Assignment Project Exam Help

Co

https://eduassistpro.github.i

Tabish Syed
COMP 273, Winter 2020

Add WeChat edu_assist_pr

Assignment Project Exam Help

https://eduassistpro.github.i

Add WeChat edu_assist_pr

```java
int[] A = new int[128 * 1024*1024];
double total = 0,start,stop;
int N = 8;
// Loop 1
for (int j = 0 ; j < N; ++j){
    start = System.nanoTime();
    for (int i = 0; i < A.length; ++i) A[i] *= 3;
    stop = System.nanoTime();
    double loop1Time = stop - start;
    total += loop1Time;
}
d
S
t
f
    start = System.nanoTime();
    for (int i = 0; i < A.length; i+=32) A[i] *= 3;
    stop = System.nanoTime();
    double loop2Time = stop - start;
    total += loop2Time;
}
double averageLoop2Time = total / N;
System.out.println("Average Time for loop 2 = " + averageLoop2Time);
System.out.println("Ratio of times = " + averageLoop1Time/averageLoop2Time);
System.out.println("But first loop does 32 times more work !!");
```

```
1    int[] A = new int[128 * 1024*1024];
2    double total = 0,start,stop;
3    int N = 8;
4    // Loop 1
5    for (int j = 0 ; j < N; ++j){
6
7        for (int i = 0; i < A.length; ++i) A[i] = 3;
8        stop = System.nanoTime();
9        double loop1Time = stop - start;
10       total += loop1Time;
11   }
12   d
13   S
14   t
15   t
16   f
17       start = System.nanoTime();
18       for (int i = 0; i < A.length; i+=32) A[i] *= 3;
19       stop = System.nanoTime();
20       double loop2Time = stop - start;
21       total += loop2Time;
22   }
23   double averageLoop2Time = total / N;
24   System.out.println("Average Time for loop 2 = " + averageLoop2Time);
25   System.out.println("Ratio of times = " + averageLoop1Time/averageLoop2Time);
26   System.out.println("But first loop does 32 times more work !!");
```

```
Average time for loop 1 = 1.3477324915E9
Average Time for loop 2 = 1.0673333525E8
Ratio of times = 12.627099943454638
But first loop does 32 times more work !!
```

Assignment Project Exam Help

https://eduassistpro.github.i

Add WeChat edu_assist_pr

```
1    System.out.println("A=[");
2    String xticklabels = "[";
3    int[] sizes = new int[] {1, 2, ..., 1024];
4    long start, stop;
5    int K = 1;
6    for ( int k = 0; k < 11; ++k){
7
8
9
10
11
12
13        System.out.println( k + " " + K + " " + (stop - start));
14        xticklabels += "\'2^{"+  k  + "}\',";
15        K *=2;
16    }
17    xticklabels += "]";
18    System.out.println("];");
19    System.out.println("plot(A(:,1), A(:,3));");
20    System.out.println("hold on;\nplot(A(:,1), A(:,3),'r*');"
21    System.out.println("xticklabels(" + xticklabels + ");");
22    System.out.println("xticks(A(:,1));");
23    System.out.println("title('Size of cache block');");
24    System.out.println("ylabel('Time ->');");
25    System.out.println("xlabel('Step size-> );");
```

```
A=[
0  1  1524888723
1  2  751189497
2  4  39127699
                8949
                13494
5  32  107168869
6  64  92080344
7  128  43472331
```

plot(A(:,1), A(:,3),'r*');

2/6

```
1    System.out.println("A=[");
2    String xticklabels = "{";
3    int[] x = new int[1024];
4    long start, stop;
5    int K = 1;
6    for ( int k = 0; k < 11; ++k){
7
8
9
10
11
12
13        System.out.println( k + " " + K + " " + (stop - start));
14        xticklabels += "\'2^{"+  k  + "}\',";
15        K *=2;
16    }
17    xticklabels += "}";
18    System.out.println("];");
19    System.out.println("plot(A(:,1), A(:,3));");
20    System.out.println("hold on;\nplot(A(:,1), A(:,3),'r*');"
21    System.out.println("xticklabels(" + xticklabels + ");");
22    System.out.println("xticks(A(:,1));");
23    System.out.println("title('Size of cache block');");
24    System.out.println("ylabel('Time ->');");
25    System.out.println("xlabel('Step size-> ');");
```

Assignment Project Exam Help

https://eduassistpro.github.i

Add WeChat edu_assist_pr

```
1    System.out.println("A=[");
2    String xticklabels = "[";
3    int[] num = new int[1024];
4    long start, stop;
5    int K = 1;
6    for ( int k = 0; k < 11; ++k){
7
8
9
10
11
12
13        System.out.println( k + " " + K + " " + (stop - start));
14        xticklabels += "\'2^{"+  k  + "}\',";
15        K *=2;
16    }
17    xticklabels += "]";
18    System.out.println("];");
19    System.out.println("plot(A(:,1), A(:,3));");
20    System.out.println("hold on;\nplot(A(:,1), A(:,3),'r*');"
21    System.out.println("xticklabels(" + xticklabels + ");");
22    System.out.println("xticks(A(:,1));");
23    System.out.println("title('Size of cache block');");
24    System.out.println("ylabel('Time ->');");
25    System.out.println("xlabel('Step size-> ');");
```

```java
int steps = 64*1024*1024;    //Arbitrary large number
long start,stop;

System.out.println("B = [");
int size = 1024; // initial size 2^10 * 2^2 = 4KB
String xticklabels
for(int j = 0; j < 20; ++j){
    int[] A = new int[size];
    start = System.nanoTime();



    System.out.println(j + " " + size + " " + (stop - start));

    System.gc(); // garbage collection
    xticklabels += "\'2^" + (j+12)+"'}\',";
    size *= 2;

xticklabels += "}";
System.out.println("];");
System.out.println("plot(B(:,1)+10, B(:,3));");
System.out.println("hold on;");
System.out.println("plot(B(:,1)+10, B(:,3),'r*');");
System.out.println("xticklabels(" + xticklabels + ");");
System.out.println("xticks(B(:,1)+10)");
System.out.println("title('Size of cache');");
System.out.println("ylabel('time ->');");
System.out.println("xlabel('Array Size (Bytes) -> ');");
```

```
1    int steps = 64*1024*1024;    //Arbitrary large number
2    long start,stop;
3
4    System.out.println("B = [");
5    int size = 1024; // initial size 2^10 * 2^2 = 4KB
6    String ticklabels
7    for(int j = 0; j < 20; ++j){
8        int[] A = new int[size];
9        start = System.nanoTime();
10
11
12
13
14
15
16       System.out.println(j + " " + size + " " + (stop - start));
17
18       System.gc(); // garbage collection
19       xticklabels += "\'2^{" + (j+12) + "}\',";
20       size *= 2;
21
22   xticklabels += "}";
23   System.out.println("];");
24   System.out.println("plot(B(:,1)+10, B(:,3));");
25   System.out.println("hold on;");
26   System.out.println("plot(B(:,1)+10, B(:,3),'r*');");
27   System.out.println("xticklabels(" + xticklabels + ");");
28   System.out.println("xticks(B(:,1)+10)");
29   System.out.println("title('Size of cache');");
30   System.out.println("ylabel('time ->');");
31   System.out.println("xlabel('Array Size (Bytes) -> ');");
```

```
B = [
0  1024  863180725
1  2048  842193845
2  4096  844589679
3  8192  846160694
4  16384  843957687
5  32768  843925466
6  65536  845388826
7  131072  846607085
...
14  16777216  1758837615
```

```
plot(B(:,1)+10, B(:,3));
hold on;
plot(B(:,1)+10, B(:,3),'r*');
xticklabels({'2^{12}','2^{13}',...
xticks(B(:,1)+10)
title('Size of cache');
ylabel('time ->');
xlabel('Array Size (Bytes) -> ');
```

```java
1    int steps = 64*1024*1024;    //Arbitrary large number
2    long start,stop;
3
4    System.out.println("B = [");
5    int size = 1024; // initial size 2^10 * 2^2 = 4KB
6    String xticklabels
7    for(int j = 0; j < 20; ++j){
8        int[] A = new int[size];
9        start = System.nanoTime();
10
11
12
13
14
15
16        System.out.println(j + " " + size + " " + (stop - start));
17
18        System.gc(); // garbage collection
19        xticklabels += "\'2^" + (j+12)+"}\',";
20        size *= 2
21
22    xticklabels += "}";
23    System.out.println("];");
24    System.out.println("plot(B(:,1)+10, B(:,3));");
25    System.out.println("hold on;");
26    System.out.println("plot(B(:,1)+10, B(:,3),'r*');");
27    System.out.println("xticklabels(" + xticklabels + ");");
28    System.out.println("xticks(B(:,1)+10)");
29    System.out.println("title('Size of cache');");
30    System.out.println("ylabel('time ->');");
31    System.out.println("xlabel('Array Size (Bytes) -> ');");
```

```
 1      int steps = 64*1024*1024;    //Arbitrary large number
 2      long start,stop;
 3
 4      System.out.println("B = [");
 5      int size = 1024; // initial size 2^10 * 2^2 = 4KB
 6      String xticklabels
 7      for(int j = 0; j < 20; ++j){
 8          int[] A = new int[size];
 9          start = System.nanoTime();
10
11
12
13
14
15
16          System.out.println(j + " " + size + " " + (stop - start));
17
18          System.gc(); // garbage collection
19          xticklabels += "\'2^" + (j+2)+"\'},";
20          size *= 2
21
22      xticklabels += "}";
23      System.out.println("];");
24      System.out.println("plot(B(:,1)+10, B(:,3));");
25      System.out.println("hold on;");
26      System.out.println("plot(B(:,1)+10, B(:,3),'r*');");
27      System.out.println("xticklabels(" + xticklabels + ");");
28      System.out.println("xticks(B(:,1)+10)");
29      System.out.println("title('Size of cache');");
30      System.out.println("ylabel('time ->');");
31      System.out.println("xlabel('Array Size (Bytes) -> ');");
```

```
$ lscpu
...
L1d cache:
L1i cache:
L2 cache:            1024K
L3 cache:            14080K
...
```

Assignment Project Exam Help

https://eduassistpro.github.i

Add WeChat edu_assist_pr

```java
int steps = 256 * 1024*1024;
int[] A = new int[8];
double start,stop;
int N = 8;
// Loop 1
start = System.nanoTime();
for (int i = 0; i < steps; ++i){
    A[0]++; A[1]++; A[2]++; A[3]++;
    A[4]++; A[5]++; A[6]++; A[7]++;
}
s
d
S
/
s
f
    A[0]++; A[0]++; A[0]++; A[0]++;
    A[7]++; A[7]++; A[7]++; A[7]++;
}
stop = System.nanoTime();
double loop2Time (stop-start)/steps;
System.out.println("Average Time for Loop2 " + loo
System.out.println("Ratio of times = " + loop1Time/lo
System.out.println("But the loops do the same amount work !!");
```

```
1    int steps = 256 * 1024*1024;
2    int[] A = new int[8];
3    double start,stop;
4    int N = 8;
5    // Loop 1
6    start = System.nanoTime();
7    for(int i = 0; i < steps; i++j){
8        A[0]++; A[1]++; A[2]++; A[3]++;
9        A[4]++; A[5]++; A[6]++; A[7]++;
10   }
11   s
12   d
13   S
14   /
15   s
16   f
17       A[0]++; A[0]++; A[0]++; A[0]++;
18       A[7]++; A[7]++; A[7]++; A[7]++;
19   }
20   stop = System.nanoTime();
21   double loop2Time = (stop - start)/steps;
22   System.out.println("Average Time for Loop 2 = " + loo
23   System.out.println("Ratio of times = " + loop1Time/lo
24   System.out.println("But the loops do the same amount work !!");
```

```
Average time for loop 1 = 48.02225795388222
Average Time for loop 2 = 77.47476292029023
Ratio of times = 0.6198438839146863
But the loops do the same amount work !!
```

Assignment Project Exam Help

https://eduassistpro.github.i

Add WeChat edu_assist_pr