Theory on YAOGUANG's Array Split Peak Defect

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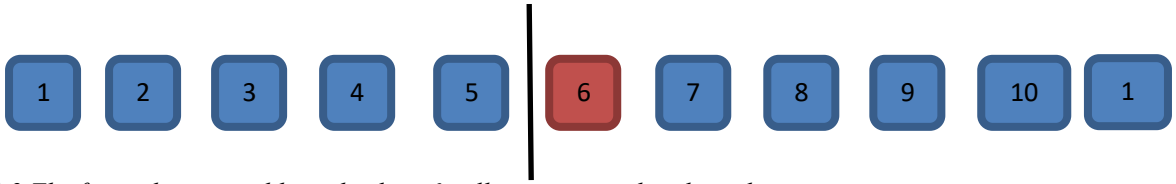
Outline: *In the common software development factory, engineer always did more and more interactions with data structure and math algorithms. Especially in the recursion, convolution, sort and generic loops, scientist likes to find a simple, more sufficiently and alignment way to face the project requirements with the large association. For instance me, I really got a real world problem at this domain while I use quicksort, also for other project such like DETA parser. What is the peak array split defect? How does it count the real world problems? Why need find it and how to get the nice solution? Cool, this paper will cause an implementation about our goals, ok now, keep forward to the context where I talking as below, thanks For more theory details and the source code implementations please check the bottom reference section.*

Peak, Array, Split, Defect, Recursion, Convolution, Sort, Generic

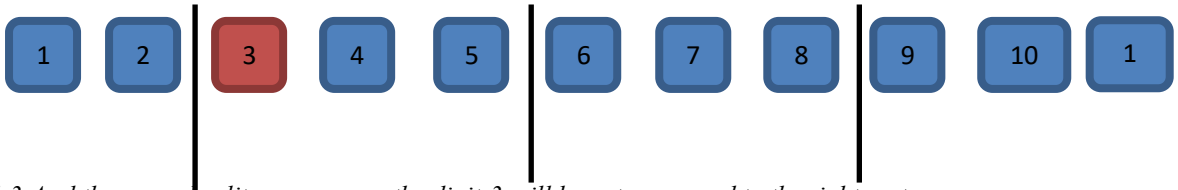
Goal one: Quicksort Yaoguang.Luo 4D

1 Details:

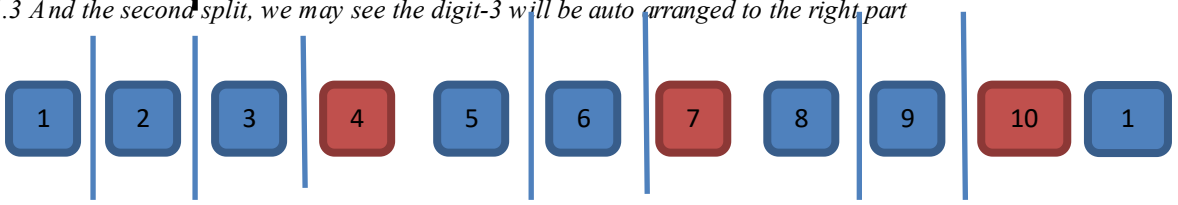
1.1 For example the array input as below where we gave 11 digits.



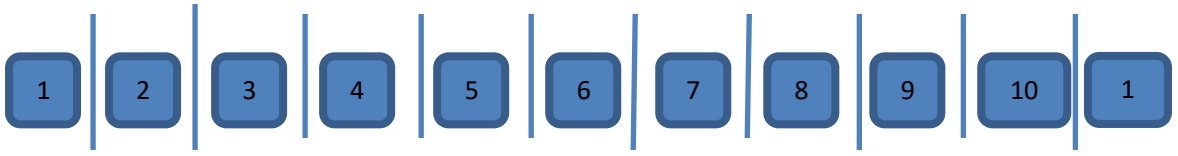
1.2 The first split, we could see the digit-6 will auto arranged to the right part.



1.3 And the second split, we may see the digit-3 will be auto arranged to the right part



1.4 The third split, we may see the digit-4.7.10 will be auto arranged to the right part



2 Thinking:

After the split array showing, we could see clear that the big problem about the asymmetry defect, as I did an annotation of N, so the i of N will absolutely find a n/POW（2，i）value points, as an insufficiency asymmetry defect model, I fall in thinking…if I do any compute theory as the same with this model style, for example in the recursion or inner loops, it will autonomic separate to the 2 different process way, it necessary to do indifferent flows.

3 Problems:

So, after the above thoughts, I may get any flashes, First, the even and odd digits both are asymmetry while in the Differential loops. For this noise, I defined as (Tinoise Peak) Second，once we did a split compute under this model, it must get more unfair sets. I defined as (Tinsets defect). Third, if this model almost in the messy and timer data system, it will catch more time and asserts wastes or exceptions.

4 Solutions:

For the god like, I find three solutions while I currently enrolled in my projects. First: computer logic acceleration, at least it can avoid the waste of the compute by using inner process optimism. -- To avoid the deep recursion. Second, reduce the compute sets. For any less memory system, we may reduce more and more memory garbages after we reduce the inner register or temp value sets. Third, we may make an optimization of the function logic where to instead the old complex functions. Those ways include the condition, algorithm, method or discrete optimization. End, we may use mathematics of double differential, deep definition, acquisition or polynomial to get the solutions.

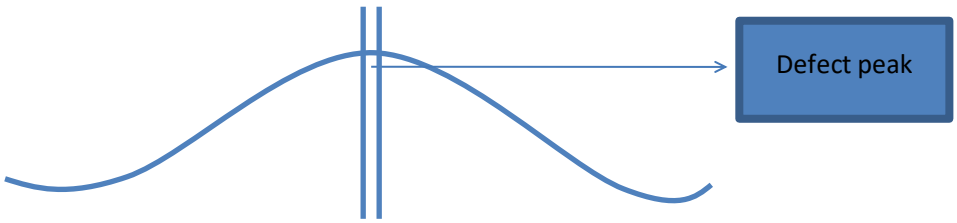
5 True Instances

Let me show the algorithms here,

```
private int partition(int[] a, int lp, int rp) {
        int x=a[lp]<a[rp]? a[lp]: a[rp]; //reduce the compute values, reduce the recursion peak
        int lp1=lp;
        while(lp1<rp){
                while(!(a[lp1]>x|| lp1>=rp)) {// reduce the condition differential check, reduce the recursion loops
                        lp1++;
                }
                while(a[rp]>x){
                        rp--;
                }
                if(lp1<rp){
                        int temp=a[rp];a[rp]=a[lp1];a[lp1]=temp;
                }
        }
        a[lp]=a[rp];a[rp]=x;
        return rp;
}
```

From this code: in a common quicksort way, the recursion based on the average deep split, suppose the initial array length is N{1,2,3…n} is an Odd, so the separate two arrays will cause an asymmetry defect, those timer asymmetry compute peak collection will cause more and more probability problems such like jam, lock, time waste and heap increment.

The odd peak binary split as below：



How to avoid those timer distinction peaks? I go more absolutely research where focus on these problems, first, differential flows. This flash is not suitable for here, May good for the DETA parser, I will show you later. Second, compute

acceleration. Yep, this is a good way, for example find the big X as the code blew, it will cause the while loop ability accelerations.

```
int x = a[lp]< a[rp]? a[lp]: a[rp];
```

Third, De Morgan condition differential as the code below, it will cause the condition ability accelerations.

```
while(!(a[lp1]>x|| lp1>=rp)) {
```

At last but the least, value reduce, code optimization both are very important way of the peak avoid filter.

Goal Two: DETA parser

6 Details:

Last year I help my father to develop the study software about getting the medicine data collection for quick search. I' m going to try to build a search engine system, input format is a string, how to get a Chinese string array split?

6.1 convolution length indicate by marching Nero index tree as below: 2|1|2|3

6.2 convolution POS indicate as below: n |c |n |adv |adj

6.3 convolution split

7 Thinks:

While I use this way on my DETA project Chinese separations, I met so many problems, the more and more important problem is the POS frequency peak waste, my POS flow functions will spend a lot of time to do the low prior convolution split condition check first… it cost me a lot of time… after I did a collection of my projects, the results are clear.

8 Problems:

First, convolution kernel gets asymmetry problems. Second, unnecessary conditions check loops. Third, unimportant heap register values. End, values sets and conditions sets too more.

9 Solutions:

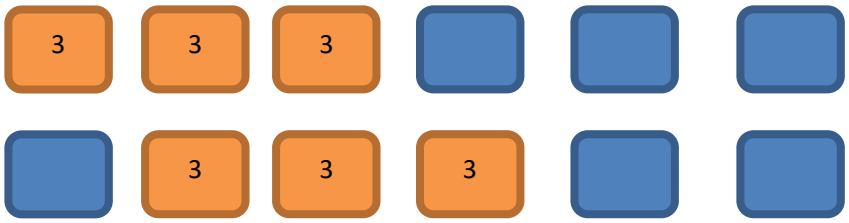
First, format the convolution kernel of the index dictionary tree, for example I use the char ASCII as the index length to reduce the match time of the convolution length indication. Also, I define the POS convolution kernel size less than five. Second, I did a condition frequency statistic, and re arrangement it, at the same time, reduced a lot of the inner sets to avoid the compute pause.

10 True instance:

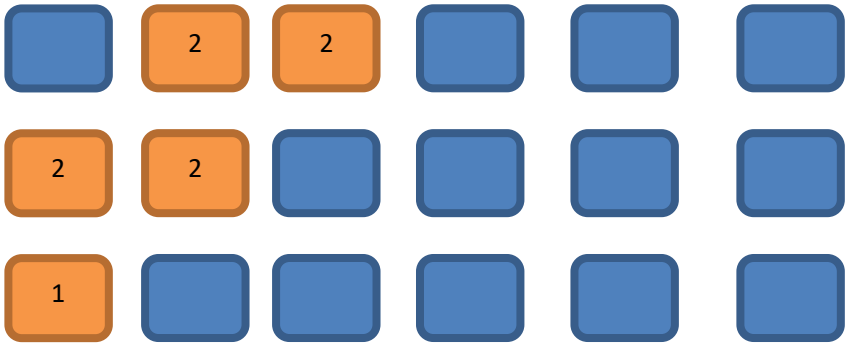
Finally I developed a convolution String array split way for marching as below: orange color are presplit sets

10.1 check 4 chars slang

10.2 Check 3 chars key word



10.3 Check 2chars normal word



10.4 In order to make a compute acceleration, I did 2 string builder array to store a pre order sets.
10.5 in order to make a PCA POS acceleration, I did 5 chars marching array to store a post order sets.
It seems the Nero Index, NLP and POS for the PCA separation with convolution kernel marching by using stepwise iterative differentiation got much higher sufficiency.

11 Reference:

DETA parser source from GITEE: https://gitee.com/DetaChina/DetaParser
DETA parser source from GITHUB: https://github.com/yaoguangluo/Deta_Parser
DETA parser split method record: https://github.com/yaoguangluo/Deta_Parser/issues/21
DETA parser official demo: http://tinos.qicp.vip/data.html
DETA parser integrated products demo from GITHUB: https://github.com/yaoguangluo/Deta_Medicine
DETA parser integrated products demo from GITEE: https://gitee.com/DetaChina/Deta_Medicine
DETA parser integrated products demo download link: http://tinos.qicp.vip/download/HuaRuiJiTm1.0.3.zip
Quicksort YAOGUANG.LUO 4D source from GITHUB :
https://github.com/yaoguangluo/Data_Processor/blob/master/DP/sortProcessor/Quick_Luoyaoguang_4D.java
Quicksort YAOGUANG.LUO 4D source from GITEE:
https://gitee.com/DetaChina/Deta_Data_Processor_Pub/blob/master/DP/sortProcessor/Quick_Luoyaoguang_4D.java
Reflection on YAOGUANG's Peak Array Split Defect1.0
https://github.com/yaoguangluo/Deta_Resource/blob/master/Reflection%20on%20Yaoguang's%20Peak%20Arrray%20Split%20Defect1.0.pdf