A. Mth Method

Mth teats each sample as a capture (or recapture). It predicts the total number of bugs based on Equation 1, 2 [1]. Table I shows the meaning of each variable, how to compute its value based on the bug arrival lookup table in Table II.

$$N = \frac{D}{C} + \frac{f_1}{C}\gamma^2, C = 1 - \frac{f_1}{\sum_{k=1}^{t} k f_k} \tag{1}$$

$$\gamma^2 = max\{\frac{\frac{D}{C}\sum_k k(k-1)f_k}{2\sum\sum_{j<k} n_j n_k} - 1, 0\} \tag{2}$$

TABLE I: Example of bug arrival lookup table

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	...
Sample #1	1	1	1	0	0	0	0	0	0	0	0	0	
Sample #2	0	0	1	1	0	0	0	0	0	0	0	0	
Sample #3	0	0	1	0	1	0	0	0	0	0	0	0	
Sample #4	0	0	0	1	1	1	1	1	0	0	0	0	
Sample #5	0	0	1	1	0	0	0	1	1	1	1	0	
Sample #6	1	0	1	0	1	0	0	0	0	0	0	1	
Sample #7	...												

TABLE II: Variables meaning and computation

Var.	Meaning	Computation based on bug arrival lookup table	Example value
N	Predicted total number of bugs		predicted value: ***24***
D	Actual number of bugs captured so far	Number of columns	12
t	Number of captures	Number of rows	6
n_j	Number of bugs detected in each capture	Number of cells with *1* in row *j*	3, 2, 2, 5, 6, 4
f_k	Number of bugs captured exactly k times in all captures, i.e., $\sum f_i = D$	Count the number of cells with *1* in each column, and denote as r_i; f_k is the number of r_i with value *k*	1=7, 2=2, 3=2, 5=1
Z_i	Number of bugs detected only in the i_{th} capture, i.e., $\sum Z_i = f_1$	For row i, count the number of column which only have 1 in row i	1=1, 2=0, 3=0, 4=2, 5=3, 6=1
n_1	Number of bugs in the capture (e.g., 1-3 sample)	For row 1 to 3, count the number of columns with 1	5
n_2	Number of bugs in the recapture (e.g., 4-6 sample)	For row 4 to 6, count the number of columns with 1	11
m	Number of bugs contained in both captures	The number of columns which have 1 in both row 1-3 and row 4-5	4

B. MhJK Method

MhJK method is similar with *Mth* method, except its equation for estimating the total number of bugs in Equation 3 [2] (with the value assignments in Table II).

$$N = D + \frac{t-1}{t} f_1 \tag{3}$$

Note that, the *MhJK* estimation has three other expressions. We use all four expressions, and choose the right estimator through hypothesis testing as suggested in [2]. Please refer to [2] for more details.

C. MhCH Method

MhCH method is similar with *Mth* method, except its equation for estimating the total number of bugs in Equation 4, 5 [3] (with the value assignments in Table II).

$$N = D + \frac{f_1^2}{2f_2} \tag{4}$$

or

$$N = D + \frac{[\frac{f_1^2}{2f_2}][1 - \frac{2f_2}{tf_1}]}{1 - \frac{3f_3}{tf_2}}, \text{ if } tf_1 > 2f_2, tf_2 > 3f_3, 3f_1f_2 > 2f_2^2 \tag{5}$$

D. MtCH Method

MtCH method is also similar with *Mth* method, except its equation for estimating the total number of bugs in Equation 6 [4] (with the value assignments in Table II).

$$N = D + \frac{\sum_{i=1}^{t}\sum_{j=i+1}^{t} Z_i Z_j}{f_2 + 1} \tag{6}$$

E. M0 Method

Method *M0* treats the first half samples as the capture, and treats the second half samples as the recapture. The total number of bugs is estimated as Equation 7 [5] (with the value assignments in Table II). Note that, we simply treat $n_1 \times n_2$ as the total number when m is 0.

$$N = \frac{n_1 \times n_2}{m} \tag{7}$$

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