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Semester   **BSCS 7A**
Subject   **Parallel and Distributed System**
Lab Task no   **02**

Q:Design an experiment (i.e., design and write programs and take measurements) to
determine the memory bandwidth of your computer and to estimate the caches at various
levels of the hierarchy. Use this experiment to estimate the bandwidth and L1 cache of
your computer. Justify your answer. (Hint: To test bandwidth, you do not want reuse. To test cache size, you want reuse to see the effect of the cache and to increase this size until the reuse decreases sharply.)

```python
import time

A=[[1,2,3,4,5],[6,7,8,9,10],[11,12,13,14,15],[16,17,18,19,20],[21,22,23,24,25]]


def algo1():
    startTime = time.time()
    print("[" , end=" ")
    for i in range(len(A)):
        print("[",end="")
        for j in range(len(A)):
            print(A[i][j]**2 ,end="  ")
        print("]" , end=" ")
    print("]")
    endTime = time.time()
    timeTaken = (endTime - startTime ) * 10**3
    return timeTaken


def algo2():
    start = time.time()
    print("[" , end=" ")
    for i in range(len(A)):
        print("[",end="")
        for j in range(len(A)):
            print(A[j][i]**2 ,end="  ")
        print("]" , end=" ")
    print("]")
    end = time.time()
    e_time = (end - start ) * 10**3
    return e_time

execTime1 = algo2()
execTime = algo1()

print("\n \n ******** RESULT: ********\n \n")
print(f"Execution time taken by Algo 1: {execTime:.03f} ms")
print(f"Execution time taken by Algo 2: {execTime1: .03f} ms")

if(execTime < execTime1):
    print("First algo take less time than Second algo")
elif(execTime1 < execTime):
    print("Second Algo take less time than First algo ")
else:
    print("Both algo take same time ")
```

```
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$ python3 algoTest.py
[ [1   36  121  256  441  ] [4   49  144  289  484  ] [9   64  169  324  529  ] [16  81  196  361  576  ] [25  100  225  400  625  ] ]
[ [1   4   9   16  25  ] [36  49  64  81  100  ] [121  144  169  196  225  ] [256  289  324  361  400  ] [441  484  529  576  625  ] ]


 ******** RESULT: ********


Execution time taken by Algo 1: 0.061 ms
Execution time taken by Algo 2:  0.164 ms
First algo take less time than Second algo

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$
```