|  |  |
| --- | --- |
|  | **CS 456: Algorithm Design & Analysis (Sem 2, 2020-2021) Final Paper (Research Report)**  **Instructor: G. Ayorkor Korsah (**[**akorsah@ashesi.edu.gh)**](mailto:akorsah@ashesi.edu.gh))  **Total points for paper: 100 Contribution to final course grade: 20%** |

**Task Summary**

The final paper in the algorithm design and analysis class gives you the opportunity to work in pairs to study an algorithm or family of algorithms that we have not covered in class and that may not be discussed in our course textbook. Your task is to learn about the algorithm(s), using a variety of sources available to you (which must include acceptable academic sources), and to write a short report on your findings.

**Guidelines for your Report**

Your report should cover the following content:

1. It should define and clearly describe the problem being solved.  You should make use of diagrams as needed, for clarity.
2. It must present, in a structured way, the algorithm(s) for solving the problem.  It should then clearly explain the algorithm(s), using examples and/or diagrams for illustration.  You should mention what algorithm design paradigm(s) the algorithm(s) fall(s) under.
3. Your report should discuss the analysis of the runtime of the algorithm(s).
4. Your report should discuss applications of the algorithm(s) – in what real-world situations does the addressed problem arise?
5. You can optionally discuss/mention issues such as limitations of the algorithm(s), further work built on the algorithm(s), other competing algorithms for the same problem, additional ideas you have for applying the algorithm(s), etc.

Furthermore,

1. Your report should be approximately 5 pages long, including all figures and the reference list.
2. As this is a research report, you should write it in a formal style/tone.
3. Your report must give appropriate published scholarly references in the ACM numbered style.  Published scholarly references include journal articles, conference papers, and books (e.g. textbooks). A good place to look for these is the ACM Digital Library (Ashesi’s library has full-text access to articles) and Google Scholar. Note that Wikipedia articles, blogs, tutorials and course lecture notes, for example, do not count as published scholarly references.
4. Having done your research to understand the algorithm, make sure that you explain things in your own words as much as possible.  Avoid accidental plagiarism. Your report must include appropriate in-text citations to the references provided.
5. Any diagrams or figures that you use, which you did not create yourself, must be cited appropriately. It is understood that some of these, if any, might not be from academic sources but other web resources. As such, such resources may also appear in your reference list.
6. Your report must be prepared with LaTex.
7. Make sure you proof-read and revise your report.  Ensure that your writing is clear and without typographical and grammatical errors

**Grading Rubric**

The paper will be graded according to the rubric below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Letter Grade** | **Score Range** | **Descriptor** | **Explanation** |
| A+ | [85,100] | Exceptional | Goes above and beyond the requirements of the assignment |
| A | [80, 85) | Excellent | Accurate, complete, well written, clear.  Meets all requirements of the assignment. Well-structured with proper referencing. No typographical/grammatical errors. |
| B/B+ | [70, 80) | Good | Mostly accurate, complete, well written, and clear. Minor lapses in accuracy, completeness, clarity, style, structure or referencing; or minor typographical or grammatical errors. |
| C/C+ | [60, 70) | Acceptable | A few lapses in accuracy, clarity or style; or some typographical or grammatical errors |
| D/D+ | [50, 60) | Fair | Major lapses in accuracy, clarity or style; or major typographical or grammatical errors |
| E | <50 | Unacceptable | Does not address assignment, or has issues such as accidental plagiarism. |

**Note:**

* You will be working in pairs to give you the opportunity to discuss the project together with another person, to ensure that you both have a solid understanding of the algorithm(s) being investigated. As you will be working in pairs, it is very important that both partners are fully involved and contribute equitably to **all** aspects of the work – research and writing (e.g. it is not acceptable for one person to write the paper on behalf of the team).
* A peer review process as well as peer evaluations will be factored into the grading process. Details of these processes will be specified later.

**Timeline**

Thursday, 25 March, 2021: Paper proposals due, indicating topic as well as list of relevant scholarly and other references

Thursday, 8 April 2021: Progress check-in

Thursday, 22 April 2021: Submission of draft report and peer review process

Thursday, 29 April 2021: Final submission of paper and peer evaluation process