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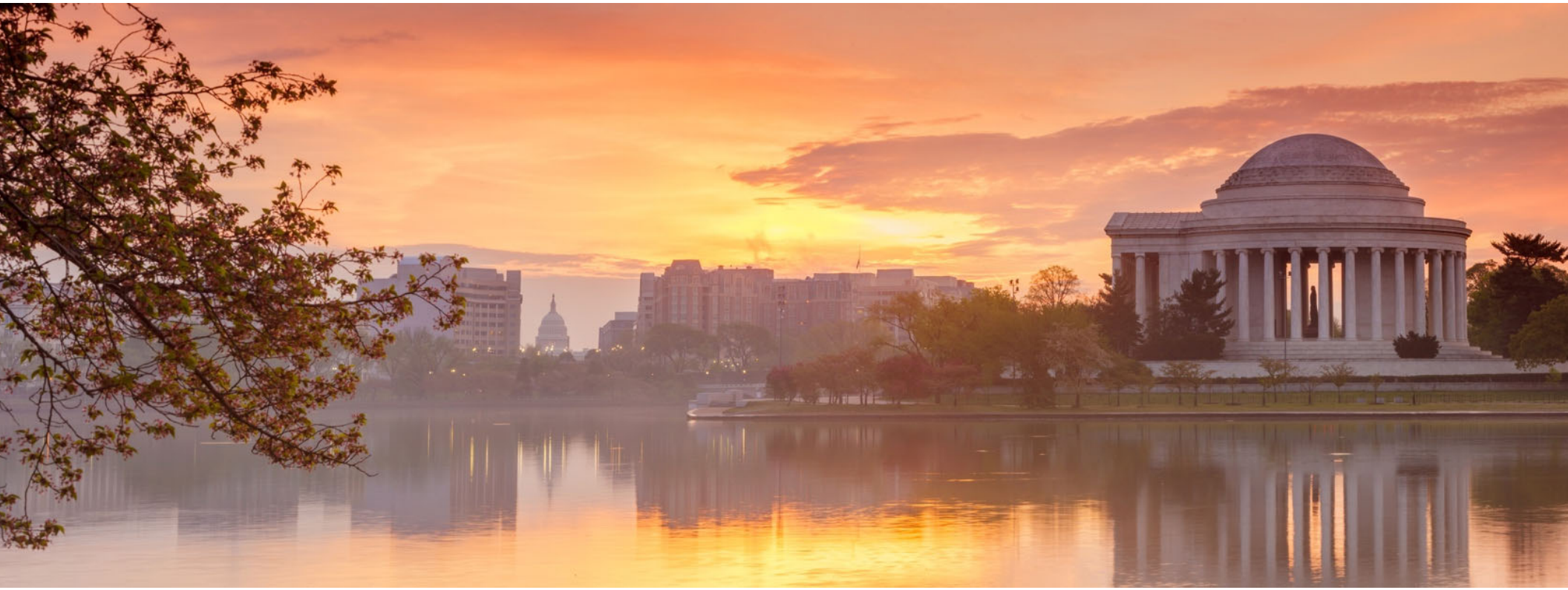

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UML Consistency Rules in Technical Books

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***Abstract*—*This paper highlights the need of identifying a set of UML consistency rules that is as complete as possible. For that purpose, we propose to complement our previous research works, by searching for such rules directly from technical books on UML-based object-oriented software development.*

Keywords— Unified Modeling Language Consistency rules

I. Introduction

The Unified Modelling Language (UML) [1] is an Object Management Group (OMG) specification that is most frequently used and is the de-facto standard modeling language for object-oriented design and documentation [2]. When UML diagrams convey contradicting or conflicting semantics, the diagrams are said to be inconsistent [3]. Such inconsistencies may be a source of faults in software systems [4]. It is therefore paramount that they get detected (a type of verification activity), analyzed and fixed [5]. Unfortunately no consolidated set of UML consistency rules was available in the literature when we started our work. To identify and validate a set, as complete as possible, of well-accepted consistency rules for UML diagrams, this PhD work is being developed [6] and the following steps have been done: 1) performed a literature review to collect the current state of the art in terms of UML consistency rules [7]; 2) performed a literature review to collect the current state of the art in terms of UML synthesis techniques [8]. This paper proposes to complement our previous work by identifying UML consistency rules in technical textbooks on UML-based object-oriented software development. Indeed, since such books often describe the use of UML for a given software development purpose, following a given methodology, they must, explicitely or not, discuss UML consistency rules.

II. Example of UML Consistency Rules in a Book

As an example of UML consistency rules discussed in a textbook, we consider Bruegge and Dutoit's chapter 5 (page 189) [9] that introduces the following heuristics for drawing sequence diagrams that are consistent with class diagrams: reading a sequence diagram from left to right, typically, 1) the first lifeline should correspond to the actor who initiated the corresponding use case (another consistency rule asks that each use case be described by a sequence diagram); 2) the second lifeline should be a boundary object; 3) the third lifeline should be the control object that manages the use case; 4) control objects are created by boundary objects initiating use cases; 5) boundary objects are created by control objects; 6) entity objects are accessed by control and boundary objects; 7) entity objects never access boundary or control objects. Entity objects represent the persistent information tracked by the system, boundary objects represent the interactions between the actors and the system, and control objects are in charge of realizing use cases [9]. These heuristics are presented in another textbook (e.g., [10]) and are not present in the UML standard [1] nor were they identified in our past work on this topic [7].

III. Conclusion and Future Work

As we commented, technical textbooks on UML-based object-oriented software development contain consistency rules that have not been collected yet. For that reason, our future work will identify UML consistency rules presented in technical books by following a systematic procedure as we previously did [7] for papers published in peer-reviewed journals, international conferences and workshops.

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