Writing Assignment

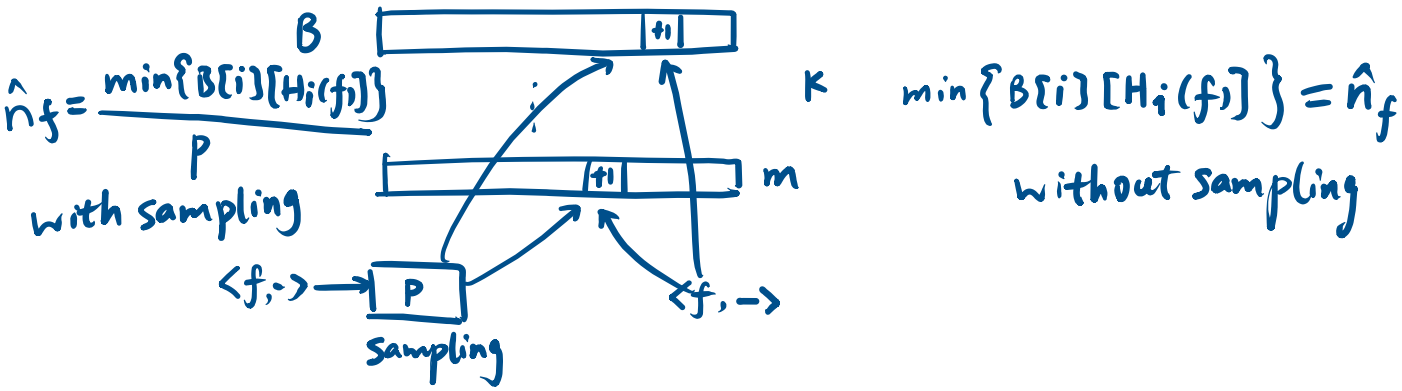
Due on December 8

This is an individual assignment that requires each student to write a research paper on a network data streaming stretch design or any related subject. . You will need to submit a pdf file with your name as the file name.

Length Requirement: The paper should be at least 5 pages with 11 pt fond size, single space, and margins no larger than 1 in.

Topic: You may select any topic of traffic measurement that is related to network data streaming algorithms and data structures. If you cannot find your own. We have a few below for you to choose from.

(1) Impact of Sampling on CountMin (Project 3)
CountMin is used for flow size measurement. Instead of recording every packet, we may add a traditional sampling module (lecture 10) with a given sampling probability p, such that only a fraction p of all packets are recorded in the data structure of CountMin. After measuring a flow's size, we need to scale it by multiplying 1/p. The problem is to study how the value of p will affect the accuracy of flow-size measurement under a given memory allocation to CountMin.



(2) Impact of Sampling on Counter Sketch (Project 3)
Counter Sketch is used for flow size measurement. Instead of recording every packet, we may add a traditional sampling module with a given sampling probability p, such that only a fraction p of all packets are recorded in the data structure of Counter Sketch. After measuring a flow's size, we need to scale it by multiplying 1/p. The problem is to study how the value of p will affect the accuracy of flow-size measurement under a given memory allocation to Counter Sketch.

(3) Impact of Sampling on Virtual Bitmap (Project 4)
Virtual Bitmap is used for flow spread measurement. Instead of recording every element, we may add an element sampling module (lecture 10) with a given sampling probability p, such that only a fraction p of all packets are recorded in the data structure of Virtual Bitmap. After measuring a flow's spread, we need to scale it by multiplying 1/p. The problem is to study how the value of p will affect the accuracy of flow-spread measurement under a given memory allocation to Virtual Bitmap.

(4) Impact of Sampling on bSketch or vSketch (sample paper, lecture 9)
bSketch (vSketch) is a family of sketches used for flow size/spread measurement. You may pick any sketch from the family to study. Instead of recording all elements, we may add a sampling module with a given sampling probability p, such that only a fraction p of all elements are recorded in the data structure. For size measurement, we need to use traditional sampling; for spread measurement, we need to use element sampling. After measuring a flow's size (or spread), we need to scale it by multiplying 1/p. The problem is to study how the value of p will affect the accuracy of the sketch you choose to study, under a given memory allocation.

Paper Structure: The structure of a paper is given as follows. Refer to the sample paper.

Title

Author(s)

Abstract

Section 1: Introduction

Explain the problem, the practical importance, the technical challenge, the inadequacy of existing work, your main idea, and your main contributions/results, at a high level.

Section 2: Background

Explain the flow model, the system model, and the problem you investigate, as precise as possible.

Section 3: Your Sketch Design

Explain your overall sketch design, the recording algorithm, the query algorithm, and other technical details.

Section 4: Analysis (if any)

Analyze the properties of your sketch design such as error bound.

Section 5: Experiments

Explain your experiment setting, evaluation criteria, implementation, input data used, and experiment results (with figures or tables). You must explain the results.

Section 3: Related Work

Provide a discussion on the existing sketches that are related to your study in this paper.

Section 6: Conclusion

Summary your work and any conclusion that your study can draw.

References

Note: Your work does not have to be entirely original from the existing literature. This is a term paper. But you cannot copy any sentence(s) from other papers. You can read other papers on how to write and explain. But you should put those away when you write, and you should write in your own words. The notations and equations may be the same, but you need to write in your own words to explain.