University of Waterloo
CS240E, Winter 2021
Assignment 4 Post Mortem

Question 1 [6 marks]

- Well done in general, but some students forgot to talk about space.

Question 2 [6 marks]

- Some students did not show that $(M+1)^d \equiv_M 1$.

Question 3 [2+4(+5)+2 = 8(+5) marks]

- a) Some students made some small mistake in calculating the hash-values.
- b) Generally well done, some students answers lacked justification
- c) Students who attempted this problem did well.
- d) Well done.

Question 4 [5 marks]

- Well done. Some students had minimality arguments which were lacking.

Question 5 [2+5+5+5(+3) = 17(+3) marks]

- a) was well done.
- For b), some students stated a bound with little to no justification.
- c) was generally well done.
- d) some students did not prove formulas for Q_v and Q_v. Quite a few did not prove that Q_v or Q_h are in $O(n^c)$.
- A large number of a students got the first bonus mark, i.e. $c = \log_{9/4} 2$. Several students found the best possible bound, which was $c = \log_3 2$

Question 6 [5+5+2=12 marks]

- a) was well done. Most students' algorithms mirrored the boundary path search algorithm learned in class.
- For b), some students stated that it would be similar to a) but could not fully flesh it out to get the answer.
- c) was well done, with the most common issue being making a statement about the structure of quadtrees that hinted at the answer instead of referring to the necessary result.