CSE 486/586, Assignment 3

Due: Monday, October 30, 2023, by 11:59 pm.

Note 1: The total mark for this assignment is **30**. You should *NOT* directly copy anything from slides or other resources. You may get the ideas from slides but what you submit *must be in your own words*. Any help must be acknowledged.

Note 2: Question 6 is only for CSE 586 students (0 point for correct answer, and -5 for wrong answer)

1. Implement the min-conflicts for the 8-queens problem (assume that there is exactly one queen in each column and each row). (**10 points**)

2. Explain in detail how can we construct a general and powerful spam filter using Naive Bayes Classifiers. Write your solution mathematically as discussed in class. (**8 points**)

3. Implement the above spam filter. (**Optional group problem, 3 EXTRA credits, Due: November 10, 2023, show me your code in person**)

4. After your yearly checkup, the doctor has bad news and good news. The bad news is that you tested positive for a serious disease and that the test is 99% accurate. The good news is that this is a rare disease, striking only 1 in 10,000 people of your age. What are the chances that you actually have the disease? (**8 points**)

5. Which algorithm discussed in class has been used to schedule observations for the Hubble Space Telescope, reducing the time taken to schedule a week of observations from three weeks (!) to around 10 minutes? What is the name of a well-known CSP solver we described in class? (**4 points**)

6. We wish to transmit an n-bit message to a receiving agent. The bits in the message are independently corrupted (flipped) during transmission with ε probability each. With an extra parity bit sent along with the original information, a message can be corrected by the receiver if at most one bit in the entire message (including the parity bit) has been corrupted. Suppose we want to ensure that the correct message is received with probability at least $1-\delta$. What is the maximum feasible value of n? (**Only CSE 586 students**)