Peer Review: Quines by T. Babies

1st November 2019

Feedback to individual sections

Abstract

The abstract gives a precise description what is going to happen in the paper. One point of concern is that in the abstract quines are explained as "[...] programs that deal with the problem of making self-replicating programs." however in part **1 Quines** they are described as follows: "[...] Quines are also known as self-replicating programs". This is not the same, you should give a consistent explanation through the whole paper.

Quines

When reading the initial description of quines I did not fully understand the difference between *direct* and *indirect* self-reference. Maybe you could elaborate on the two examples given because they really are good examples of *direct* and *indirect* self-reference. Hence the first part of that section gives the reader a good understanding of <u>what</u> quines are but I missed a motivation for <u>why</u> quines are an interesting or important topic. I suggest you move part **3 What are Quines used for?** between the explanation and subsection **1.1 Examples that are not Quines**.
At last the word "author" in the sentence "He is the Author of Quine's paradox:" should be written lowercase and not with a capital 'A'.

Examples that are not Quines

The title implies that the following examples are not quines but then you talk about *cheating*. Is there a difference? You should at least explain what *cheating* means when used on quines.

Constructing a Quine

It is not clear what you mean with *repr()* function and that function is nowhere else used or mentioned. You should explain what you mean with this function or remove the expression and explain the example without it. Otherwise I think this part is quite good because you build a quine step-by-step and also explain the given code-examples well which gives the reader a good grasp of how quines work.

Introns

The only thing that struck me with this part is that in the last sentence before the code it should be "include an intron" and not "include an introns". I think this part is alright and I just want to express a personal preference regarding the name *intron*. You could add a note about where the name comes from.

Multi-quines

Firstly you copied a quite long passage from one of your references here and I think it wise to rewrite that with your own words. Secondly you refer to one of your sources that gives examples of multi-quines but no example is included in this paper. You should give an own example or if you think the examples of your source are very good use one of them. Do not forget to reference it and maybe explain why you think this is a good example.

Kleene's fixed-point theorem

In this part there are mainly issues regarding the writing rather than regarding the content. In theorem 1 it should be the word "states" and not "stats". After theorem 2 there is the sentence "Calculating both g and f in succession $f \circ g$ on an input." which makes no sense. I think you mean something like this: Calculating both g and f in succession on an input is the same as calculating the composition $f \circ g$ on that input. Finally there is a typo in "[...] the composition $f \circ d$ [...]" where probably $f \circ g$ is meant.

Kleene's fixed-point theorem and quines

This part is very short and I think you could extend it by explaining the term *fixed-points* and how the theorem shows that quines are fixed-points. Also please specify which print function you refer to.

What are Quines used for?

This part is very important as it relates quines to the real world. As I suggested earlier think about moving this part further to the beginning of the paper. Also this part made me feel that quines are not very important. But this part has the potential to arouse interest in the topic of quines so you should try formulating this part more positively. For example you could emphasize the use of quines in malware so that they are important to know about if one wants to prevent damage through malware.

Conclusion

In the conclusion it should not be summarized what was done in the paper but what results and insights the paper provides. I suggest you elaborate the result that quines exist in every Turing-complete programming language. The end of the conclusion on the other hand is really nice because you present ideas regarding future projects.

References

The references are not consistent. The first two and the fourth source have numbers but the third source uses "[Kleene]". Either use numbers for all sources or names for all sources. Also for the third source no year is specified and the year of the first source is only partly specified.
It is good that the dates of last access are included for website links.

General feedback

Overall I think it is a good idea if you write transitions between the sections and subsection to guide the reader through the paper. For example between **1.1 Examples that are not Quines** and **1.2 Constructing a Quine** you could say that after seeing how quines do not work you are going to show how to built a quine. Furthermore you write the word "quine" always with a capital 'Q' but as far as I know the word "quine" should be written lowercase because it is not the name of a person or something similar.
As a last suggestion think about adding a part about how quines were invented as this might help creating interest for the topic of quines.