Project – 4 : Implementation of Multi Flow-Spread Sketches

The following project contains a zip file, which consists of 2 source code files(java) which contains the logic for implementing Virtual BitMap and bSkt HLL algorithms and corresponding output text files and graphs.

Below are the steps which guides to run the project on command line to the functionality of the algorithms mentioned above.
1) Launch the terminal application and go to the "src" folder of the project.
2) Begin by executing the following commands:
"javac P5_VBitMap.java", "java P5_VBitMap 500000 500" and
"javac P5_bSkt_HLL.java", "java P5_bSkt_HLL "
3) Executing these commands will result in the creation of output files in the "src" directory and, if those files already exist, will replace them.

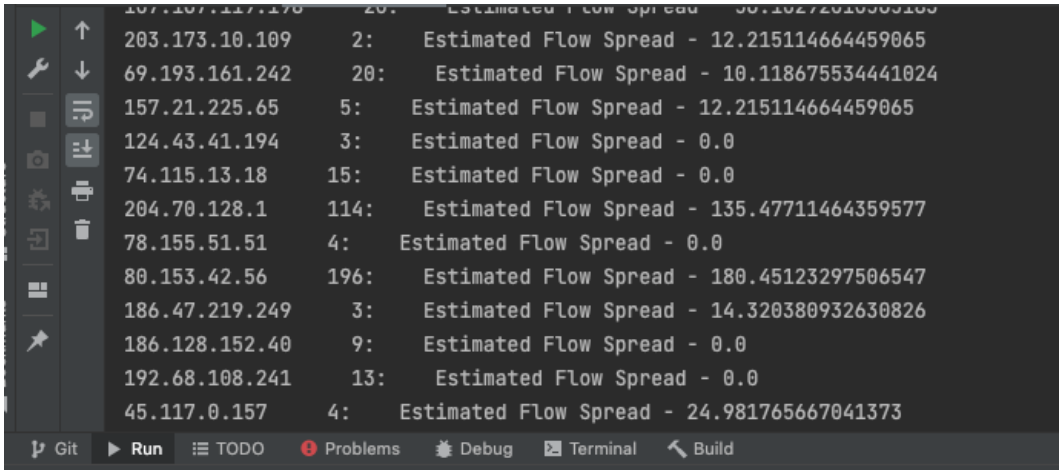
1. **Virtual BitMap.java:**
   In this algorithm, we try to evaluate the hash for the each of the element using physical bitmap and virtual bitmaps and we perform the hash for it and assign the bitmap value to 1 and estimation of the flow spread is done using the formula "Virtual_BitCount _Size * ln(fraction of elements that are zeros w.r.t Physical Bit count) - Virtual_BitCount _Size * ln(fraction of elements that are zeros w.r.t Virtual Bit count)"

2. **bSkt HLL.java:**
   In this algorithm, we have 4000 HLL estimators with 128 5-bits for each of the register as it is given that each of has 3 hash values, we evaluate the hash for each of the element and we calculate the number of leading zeros for the hash value, and we use the information to evaluate the flow spread using the formula "Alpha * BitMap_Size^2(1/2^HLLBitMap[Hash(Element)])^-1"

This project is tested out on both IntelliJ and command line for execution, and below are the screenshots for the outputs. Project starts when above commands is run and contains the calls to the methods to execute the functionality.

Output Screenshots:

1. **Virtual BitMap:**



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2. bSkt HLL:

Flow Address	TrueSpread	EstimatedSpread
85.97.61.130	57714	57415.306252791735
159.178.28.17	55453	53621.157864306966
36.99.119.77	45126	50118.496743048076
122.114.8.30	52238	47530.14475913412
23.21.88.60	52296	44480.75546748533
107.77.221.58	36234	41153.99443202597
189.144.210.6	28522	30962.138443477874
67.151.60.134	31002	30767.400211940898
213.254.138.15	22224	23727.627412582446

Graph for Virtual Bitmap: