CS 5/7314: Software Testing and Quality Assurance

Final Exam

April 30 - May 7, 2024

Student Name: _____

Exam grade: _____

General Instructions

- This is an open-book, take-home exam, totaling 50 points. But, you must complete your exam independently.

- Read exam questions/detailed instructions carefully before completing it.

- The exam will be posted/available on Canvas on Tuesday, 4/30/2024 at 6pm.

- You must upload your completed exam to Canvas, ideally in a single file (multiple files are acceptable, although not preferable) by 6pm, Tuesday 5/7/2024.

- **Good luck!**

Independent Study/Exploration Report/Essay .... *(50 points.)*

Your essay should cover some in-depth (published research in/by reputable journals/conferences/publishers) and up-to-date (must include research done in the last few years) studies of a chosen topic closely related to one of the chapters of our main textbook covered since Exam #2, or some of the topics briefly covered earlier but we didn't explore thoroughly, supported by at least two primary research papers, while satisfying the following specific requirements on the topic/paper/chapter selection:

- The topic must be selected from the following five topics corresponding to one of the chapters/sections of our main textbook:

    - C13&20/Topic-1. Defect prevention and its relationship to defect analysis (Chapter 13 and 20).
    - C14/Topic-2: Software inspection (Chapter 14) and new development/applications for open source software projects.
    - C18/Topic-3. Feedback and quantifiable quality improvement: basics (Chapter 18) and new applications for the Cloud and Web-based systems.
    - C19&20/Topic-4. Quality modeling and defect analysis based on data from testing (Chapter 19 and 20; but also Part II – Testing).
    - C20.2/Topic-5: ODC (Section 20.2, or p4_j27webodc.pdf or p5_j31autoODC.pdf on Canvas/files) and recent development/applications

- One research paper must be either

    - a) one of the papers (p4-p5) on Canvas/files mentioned above, or
    - b) one of the papers from SMU/Tian research group linked from our class home page (URL: s2.smu.edu/~tian/class/7314.24s/refT.html), or
    - c) from the list of referenced papers from the corresponding chapter/section of our main textbook, or
    - d) from the list of referenced papers from p4-p5.

- Another research paper must be outside the sources mentioned above and published within the last 8 years (2016 or after). I.e., you need to find other paper(s) on your own, published in a professional journal or conference proceedings, but not some web documents/"white papers"/internal reports/etc. Also, no survey papers here, please! As I mentioned in class, *online resources* from SMU Library is a good place to start.

- You are welcome to use more than two papers. But in that case, you must clearly identify your two primary sources satisfying the above requirements.

- Make sure you have access to the full papers, not just title/abstract/description/summary/etc. of the papers.

After you study the papers of your selected topic thoroughly, you need to write an essay (or an independent study/exploratory research report) to summarize what you learned and to express your own opinions, observations, and conclusions about the topic. Here are a few specifics about your essay:

- Your essay should be around 5 double-spaced pages in length, with a strict upper bound of 8 pages.

- Suggested outline/format of the essay:

    - a descriptive title (should be more specific/descriptive than the corresponding chapter/section title of our main textbook or the topic title above),
    - introduction and topic description,
    - summary/results of your primary sources (your 2 selected papers),
    - discussions (the most important part! – see below),
    - conclusions,
    - references (list your two primary sources first, and then possibly other papers, if any).

- A summary of the chosen papers is only a part, but definitely not the whole, of your essay. It shouldn't exceed 40% of your essay/report in length,

- After summarizing your primary source papers, a comprehensive discussion section should be included (if you choose, you may use multiple subsections, or even multiple sections), which should include:

  - an evaluation of the research and the results in the source papers, their strengths and weaknesses, what you'd have done differently (critical review/analysis/assessment),
  - an assessment of the importance of the research in the source papers and the overall impact on relevant testing/QA research and practice (broader impact),
  - relevance of your primary source papers to the specific chapter (and section, if applicable) of our main textbook,
  - possible adaptation/adoption of the research covered to your testing/QA-related work and/or to your course project (including extensions to your project, wherever appropriate),
  - possible future work along the same line and/or in related research areas, and a general outlook into the future about this research topic you selected,
  - any other discussions you deem relevant to the topic selected.

  Notice that these are your own opinions, not those already expressed in the source papers, based on your own knowledge/experience/reasoning/analysis/synthesis/etc. This is the most important (and original) part of your essay, making up about 1/2 of your essay/report in length, to demonstrate your understanding/mastery of the topic you selected.

- An overall conclusion should be included, to summarize the whole topic and your essay.