CSC 540 Project 2: SimpleDB

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1 Modified Java classes

Java classes that are modified:
a). under simpledb.buffer
BasicBufferMgr.java
BufferPoolMap.java (new created)
b). under simpledb.file
Page.java
TestPage.java (new created)

2 Graph and Analysis

We plot the figure with buffer sizes : 8,16,50,500,10000,25000,50000,100000. use linear search strategy and hashed search strategy, shown in the following figure.

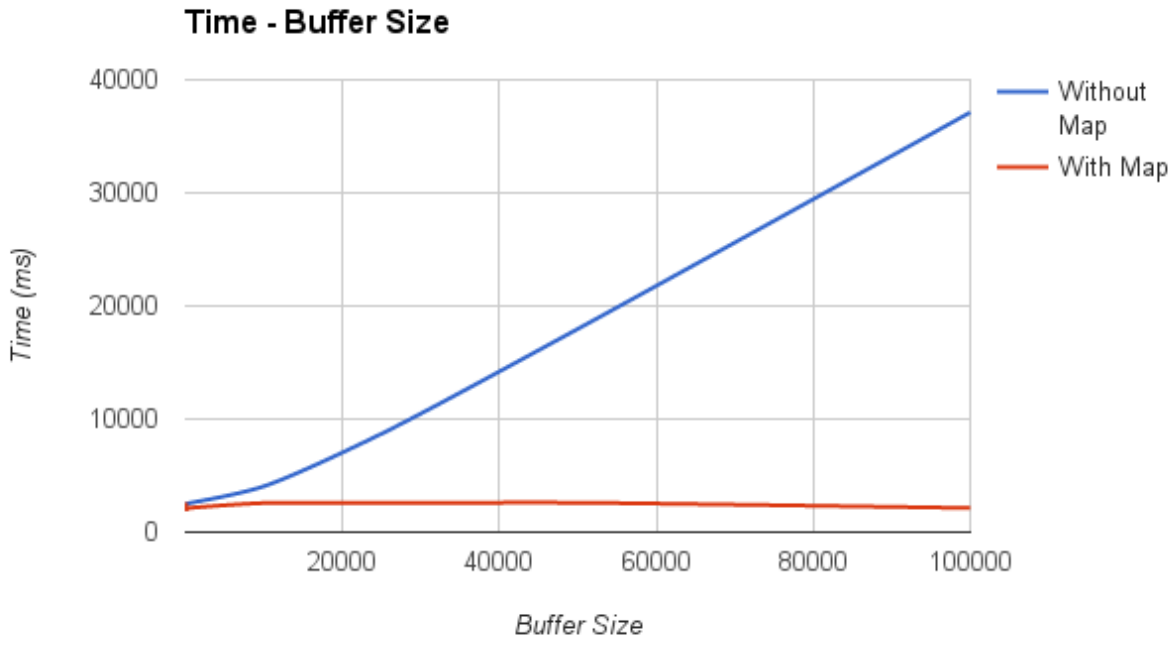

Figure 1 buffer sizes VS time taken

Buffer Size	8	16	50	500	10000	25000	50000	100000
Without Map(ms)	1927	1981	2432	2573	4060	8712	17976	37118
With Map(ms)	2620	2546	2032	2135	2576	2574	2601	2132

Table 1 Time comparison of two methods

Analysis:
From the above picture, we could see that originally the time spent on the query increases linearly with the increase of the buffer size. It can surge up to 36000 ms. However, when we implement the Map structure, the time spent on query remains almost the same with the increase of the buffer size, which takes about 2000ms. This improvement mainly because the query in the map only takes O(1) time, however, in the former design, the search for the block in the buffer pool will take O(n) time by traversing all the buffer in the buffer pool.

3 Unit test case

We perform unit test case using Junit, a unit testing framework for the *Java* programming language. This is implemented in TestPage.java. Directly test the getter and setter methods for Short, Bloolen,Byte, Date. We first assign different values to two independent variables. Then one variable is set in the page, the other variable gets the value. If the two variables are equal, it means that the two functions work.

See our code below.

```
@Test
// test setShort and getShort function
public void testShort()
{
        Page page=new Page();s
        short vals=5;
        short valsget=4;

        page.setShort(10,vals);
        valsget=page.getShort(10);
        assertEquals(valsget,vals);
}
@Test
// test setBoolean and getBloolen function
```

```
public void testBool(){
	Page page=new Page();
	boolean valb=true;
	boolean valbget=false;
	page.setBoolean(9,valb);
	valbget=page.getBoolean(9);
	assertEquals(valb, valbget);
}
@Test
// test setBytes and getBytes function
public void testBytes(){
	Page page=new Page();
	byte[] valb={'a','b','c','d'};
	byte[] valbget=new byte[4];
	page.setBytes(5,valb);
	valbget=page.getBytes(5);
	assertArrayEquals(valb, valbget);
}
@Test
// test setDate and getDate function
public void testDate(){
	Page page=new Page();
	Date vald=new Date();
	Date valdget=new Date(System.currentTimeMillis() - (4 * 60 * 60 * 1000));
	page.setDate(5, vald);
	valdget=page.getDate(5);

	assertEquals(vald.getTime(), valdget.getTime());
}
```