dC d Dff s
g h s f v s dd s s

National University of Singapore, School of o p ting
S5322 Databases Sec rity - 2009/2010 (Se ester 2) - Project eport

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ABSTRACT

or the Dat abases Sec rity project, e choose to ake a Java i ple entation of the sol tions sho e in [ ] he context of this paper is the classic para ig of atabase o tso rcing an privacy threats r paper provi es so e explanations of [ ] an of o r choices of i ple entation

atabase, sec rity, privacy, encryption, q ery, in ex, java, ery- pti al- cketi ation, ontrolle -Diff sion, attack

1. THE ORIGINAL PAPER

n this section e ill q ickly intro ce the notions presente in [ ] e a vice the rea er to refer at least to the *table 1: Notation o Bucket* of [4] 722. mor r n *ection 3* r our m m n on.

1.1

[3, 1], v cy c y v . [4] . c

paper a e on e work of [4].
paper a 9 page .
Ver on of pr 12, 2010.

n [1, 3, 4] e n e e o ake a opera on on en r p e pe .

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Example 1. [1] *table 1* 1)

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860			60	80
320			50	50
875			55	110

1: **f h**

f m w . yp (f. *table 2*

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s o os w os of
o m s.

1.2

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1.3

[4]
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v y *5.2* 5) dis-
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2.1

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y o d a a o d a a o o
a y a d y a

O o a o d a a a o H w a
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o a d a d o o a
d a a o wo a d a a T a a w
o d y z H o d w a
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d o a d a a a

2.2

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a o d [4] w y o o d a a
o a d [4]

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a a [4] w w d o
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o a o d a o w wo
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A o a a a o o a a z a o
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l r c r v .

3. OUR O

3.1

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k (f [6]) k k
J [5] J
f f [2]

3.1.1

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f a a p k a f f
a 5 p f f a a
p f [6]

p a p f p f [7] ak a
f a a : a
p a f a
k p a a a p a a
a a k

3.1.2 JU t

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a f *A.2* pa 9 f f a
a a a

3.2 a a a a

3.2.1

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[3]our SVN t)
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[4] r o t r b t
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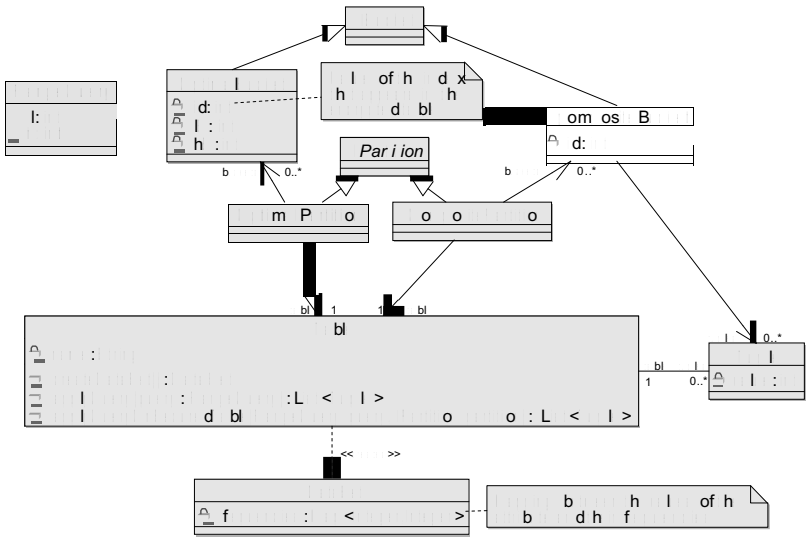

Figure 1: Our ir i e e i : i g e ri u e

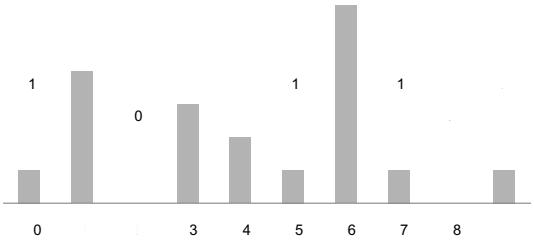

Figure 2: e for our e

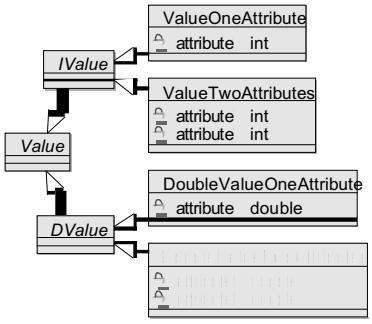

Figure 3: e u gr e f r ri u e

frs model of e d se d of e e o e rre model s more omplex e se of e m l r e poss l es

3.2.2

m y f y 2[5] 3) f f

3.2.3 M l - b

f m m y f m m m f 3 3) m f m m y f m F y f m

Ex mpl 2. f f my =

[5] m f m f

s s

s f s ss s f 1)

3.3

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o m o s

3.3.1 f

1. *3.2* o

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- *R* : of f
- $_T$: of *R* d d z d o f *T* , d
- : d o o

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- e
- e n e e e

3.3.2 n ( )

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$_S$ $_S$

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3.3.3 *Vara*

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E −E

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3.3.4 *Devi io*

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i o 4. d f d d d v o *σ* of dom v oo of v :

σ

3.3.5 E opy

i o 5. d f d *e io 4.3* of [4], o of dom v d v o o d o *p*$_i$, *i* *n*] g ven

n ^{n} *p* × g$_2$ *p*

3.3.6 *E fE n (EE)* m en e ev e e - e me

6. *4.1* o *4.2* of [4]:

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) ^{t}) ×) × −)

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X nd v le n e n l e e en l n) P l d n X X g e ed v l e X

l dve e e e v l e nd ele en en e e B.

n e g l ng e e l l ve e *4.2* de ned n [4].

o m o s

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3.4 lg r hms

3.4.1 ( )
n

3.4.2 ( )

4. CONFRONTATION OF THE O UCK-ETI ATION

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f , .

4.1 A

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f).

f
x .
)
x
f f) f .

4.2 O r A A r (AA)

4.2.1 Principle

4.2.2 P e e

4.3 Our u u r ( )

4.3.1 Origin of n

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4.3.2 Principl

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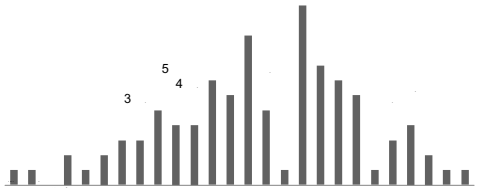

Figure 4: e genered n r r nd

4.3.3

5.

5.1

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- orm lly i ri

2. f no *N* norm l i ri ion i m n n ri n ,

$$N \quad N\ 0\ 1$$

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5.2

5.2.1

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o o o of q :

Fo o fo o o o o o o
f o [8].

o
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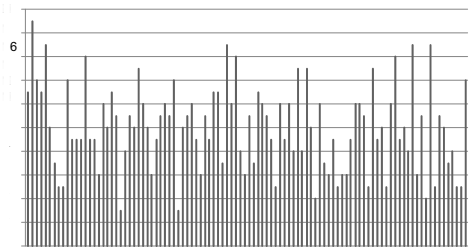

Figure 5: e genered uni r r nd

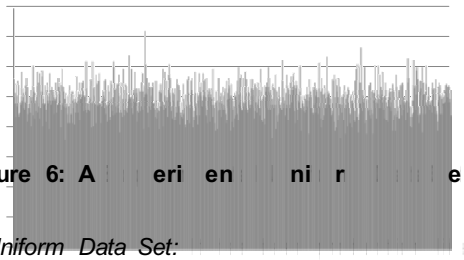

Figure 6: A eri en ni r e

. *Uniform Data Set:* 7.1 f [4] 728). 10^5 f [0 999]. Y - f f 6 6). f 500 f 83333.5.

2. *orma Data Set:* 10^5 f - w 500 83333.5). Y f f 7 6) [759 1880].

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5.2.2 ro edure

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ff f *OutOfMemory rror*, w . A

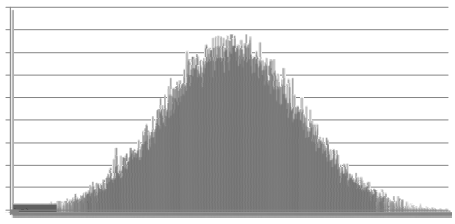

Figure 7: A eri e r e

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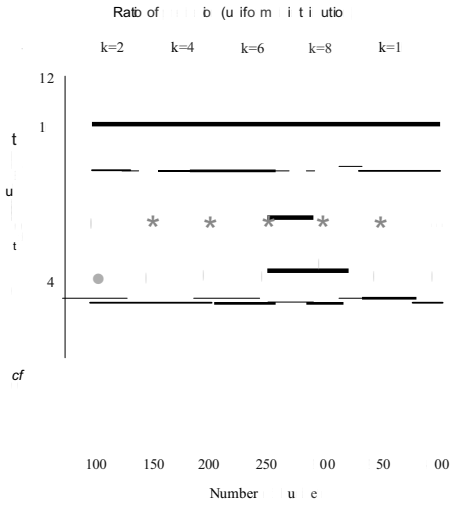
5.2.3

You may find our r u in a a d fi ma ri m n



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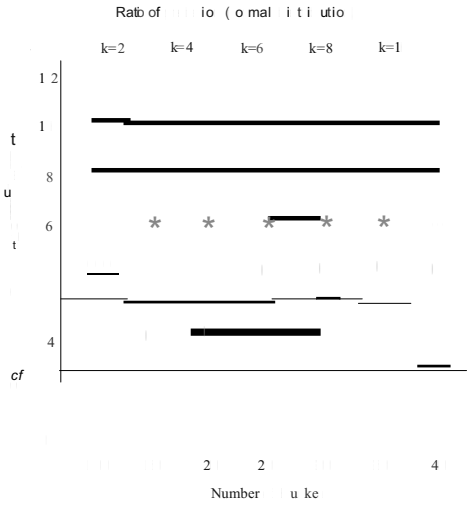

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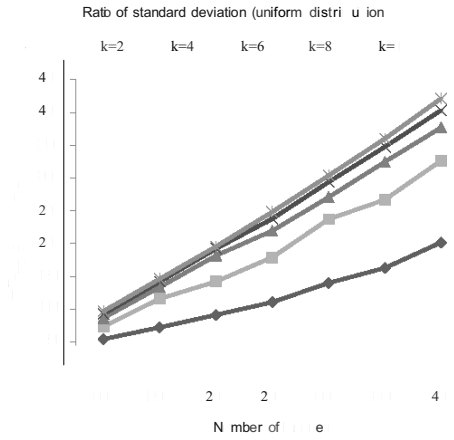

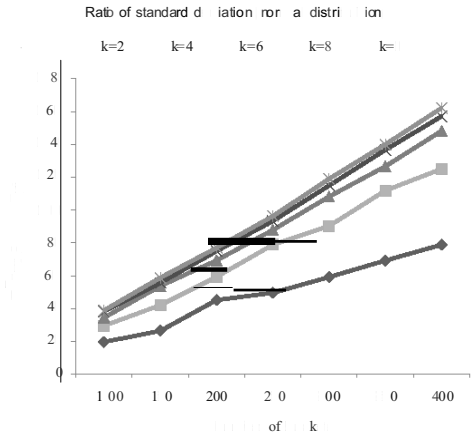

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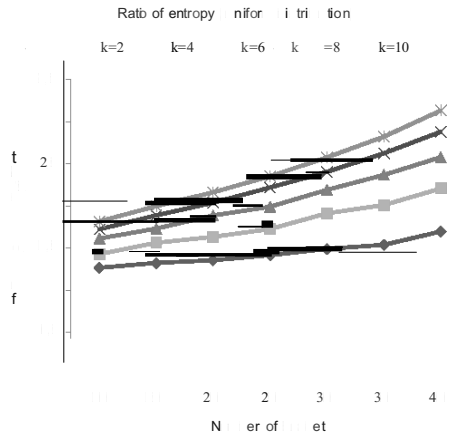

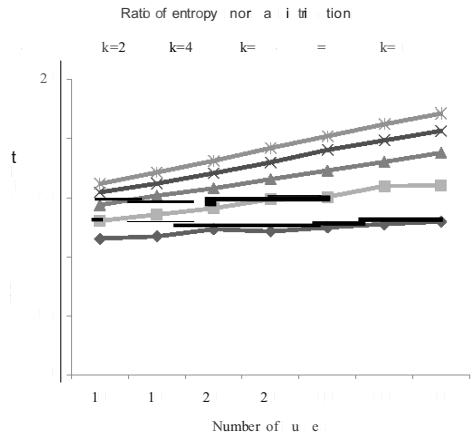

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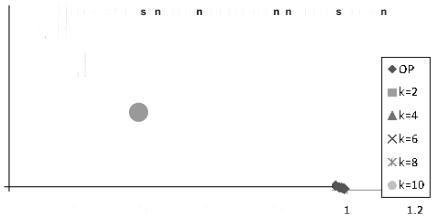

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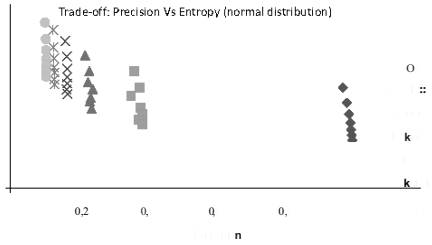

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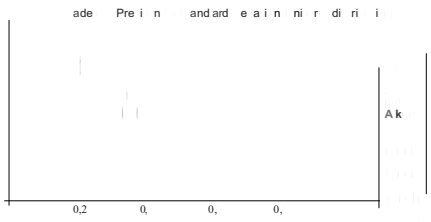
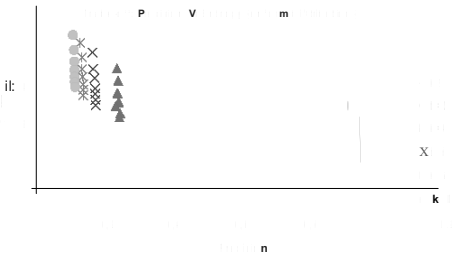


16:



17:

Trade-off

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f	1. s
s s f	45 s

4:

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5:

5.3

6. OU SOLU ION I N

7. CONCLUSIONS

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8. REFERENCES

[1] E. S. . C. S. S. . S . C y y U

In *CCS f th Oth C f C t a at* N w N U A A www

H. H B. . L . . QL v

R S R C U

s Po Mo l. *SIGMOD f th ACM SIGMOD t t f M m t f t*, 216–227, N w York, NY, USA, 2 2 A
[4] B Hor , S hrotr , nd G d k A Pr v cy-Pr rv n nd for n Q r n *D f th h t th t t f y t*, 72 –7 1 VLDB ndow nt, 2 4
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[9] S dok htt nwk d or wk S dok
[1] V r nc - D cr t c htt nwk d or wk V r nc D cr t -c

APPENDIX

A. IN A A I N

[2] you m y f om b c uc o o l you u g ou J v o c f you v om ff cul you c co c u u g o o w kw y

A.1 P

To ll cl l f o [2]

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A.2 JUnit

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- on *a*
- C on *A t a JAR* nd on n do n o d d

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B. SOLUTION OF THE SUDOKU

Here e f e d k e e 3 e

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6				9			4	8
	9	8		4			6	
8		9		6		4		
4		6	8				9	
			9		4	8		6
9	6						8	4
	8		4		9	6		
	4			8	6			9

T 6: Th f h

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k
Y -L P V