Reading prompt for 9/10/2020

The assigned reading for 9/10 provides background for some theoretical results that we will discuss in class. So, this prompt does not ask any questions directly related to the reading. Rather, we will continue our exploration of what RV is (reading 1 asked you to define RV in your own words).

1 What is runtime verification?

In Lecture 1 (on 9/3), we did not give a definition of runtime verification because there is no widely acceptable definition of what runtime verification is. Here, you will critically examine some definitions of RV and you will revise your definition of RV. Here are some definitions of RV:

Definition 1.1. Runtime verification is a computing system analysis and execution approach based on extracting information from a running system and using it to detect and possibly react to observed behaviors satisfying or violating certain properties [1].

Definition 1.2. Runtime verification is a dynamic analysis method aiming at checking whether a run of the system under scrutiny satisfies a given correctness property [2].

Definition 1.3. Runtime verification is the discipline of computer science that deals with the study, development, and application of those verification techniques that allow checking whether a run of a system under scrutiny satisfies or violates a given correctness property [3].

Definition 1.4. Runtime verification is the study of how to design artifacts for monitoring and analyzing system executions. Such artifacts can be used for a variety of purposes, including testing/program understanding and fault protection [4].

Definition 1.5. Runtime verification is a computing system analysis and execution approach where data is collected during the concrete or symbolic execution of programs and used to react to behaviors that satisfy certain properties [5].

Answer the following questions:

1. Which two definitions of RV do you agree with the most? (Recall the comparison of RV with testing and formal verification in Lecture 1.)

2. For each of the definitions you chose in 1, give one reason why do you think it is not the best definition of RV. (You cannot repeat the same reason.)

3. Revise your definition of RV that you gave in the reading for 9/8, based on the your response to 1 and 2.

4. Deliverable: Give your answers to 1, 2, and 3 in a file, `reading-2.txt` and upload to CMS.

References

[1] Ezio Bartocci, Yliès Falcone, Adrian Francalanza, and Giles Reger. "Introduction to runtime verification". In: *Lectures on Runtime Verification*. Springer, 2018, pages 1–33.

[2] Yliès Falcone, Klaus Havelund, and Giles Reger. "A Tutorial on Runtime Verification." In: *Engineering dependable software systems* 34 (2013), pages 141–175.

[3] Martin Leucker and Christian Schallhart. "A brief account of runtime verification". In: *The Journal of Logic and Algebraic Programming* 78.5 (2009), pages 293–303.

[4] Klaus Havelund. *Introduction to Runtime Verification*. `http://www.runtime-verification.org/course/slides/lecture1.pdf`. 2009.

[5] Runtime Verification Inc. *Introduction to Runtime Verification*. `https://runtimeverification.com/faq`. 2020.