Student Worksheet: Analyzing a Journal Article

Please read the assigned journal article and answer the following questions. Review the "Paraphrasing" module as needed to help you understand how to paraphrase to avoid plagiarism.

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Journal article title: A Research Landscape on Formal Verification of Software Architecture Descriptions by CAMILA ARAÚJO, EVERTON CAVALCANTE, THAIS BATISTA, MARCEL OLIVEIRA AND FLAVIO OQUENDO

Step 1. What is the purpose/hypothesis/aim/objective of the study?	
a. Write down the exact statement in which the authors describe what they were testing. (Hint: This information may be provided in the article as a purpose statement or as a hypothesis). Include quotation marks around the exact wording and indicate page number(s).	"This work contributes with (i) a structured overview and taxonomy of the current state of the art on this topic and (ii) the elicitation of important issues to be addressed in future research." (page 1) "In this paper, we report (i) the main findings of the performed systematic mapping, (ii) a structured overview and taxonomy of the current state of the art on this topic, and (iii) a discussion on important issues to be addressed by future work." (page 2) "One of the goals of our study was identifying which ADLs have been used in the primary studies for architecture description towards supporting verification, their characteristics, and supported views" (page 4)
b. Now describe the purpose of the study (as you understand it) in your own words.	The purpose is to offer an overview of what has be done so far when it comes to formal verification of the software architecture and also provide a classification of them and show which are the issues that could be solved in the future.

c. What was the "gap" in the research that the authors were trying to fill by doing their study?	They wanted to have a structured overview and taxonomy of the existing formal verifications of the software architecture description. They also indicate which are the issues with the current papers.

Step 2. What is/are the major finding(s) of the study?	
a. Make some notes about the authors' major conclusions or findings as written in the article. Include quotation marks whenever you use their exact wording and indicate page number(s).	After reading the papers, they found out that there was no reference language that was used by all the papers to formally describe software architectures. Also , the "visual and semi-formal notations have appeared as means of supporting software architecture description despite requiring an additional process to translate the produced models towards formal verification" (page 9) "Properties related to reliability, concurrency, and real time characteristics have been addressed in the studies as a reflex of the relevance of these concerns in many critical systems". The most important conclusion was that "model checking has been the most used technique to support the formal verification of architectural properties despite its well-known limitations with respect to scalability" (page 10)
b. Now write those conclusions (as you understand them) in your own words.	Their conclusion affirmed that model checking was used in a lot of the articles that they reviewed even though it has some limitations, and also that in the papers they sustained theirs theories by using visual or semiformal notations to support the architecture.
Step 3. How did the authors test their hypothesis?	
a. Briefly summarize the main steps or measurements that the authors used in their methods. Try to explain in your own words as much as possible.	The main steps are: - Planning (protocols defining the research questions to be answered, the search strategy to be adopted, the criteria to be used for selecting primary studies, and the methods for extracting and synthesizing data) - Execution (primary studies identified, selected, and evaluated according to the protocols) - Analysis (aggregating information extracted from the relevant primary studies) - Conclusions (issues that can be solved in future papers)
b. Do the authors suggest any problems or limitations with their methodology? Do you see any problems or limitations with their methodology?	They sustain that because of the multiplicity of perspectives under which existing work can be classified, they used the one that is the most used in classification structures.

c. How did the authors analyse their data? What test/s did they use?	They analyzed their data in 5 phases: 1. Unifying the result from the multiple database engines (delete the duplicates) 2. They read the title, abstract, and keywords and filter them 3. Reading the introduction and conclusion of each paper and filter them again 4. Fully reading the studies and filling out the data extraction sheet 5. Expert suggestions were considered about the inclusion of possibly relevant studies For the analyzation part, they used 3 inclusion criteria and 7 exclusion criteria.

Step 4. How reliable are the results?	
a. Do the authors suggest any problems with the study that could lead to unreliable results?	Their study is subjective because they considered only some papers that fit into their criteria and maybe because of that they rejected papers that could have a lot of meaning for this subject. As data source, they took all the papers from reliable sources like the most ACM Digital Library, IEEEXplore, ScienceDirect.com, and Scopus.
Step 5. Based on your analysis, are the claims made in this journal article accurate?	
a. Do the conclusions made (about the results) by the author make sense to you? Are the conclusions too broad or too narrow based on what was actually done in the study?	They gave a lot of information about what they discovered (many percentages and also added for each discovery the paper numbers which sustain their percentages) and we think that the conclusions were just the exact amount that was needed, explaining what the achieved and how.
b. Based on the accuracy of the methodology and the reliability of the results as described in Steps 3 and 4, do you think the conclusions can be believed?	They used a good method to analyze the data and the results can be trusted, but because of the subjectivity it depends in which direction you want to go with the paper if you would want to believe the results or not.

Step 6. What is the importance of this scientific work?	
a. Write (in your own words) the significant contributions of the experimental work in this journal article as reported by the authors.	Their contributions offer a way of visualizing what formal verification methods are used and in formal verifying the software architecture. In the same time, they offer the taxonomy of the analyzed journal papers.
b. Re-read your notes and explain why you think this is ○ **a strong or weak scientific article** ○ **a strong or weak scientific study**	We think this is a strong scientific article because it makes it clear what and why you should use formal verification methods for architecture validation and also offers a way in which you can classify the verification methods.

Resources for students:

1. If you are struggling with plagiarism and paraphrasing, then refer to our online "Paraphrasing" module.
2. If you are struggling with figuring out how to read the information, then refer to the section on active reading in the "Learning from Textbooks" section of A Guide for University Learning.
3. If you want to learn how to find more academic information on other science topics, then refer to our online "Searching for Scientific Journal Articles" module.