CSCI 330: Research Report on Programming Languages

Professor Killian

September 7, 2020

1 Overview

As part of the course requirements established in the syllabus, every student must submit and complete a short research report on one of the following topics:

1. A programming language (e.g. C++, OCaml, Rust, Lisp, COBOL, Snobol, FORTRAN)
2. A programming language family (Imperative, Meta, Functional)
3. A tool leveraged by a language or language family (e.g. Cargo, CMake, `pip`, `opam`)
4. A language feature (e.g. Objects, Pattern Matching, Metaprogramming)

Item	Points	Date & Time	Submission	Description
Research Topic	5	Sept 16 11:59PM	Autolab	Title and topic of paper with paragraph describing what you will discuss.
Bibliography	10	Oct 7 11:59PM	Autolab	Five source minimum – three must originate from the ACM Digital Library.
Checkpoint	10	Nov 11 11:59PM	Autolab	Draft submission of paper file. Adequate progress must be shown. Interim feedback will be given.
Final Paper	125	Nov 29 11:59PM	Autolab	Final submission of paper. There is a 5 page (1200 word) minimum.
Presentation File	25	Nov 29 11:59PM	D2L	PowerPoint file.
Video Presentation	25	Nov 30 – Dec 4	Class	5–7 minute talk given to class.
Evaluations	25	Nov 30 – Dec 4	Class	Peer evaluation.

Attendance of class is **MANDATORY** during the week of presentations.

2 Paper

You will write a technical paper of at least 5 pages, double spaced, using the LaTeXtemplate of which this handout is based. You should have at least 5 technical references; at least 3 of which should be available from the ACM Digital Library.

The content of your paper should include a summary of the papers (no more than 3 pages) and an analysis and commentary on those papers (at least 2 pages). Your paper should include a critical evaluation according to the language evaluation criteria we cover in class.

You will be graded on the technical content of your paper as well as on its mechanical details (such as spelling, grammar, organization, use of appropriate headings, clarity, etc.). See the attached paper rubric for details.

3 Presentation

Your presentation should be approximately 7 minutes in length – significantly short or long presentations will result in grade deductions. It should be appropriately supported by the use of presentation media. Your presentation will be graded on its content and effectiveness, including presentation skills. See the attached presentations rubric for details.

Presentation Rubric

Outcome	4 (Excellent)	3 (Good)	2 (Adequate)	1 (Inadequate)
Technical Content	Content was at appropriate technical depth	Content had sufficient basic information, but more depth in some areas needed	Content includes only basic information about topic	Content depth insufficient to impart technical knowledge of subject
Thoroughness	Content covered breadth of topic well	Content covered much of the topic	Content covered some of the topic	Content covered little of the topic
Organization & Coherence	Topic is clearly discussed; specific examples are appropriate and clearly developed; flow is good; well organized	Most information presented in logical sequence; generally well organized, but needs better transitions between concepts	Concept and ideas are loosely connected; lacks clear transitions between topics; flow and organization are choppy	Choppy and disjointed; lack of flow; development is vague; no apparent logical order of presentation
Presentation Skills	Presentation is creative; delivery is excellent; audience is engaged;	Not as polished as possible; media used not as creative or varied	Choppy use of media; uneven delivery; some inappropriate use of media to support topic	Little or ineffective use of appropriate media; largely unintelligible or incoherent delivery

Writing Competency Rubric

Outcome	4 (Advanced)	3 (Proficient)	2 (Basic)	1 (Minimal)	0 (Deficient)
1. Central or Controlling Idea Presents a clear and focused central idea (a.k.a. thesis) that moves beyond general themes, clichés, and common knowledge while corresponding to the requirements of the writing task.	Central idea is perceptive, demonstrable, and maintained throughout, revealing robust and nuanced understanding– engaged thought in regard to the writing task.	Central idea is a clear, thoughtful, appropriate response to the writing task, demonstrating solid understanding.	Central idea is perfunctory: perhaps a general theme that shows some understanding but modest to little engagement with the task at hand.	Central idea is unclear or absent, perhaps not demonstrable, and perhaps not well- connected to the writing task. Reflects little understanding.	No evidence of a central idea.
2. Organization Purposefully advances the central idea by the selection and arrangement of ideas coupled with the skillful use of transitions to create document and paragraph level coherence.	Clear, coherent structure with evidence of deliberate, original planning for the assigned task. Consistent, effective transitions. No significant lapses in overall cohesion.	Evidence of thoughtful planning appropriate to the writing task; easy to follow with some effective transitions.	A mechanical organization. Lack of smooth transitions distract from a unified coherence.	The sequence of ideas is difficult to follow? apparently patterned on the writer?s idiosyncratic thought processes–with few, if any, cues for comprehension.	No apparent organizational pattern.
3. Development Primary and secondary source materials are applied in a sound and credible way to extend support and explain presented ideas and/or arguments.	Key points are fully, specifically, and effectively supported with a variety of credible materials. Sources are well- chosen, well-contextualized, and mindfully synthesized for the writing task– and correctly cited.	Main points are supported with appropriate material. Sources are reasonably framed, synthesized, and explicated; nearly all sources are cited.	Support is general with an adequate mix of materials. Resource materials are not fully explained and not carefully contextualized in relation to the central idea?limited synthesis. Some citations may require clarification.	Thin explanation. Little of the evidence and explanation used supports the central idea. Resource materials are neither contextualized nor explicated. Citation is problematic.	Supporting materials and/or citations are absent.
4. Mechanics Applies the spelling, grammar, usage, punctuation, documentation style, and disciplinary conventions appropriate for the particular task.	No distracting spelling, punctuation, or grammatical errors; quotations and/or secondary source materials are all correctly cited.	Few distracting spelling, punctuation, and/or grammatical errors; quotations and/or secondary source materials are correctly cited.	Some distracting spelling, punctuation, and/or grammatical errors; some quotations and/or secondary source materials are not correctly cited.	Significant and distracting spelling, punctuation, and/or grammatical errors; quotations and/or secondary source materials are incorrectly cited or lacking citations.	Consistent patterns of errors and evident failure to grasp rules of language and disciplinary conventions. No citations for quotations and/or secondary source materials.
5. Style The varied use of sentence structure and careful choice of language helps to emphasize key ideas and create an appropriate tone for the writing task.	Sentences are noticeably original, vivid, and well-constructed? effectively suited to the rhetorical context. Vocabulary is precise and thoughtfully chosen. A distinct author?s voice is evident in the sentence formation and choice of words.	Language is clear, thoughtfully expressed, and appropriate for the task at hand. Meaning may be discerned with little effort.	Sentences are adequate for the writing assignment, but with little variation in construction. Language choices are sometimes inadvertent and inappropriate to the writing task–and may be confusing.	Sentence structure, word order, and word choice are confusing and consistently undercut the writing task and its rhetorical context.	Sentence structure includes significant errors and technical missteps that lead to confusion. Language choices and tone evoked are in conflict with the intended aim of the writing task.
6. Audience Awareness Demonstrates deliberate consideration of the readers? needs, provides sufficient information necessary for understanding, and creates a connection with readers through diction, development, and document design.	Pointedly, thought- fully engaging: speaks specifically and originally to readers? needs and concerns, given the situation. Document exhibits purposeful design elements?for example, graphs, typesetting, and headings? relevant for the particular audience.	Reveals awareness of a real audience and its distinctive needs, demonstrating reader accommodation in deliberate document development, design, and articulation.	Limited content development, design, and articulation–with little attention to connecting with readers.	Document speaks strictly from the writer?s perspective, demonstrating little to no consideration for readers? existences.	No awareness of audience evident in rhetorical choices or significant and disabling disparity between audience invoked and rhetorical choices selected.

Developed by William Archibald, Caleb Corkery, Kerrie Farkas, Judith Halden-Sullivan, Kimberly McCollum-Clark & Tracey Weis 2013

3.1 Including code snippets

Now, for the fun part. Suppose I want to include some source code in my paper (and describe it). For individual lines, we can use the `minted` environment and package. Code like this:

```
\begin{listing}[!h]
\begin{minted}{java}
public static <T> T add (T t, T u) {
  return t + u;
}
\end{minted}
\end{listing}
```

will be displayed as:

```java
public static <T> T add (T t, T u) {
  return t + u;
}
```

Including References

If we want to cite something, we need to refer to its tag found above under the bibliography section. We issue a citation by stating `~\cite{book_2014}` as shown here [1].

Downloading this template

You can download the template from our course webpage or start through Overleaf: `https://www.overleaf.com/read/tkvhqbzvhgxy`

Please pay *careful* attention to comments. I am available to answer any questions related to LaTeX that you may have.

I highly recommend using Overleaf `http://www.overleaf.com` to edit the template and keep a copy saved. This is similar to Google Docs.

References

[1] DOE, J., BAR, F., AND DOE, J. *Book Title*. Publisher Name, 2014.