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CS223

HW2 report

A:

The goal of the problem is to run Josephus game with vector and list and find difference of efficiency.

B:

Both games have the same algorithm.

1. Generate list and vector by using for loop.
2. If n<2 then the winner is player 0.
3. Else, n>1, do the infinity loop. This loop eliminates the players one by one and is terminated when there is only one player left.

Loop

1. Start clock
2. Increase i for m times. If i is bigger than the number of left players(j), then i become 0 (circular)
3. Add the player id to string before eliminate the player.
4. Show which player will be eliminated.
5. Eliminate ith player. Number of left player decreases by 1 (j--).
6. End clock
7. When this loop is terminated, calculate the average time spent for elimination.
8. After the loop, show the sequence by showing the string, show the winner, show the average time spent for elimination, and show the total time spent.

C:

Machine> samsang laptop, Ram: 8GB, 64bit, i5-3230M CPU 2.6GHz

N trial> 13 times

O/S> Windows 10

Compiler> Visual Studio

Result: (see attached excel)

N changes

List: Elimination is fast when n is small. Elimination gets slower than vector as n goes bigger.

Vector: Elimination is fast when n is small. Increment of elimination time is smaller than list: it is faster when n goes bigger.

Total spent time: Almost same.

M changes

Vector and List have similar efficiency.

Discussion:

1. Vector is better than List when n goes bigger.

Difference of total spent time of list and vector is small.

N affects more than M.

1. List is slower when n goes bigger since the program can not directly access the midpoint of the stack.

Vector offers bracket, so the program can directly access the midpoint of the stack.

Both games have the same algorithm, so there is no difference when they generate the stacks. It means list’s push\_front is not used.

N affects more than M since how many the program loops is depending on N.

Vector game and list game have almost the same total spent time. The reason is maybe that the printing part takes overwhelmingly more time than the game part does.

The results agree with my prediction. I predicted that vector will be faster since list game needs more code than vector game does.