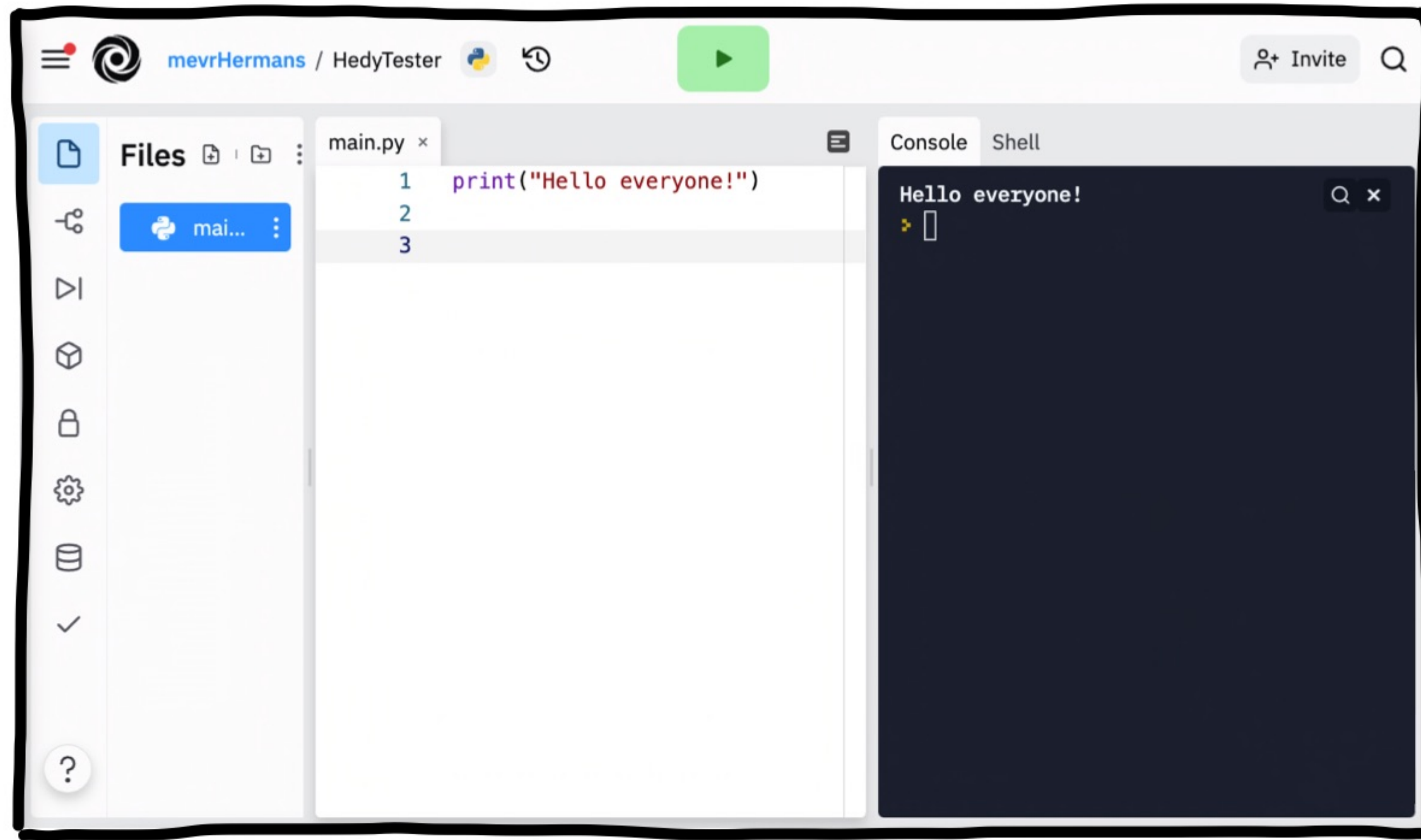


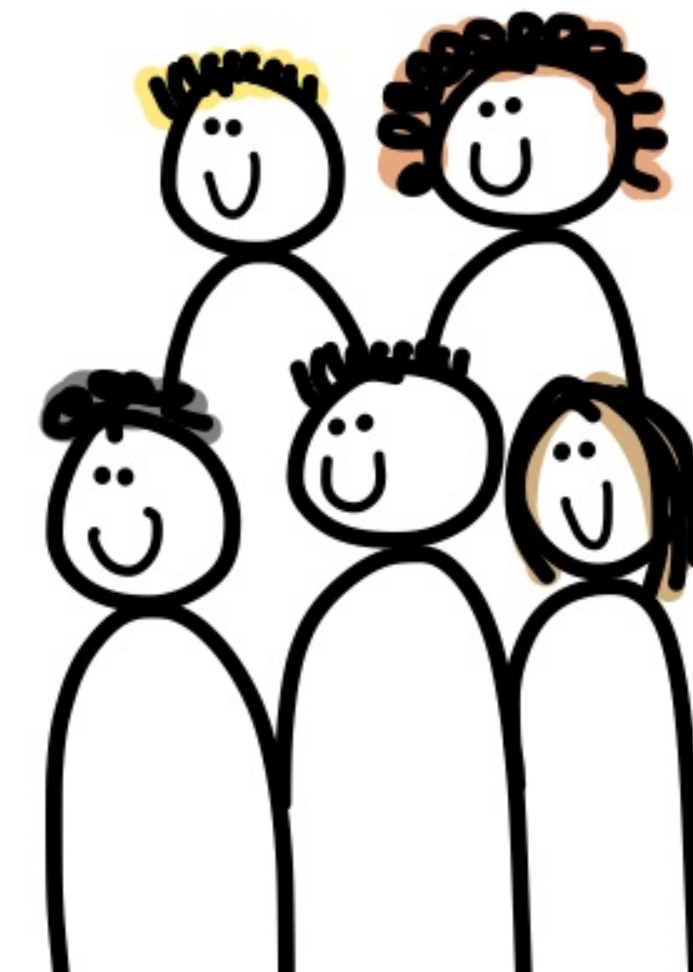
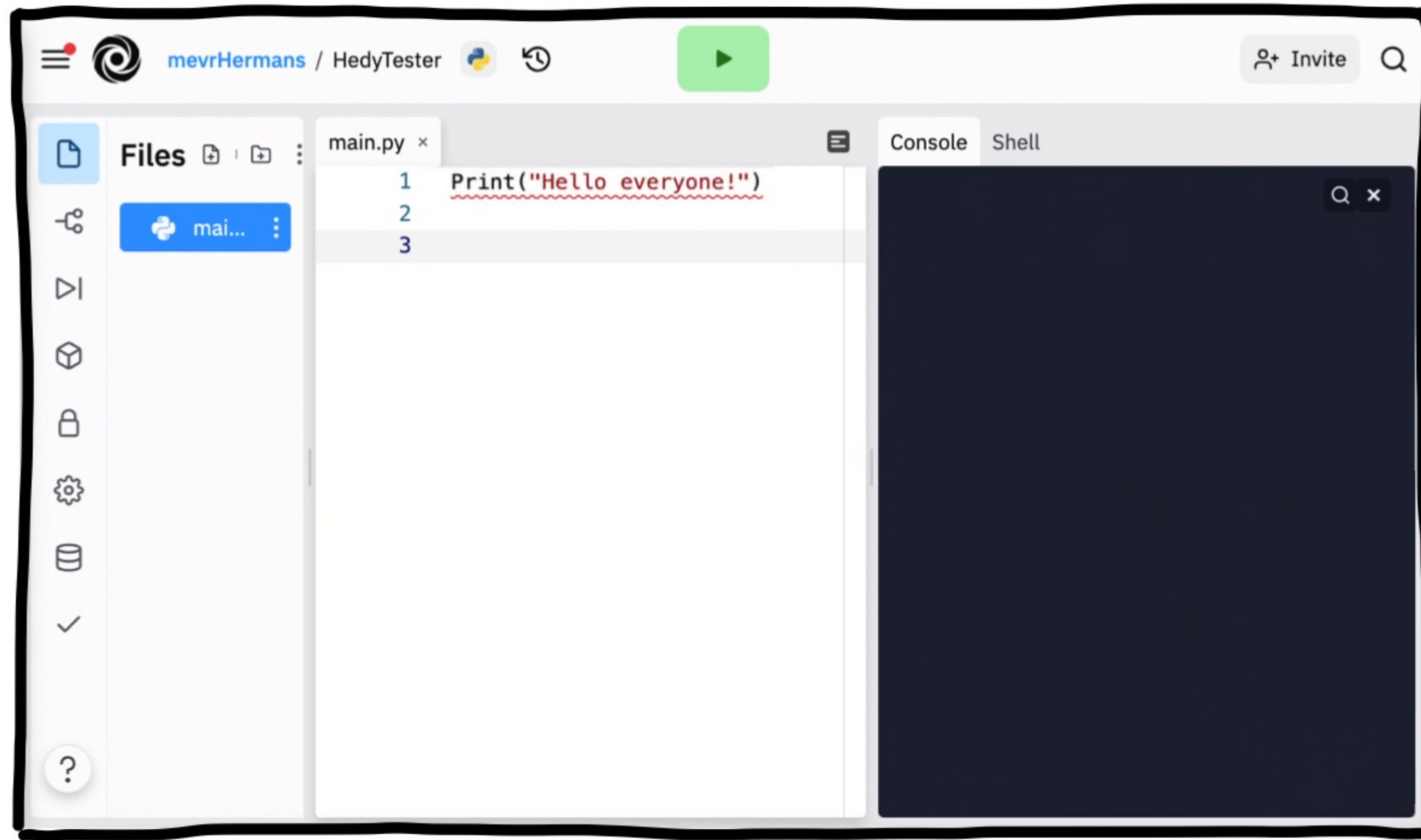


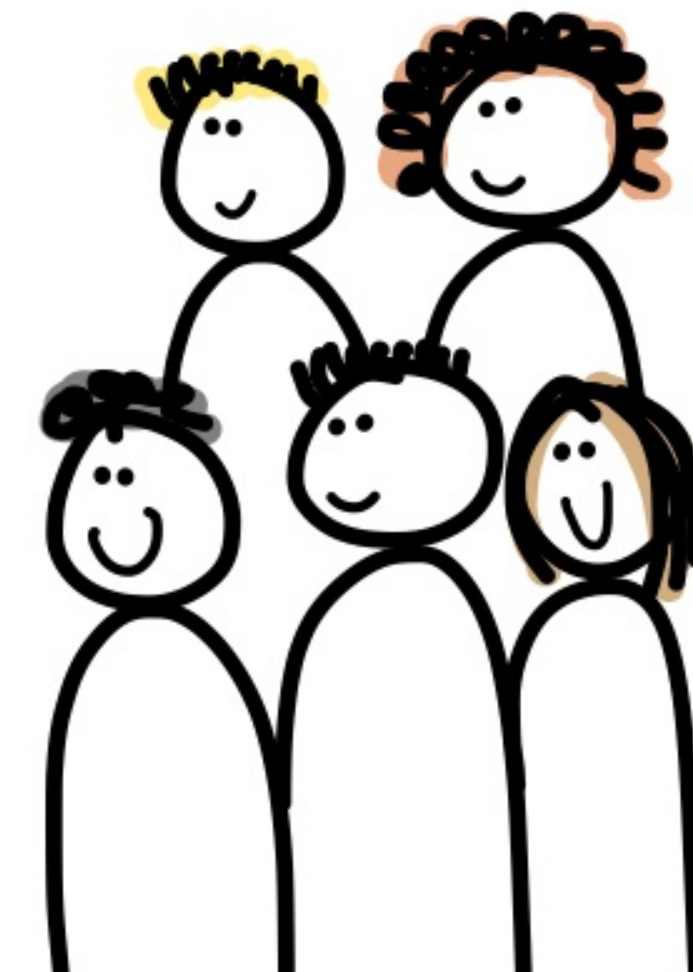
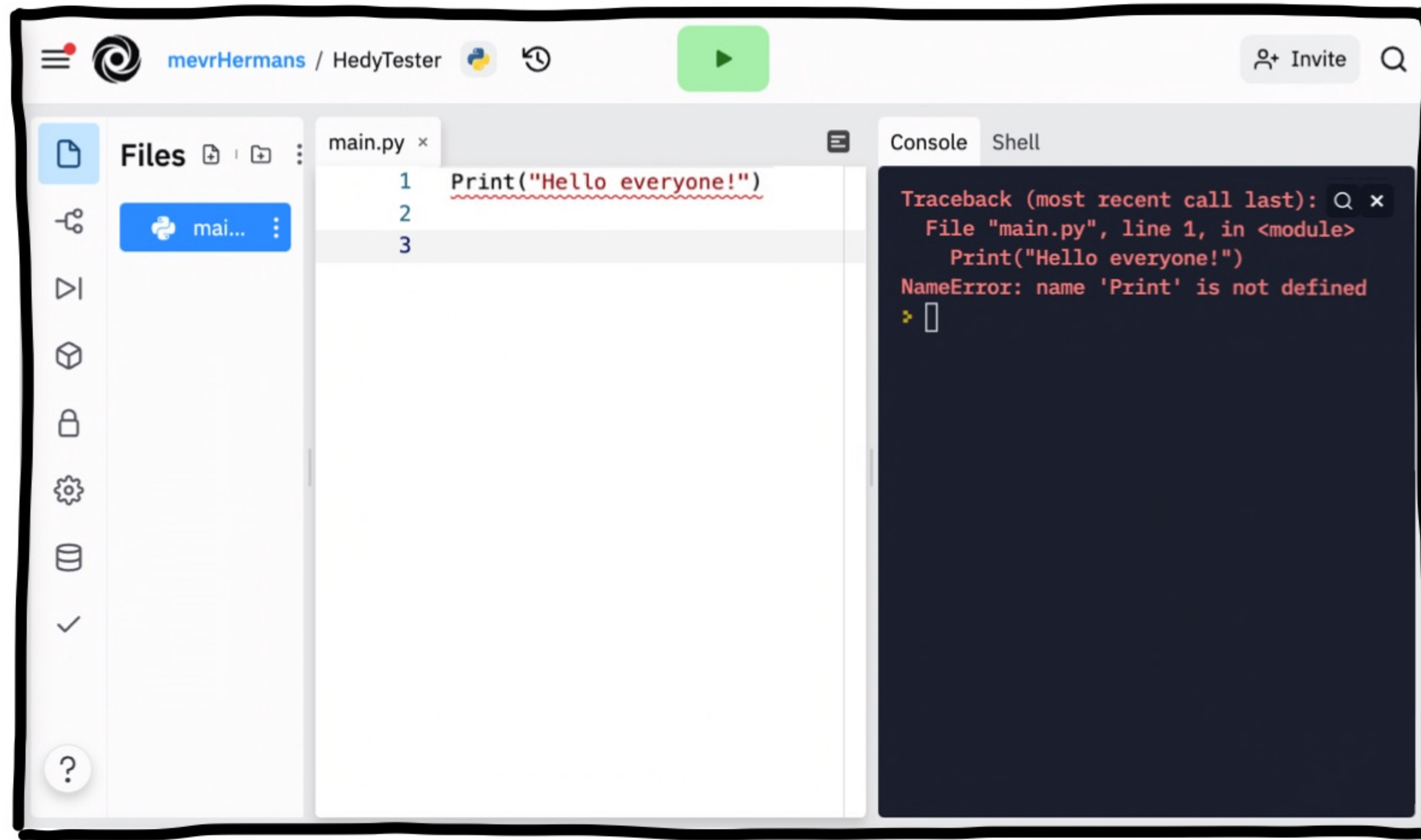
Scratch
is
for kids

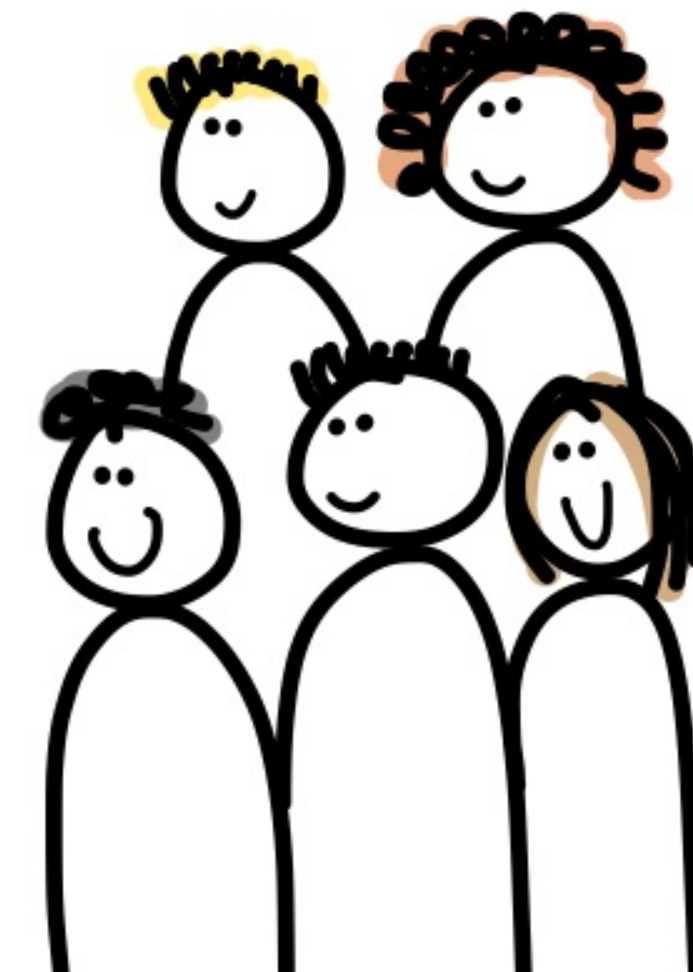
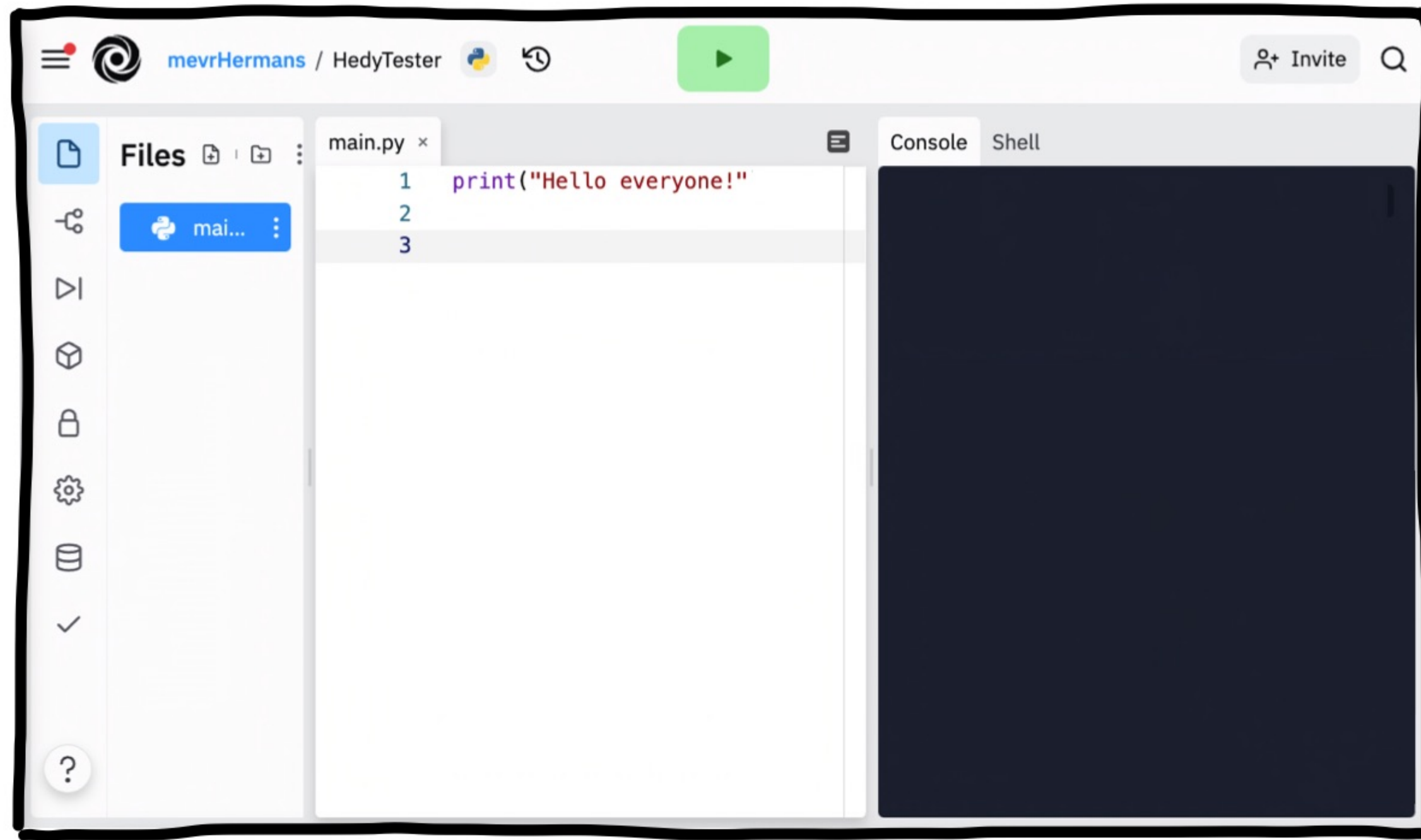


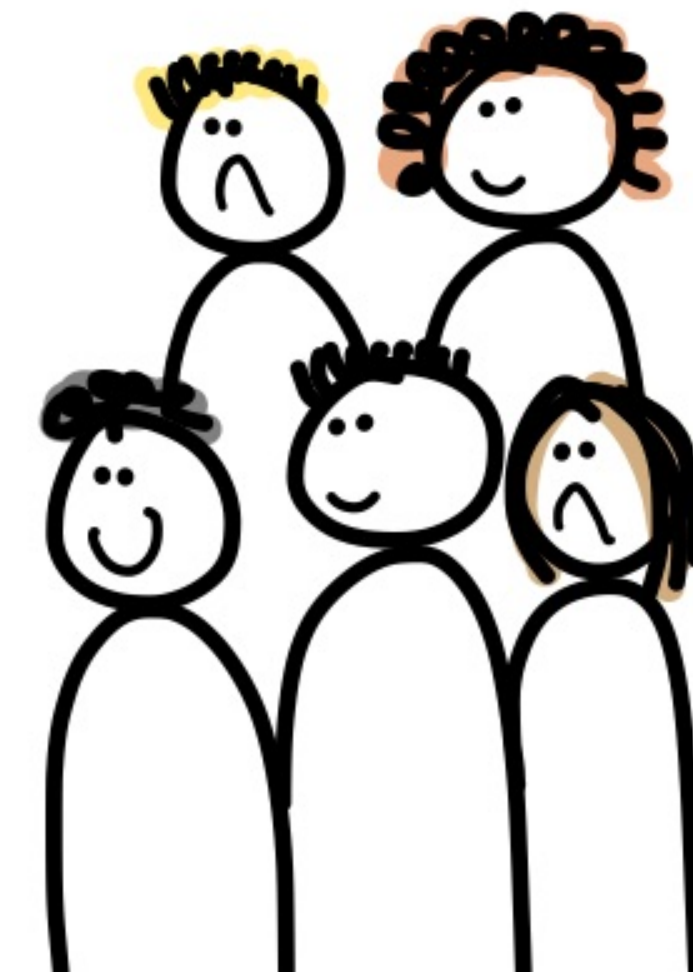
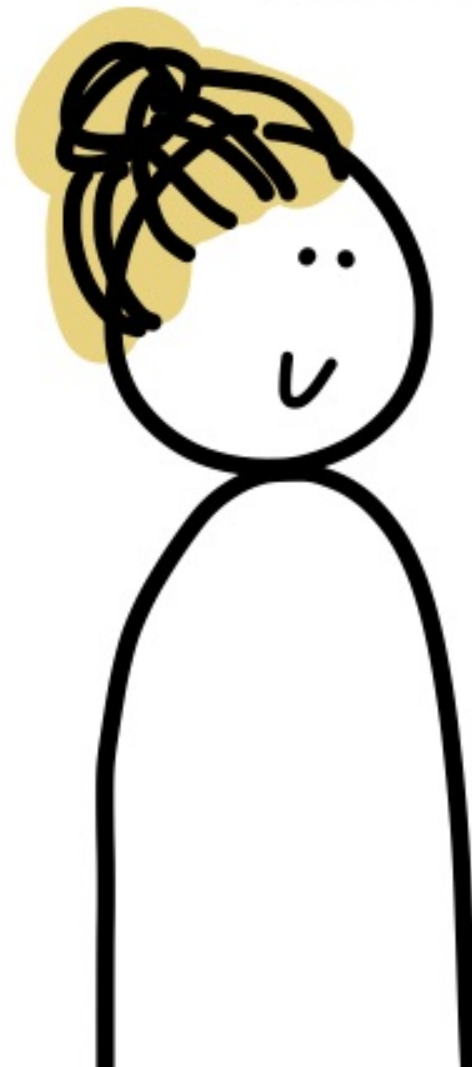
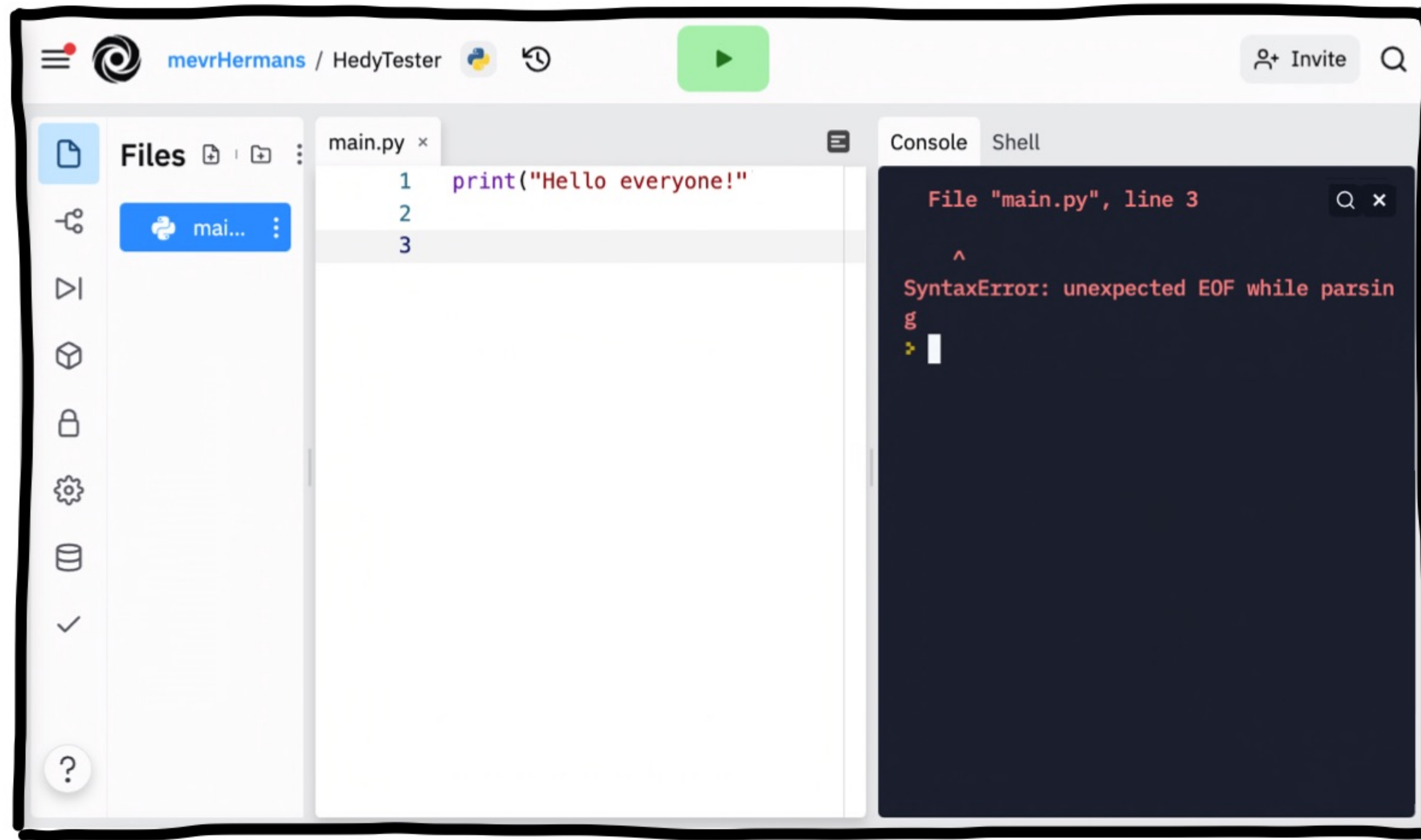


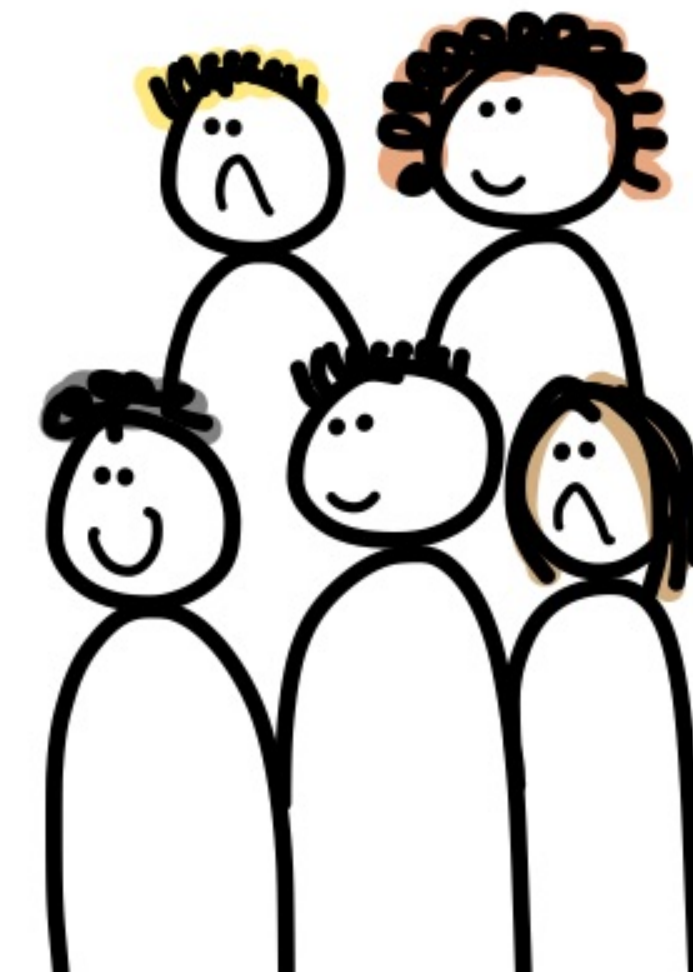
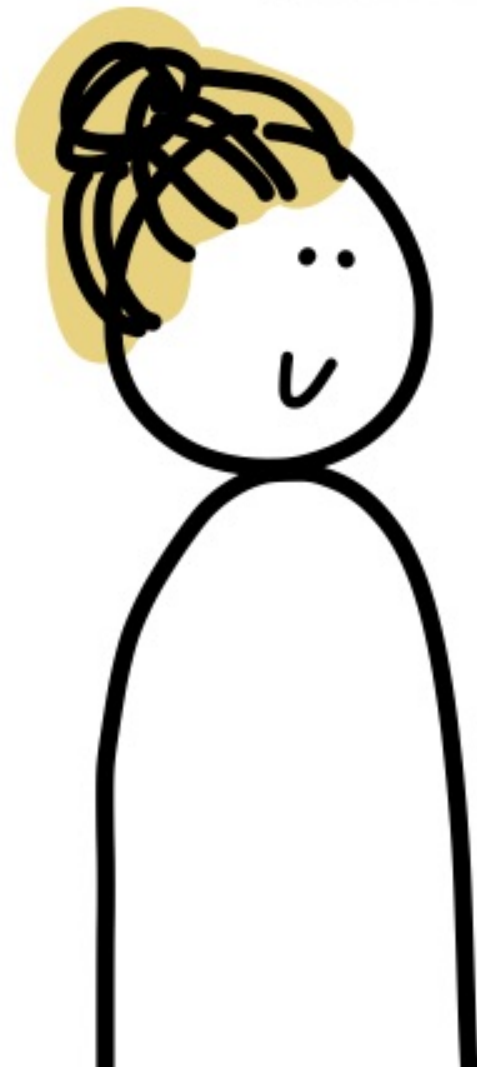
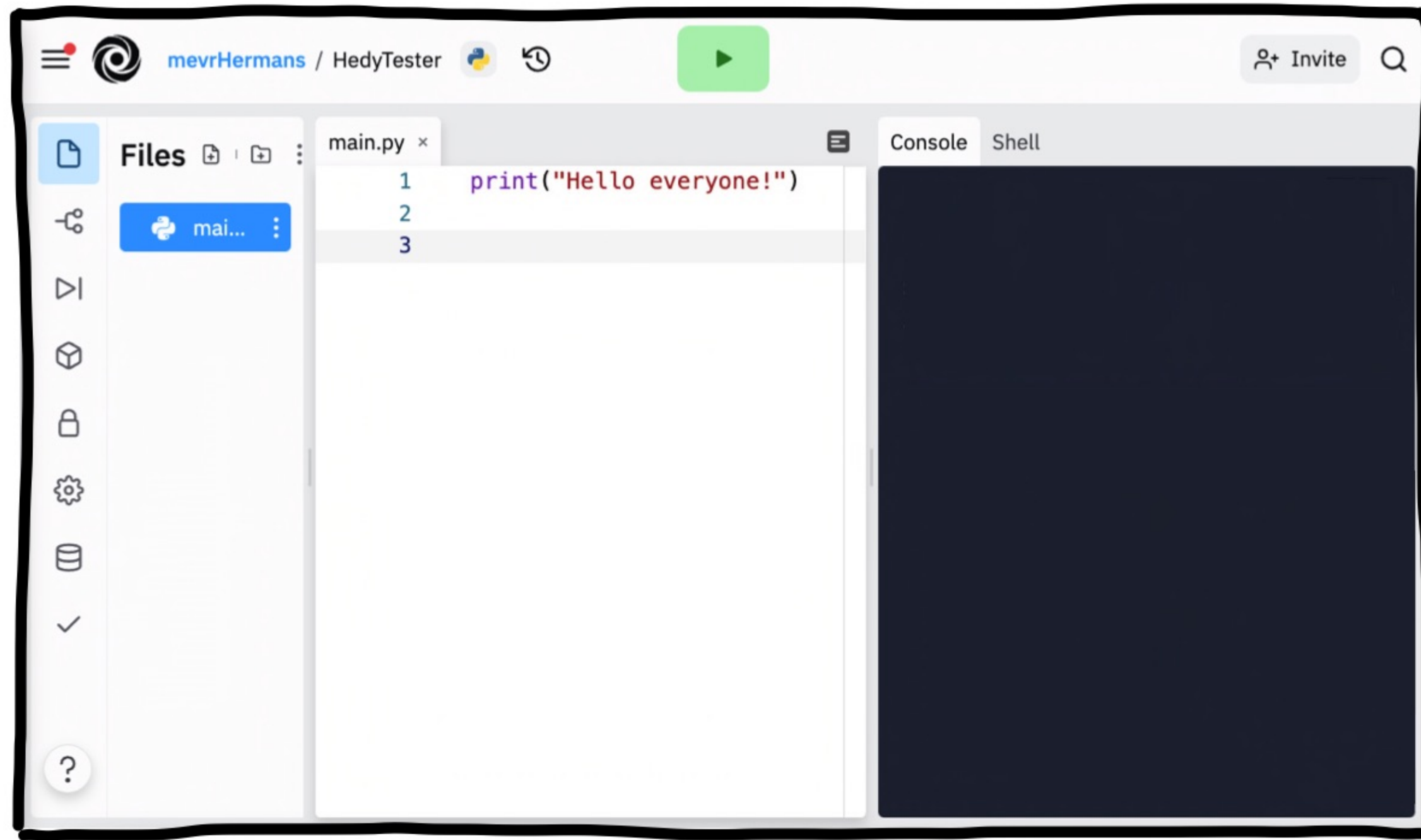


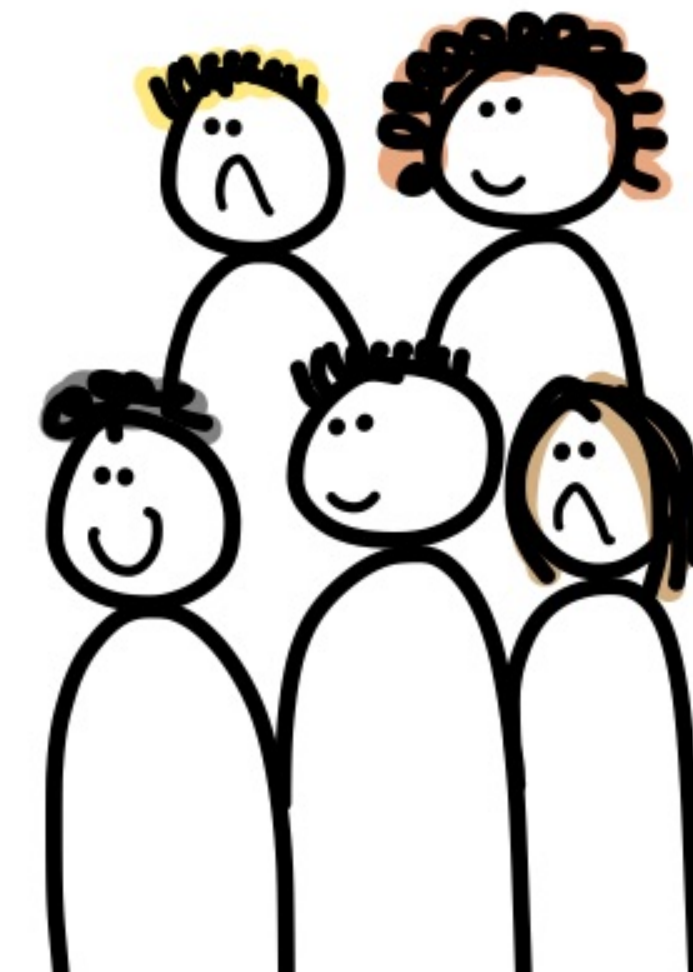
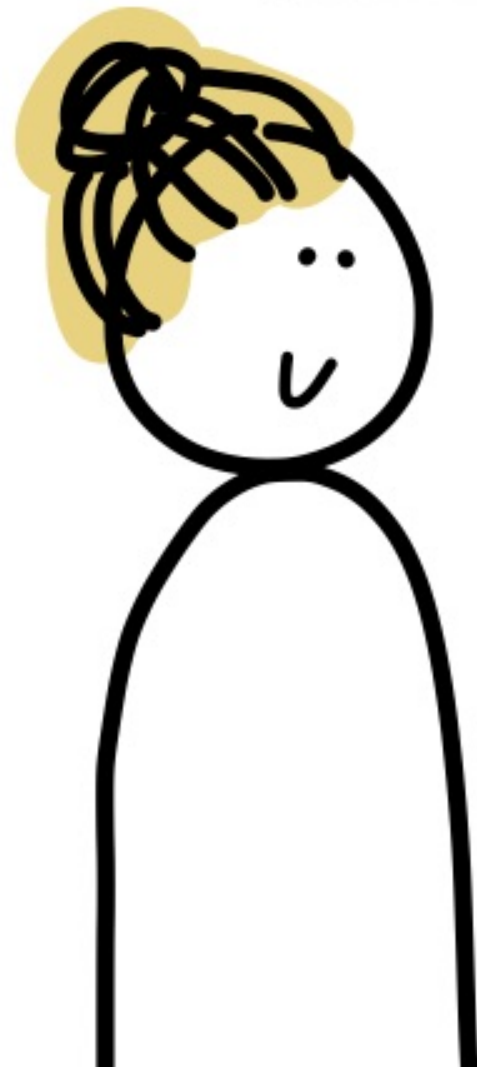
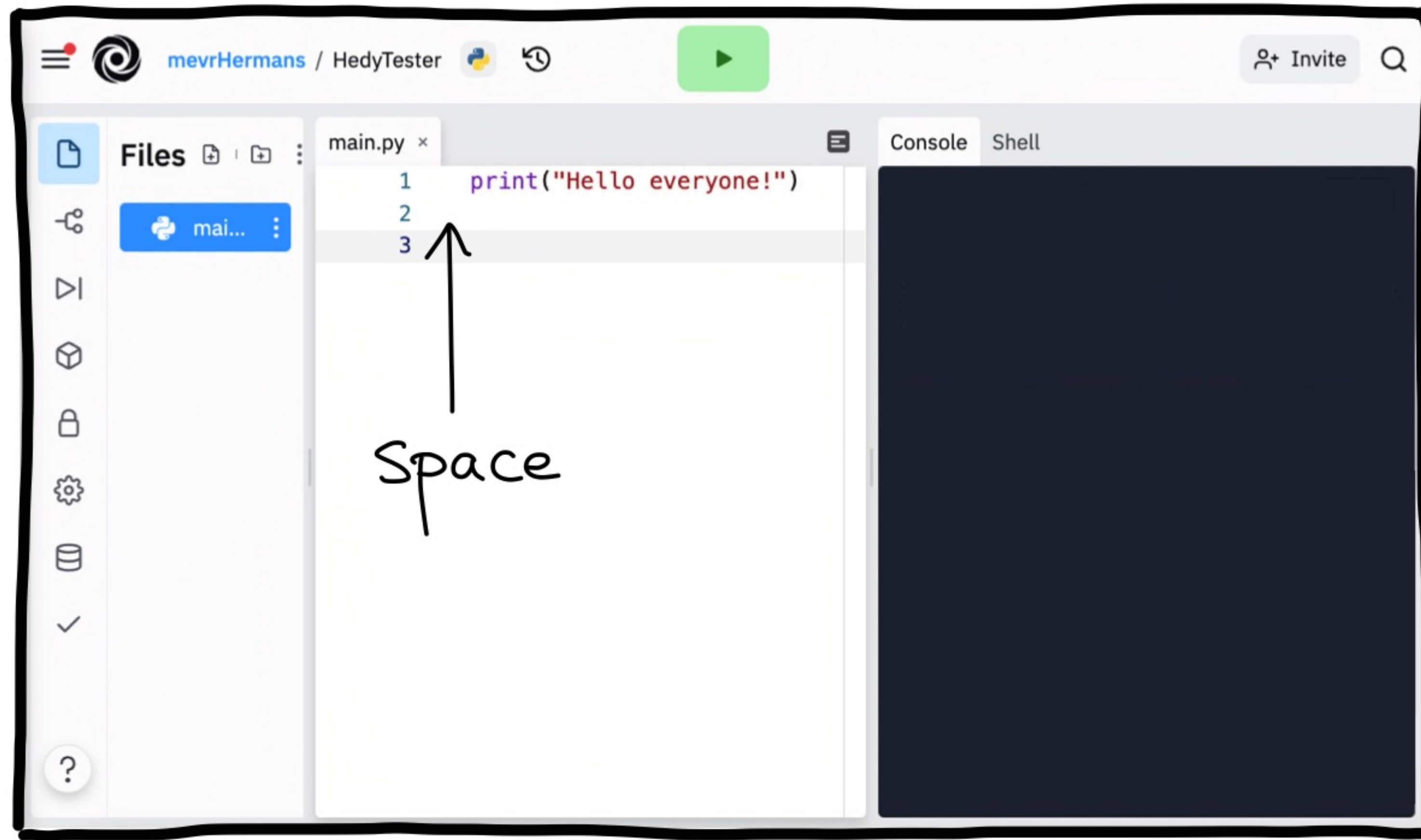


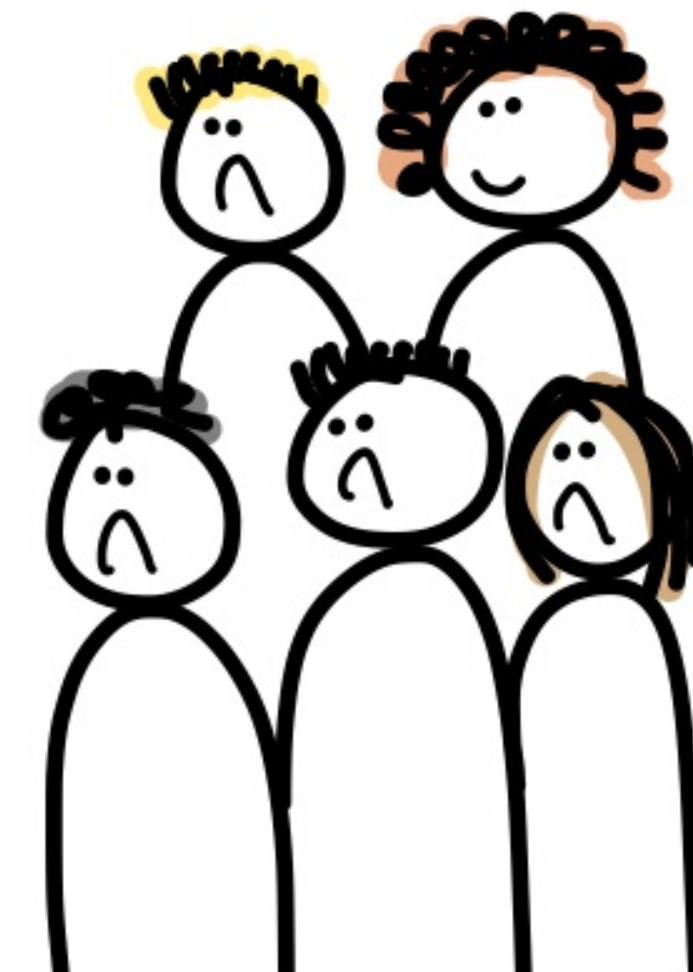
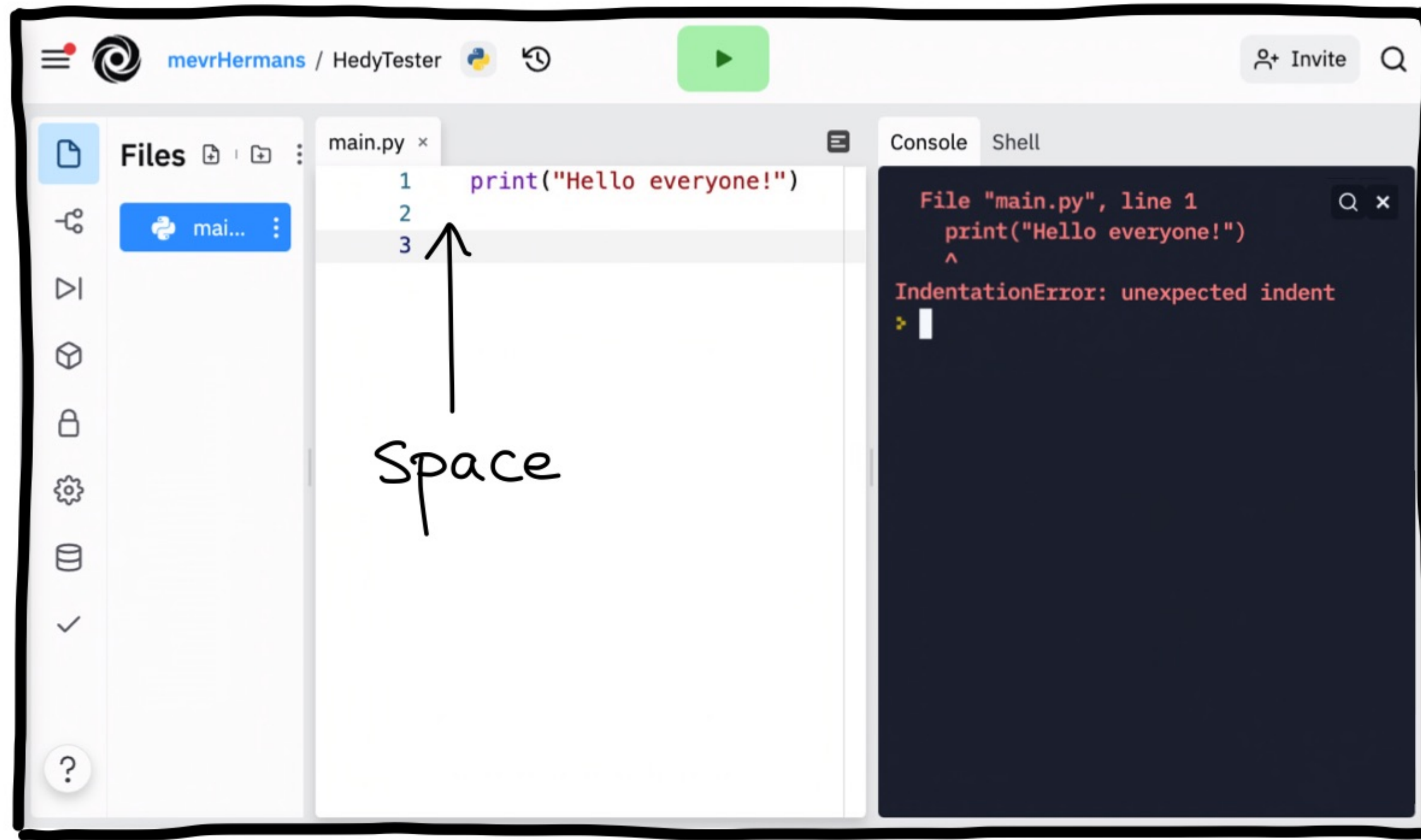














Compilers are
lovely teachers



```
for i in range(4):  
    print(i)
```



Repetition



```
for i in range(4):  
    print(i)
```



Repetition



```
for i in range(4):  
    print(i)
```

Colon

Brackets

Spaces



Syntax creates
cognitive load

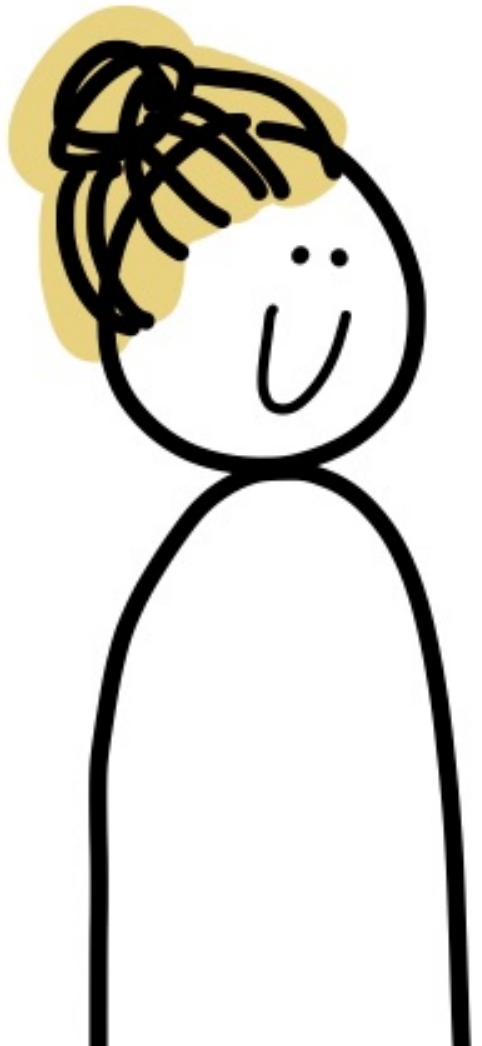


```
for i in range(4):  
    print(i)
```

Colon
Brackets
Spaces

A simple line drawing of a person looking upwards towards the text 'Colon', 'Brackets', and 'Spaces'. Three long, curved lines connect the words to the figure's head.

How do other fields
manage cognitive load?



a in e

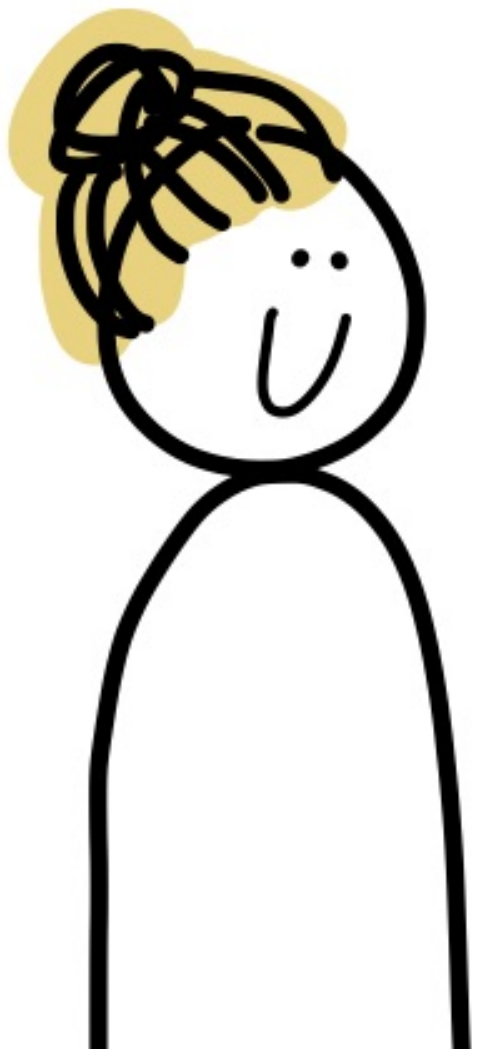
cat in tree

Cat in tree

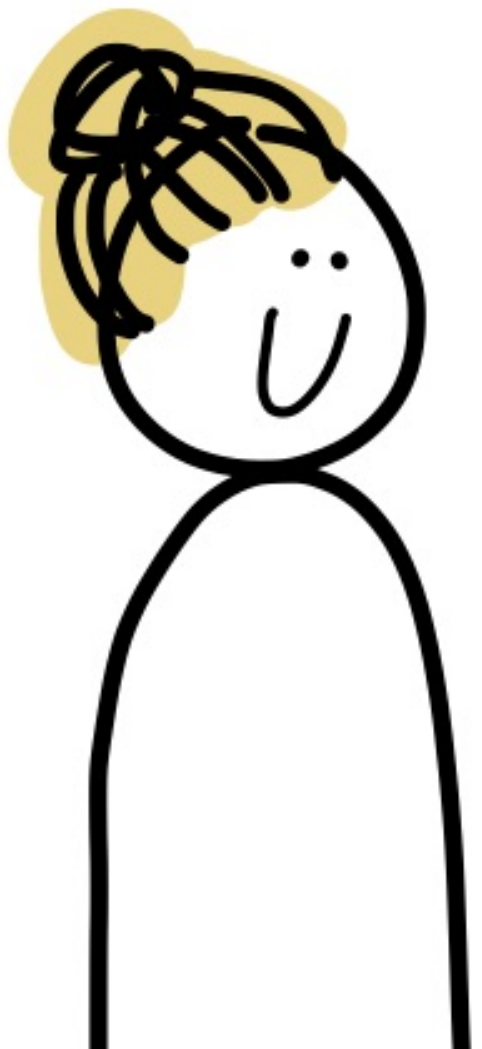
Cat in tree.

The cat in the

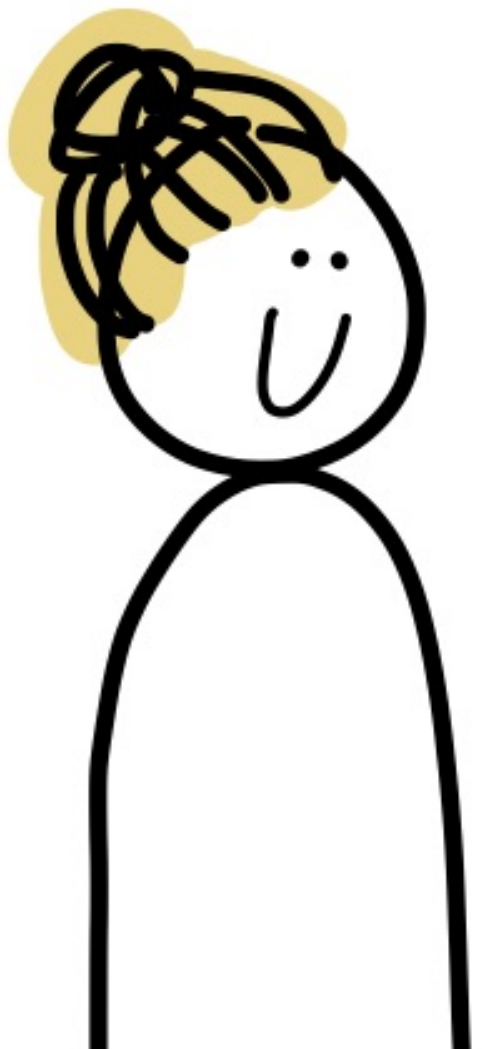
tree.



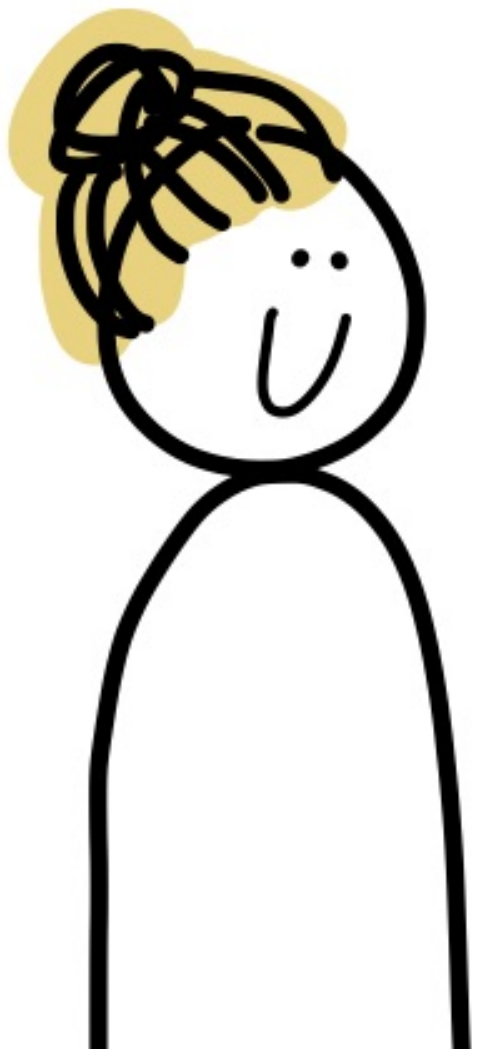
a in e
cat in tree
Cat in tree
Cat in tree.
The cat in the
tree.



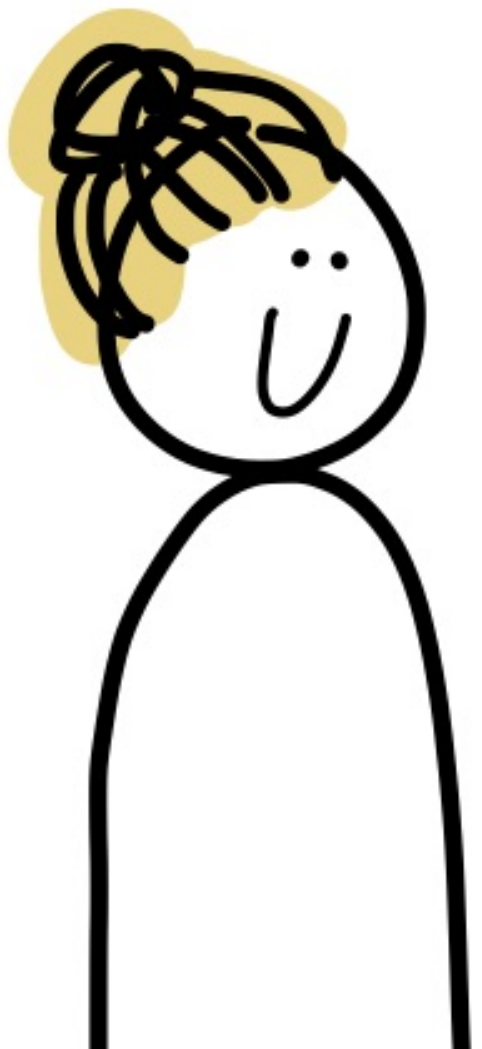
a in e
cat in tree
Cat in tree
Cat in tree.
The cat in the
tree.



a in e
cat in tree
Cat in tree
Cat in tree.
The cat in the
tree.

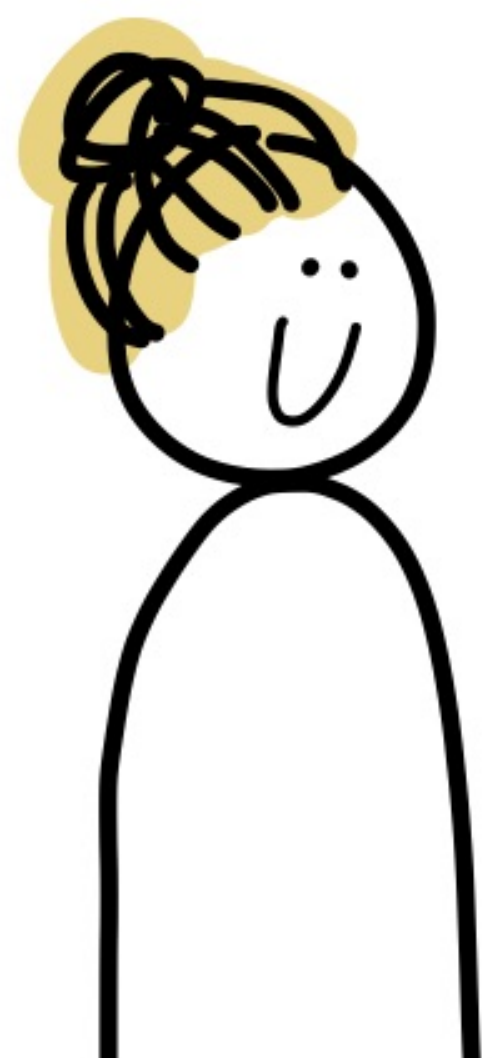


a in e
cat in tree
Cat in tree
Cat in tree.
The cat in the
tree.



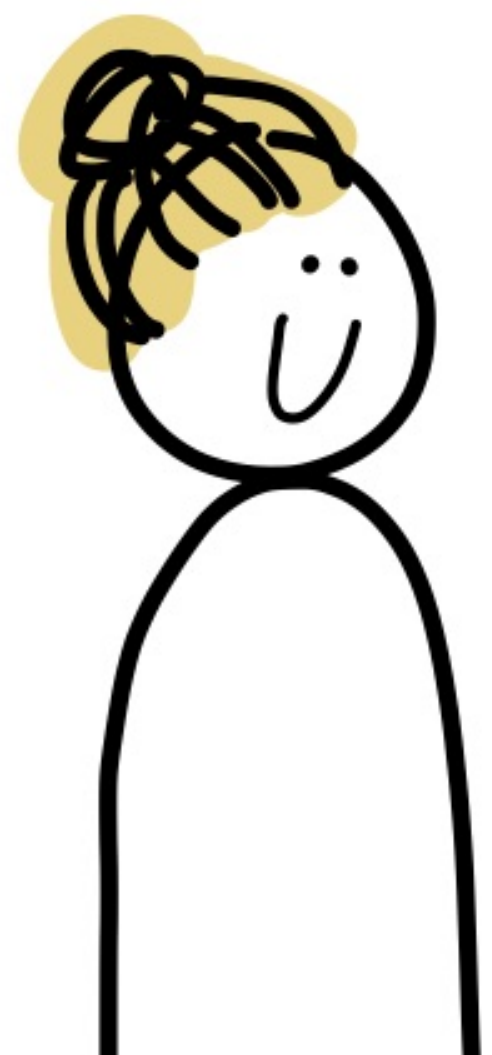
Rules gradually
change

<u>a in e</u>
<u>cat in tree</u>
<u>Cat in tree</u>
<u>Cat in tree.</u>
<u>The cat in the</u>
<u>tree.</u>



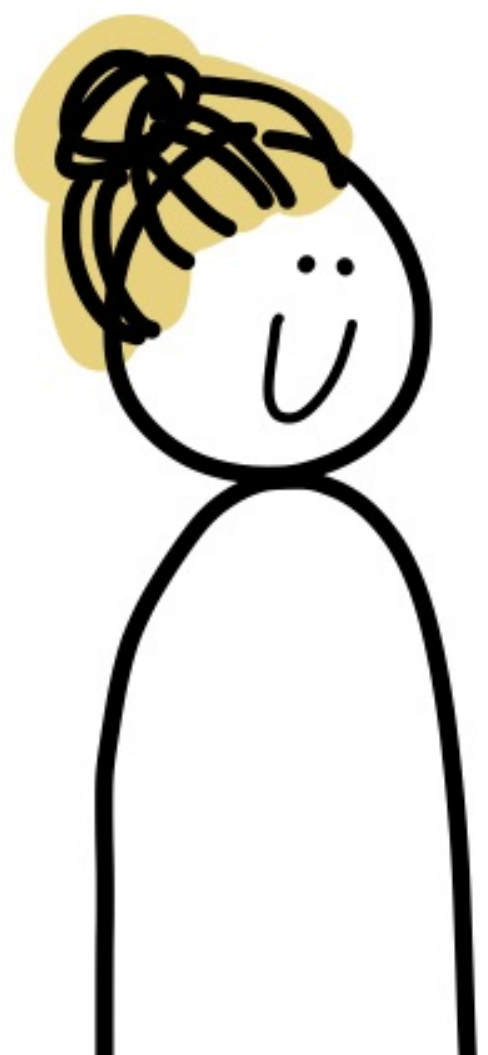
Rules gradually
change
in math too!

$5 - 3 = 2$
$3 - 5 = 0$



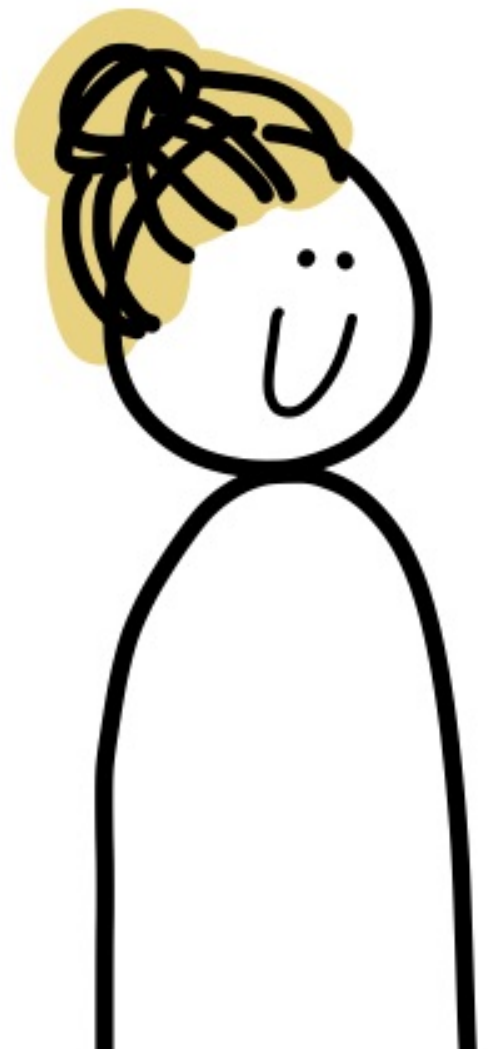
Rules gradually
change
in math too!

$5 - 3 = 2$
$3 - 5 = 0$
$3 - 5 = -2$

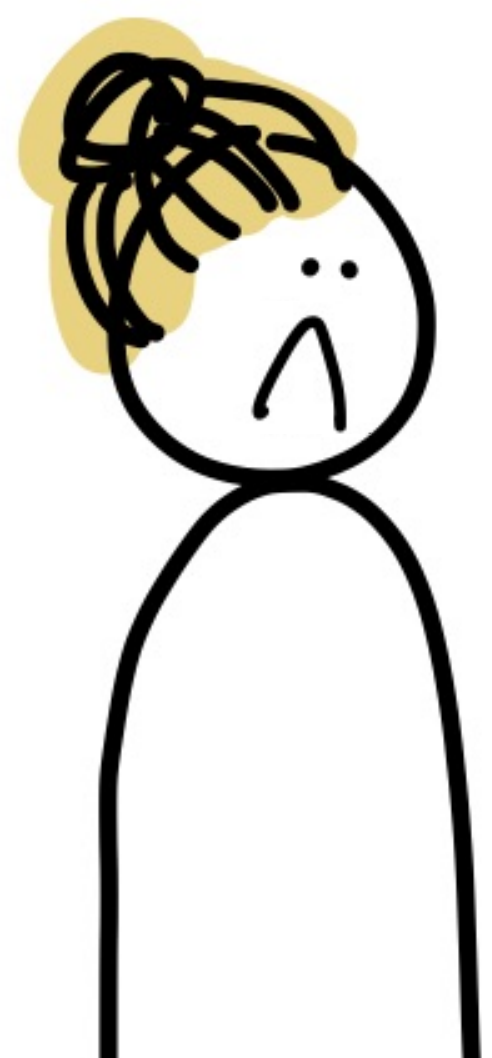


Rules gradually
change
in math too!

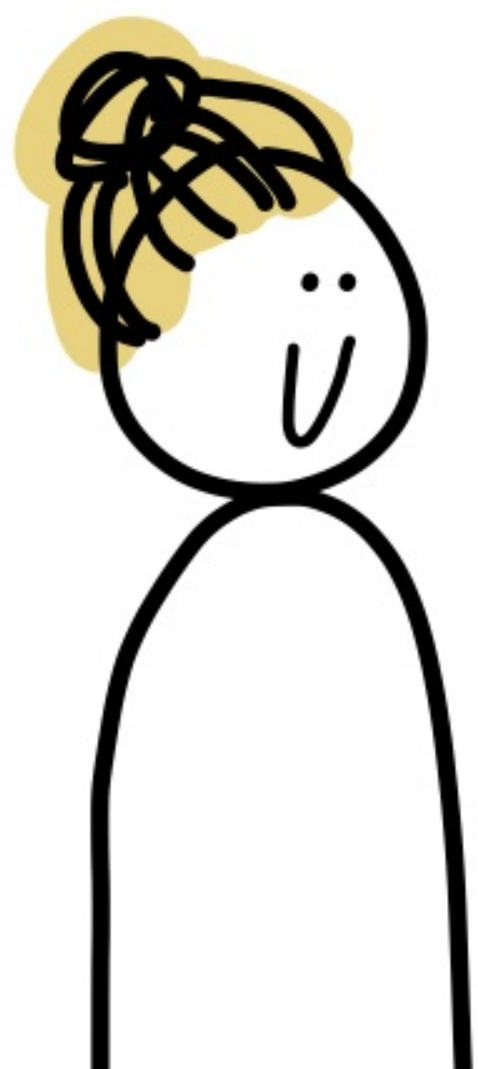
$5 - 3 = 2$
$3 - 5 = 0$
$3 - 5 = -2$
$8 / 3 = 2 \text{ r } 2$
$8 / 3 = 2 \frac{2}{3}$
$8 / 3 = 2,666\dots$



Can we teach code
gradually?



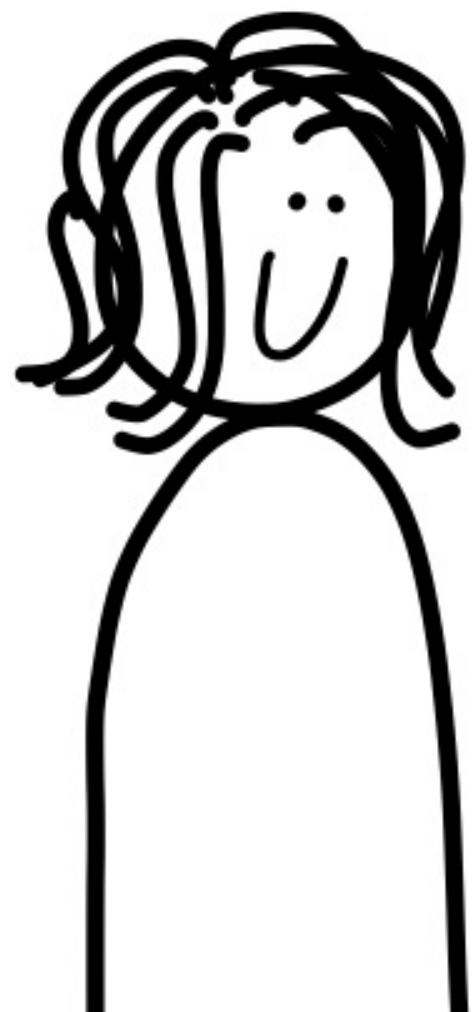
Let's look at
a demo!



Hedy is gradual ✓

multi lingual

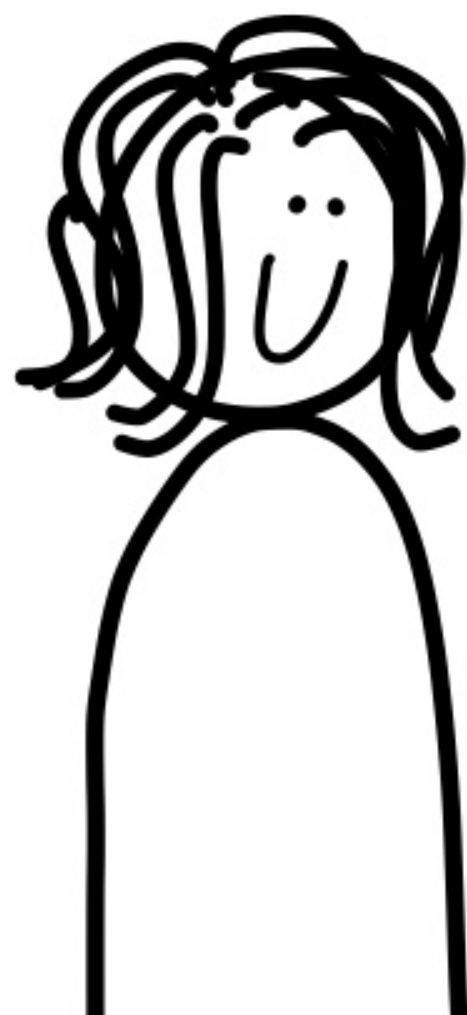
built for teaching



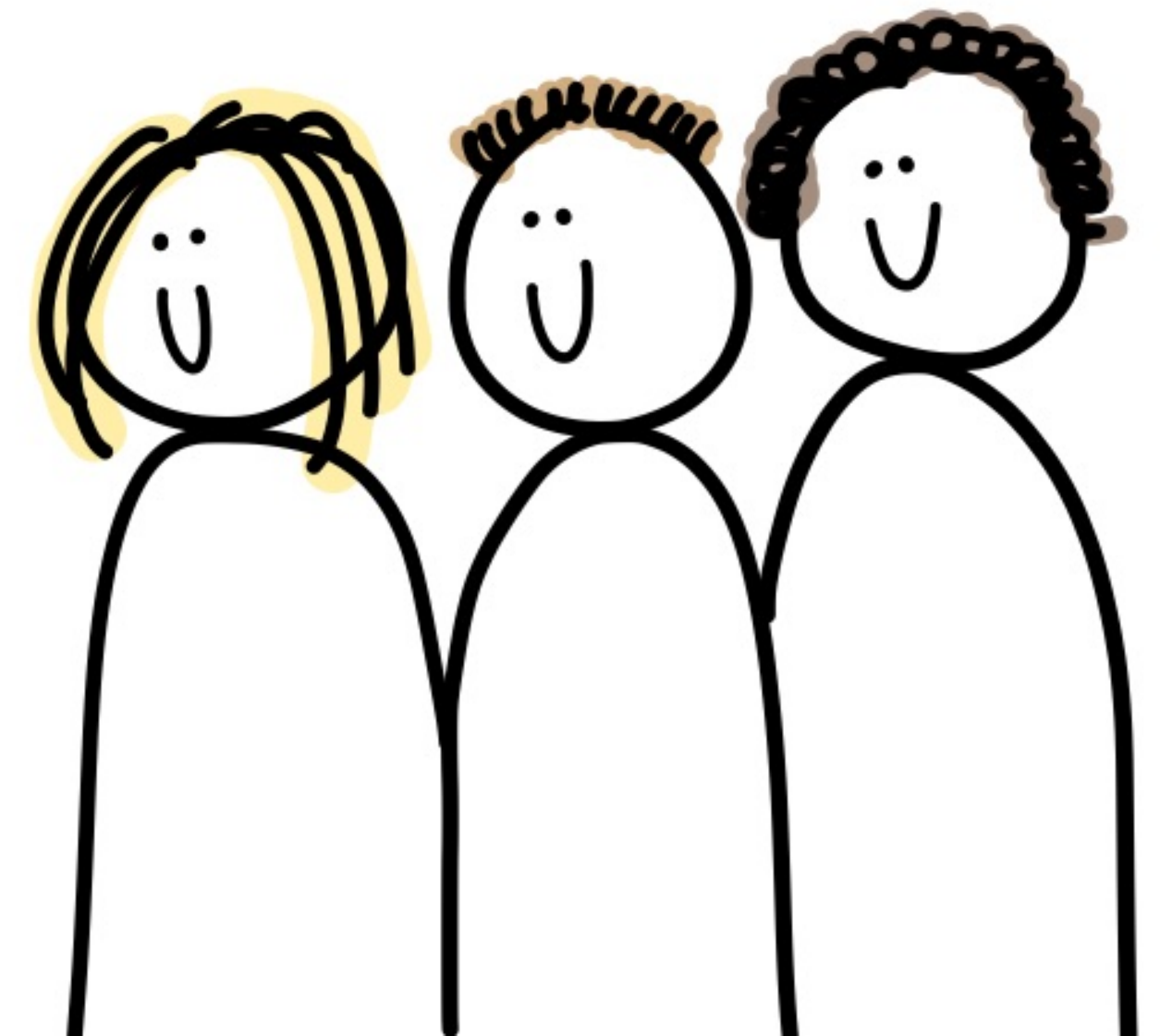
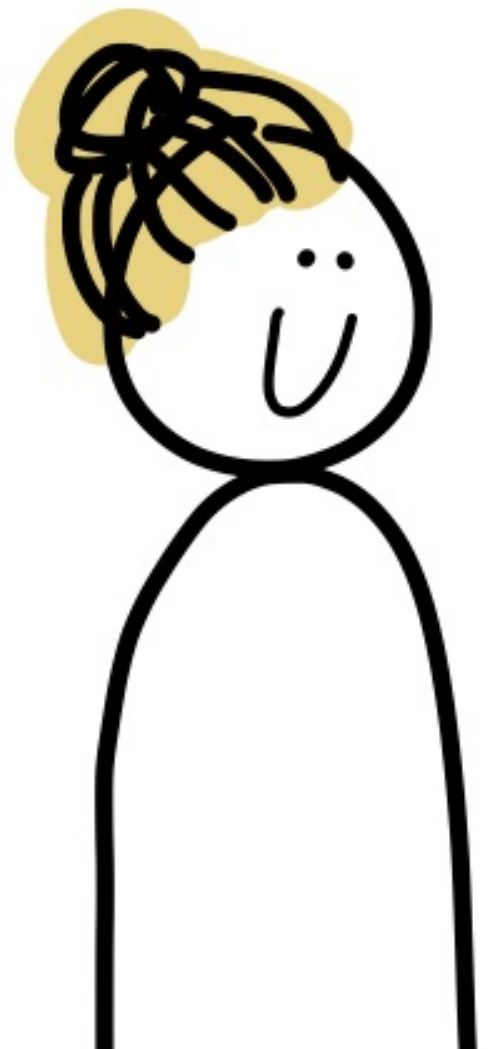
Hedy is gradual

multi lingual

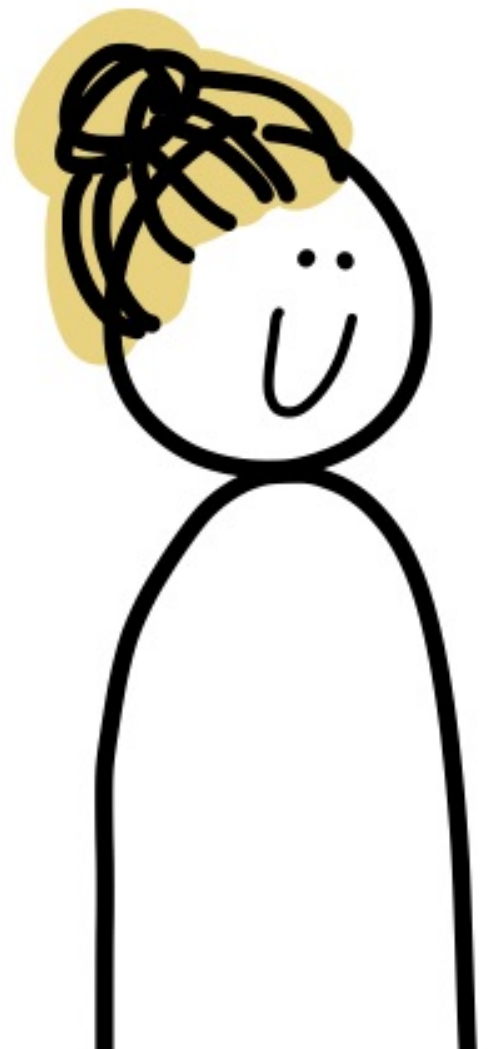
built for teaching



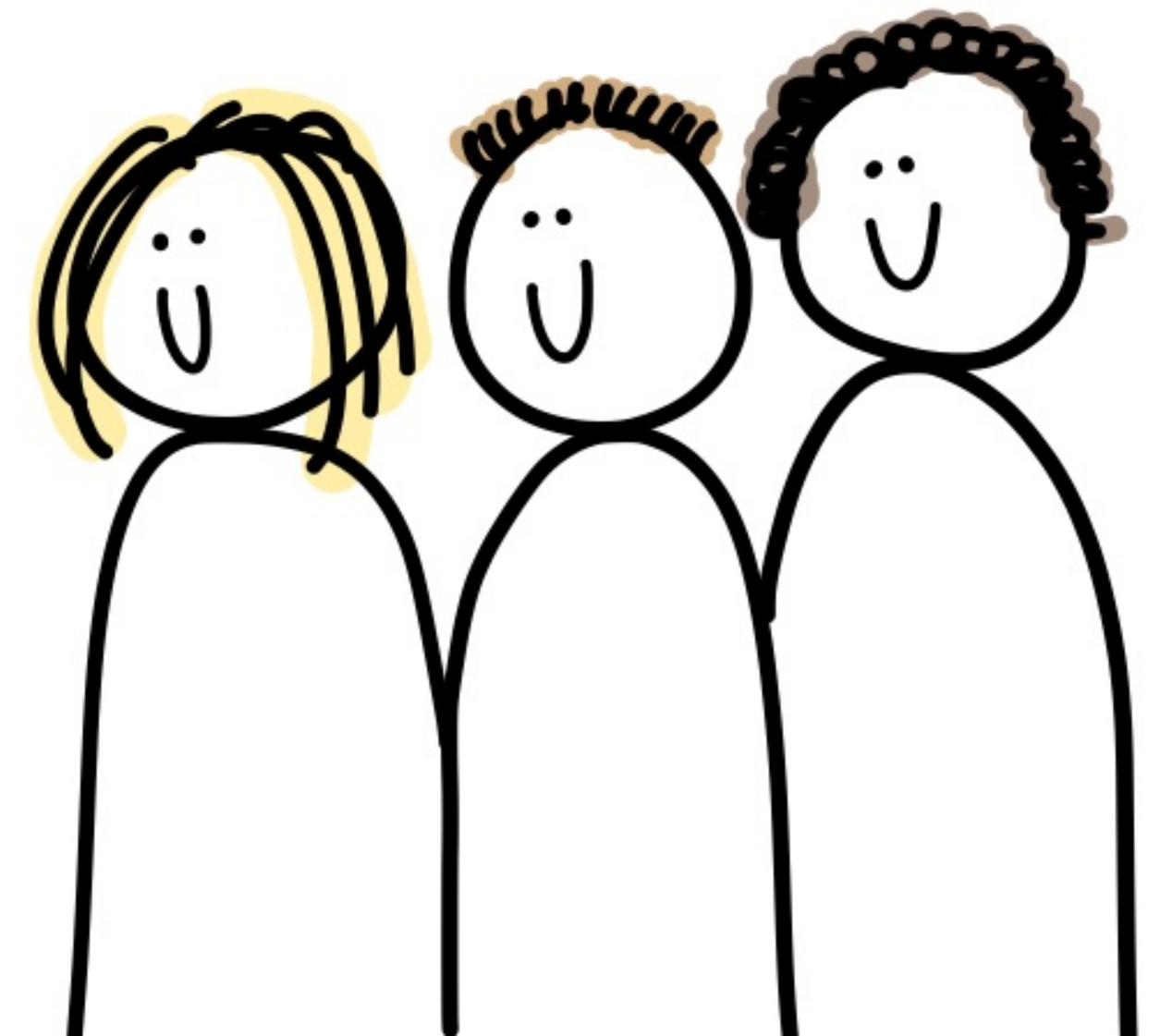
Do kids
like Hedy?



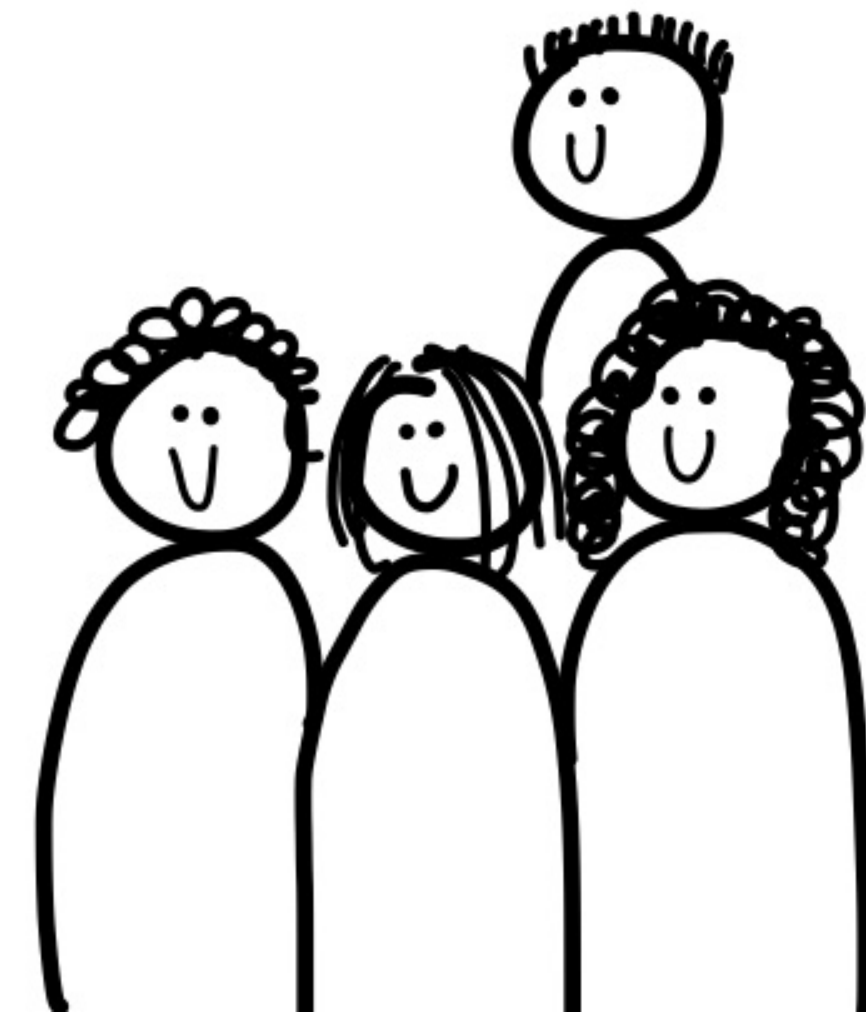
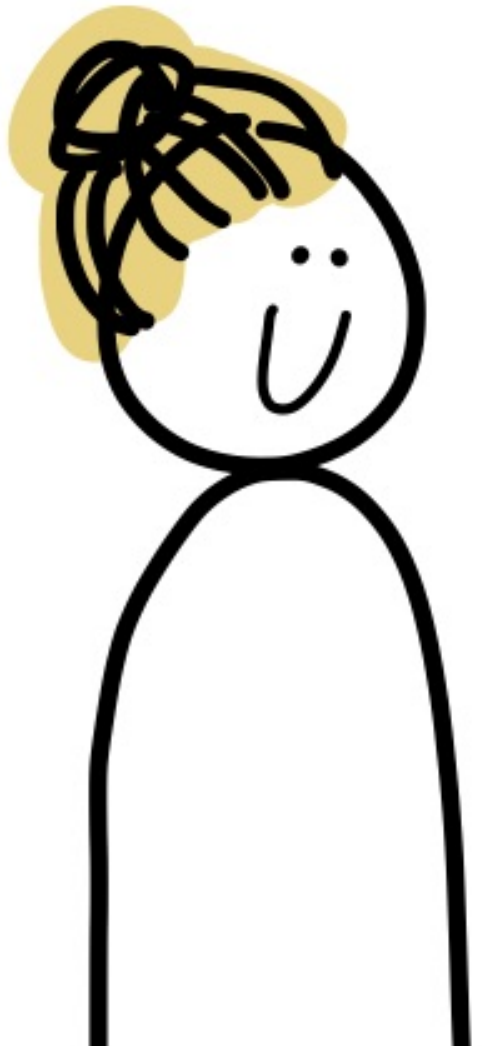
We ran a
user study!



Do kids
like Hedy?

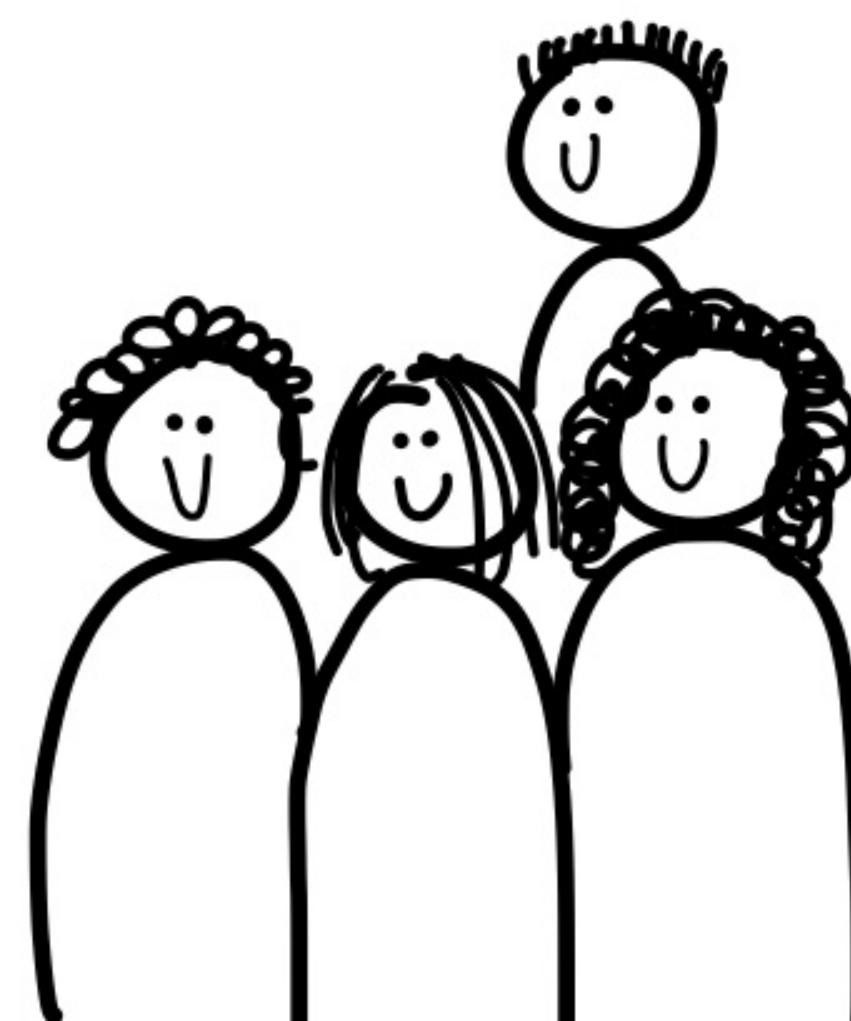
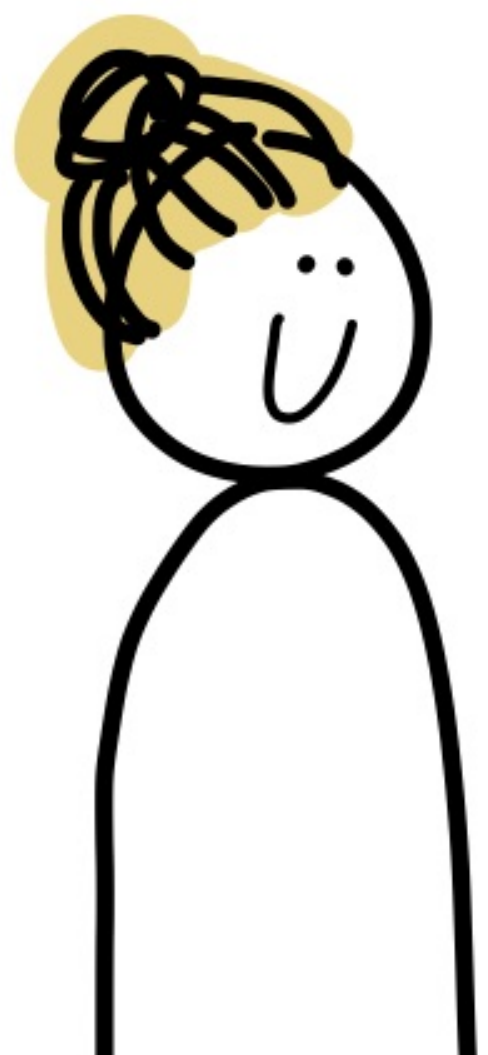


39 kids



39 kids

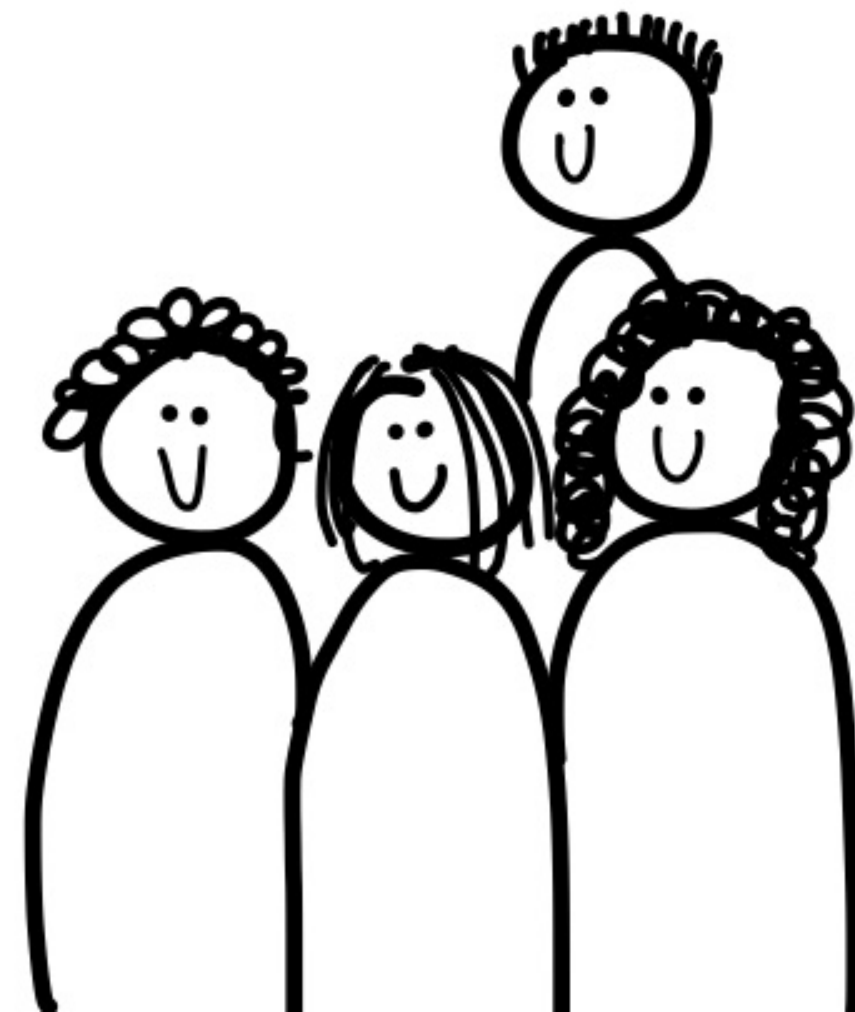
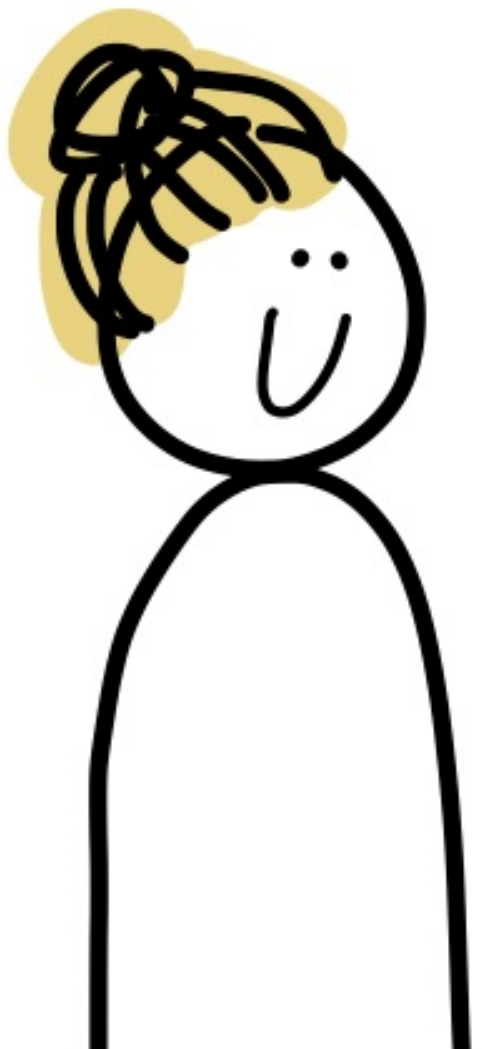
12 online
lessons



Benefits, challenges & improvements

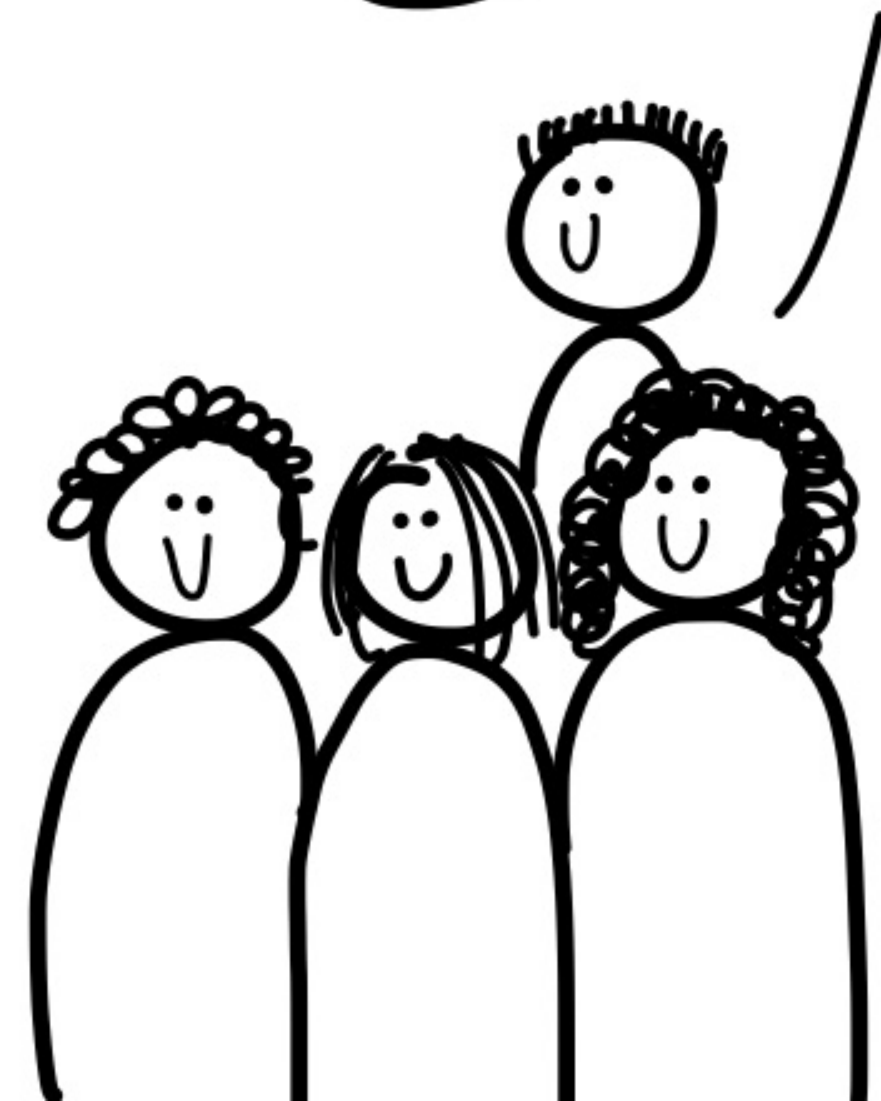
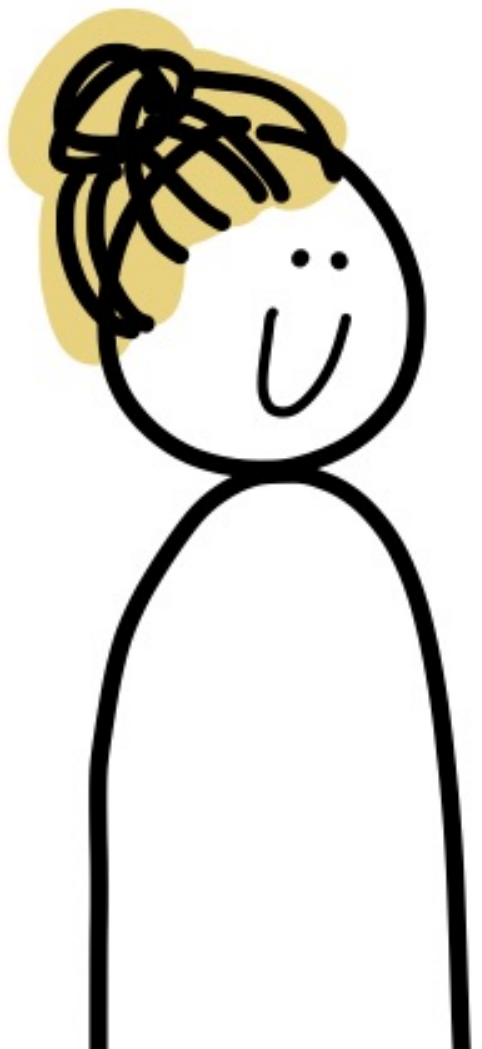
39 kids

12 online
lessons



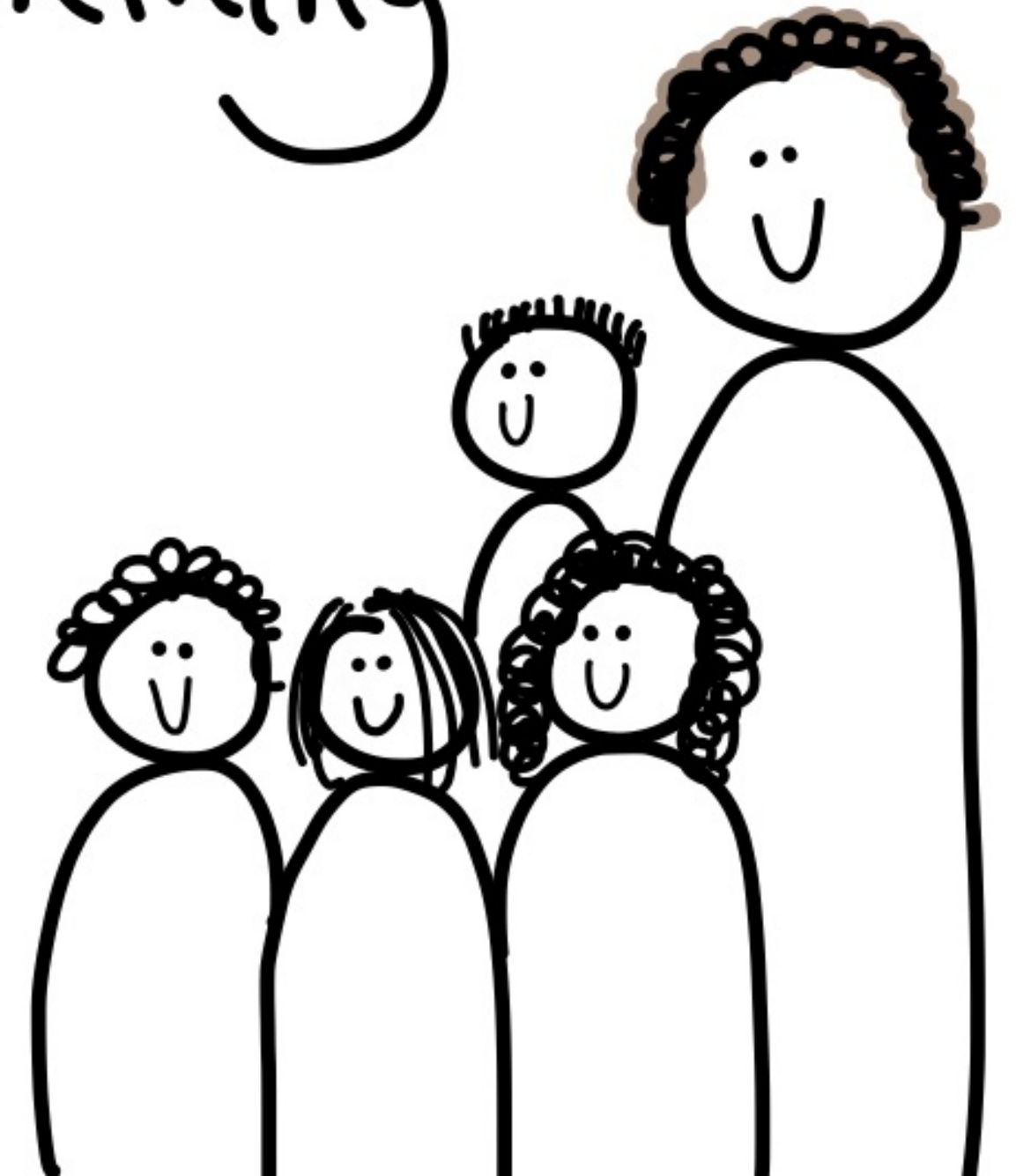
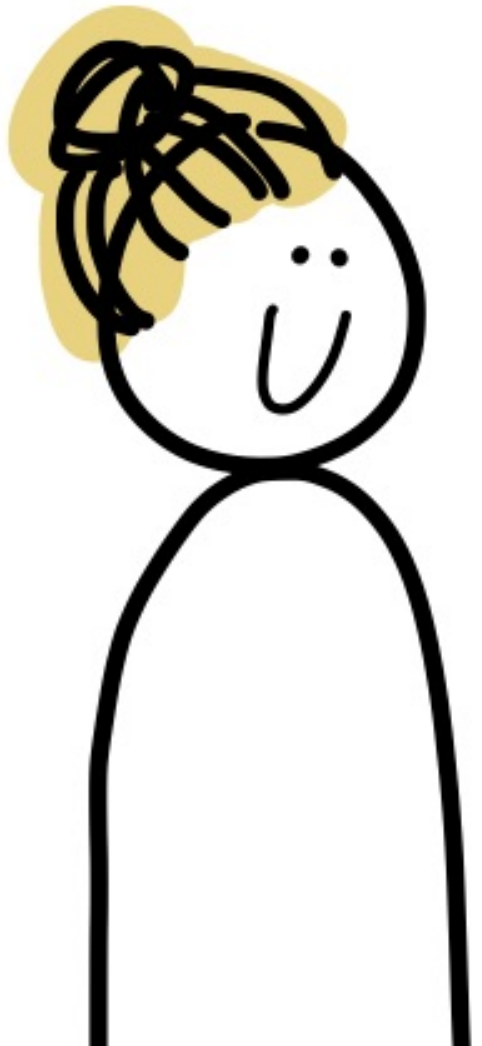
Benefits, challenges & improvements

The levels are
a step by step
guide



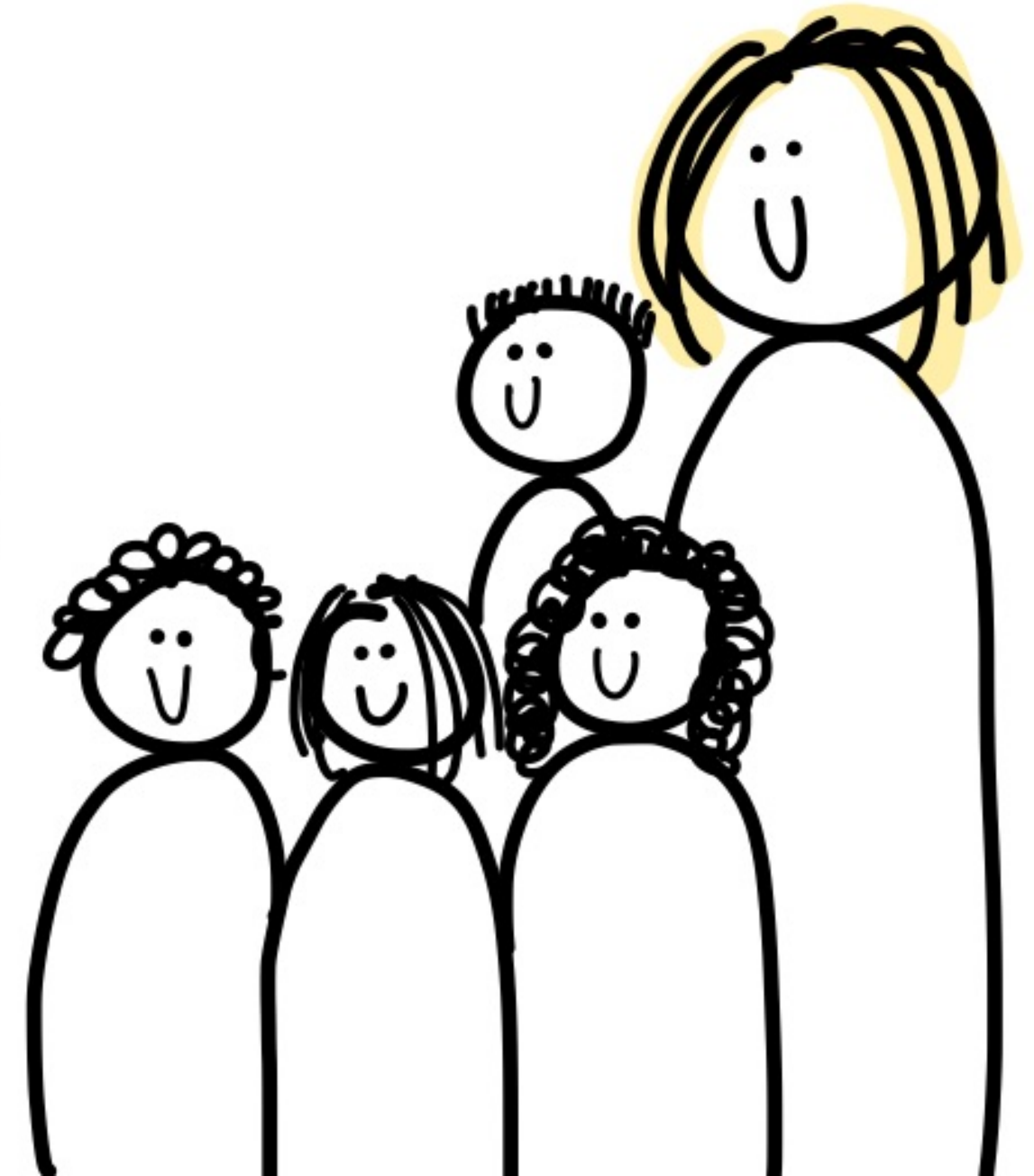
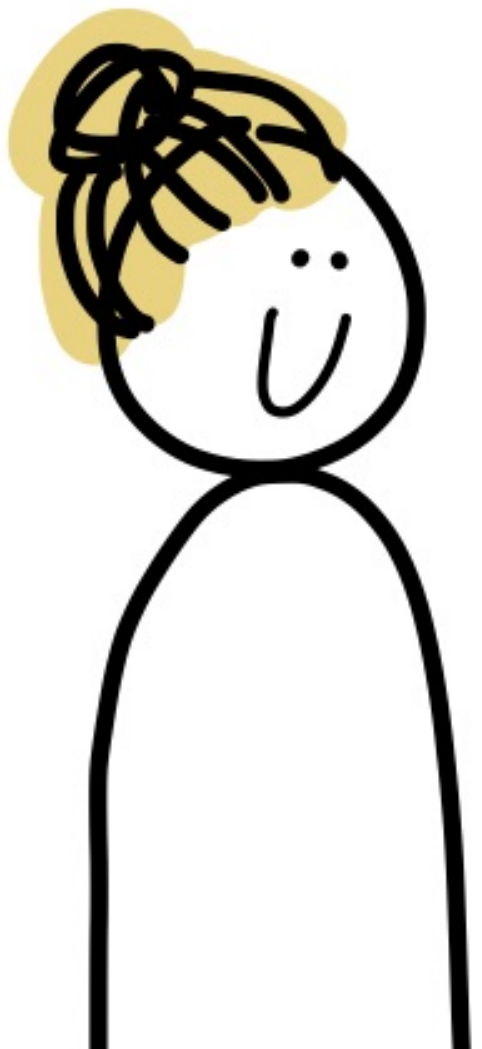
Benefits, challenges & improvements

With Hedy all kids
learn some programming



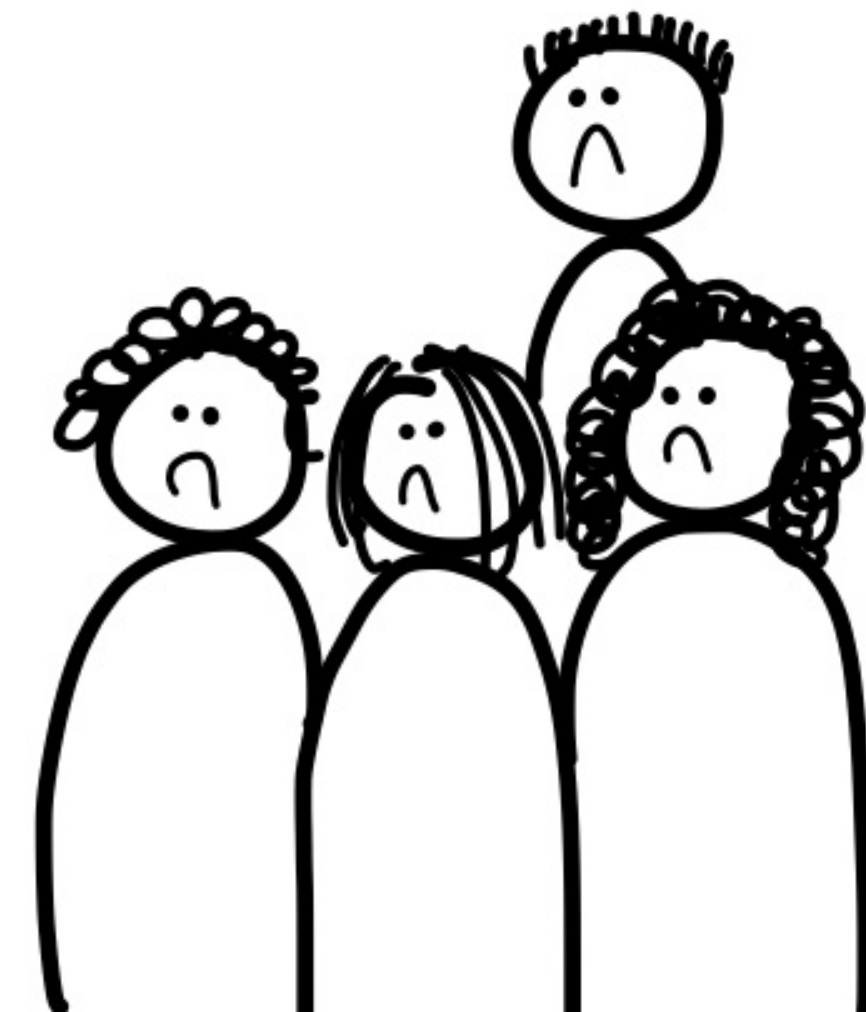
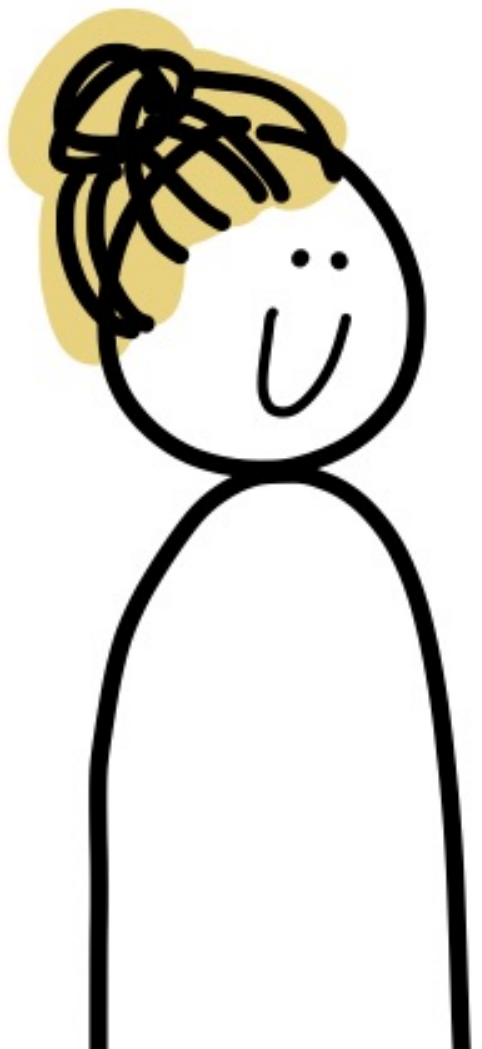
Benefits, challenges & improvements

Hedy gives girls
the confidence to
learn programming



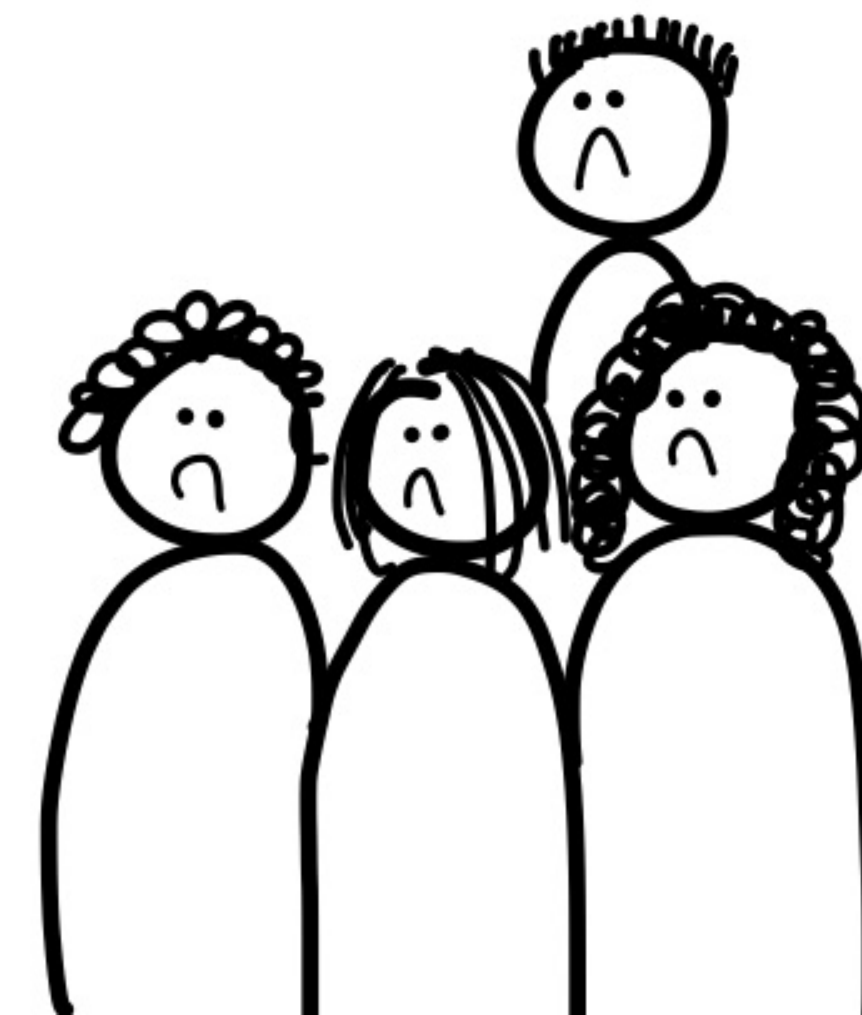
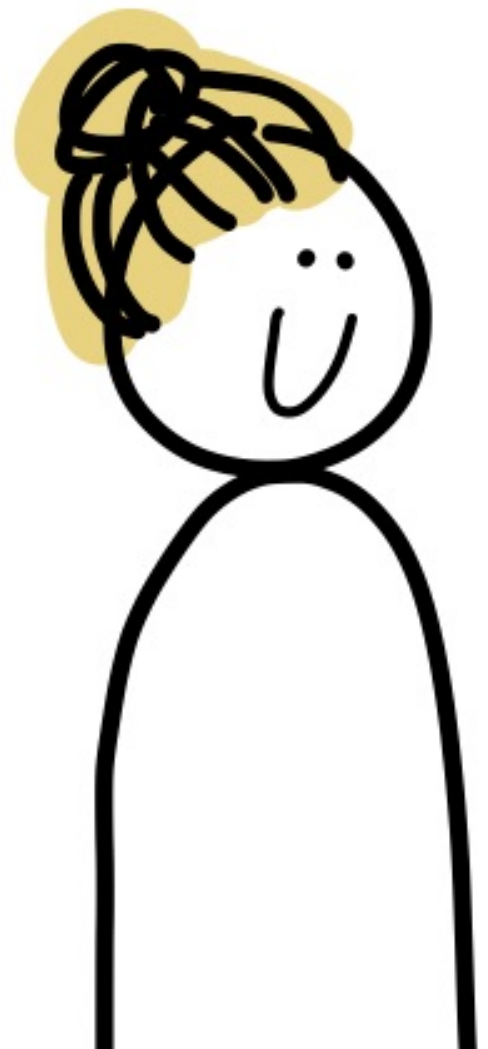
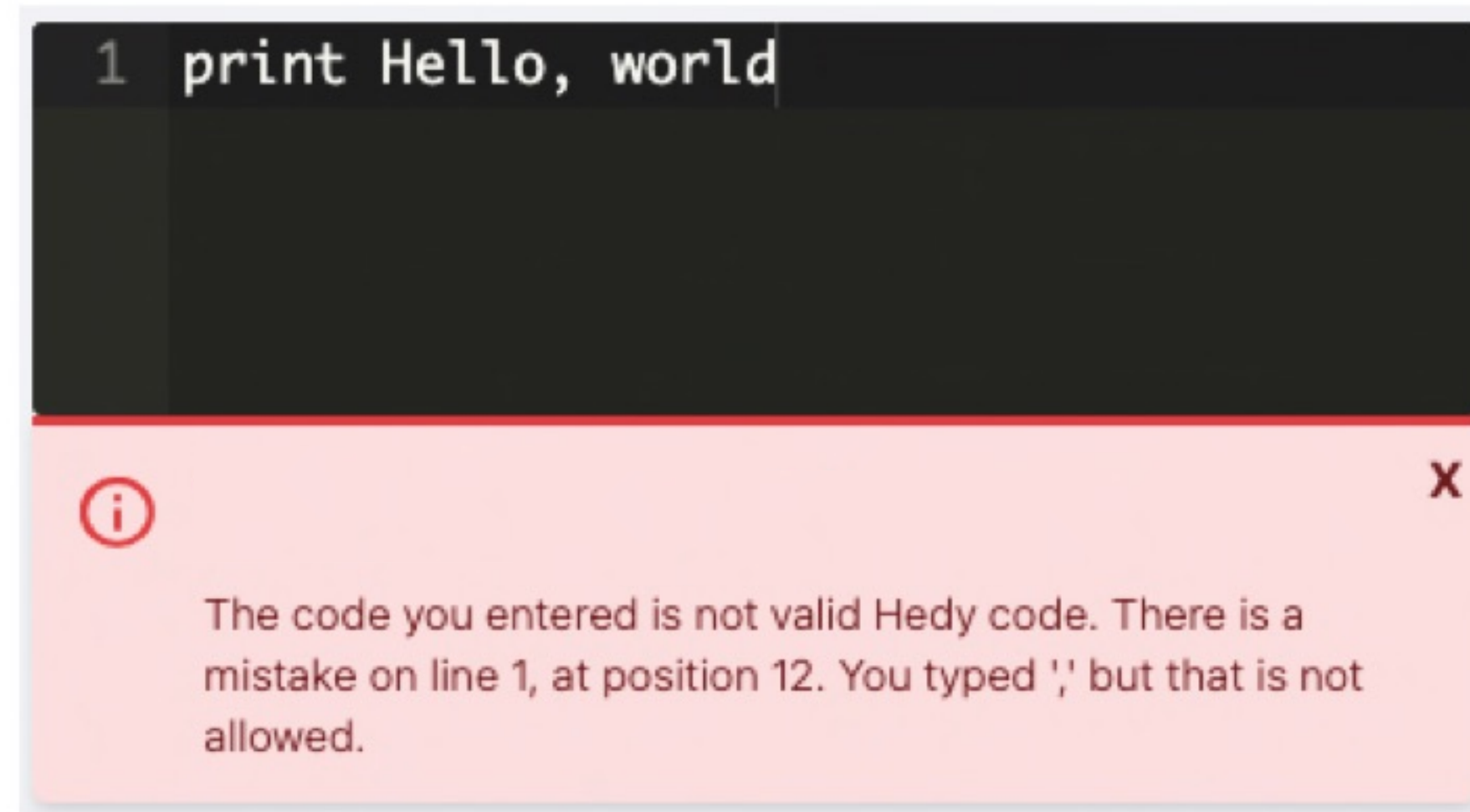
Benefits, challenges & improvements

Better error
messages



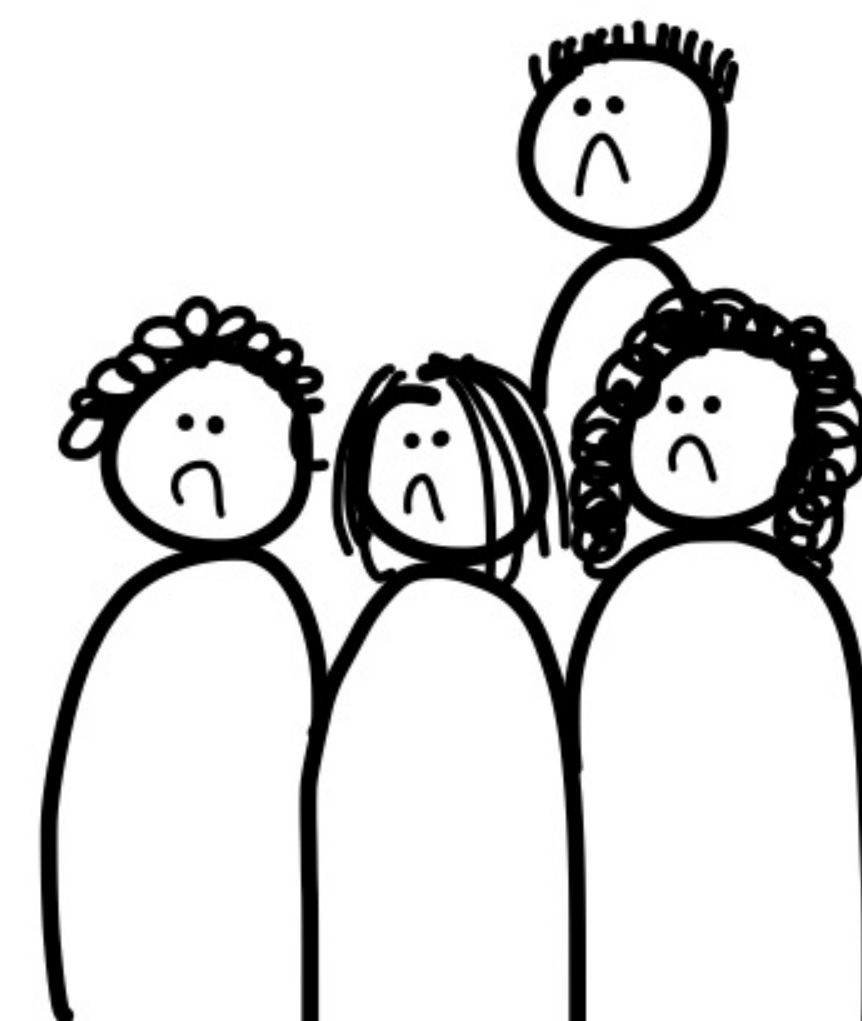
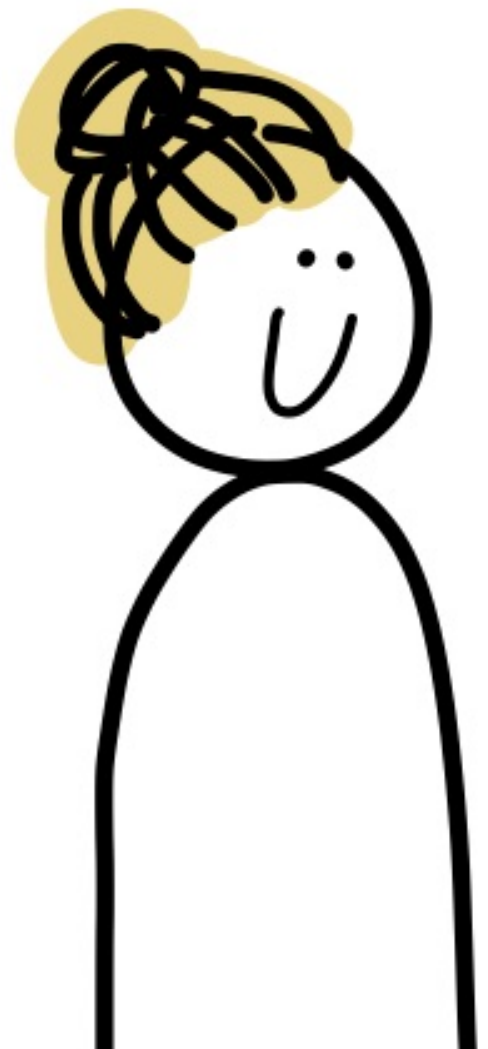
Benefits, challenges & improvements

Better error messages



Benefits, challenges & improvements

Better error
messages

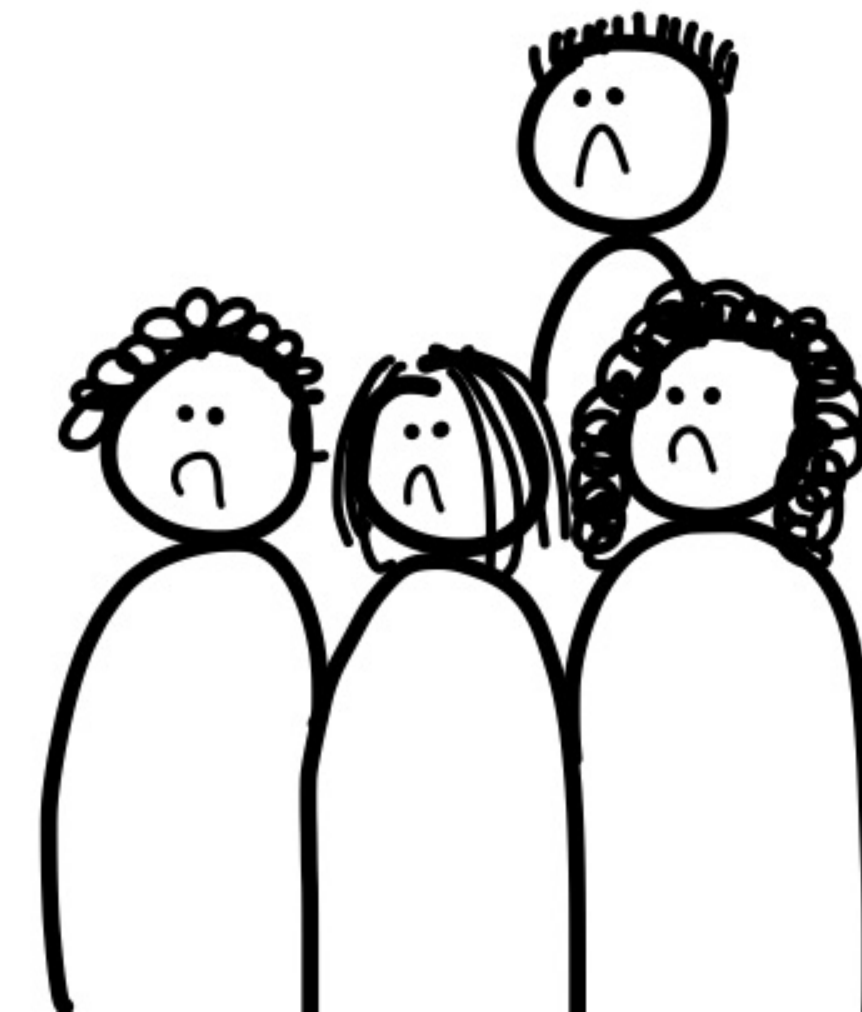
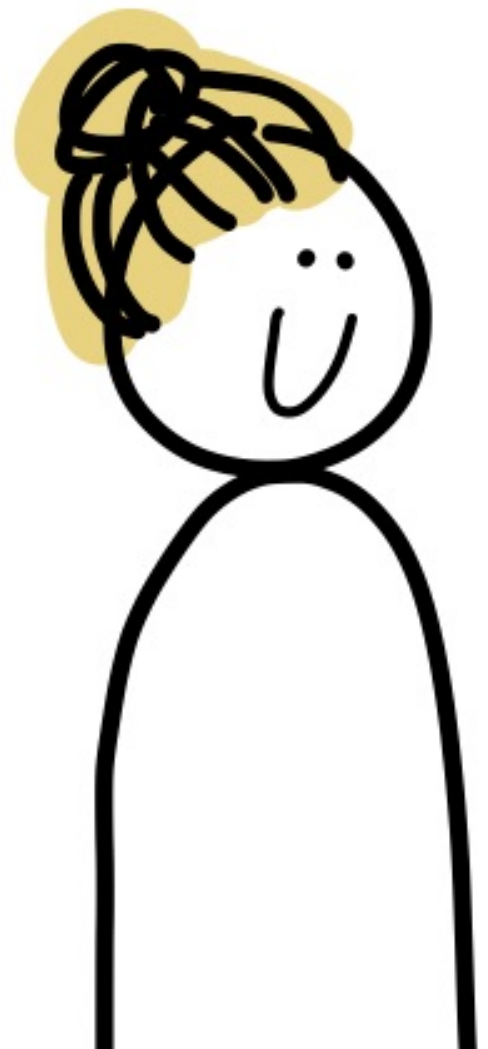


Benefits, challenges & improvements

Better error
messages

```
1 name is Hedy
2 print welcome, name
3
```

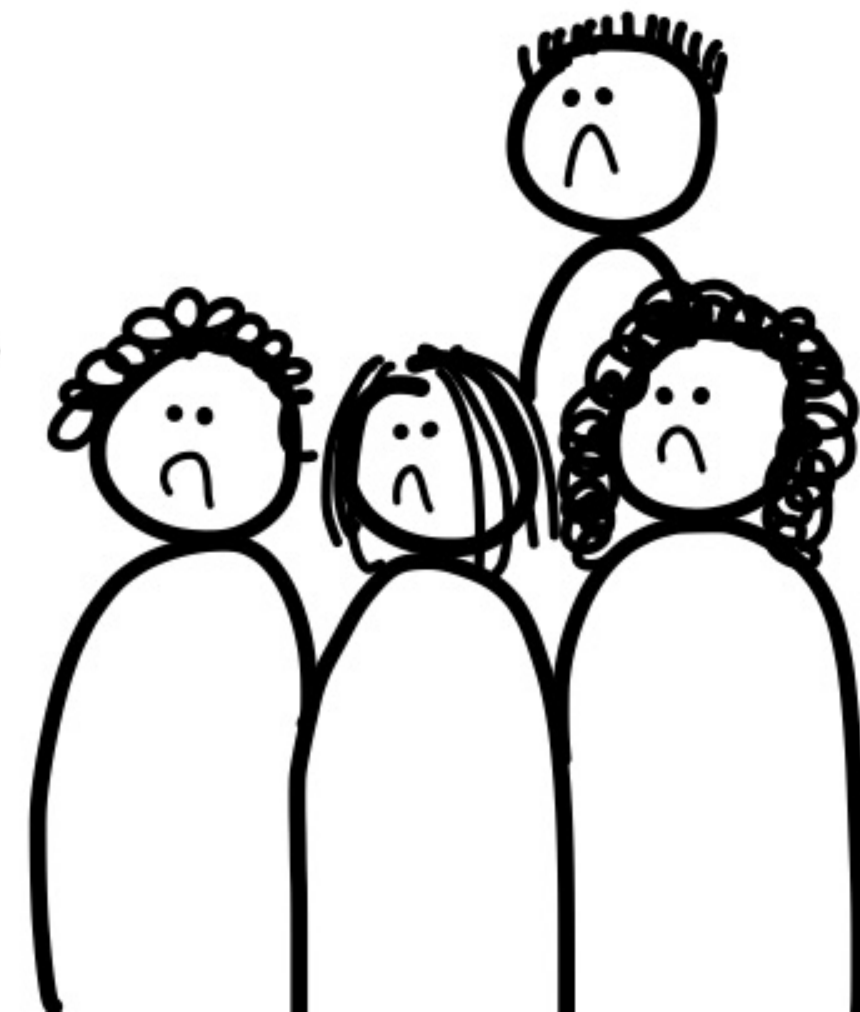
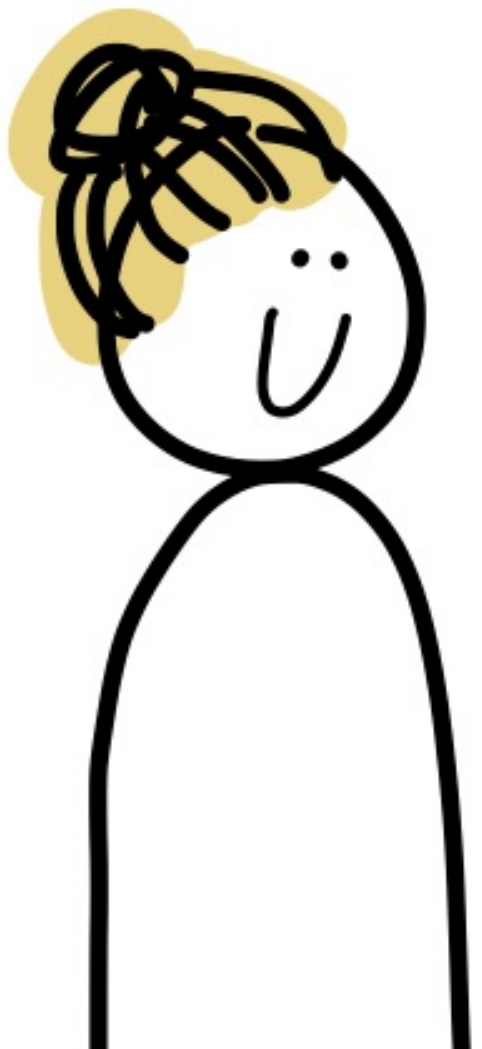
 The code you entered is not valid Hedy code. There is a mistake on line 2, at position 14. You typed a comma, but that is not allowed. 



Benefits, challenges & improvements

Better error
messages

Dutch keywords

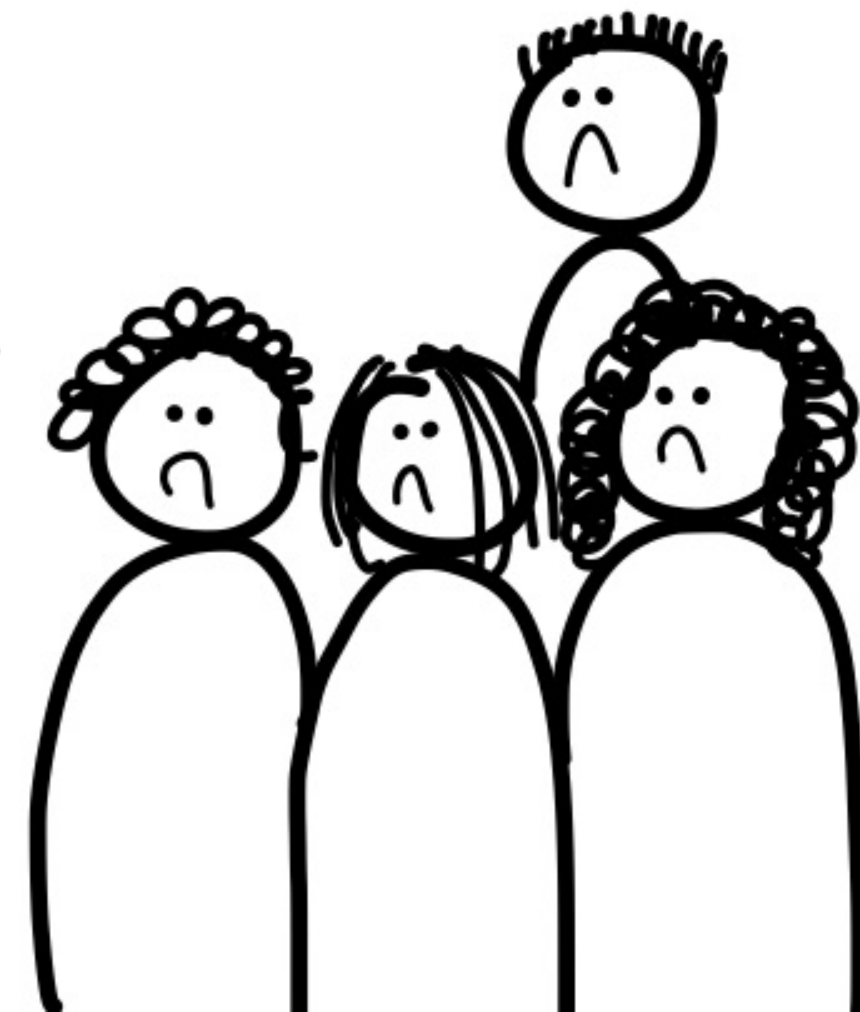
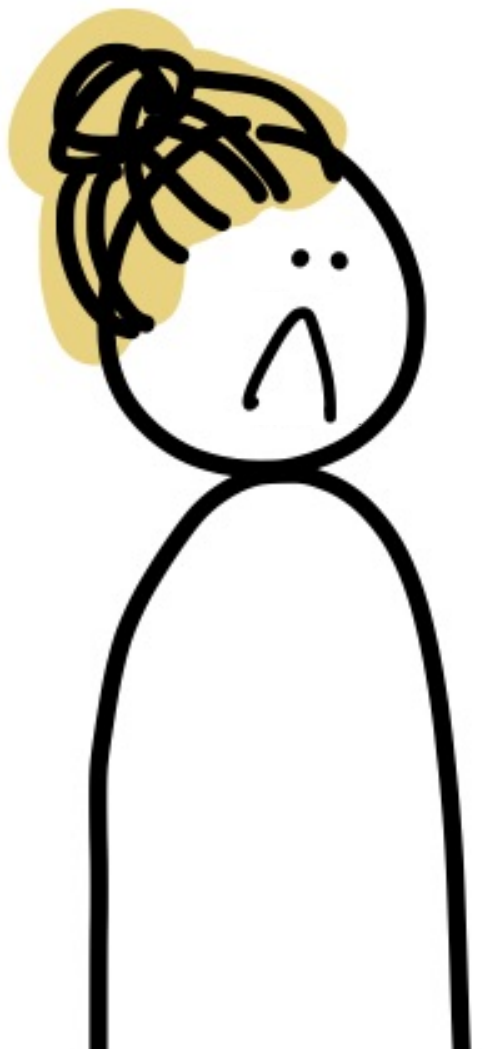


Benefits, challenges & improvements

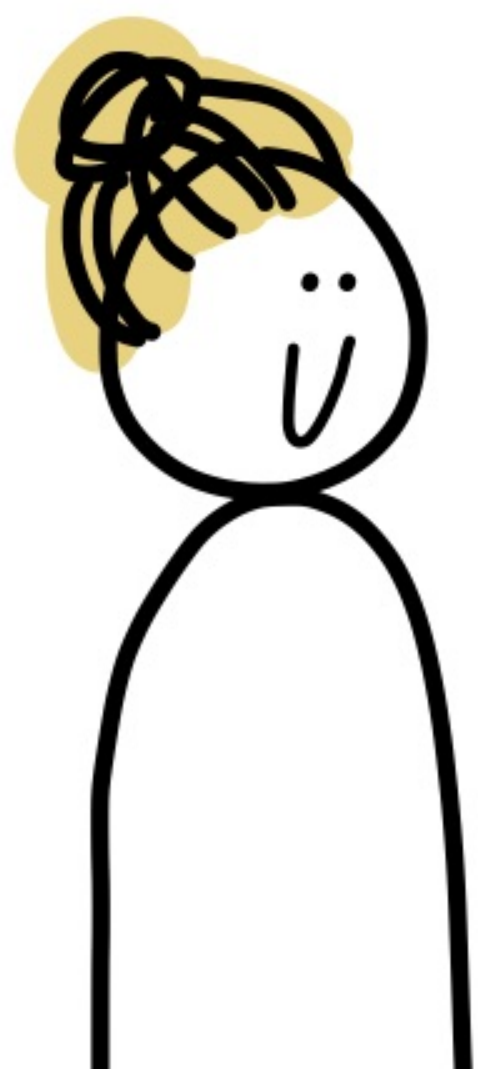
Really?

Better error
messages

Dutch keywords



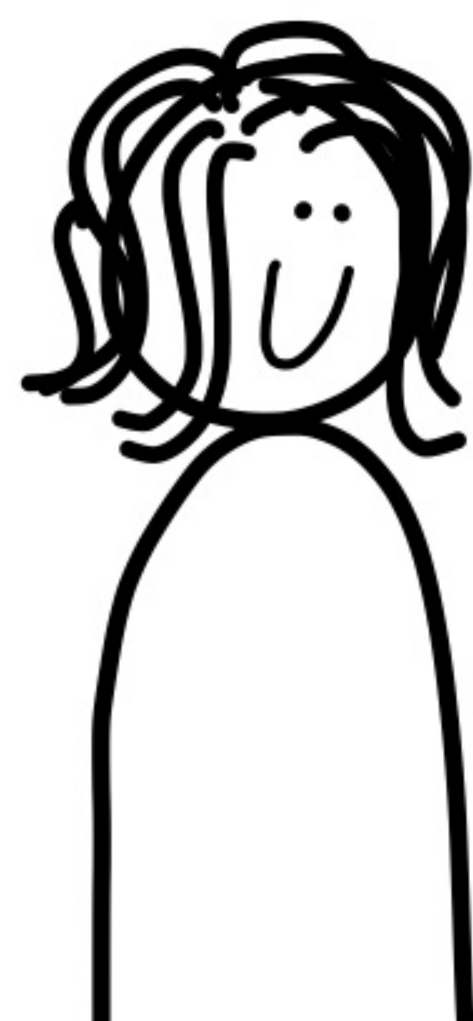
Let's look at
a demo!



Hedy is gradual

multi lingual ✓

built for teaching



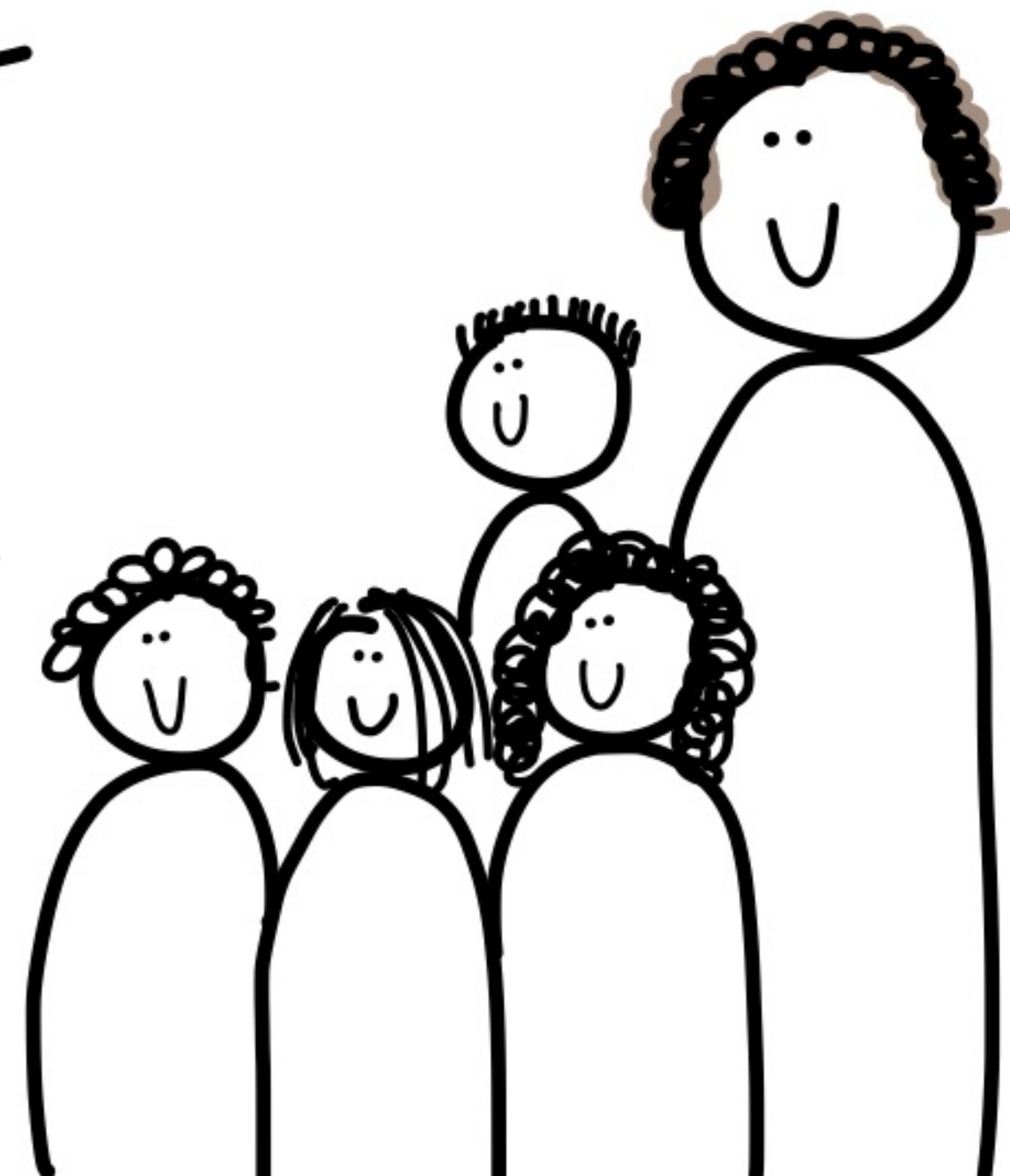
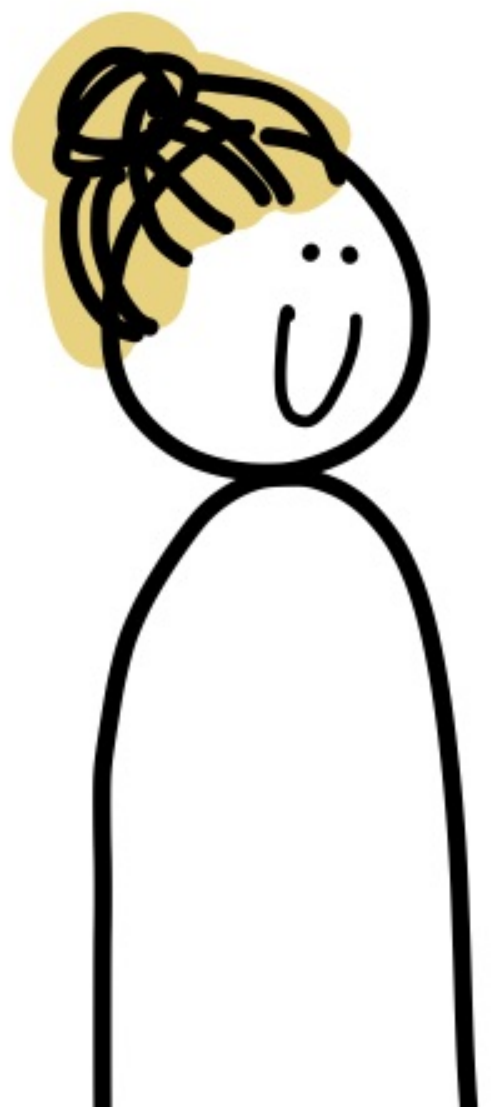
Hedy is gradual

multi lingual

built for teaching

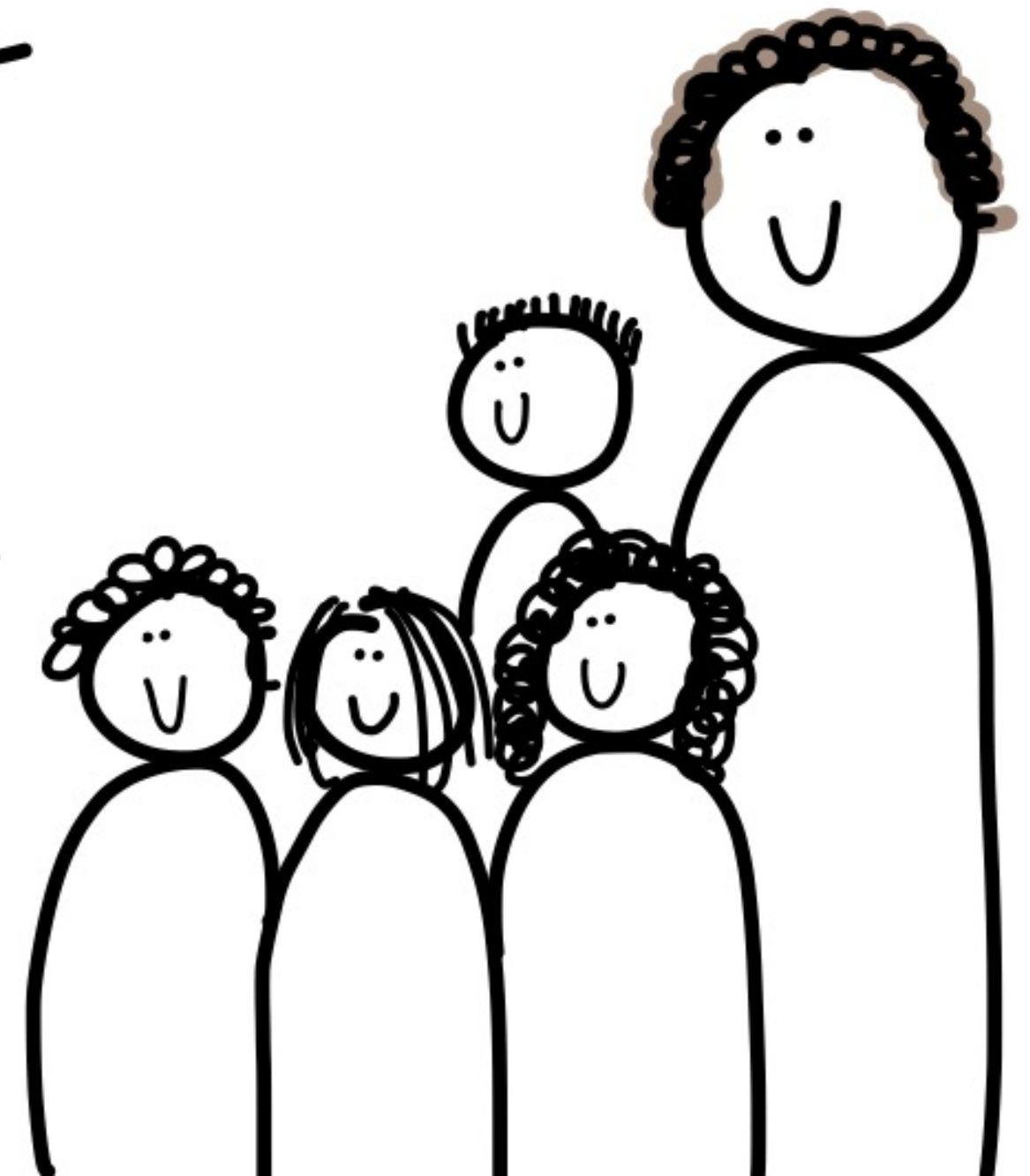
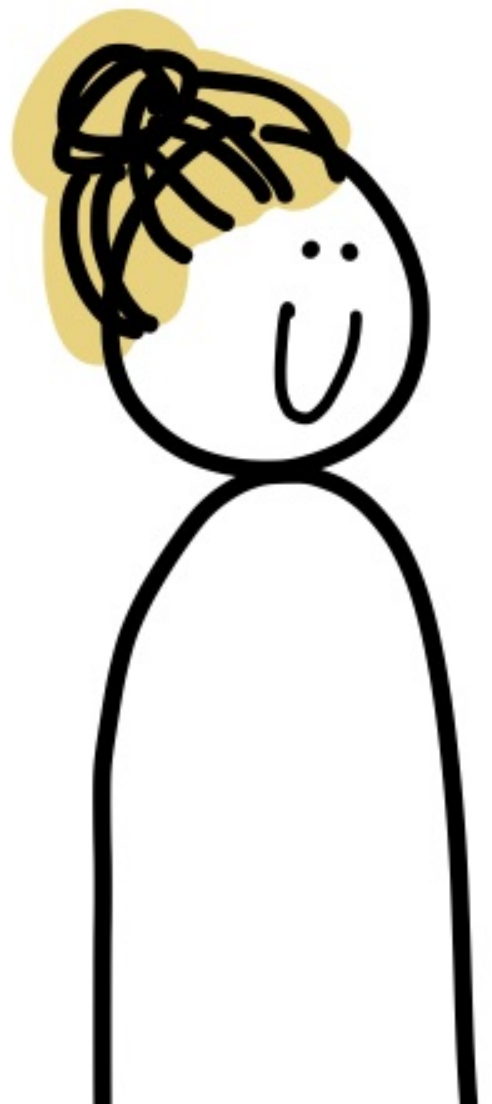


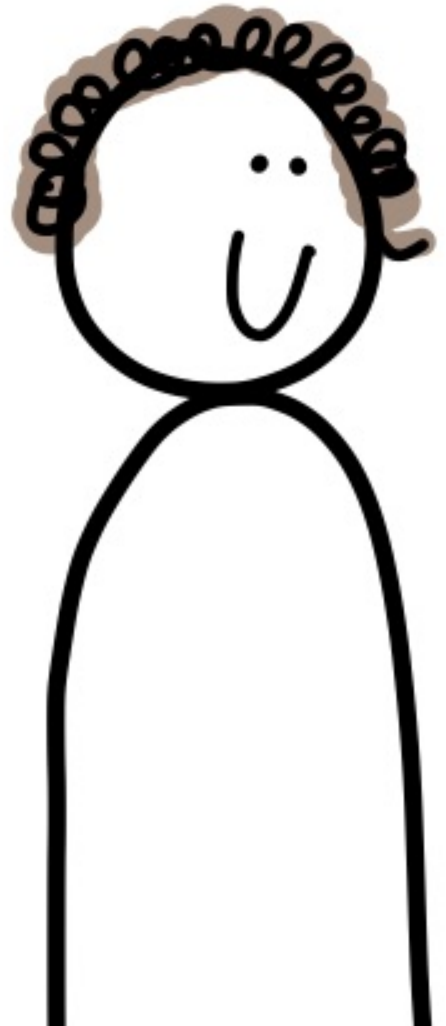
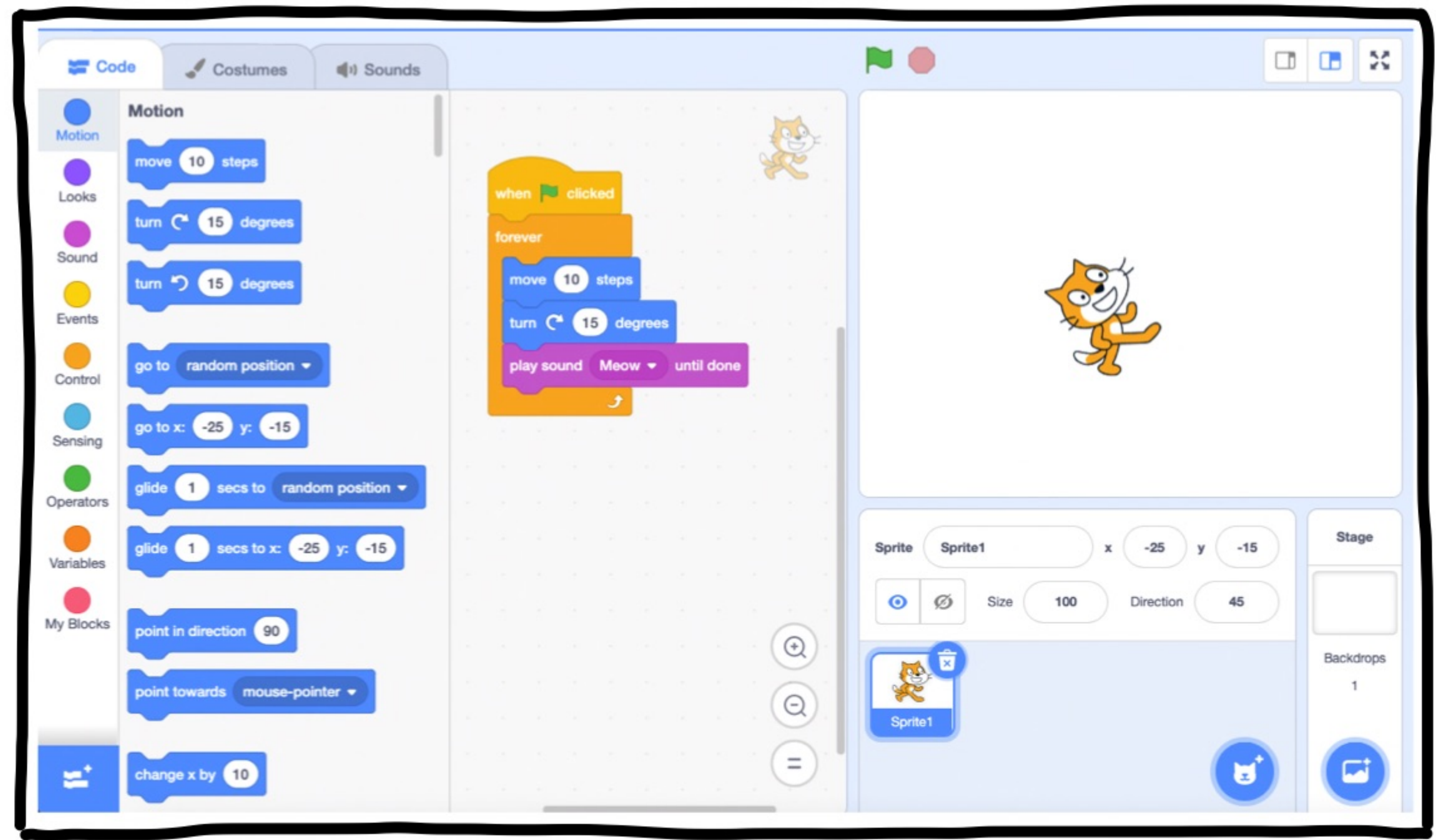
The levels are
a step by step guide



Less overwhelming for
me too!

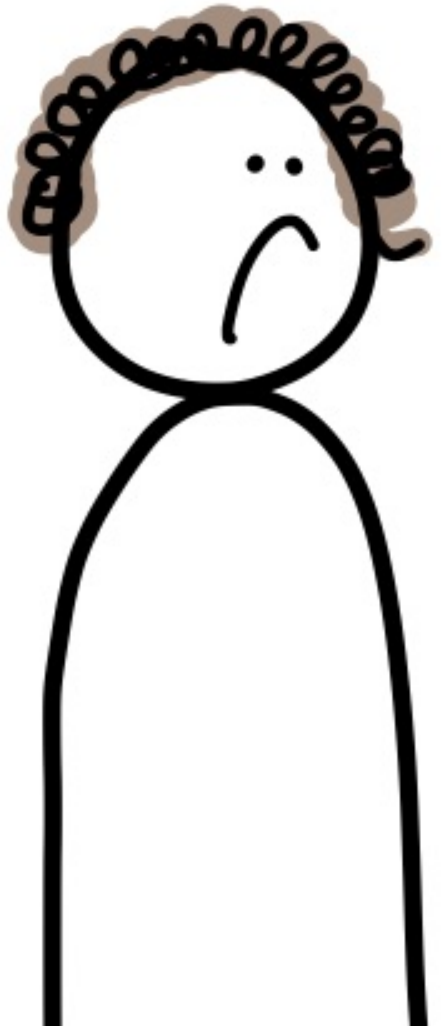
The levels are
a step by step guide



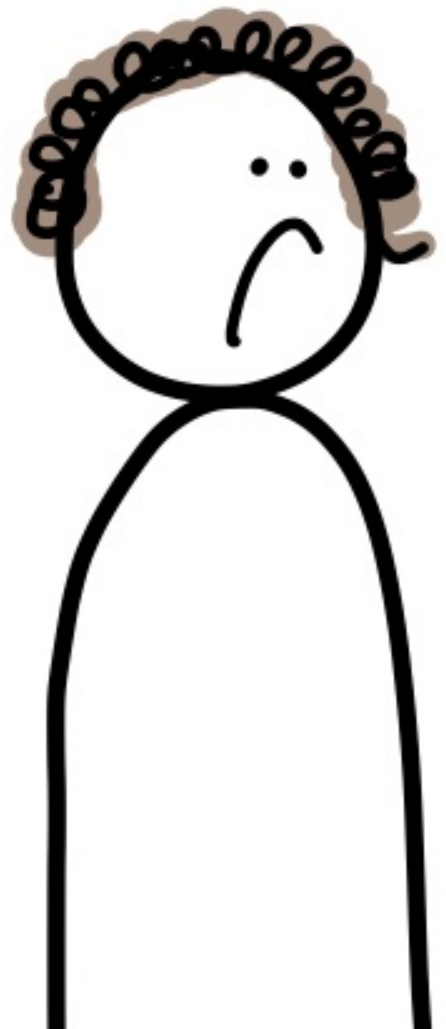


What can my
Students build?

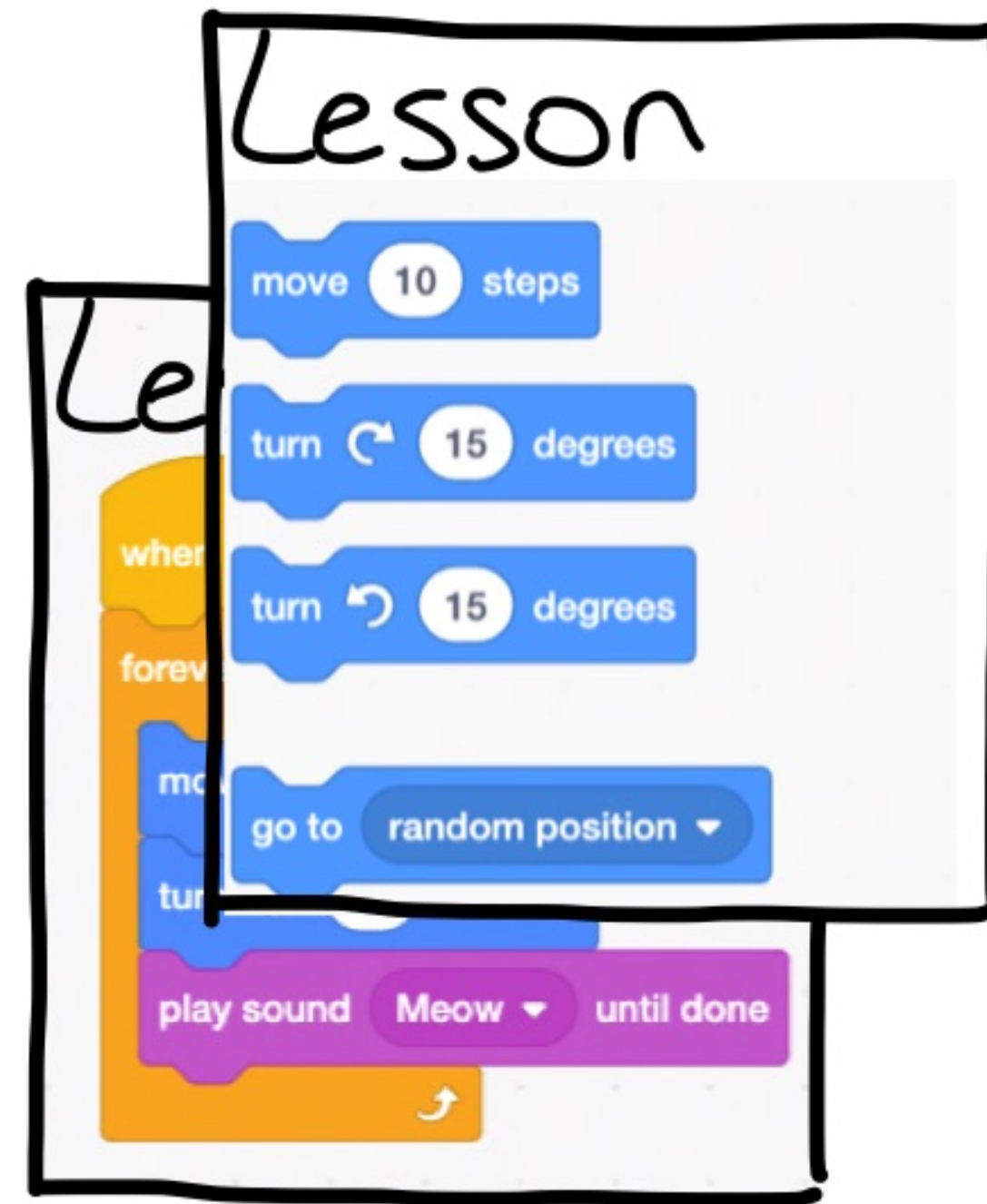
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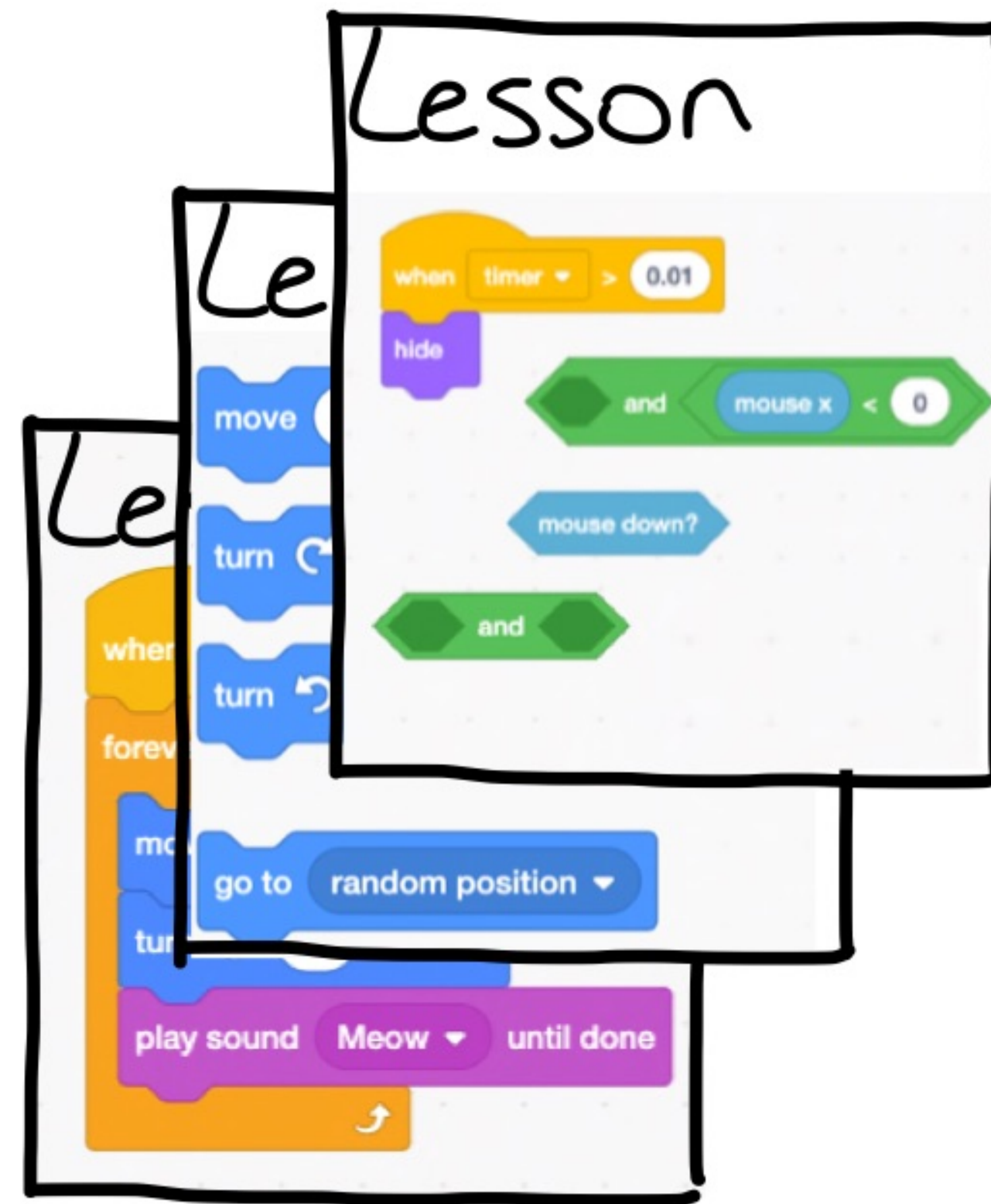
What can my
Students build?



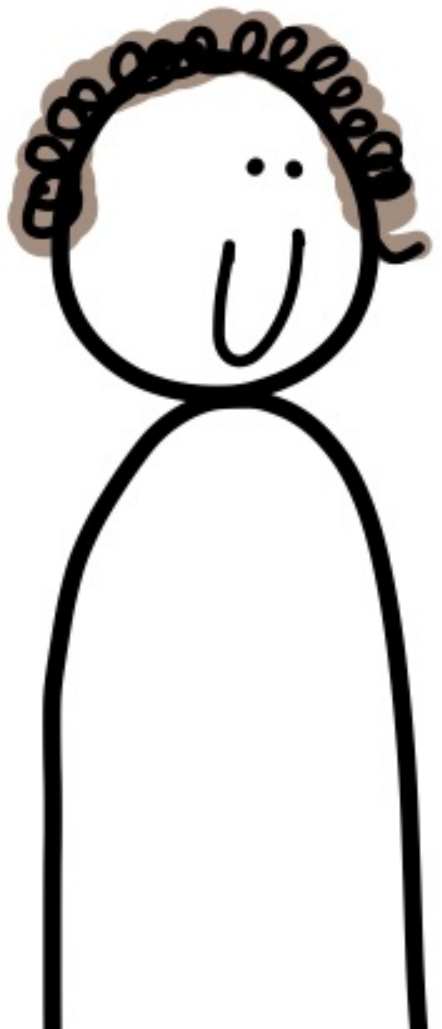
What can my
Students build?



What can my
Students build?

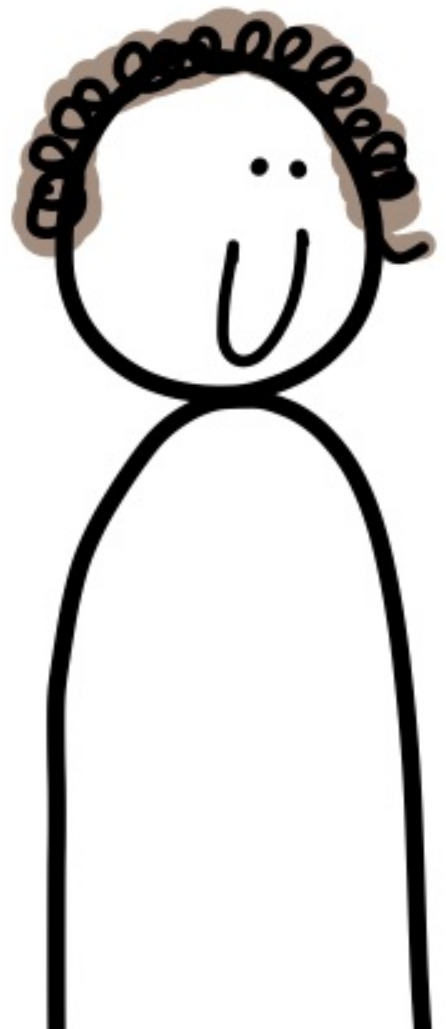


What can my
Students build?



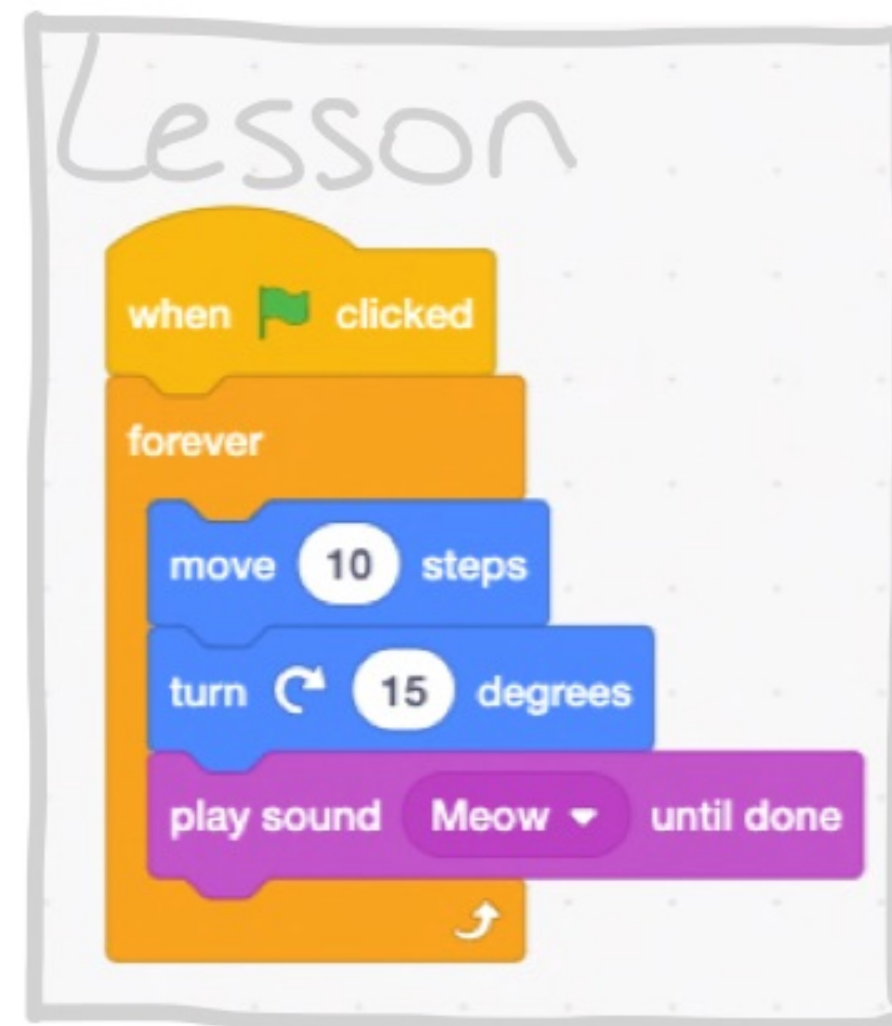
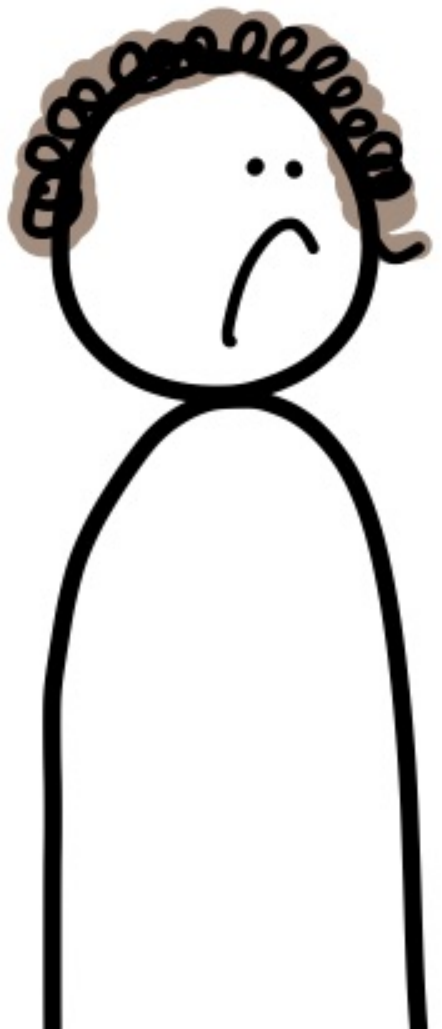
What can my
Students build?

(



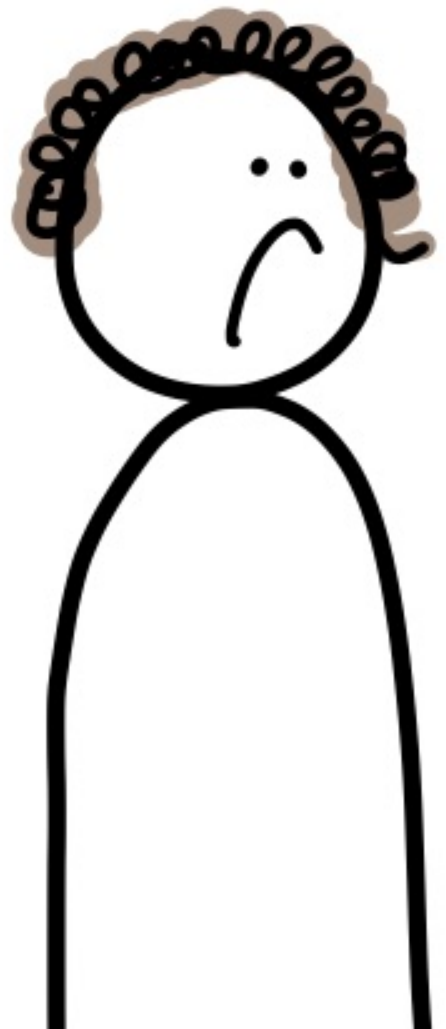
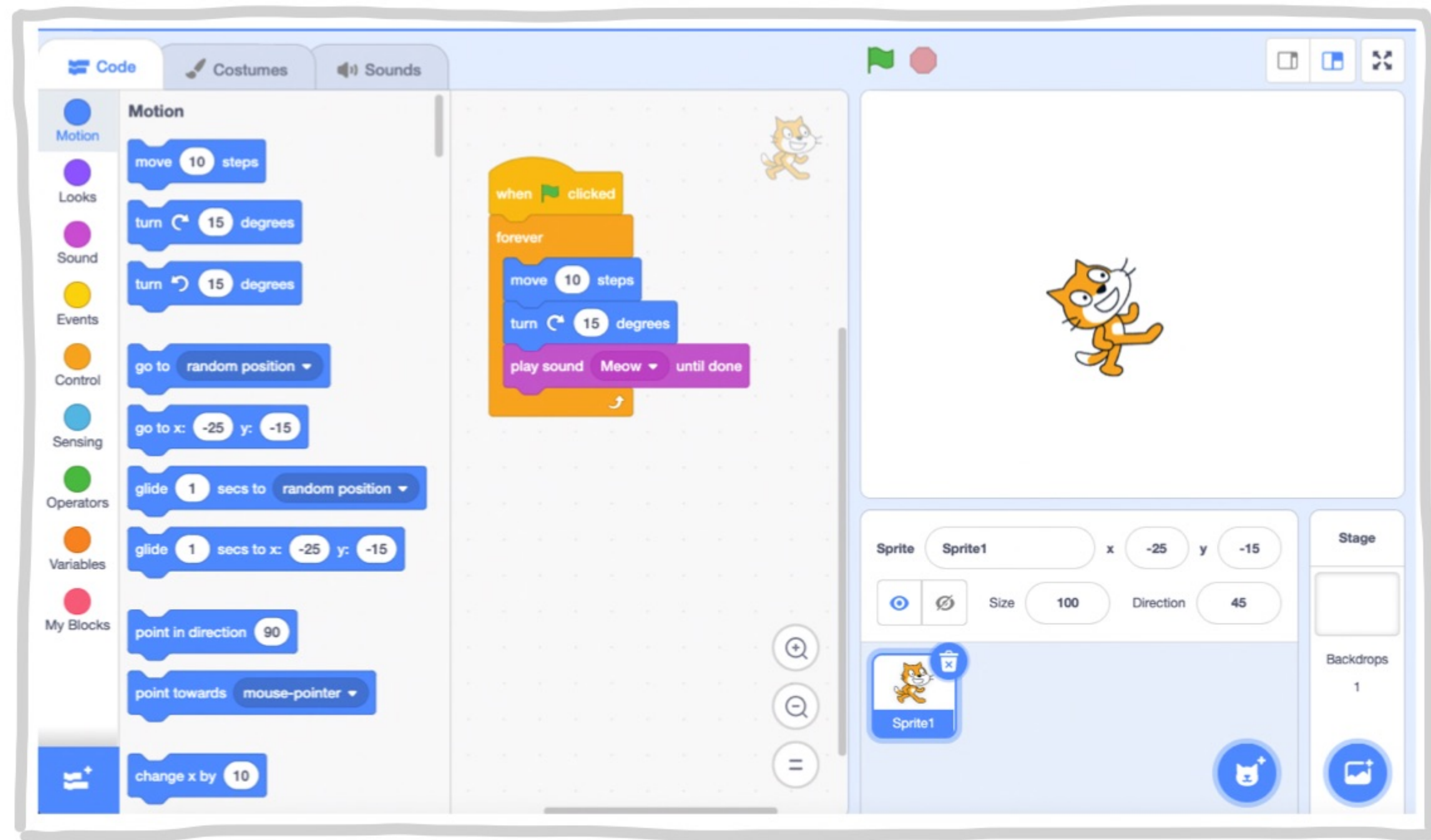
What can my
Students build?

(



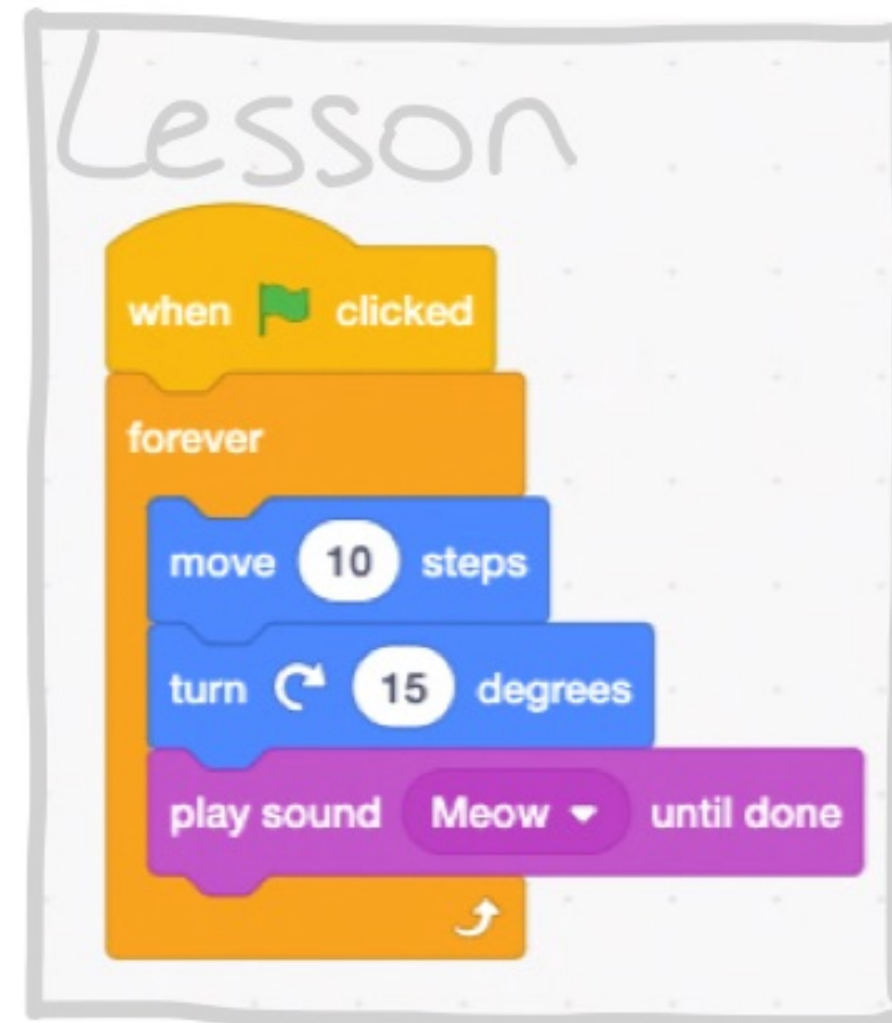
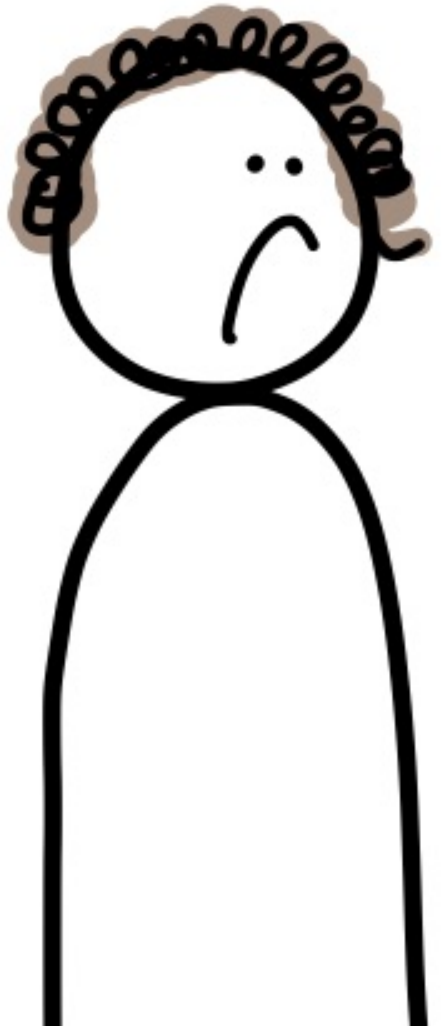
What can my
Students build?

(



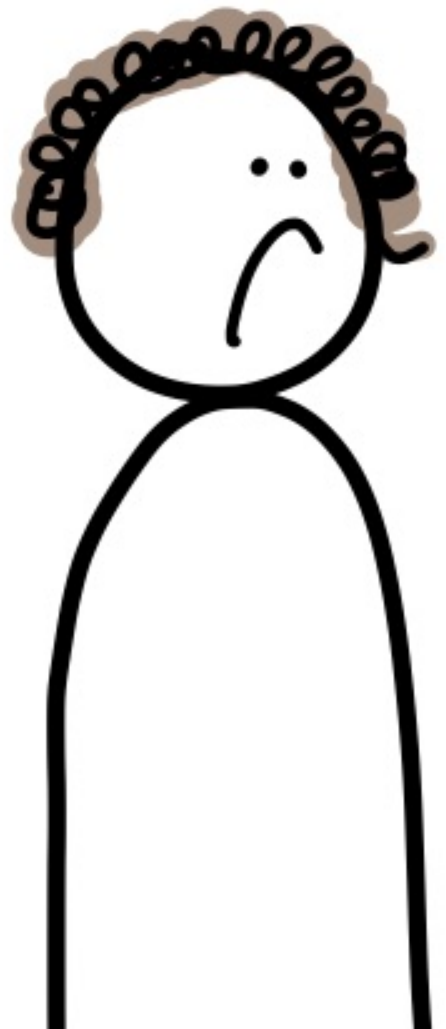
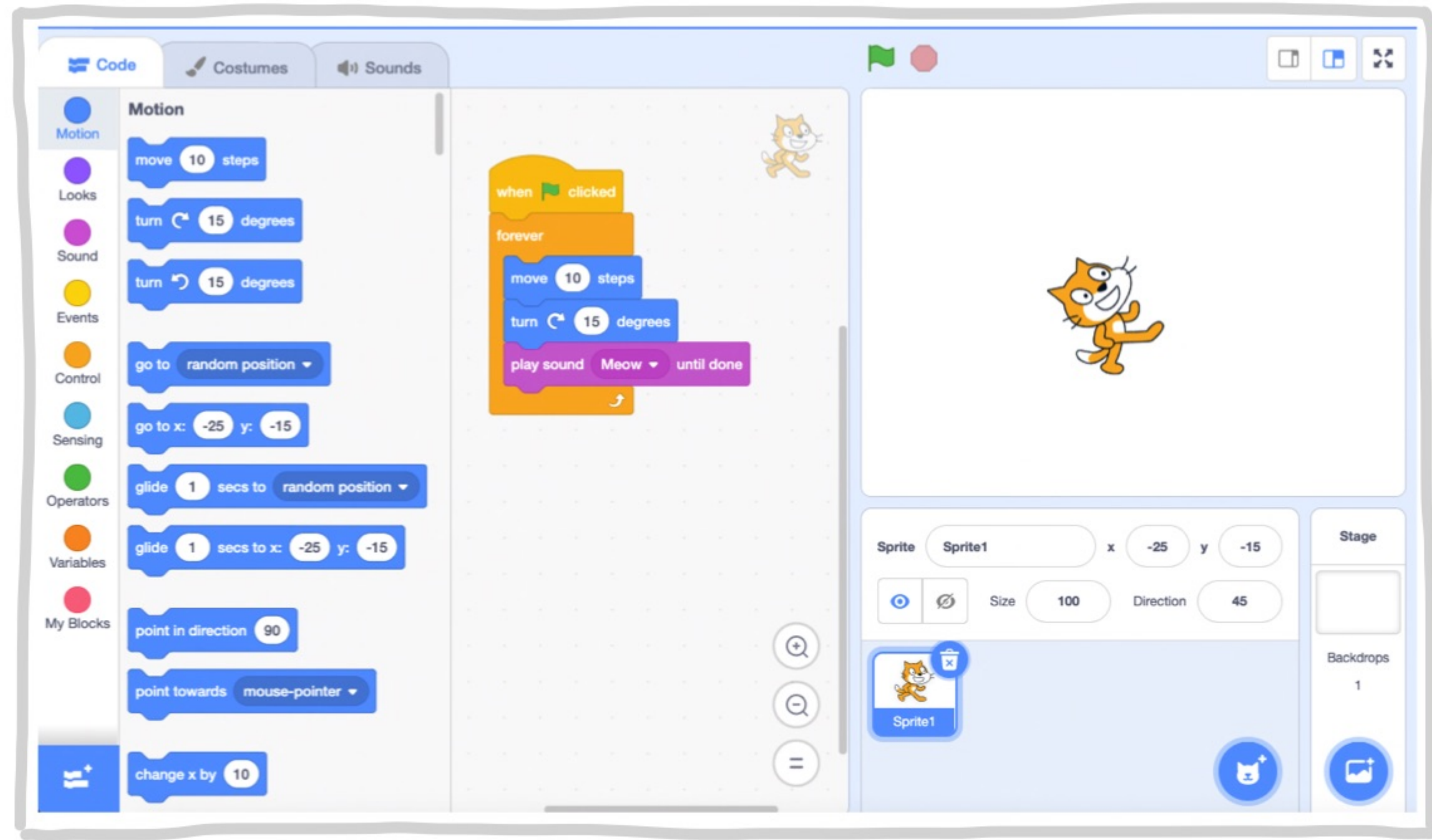
What can my
Students build?

(

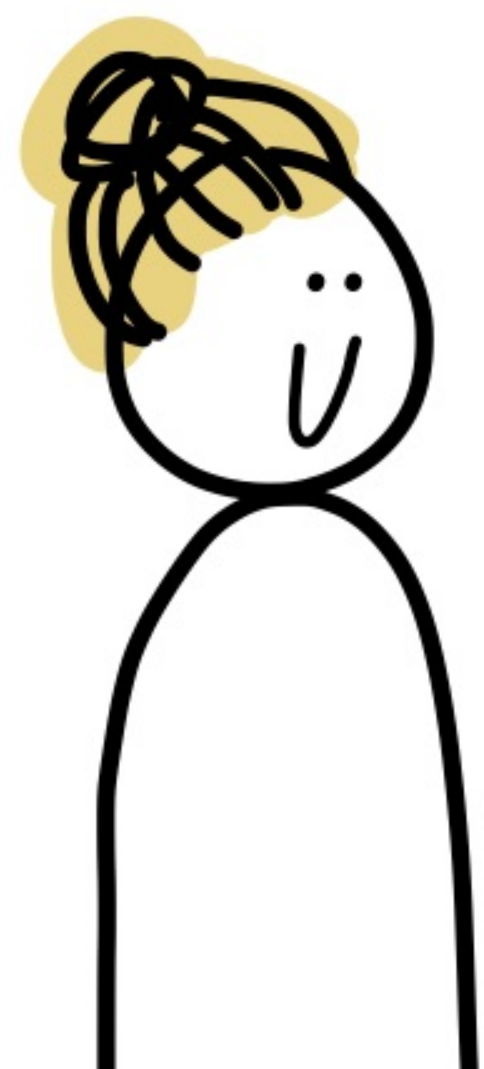


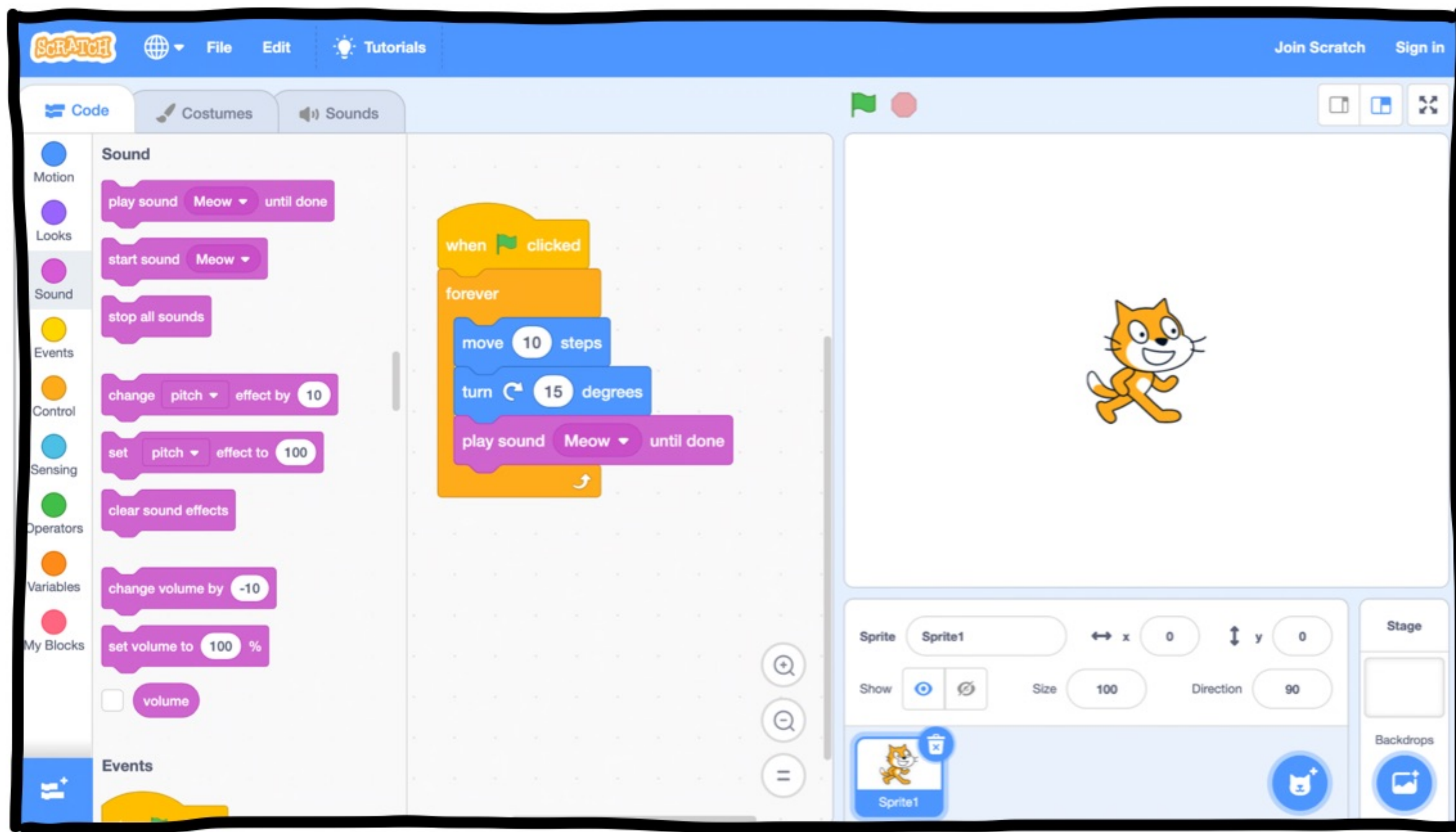
What can my
Students build?

(

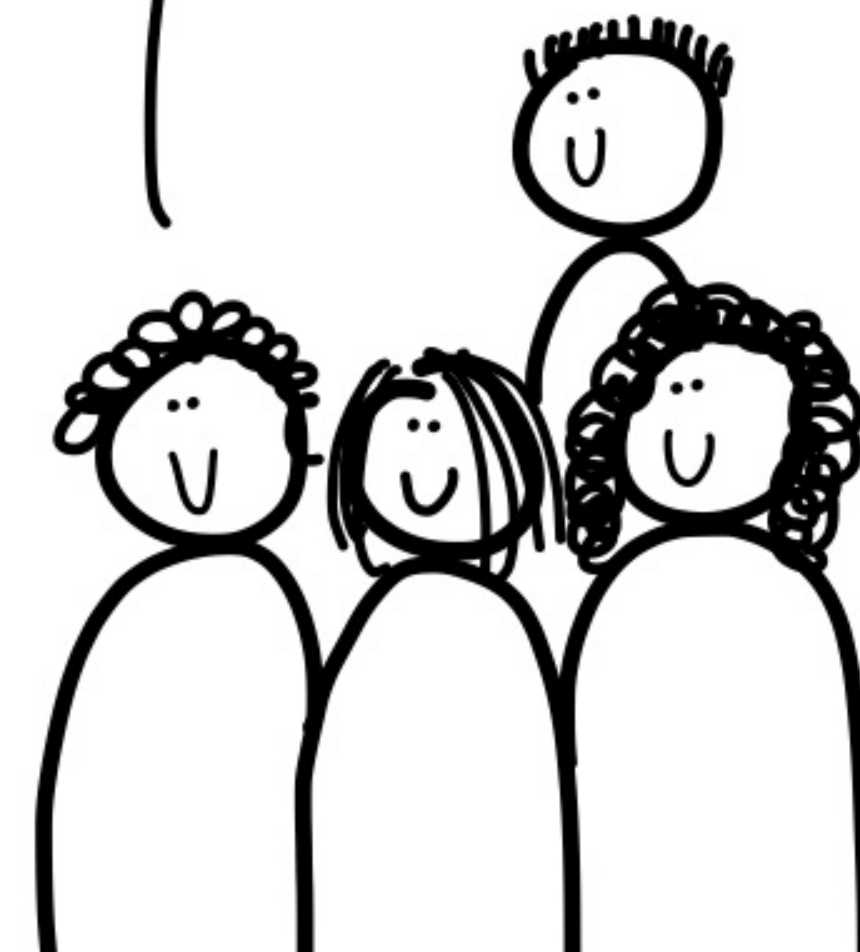
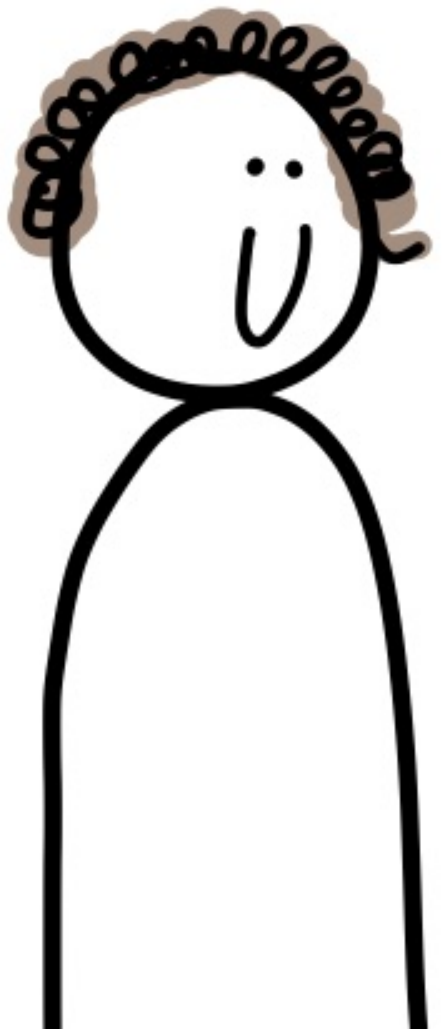


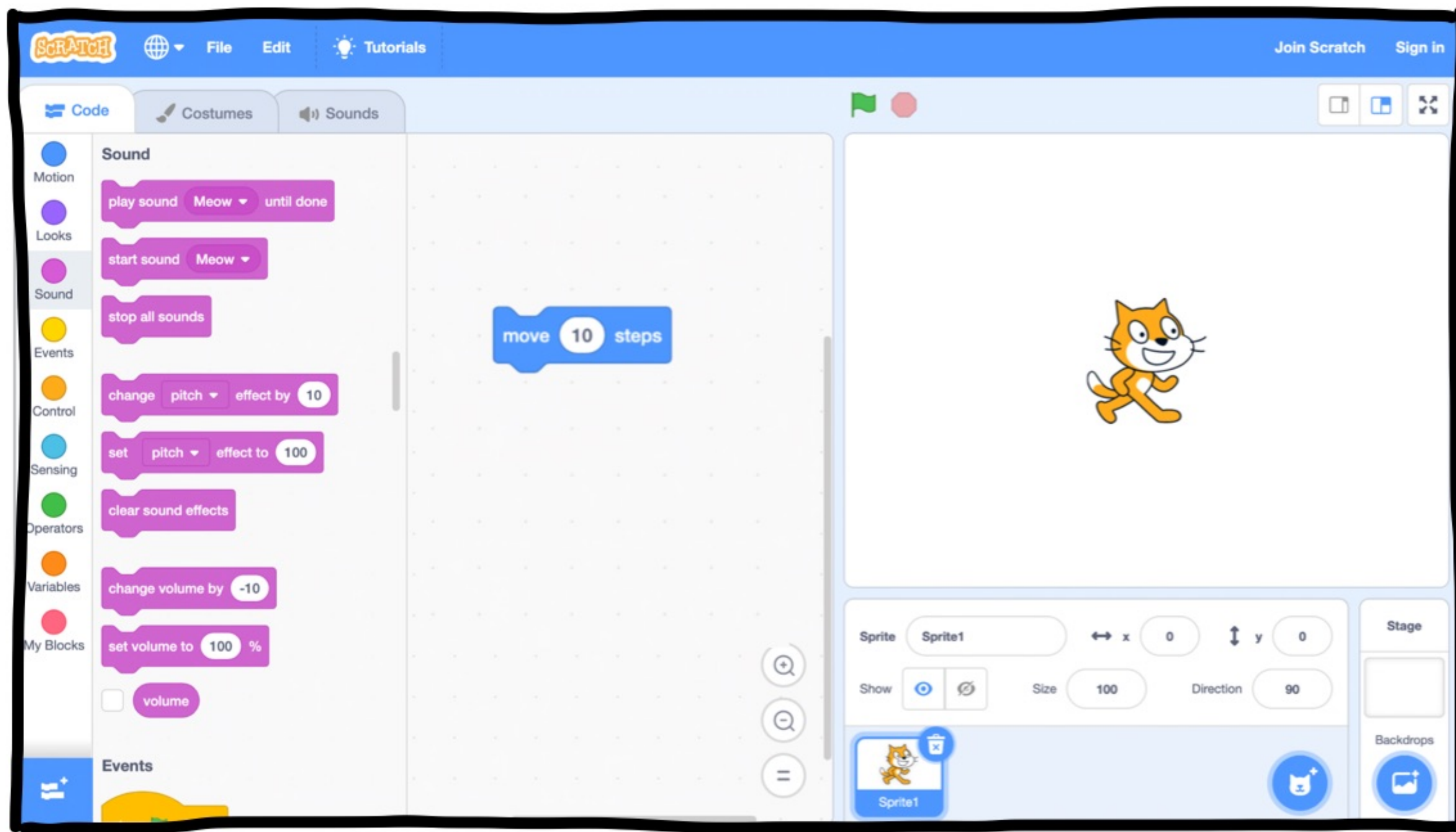
Adventures



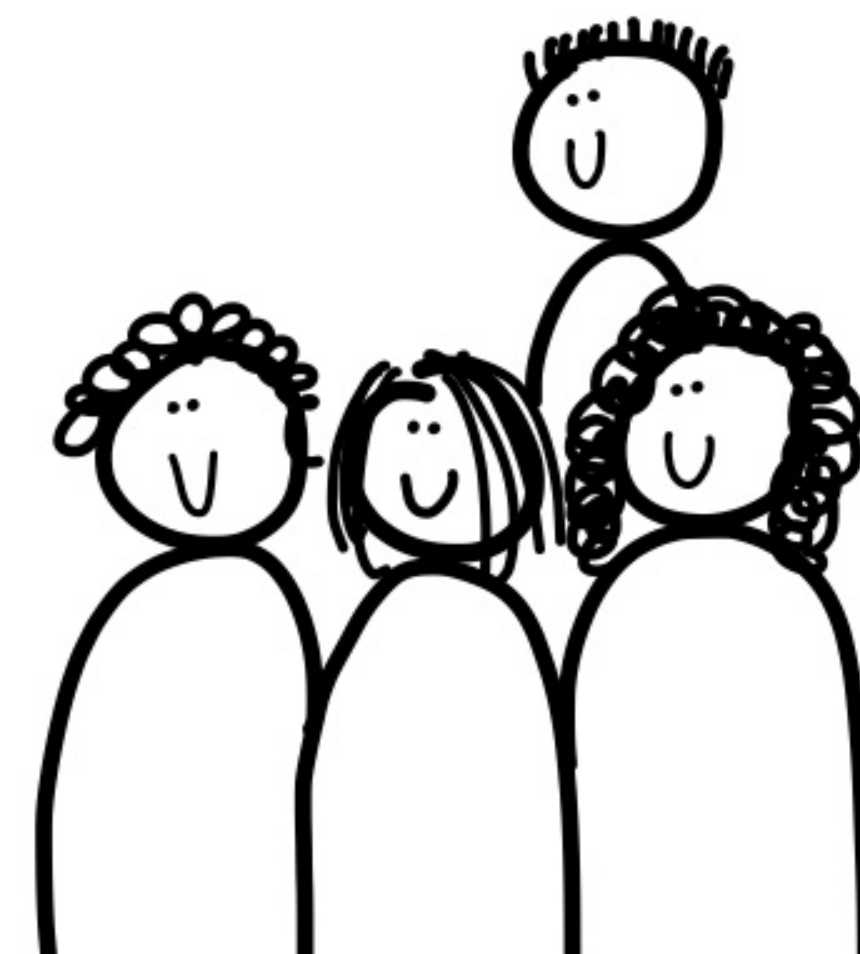
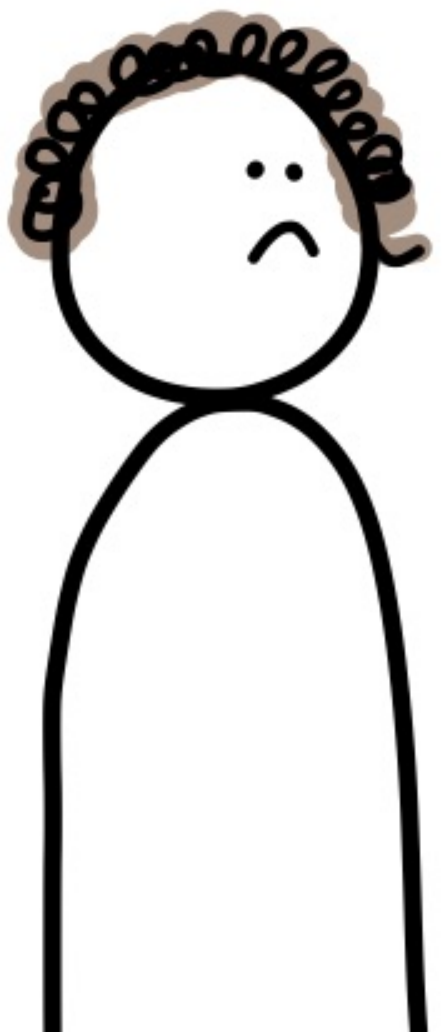


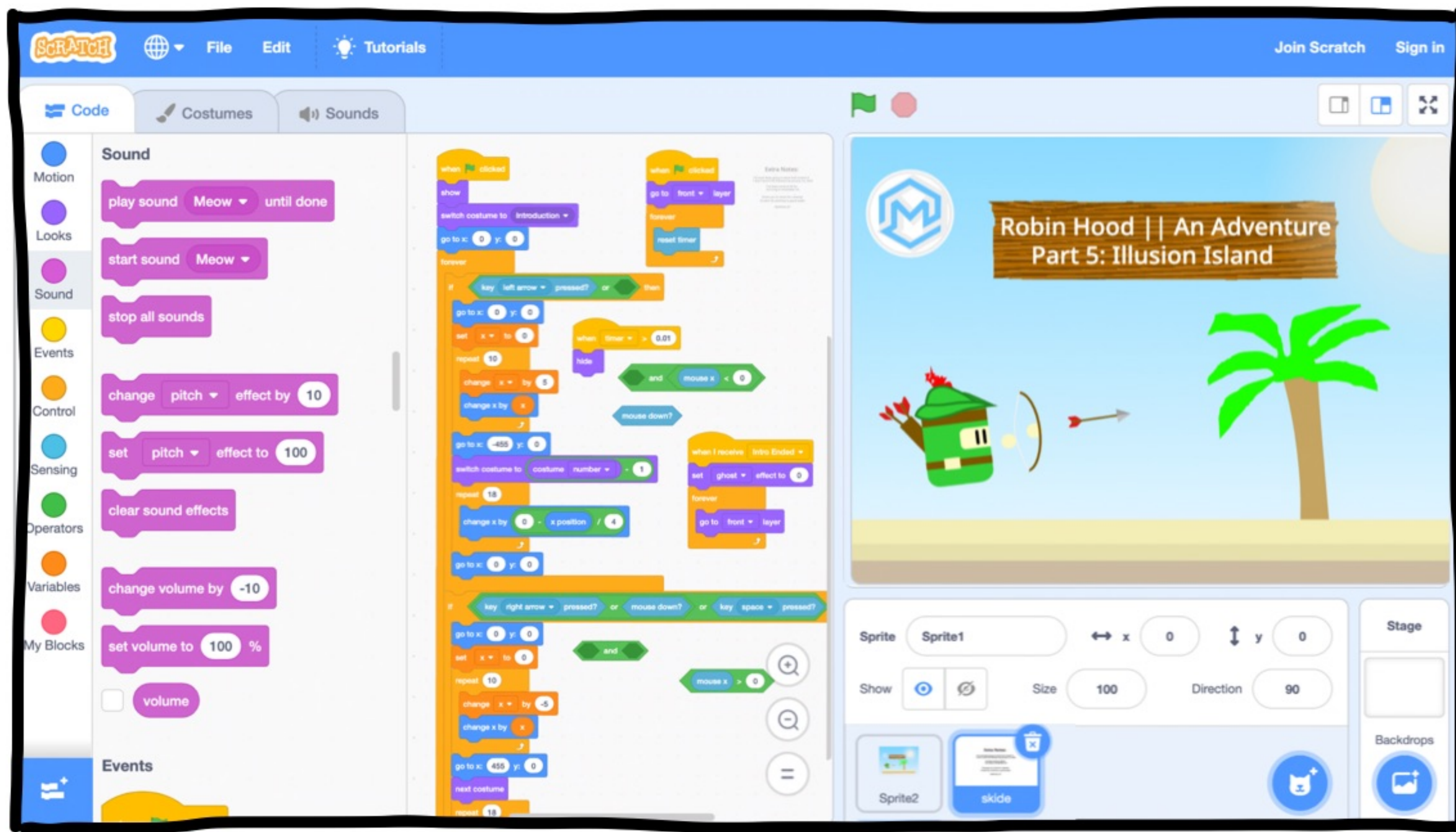
I did it!



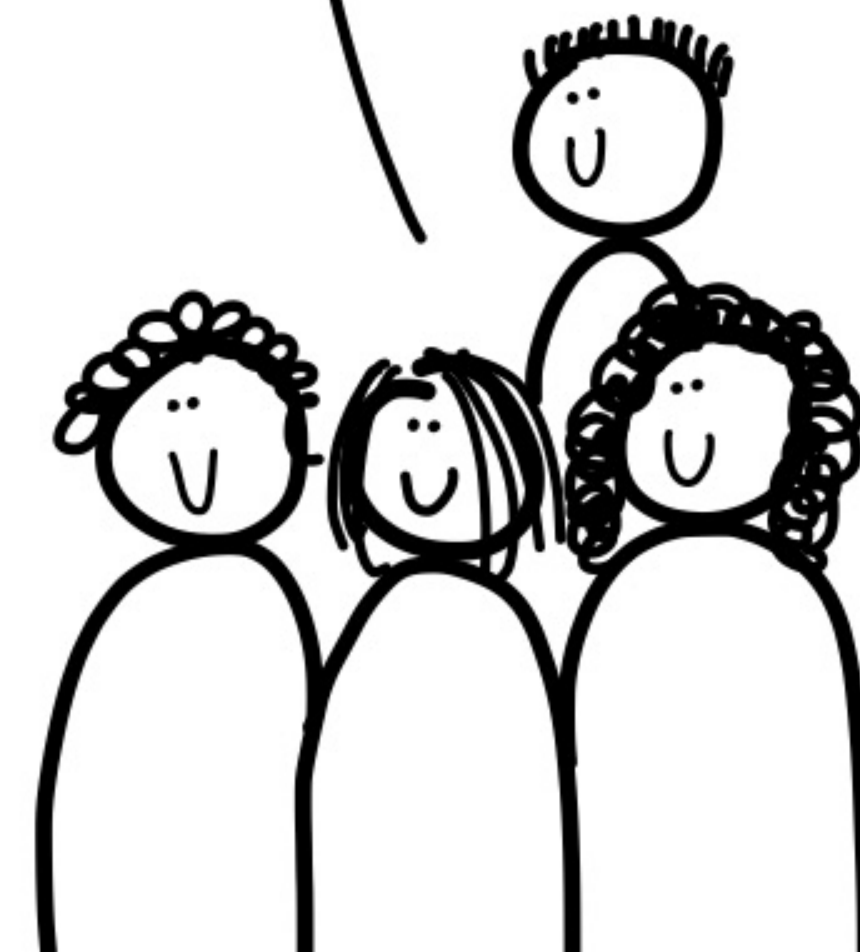
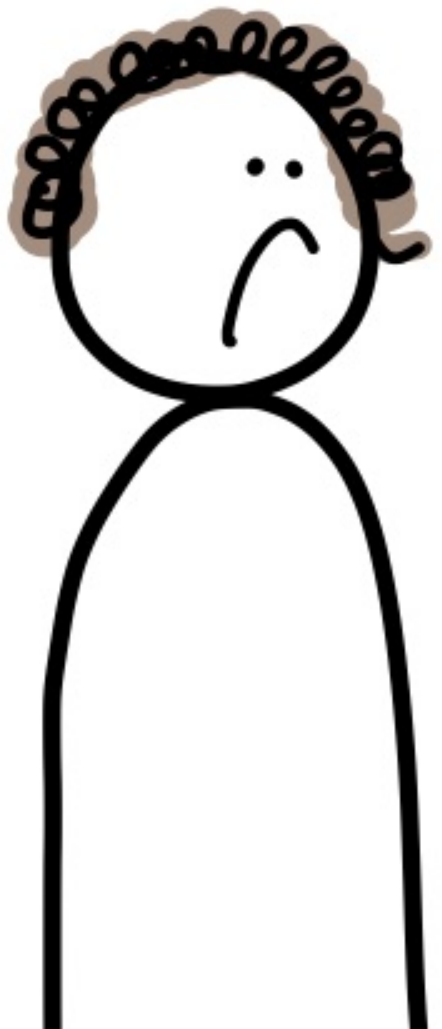


What do I do now?

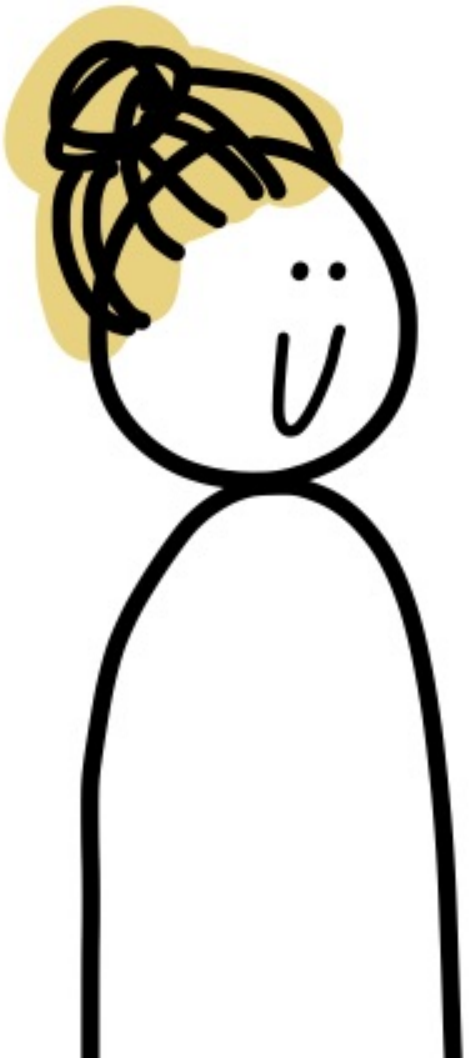




I built this!



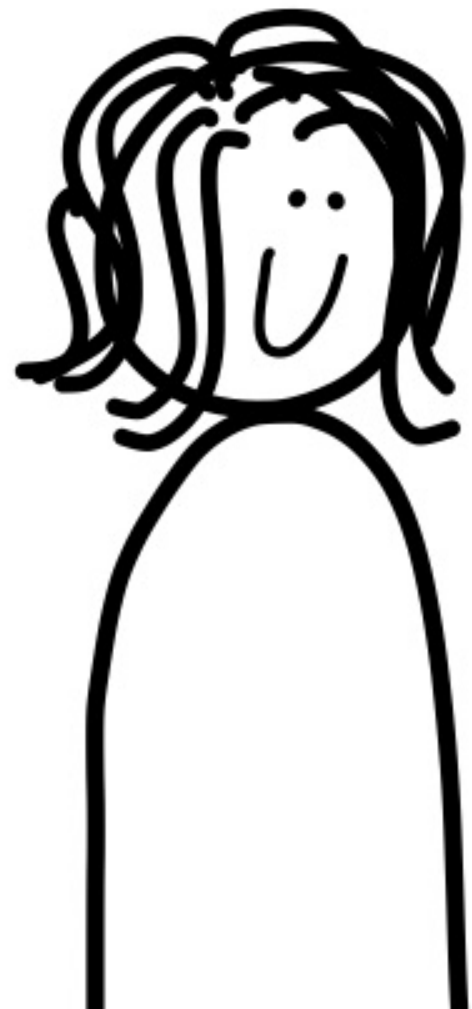
Customization



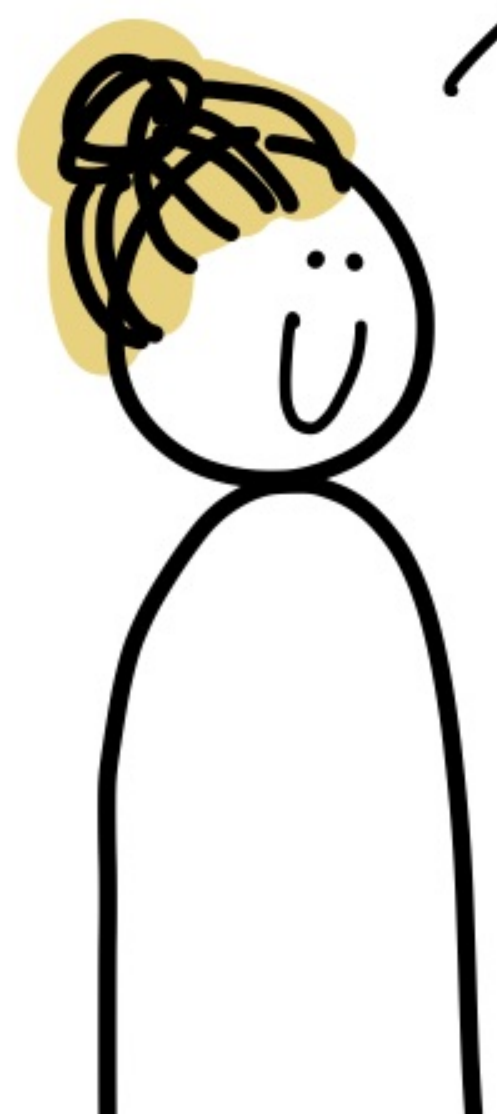
Hedy

Named after

Hedy Lamarr

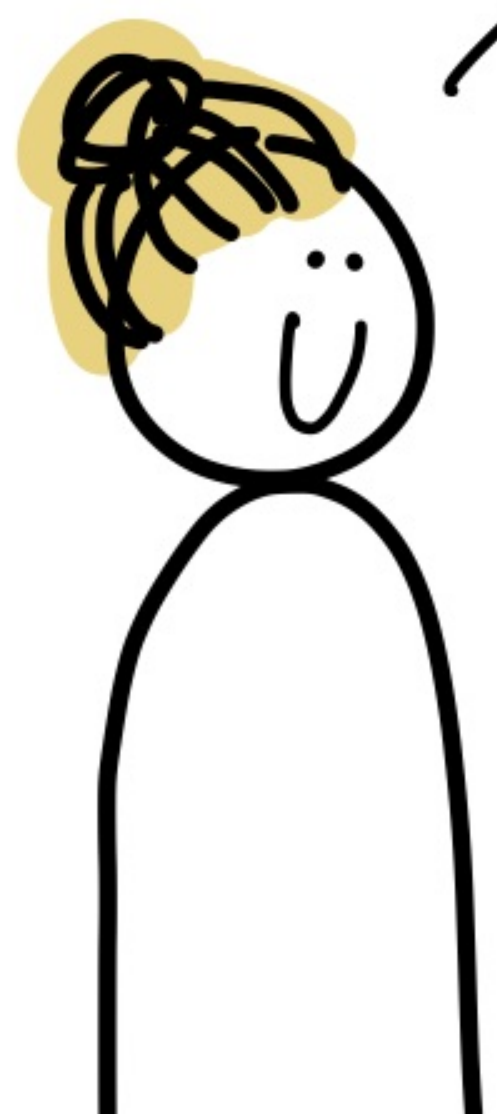


We love your help!



Hedy is gradual

Want to work on an
innovative parser?



Hedy is gradual



Journal of Computer Languages

Available online 20 September 2022, 101158

In Press, Journal Pre-proof ?



Design, implementation and evaluation of the Hedy programming language

Marleen Gilsing^a, Jesús Pelay^b, Felienne Hermans^{a, c}  

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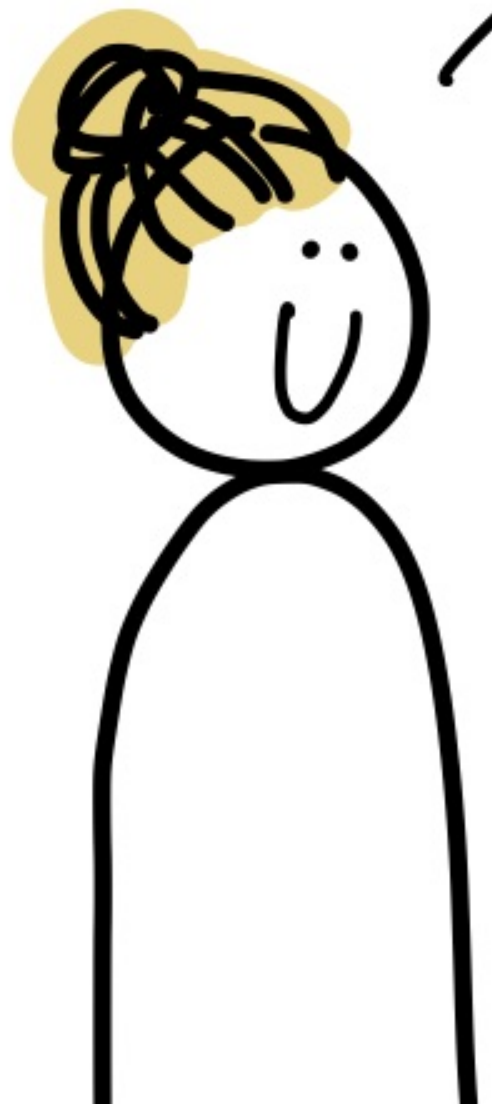
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Hedy is gradual



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In Press, Journal Pre-proof ?



Design, implementation and evaluation of the Hedy pro

Marleen Gilsing^a, Jes

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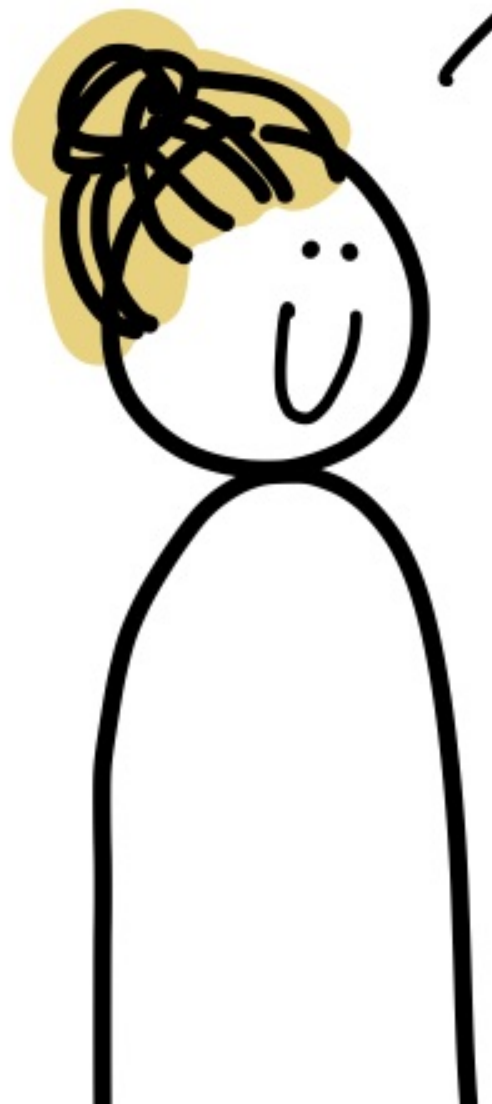
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<https://doi.org/10.10>

Under a Creative Cor

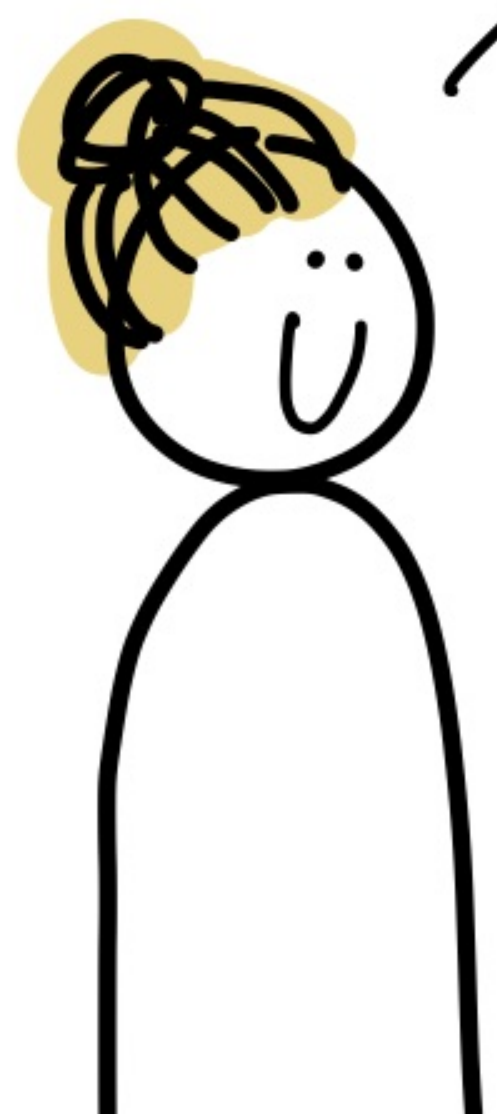
Highlights

- Details the full implementation of Hedy; the first gradual language for programming education.
- Introduces an EBNF extension used for merging partial grammars to enable gradual language implementation.
- Describes the first user study on Hedy.

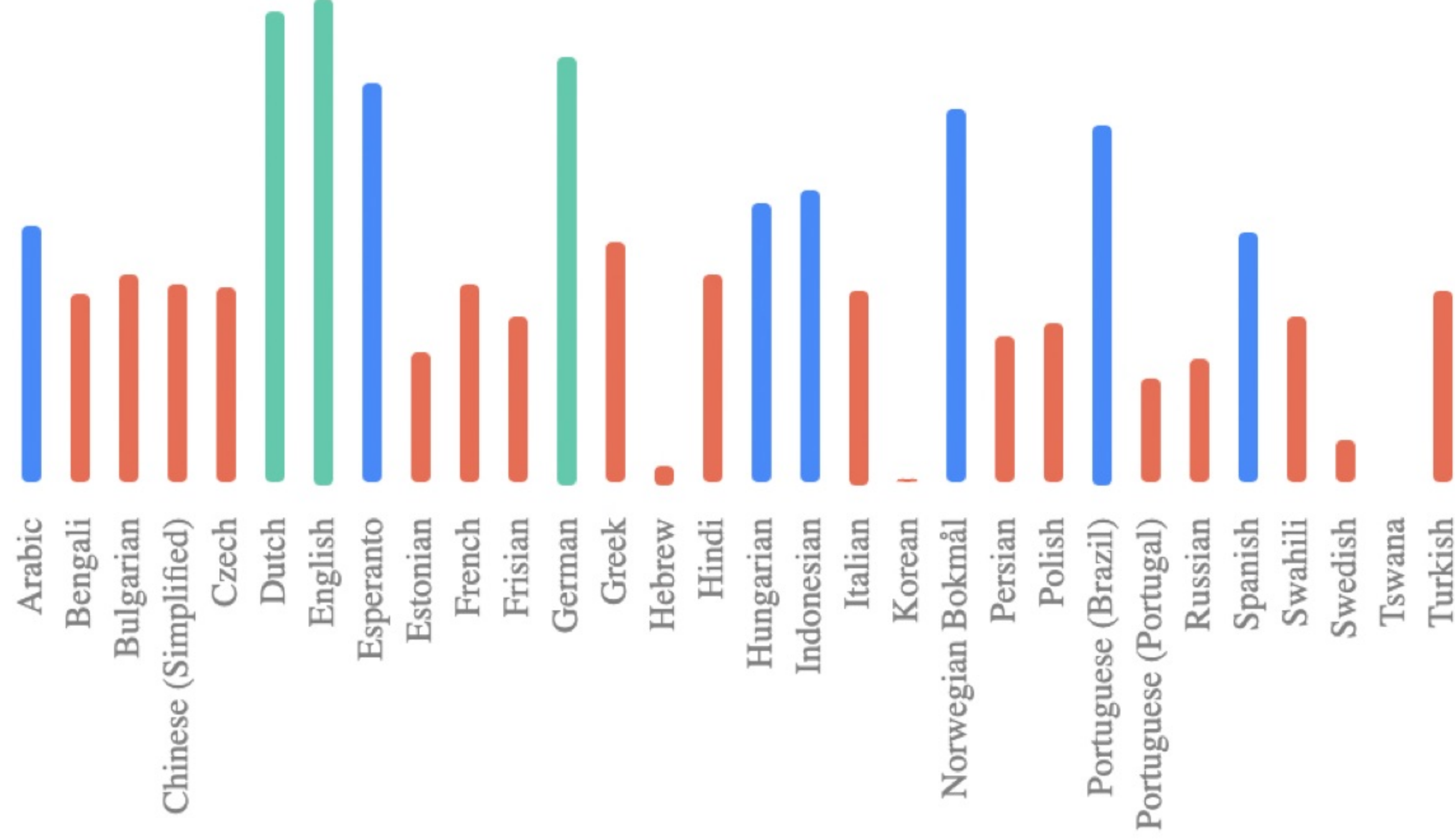
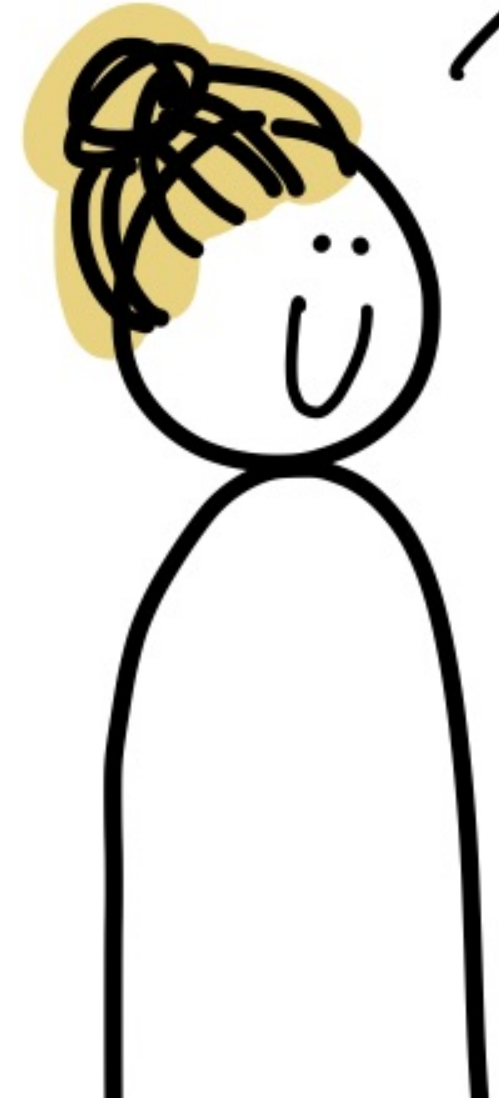


Hedy is multi lingual

Want to add or
extend translations?

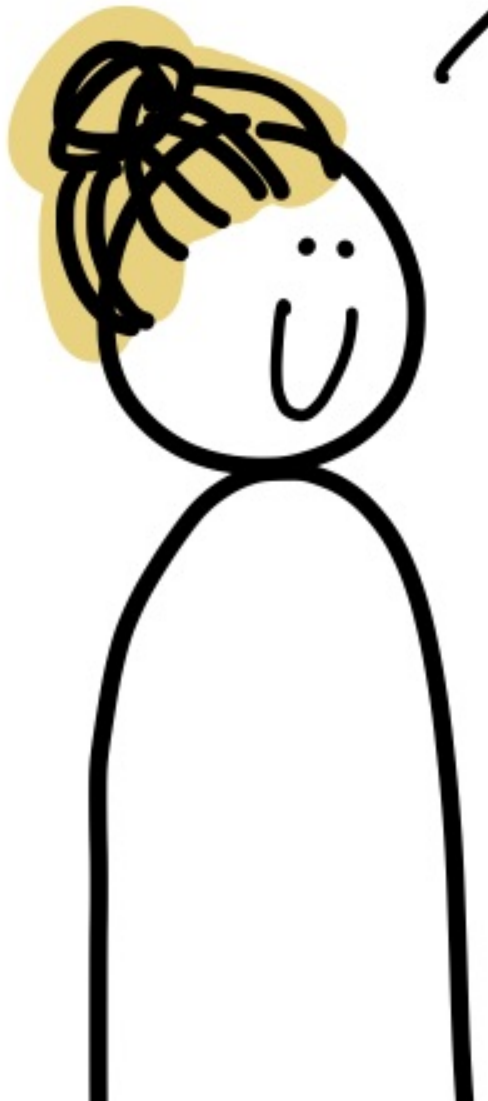


Hedy is multi-lingual



Hedy is built for teaching

Want to bring Hedy
to teachers?

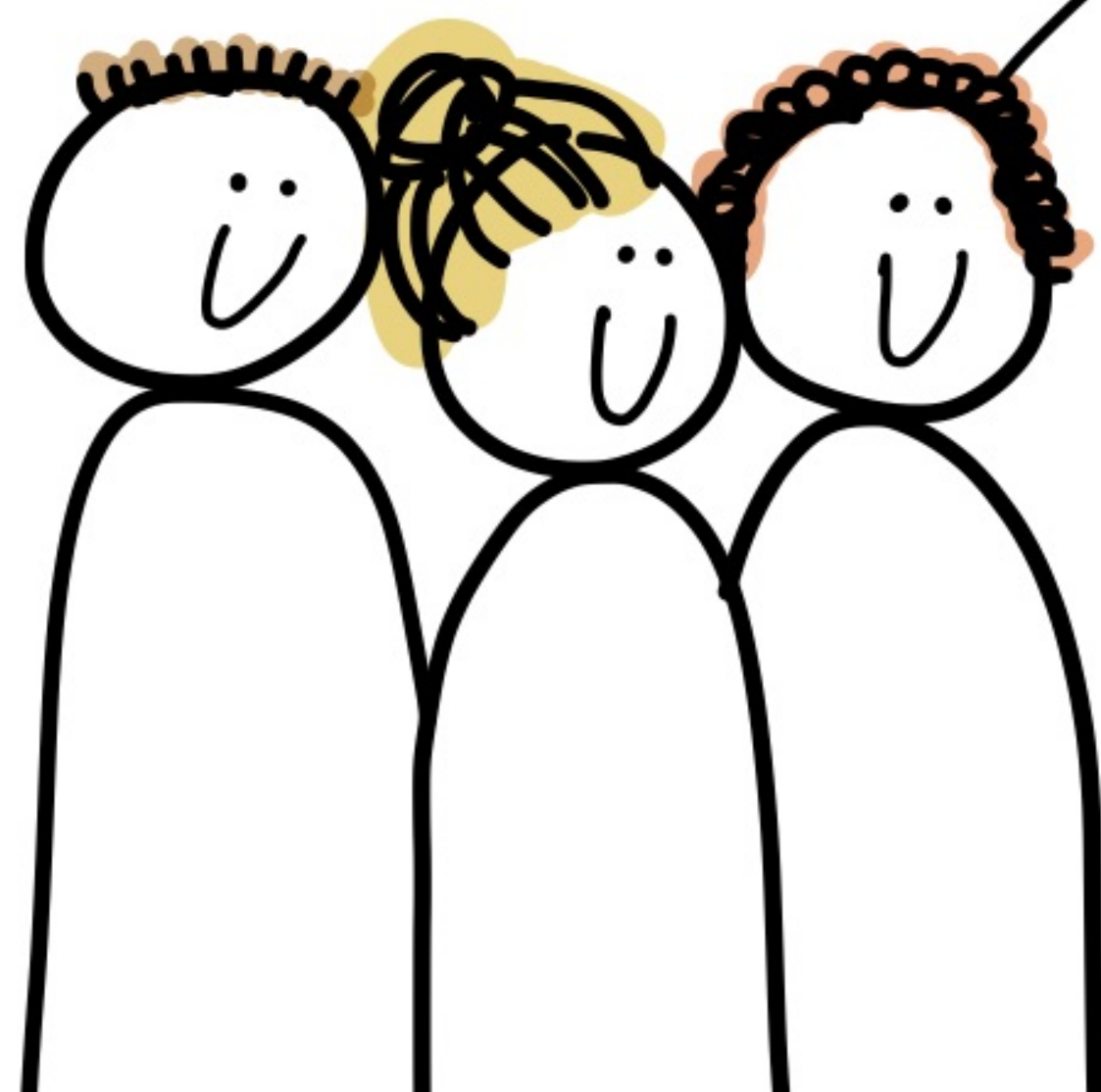


Hedy is built for teaching

The screenshot displays a YouTube video of the Hedy programming website. The website's header includes navigation links: Home, Hedy, Explore, Learn more, and Log in. The main content area is titled 'Level 1' and features a 'Welcome to Hedy!' message. It explains that users can use 'print', 'ask', and 'echo' commands. Below this, there are two example code blocks. The first block shows 'print Hello!' and 'print Welcome to Hedy!'. The second block shows 'ask What is your name?' and 'echo hello'. A 'Run code' button is visible at the bottom of the code editor. The video player interface at the bottom shows the video is at 0:05 of 1:07, with standard playback controls.

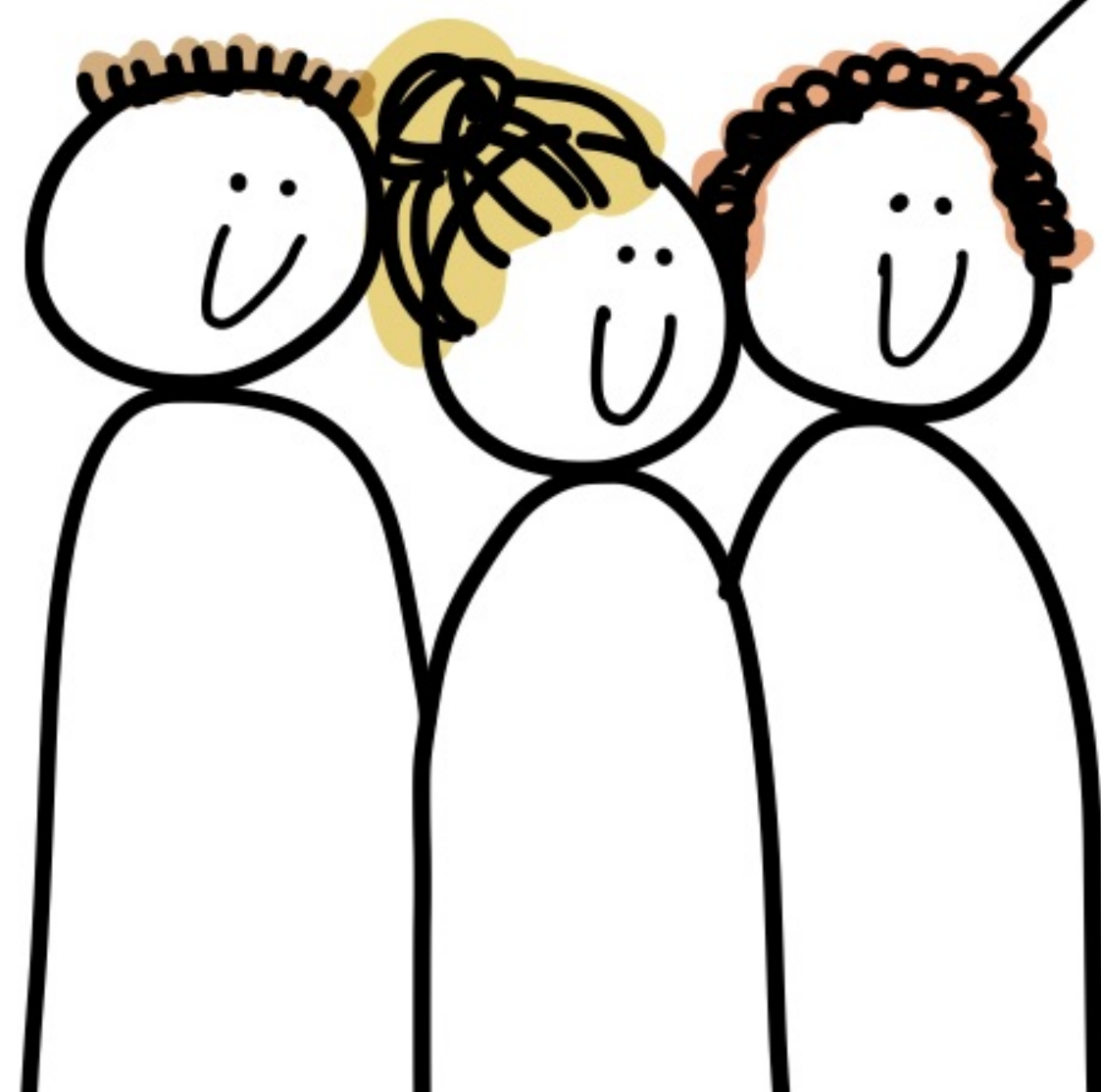
Hedy Community

Join us!



Hedy Community

Join us!



www.hedy.org/join



Guido van Rossum ✓

@gvanrossum

...

Just discovered Hedy, a gradual programming language. It's a new idea on how to teach programming to beginners. Very cool! hedycode.com @hedycode

1:53 AM · Mar 30, 2022 · Twitter Web App

139 Retweets **14** Quote Tweets **691** Likes

