Report

Program Results

```
ayodeji.osho@linux02-eb:~/Documents/CPSC441/A4$ g++ mac.cpp
ayodeji.osho@linux02-eb:~/Documents/CPSC441/A4$ ./a.out
Enter a value for K: 10
K =10
M =1024
Probing At Root Level:
Customer  Items     Idle      Success   Collision Total     Efficiency(%)
1         12        6         12        17        35        34.2857
2         50        21        50        70        141       35.461
3         132       33        132       164       329       40.1216
4         150       42        150       191       383       39.1645
5         177       49        177       225       451       39.2461
6         329       50        329       378       757       43.461
7         441       44        441       484       969       45.5108
8         457       42        457       498       997       45.8375
9         433       46        433       478       957       45.2456
10        371       51        371       421       843       44.0095

Probing At Leaf Level:
Customer  Items     Idle      Success   Collision Total     Efficiency(%)
1         12        1012      12        0         1024      1.17188
2         50        974       50        0         1024      4.88281
3         132       892       132       0         1024      12.8906
4         150       874       150       0         1024      14.6484
5         177       847       177       0         1024      17.2852
6         329       695       329       0         1024      32.1289
7         441       583       441       0         1024      43.0664
8         457       567       457       0         1024      44.6289
9         433       591       433       0         1024      42.2852
10        371       653       371       0         1024      36.2305
ayodeji.osho@linux02-eb:~/Documents/CPSC441/A4$
```

Answer To Question

1. Which of the customers has the most items? How many items do they have?

   Customer 8 basket has the most items. The number of items is 457

2. When starting at the **leaf level** of the tree, which basket of goods takes the most time to scan? How many time slots does it require?

   All baskets take the same amount of time to scan. The time slot for is 1024

3. When starting at the **root level** of the tree, which basket of goods takes the most time to scan? How many time slots does it require?

   Customer 8 takes the most time to scan for. The time slots is 997

4. When starting at the root level of the tree, which basket of goods takes the **least time** to scan? How many time slots are needed?

   Customer 1 basket takes the least time to scan. The time slot is 35

5. When starting at the root level of the tree, which basket of goods generates the **most collisions** during scanning? How many collisions occur?

   Customer 8 basket has the most collisions. The number of collision is 498

6. When starting at the root level of the tree, which basket of goods generates the **highest proportion of successful slots** (i.e., efficiency) during scanning?

   Customer 8 basket had the highest proportion of successful slots.
   The efficiency is 45.8375%

Summary Of Results

At the root level, basket 8 has the most items, takes the most time to scan, has the most collisions and the highest proportion of successful slots.

The reason for this is in a time slotted mac protocol the more items you have the more likely collisions are to occur. Therefore, you have to do more scans to find the right slots. The efficiency is the highest because basket 8 has the most items so it has the most success.

However, basket 1 took the least time to scan because it has the least number of items.

For the leaf level, since all leaves have to be scanned, the entire tree has to be searched so all ten baskets will have the same time slot. By doing so many scan, the number of efficiency reduces drastically