AI End Sem Exam - Open Book Open Resources

Read instructions and questions carefully: (i) you cannot talk to any PhD student or faculty. (ii) you should declare the names of all the people you have discussed the questions. (iii) you cannot ask clarifications from TAs or instructor. (iv) you are free to make assumptions - they will be considered if your instructor feels that they are VALID. (v) you may discuss with others but at the end, it is your answer, so no copying no plagiarism. (vi) Cite all the resources you have referred to for answering this question including papers, websites and discussion with individuals. (vii) Finally, be precise - you are not a story teller.

Attempt both the questions. Each question carries equal marks. You have till 6pm (backpack time) to submit your answers. You need to typeset (times new romans, 11 pt font size) and upload pdf file on backpack. You will not get any extension for this.

1. Department of Transport (Govt of NCT of Delhi) in association with IIIT-Delhi (Dr. Sambuddho and Dr. Pravesh) now publishes transit datasets (static and dynamic/real-time) on Open Transit Data. The link is: https://otd.delhi.gov.in This platform provides a webservice (api) for live location data (as well as static data) of 1600 Delhi cluster buses (orange buses). Delhi Government wants you, as AI expert, to design intelligent vehicular traffic network routing algorithm for all DTC buses using this data. This "vehicular traffic network routing algorithm" helps the drivers to optimize time, route, and number of traffic lights, and stops. Assume that there are n=1000 buses for which the algorithm is to be designed.

   - Define PEAS and PAGE for the problem.
   - Identify 2-4 components that you would use to design the algorithm.
   - Create the flow diagram.
   - How will you approach this problem? Describe your approach (not the solution).
   - How will you solve this problem. Provide the algorithmic description. Do not forget that you are a student of AI course and you have also taken the Algorithms course.
   - Argue why your approach should work. Show with a simple example that the algorithm works.
   - Do not forget to consider "**Robustness**" factor in your algorithm design. What kind of attacks do you think your algorithm would face. Argue that your algorithm is attack-proof.

2. The Infosys Center for AI@IIIT Delhi wants to start an undergraduate program in AI (BTech-AI). While the program will be designed by faculty, being AI course student, we have given you the task of designing:
   A. "smart AI tutors" for all the courses. Smart tutors are student specific and the program takes the lecture slides and text book (pdf files) pertaining to a course and create flashcards and smart study guides such that they can tutor a student based on the difficulties they are having with class material.
   B. In order to help course instructors, you need to provide a "smart evaluator tool" for quizzes (Q), assignments (A), and programming homeworks (P). When students submit Q, A, P, the tool automatically evaluates them and sends the marks to the students. At the end of the semester, the instructor defines the thresholds for grading and the tool sends out the grades to the academic department. Note that different instructors can define their Q, A, P differently as well as thresholds for grading.

In your answer, choose one of the problems and show your work:

- Define PEAS and PAGE for the problem.
- Identify 2-4 components that you would use to design the algorithm.
- Create the flow diagram.
- How will you approach this problem? Describe your approach (not the solution).

- How will you solve this problem. Provide the algorithmic description. Do not forget that you are a student of AI course and you have also taken the Algorithms course.
- Argue why your approach should work. Show with a simple example that the algorithm works.
- Do not forget to consider "**Fairness**" factor in your algorithm design. Argue that your algorithm is not-biased.