Software Engineering Test

The problem

This problem is related to the Hungarian lottery. In case you are not familiar with it: players pick 5 distinct numbers from 1 to 90. There is a weekly lottery picking event when the lotto organization picks 5 distinct numbers randomly between 1 and 90 – just like the players did. The player's reward then depends on how many of the player's numbers match with the ones selected at the lotto picking. A player wins if he/she has 2, 3, 4 or 5 matching numbers.

Now, the problem: at the lottery event, right after picking the numbers, a computer shall be able to report quickly that how many winners are in each category, for example:

Numbers matching	Winners
5	0
4	12
3	818
2	22613

This report shall be generated within a couple of seconds after picking the winner number. The player's numbers are known in advance – at least 1 hour ahead of the show. In peak periods there are about 5 million players, but to be sure we can assume it is not exceeding 10 million.

Technical specification

Write a console application in a freely chosen programming language that can be compiled on Linux. Your application will be called like this:

./yourapp input.txt

where input.txt file exists in the same folder and is an ascii file, in which each line contains 5 space separated integers (in the range of 1-90) representing one player's numbers.

You can download a sample file [here](#).

When your application finished processing the player's dataset from the file, it should write a line to the standard output like this:

READY

Note that it should be newline terminated. After that, the program may receive multiple lines (identical to the file's lines) representing the lottery's picks and it should be able to report 4 space separated numbers in the standard output as fast as possible (line should be newline terminated). The four numbers shall mean the number of winners with 2, 3, 4 and 5 matches respectively.

Example C boilerplate code:

```
#include <stdio.h>


int main() {
```

```c
    int a,b,c,d,e;


    printf("READY\n");
    int i = 5;
    while(i == 5) {
       i = scanf("%d %d %d %d %d", &a, &b, &c, &d, &e);
          if(i == 5) {
             printf("%d %d %d %d\n", 0, 1, 2, 3);
          }
    }


    return 0;
}
```

Expectations
- Write an optimized code that can report the results in a couple of seconds – or faster, even better.
- Document the asymptotic run time of your solution
- Use code comments (enough to make it easy to understand)
- Document your ideas how you could further improve the calculation speed, if any
- Submit your code by email or share it privately (do not share it in **public** space like github), including instructions on how to build and run.