CS 320 - Assignment 1

Research Report – 20 pts
Due Sept 12, 2014

The purpose of this assignment to write a well organized research report that investigates a research topic from a software engineering perspective. You will use the WSU library system to research electronic journals as well as the Internet.

1. Topics

You may choose from the following topics:

a. Security in Software Engineering

Michael Howard, a security expert at Microsoft, was asked the question: "What isn’t being taught well enough in college?" He responded, “Security; many college graduates need to get remedial security training”.

The history of computer security shows that it is neither trivial nor something that one can effectively add on as an after-market upgrade. Most security breaches are not due to cracking encryptions, but to bad software designs. Effective security needs to be designed into any application from the start, and continuously evaluated throughout software development. Software development is often taught as an undergraduate course, hence designing in security must be addressed at that level. Any good computer science curriculum should include at least one software engineering course focused on security. Today, security is often associated with the math of encryption, not with software engineering.

b. Cyber-Physical Systems (Wikipedia)

A cyber-physical system (CPS) is a system featuring a tight combination of, and coordination between, the system’s computational and physical elements. Today, a pre-cursor generation of cyber-physical systems can be found in areas as diverse as aerospace, automotive, chemical processes, civil infrastructure, energy, healthcare, manufacturing, transportation, entertainment, and consumer appliances. This generation is often referred to as embedded systems. In embedded systems the emphasis tends to be more on the computational elements, and less on an intense link between the computational and physical elements.

Unlike more traditional embedded systems, a full-fledged CPS is typically designed as a network of interacting elements instead of as standalone devices. The expectation is that in the coming years ongoing advances in science and engineering will improve the link between computational and physical elements, dramatically increasing the adaptability, autonomy, efficiency, functionality, reliability, safety, and usability of cyber-physical systems.

c. Concurrency/Scalability in Software Engineering

With the growing popularity of multicore processors and increasing complexity of computer systems, concurrency in software is highly desired. Although today’s hardware technology enables concurrency, software engineering must go through a shift towards supporting development of correct, concurrent, and scalable software. Through a literature review on this topic, study the impact of concurrency/scalability on software engineering.
2. Your Tasks

A key skill that should be demonstrated by upper division undergraduate students is critical reasoning of ideas presented in lectures combined with knowledge obtained from researching a topic. You are NOT expected to be experienced with security analysis, cyber-physical systems, concurrency and software engineering, and this will be taken into consideration when evaluating your work. You are required to write a research report composed of material found on the Internet, electronic journals, and conference proceedings.

1. Find 5 (or more) research papers from journals and conferences that discuss the relevant topic of your choice.

2. Summarize the finding of each paper, by discussing the salient points and critique the content (as your abilities allow).

3. Try to make an argument that certain aspects of software engineering still needs to mature.

4. The report should be between 2,000 and 3,000 words long. Overly short or overly long assignments will be penalized. All words within the assignment will be counted towards the word limit, with the exception of quotes, references, or appendices.

5. Provide an introduction which properly identifies the context and the purpose of the discussion for any reader, and also conclude the report with a summary that highlights and reiterates concisely.

3. Formatting

Use a 10 point "Times New Roman" or "Arial" font and double space the document. Page margins should not exceed 1.25 inches. Each page should contain a header as follows:

First Last Name
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Cite all references when used (e.g. UML diagrams can be used for static checking [1]). References should be attached as a separate page and should be single spaced and formatted as follows:

References:


4. Submission

Submit a PDF or DOC file on Angel before 11:59pm on the due date.

5. Assessment

You will be assessed on your ability to make reasonable judgments and infer reasonable theories based on what is known from the lecture, and what can be found in electronic journals and Internet. In addition, grammar, punctuation, and formatting will also be included in the grading.