

Can you animate computer programming?

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Purpose

Computer programming can be challenging to learn because it involves logic and abstract structures. With the addition of visual programming environments such as Scratch and Alice, training in Computer Science is growing. On the other hand, research has also shown that some students do not find these tools effective.

Objectives

We propose to narrow this gap by using “visual aids” to support the hands-on experience of computer programming. We believe that the visual representation of abstract concepts such as functions, loops, and variables will greatly support the understanding of the core programming concepts.

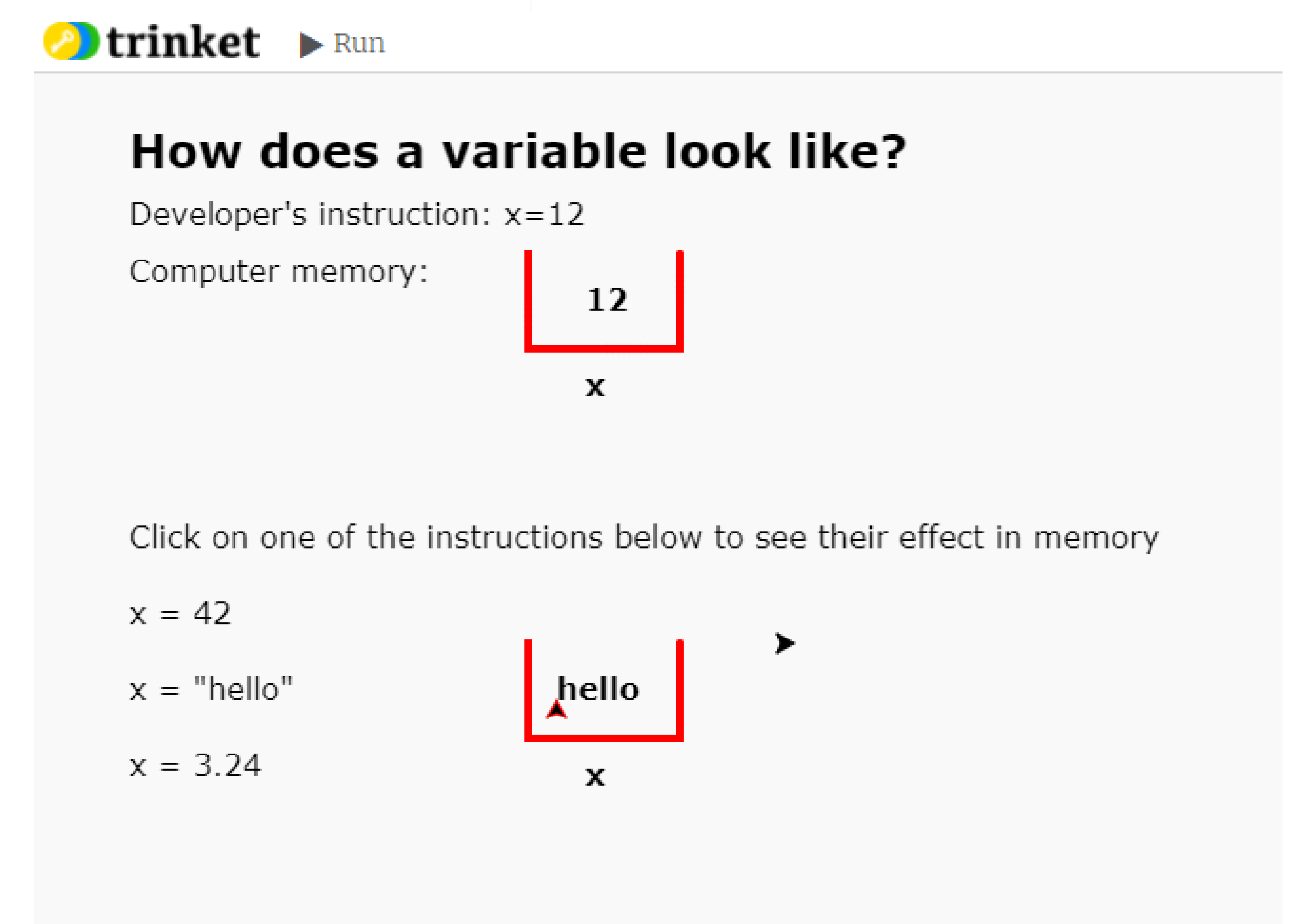


Figure 1. Visual animation made for variables.

Materials

We asked college students to create a library of visual aids related to computer programming. We asked them to create their visual aid using Python’s turtle library. We have set up a website with these animations that we plan to share with local high school students on social media.

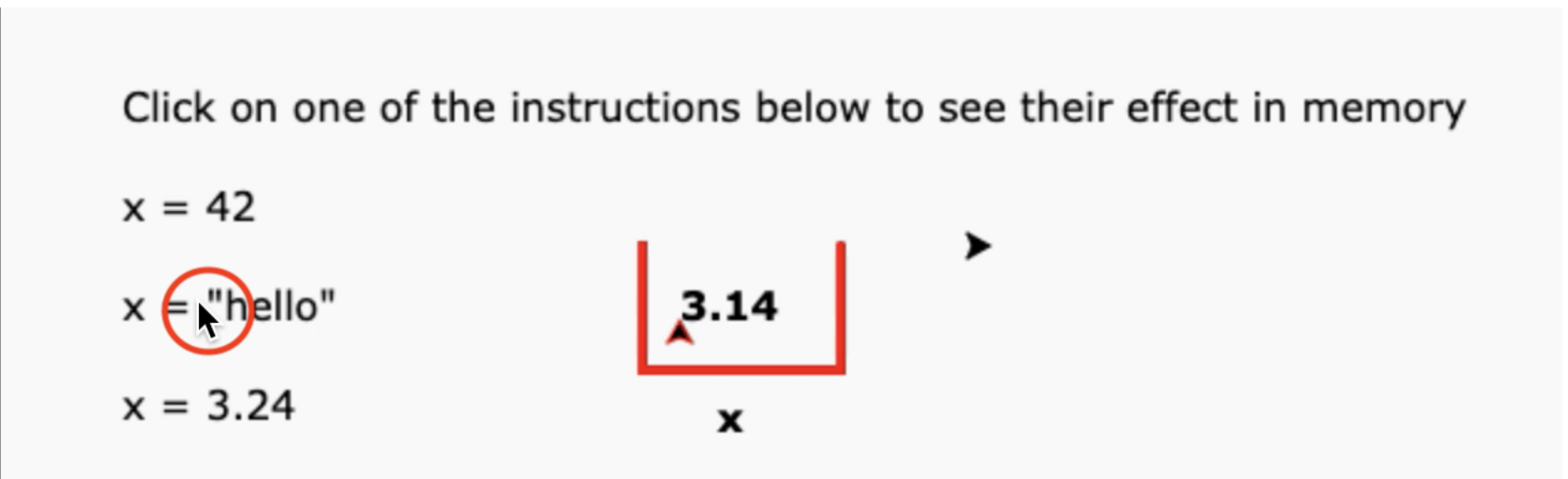


Figure 2. User clicks on the declaration of a variable.

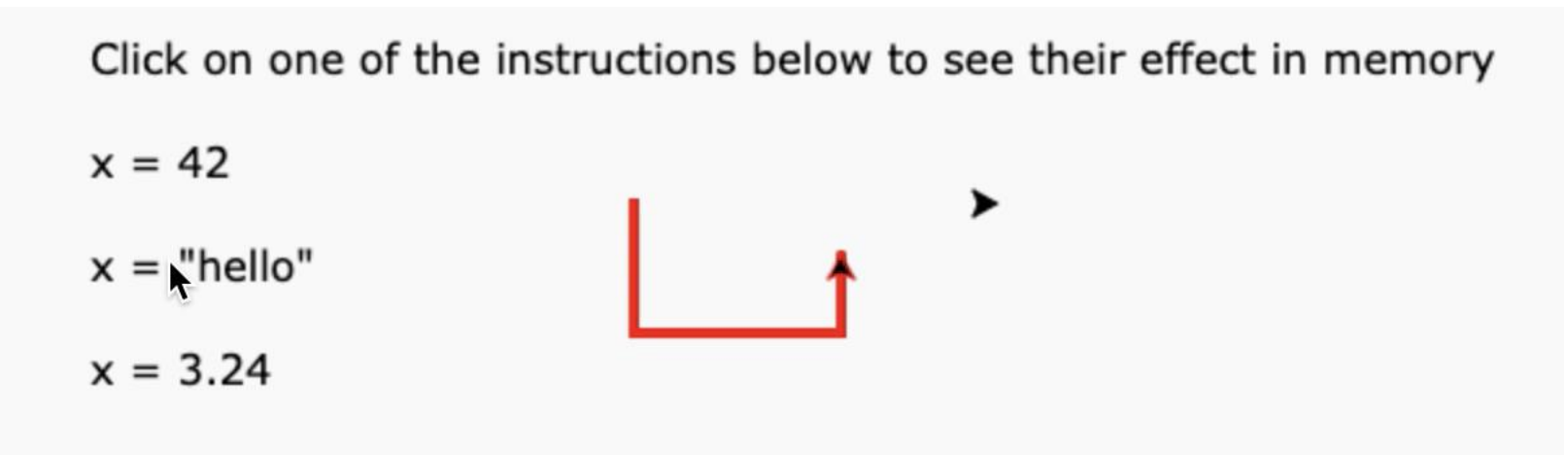


Figure 3. The animation draws the box representing the variable.

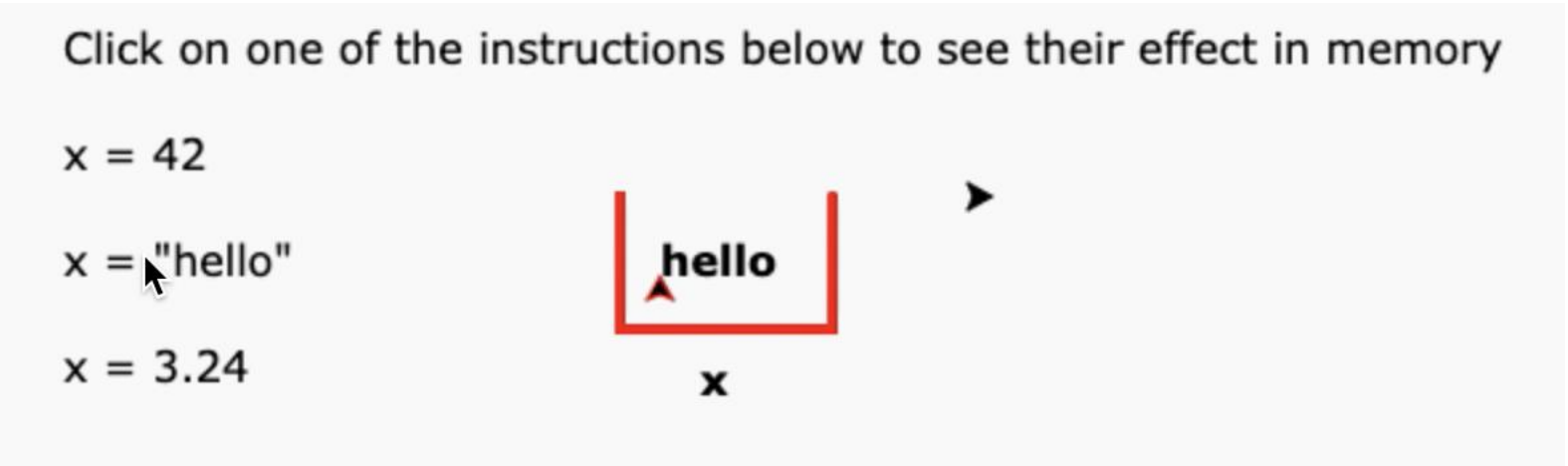


Figure 4. The animation draws the content of the variable

Methods

We have setup surveys for each visual aid in order to determine which aids are most effective. We ask each student rate the usefulness, how beneficial they it, and if they feel they got more information from the animation compared to a traditional programming language. We also have a survey for the overall effectiveness of the animations which can be seen in Figure 5.

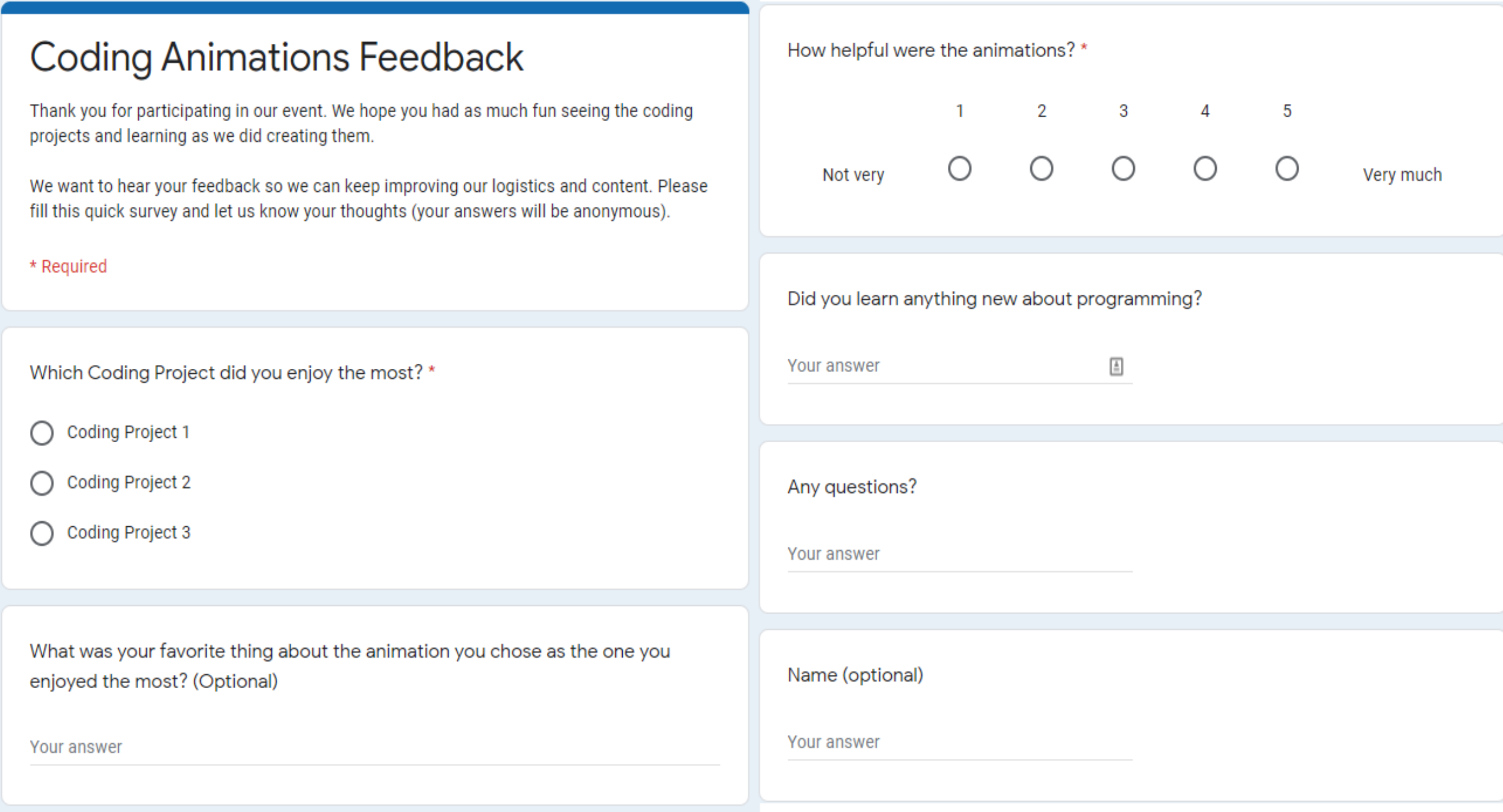


Figure 5. Overall rating survey

Conclusions

We have put together the webpage to be shared on social media shortly. We will then use the data collected from the surveys to assess the effectiveness of our approach and determine what did and did not work well.

Please visit https://gwccms.github.io/turtle_workshop/ to see all our current animations.

Acknowledgments

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References <https://www.freecodecamp.org/news/scratch-has-a-marketing-problem-f84626bd18ef/>

