

Analysis:

Analysis of the time complexity for whole execution of the program:

- The best case is: $\Omega(n \log(n))$
- The average case is: $\Theta(n \log(n))$
- The worst case is: $O(n^2)$

The time complexity for insertion(i.e. addPerson) is $O(1)O(1)$,

while deletion(i.e. giveTicket) is $O(n)O(n)$ (in the worst case) for a single operation.

The amortized costs for both are $O(1)O(1)$ since having to delete $n \cdot w$ elements from the queue still takes $O(n)O(w)$ time.

Performance with respective different input values,

Typical Input Instructions:

ticketSystem:3:6

addPerson:1

addPerson:2

addPerson:3

addPerson:4

addPerson:5

getWindow:1

getWindow:2

isOpen:1

isOpen:2

addPerson:6

addPerson:7

addPerson:8

addPerson:9

addPerson:10

addPerson:11

addPerson:12

addPerson:13

addPerson:14

addPerson:15

addPerson:16

addPerson:17

addPerson:18

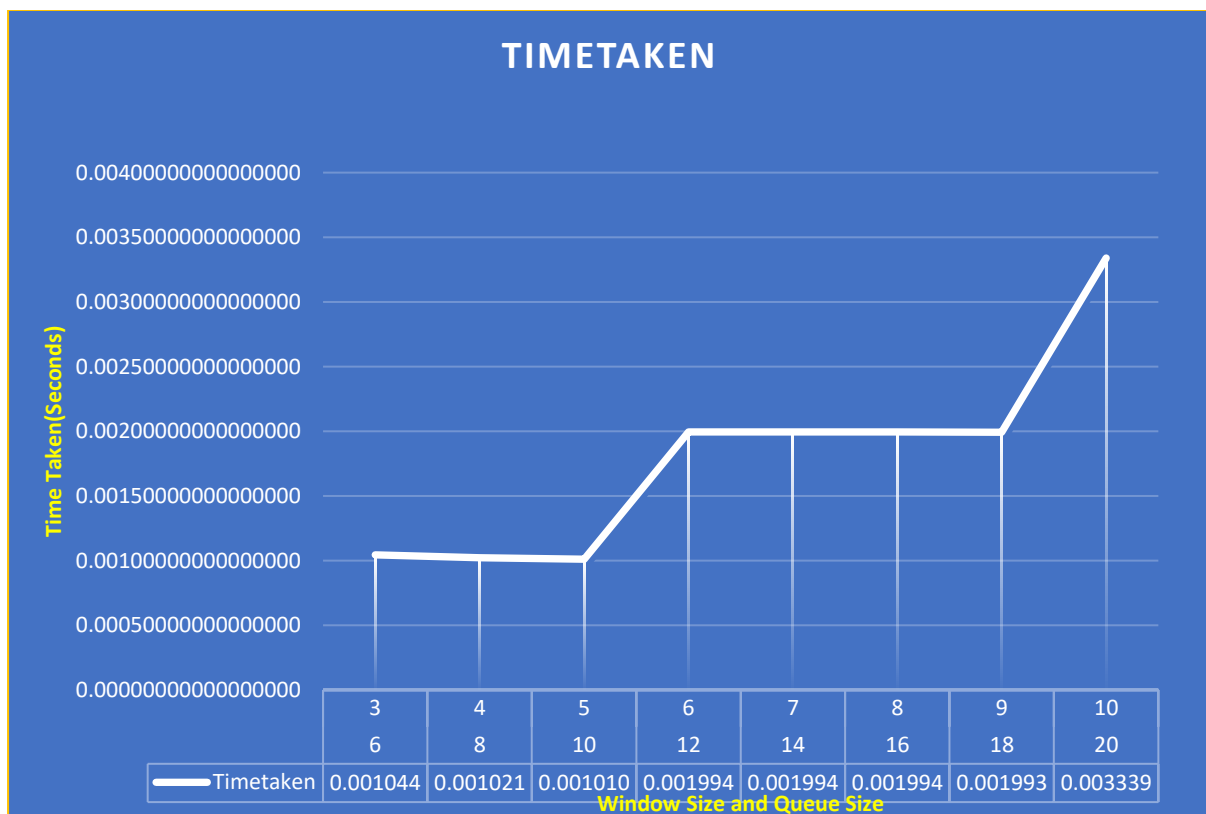
getWindow:1

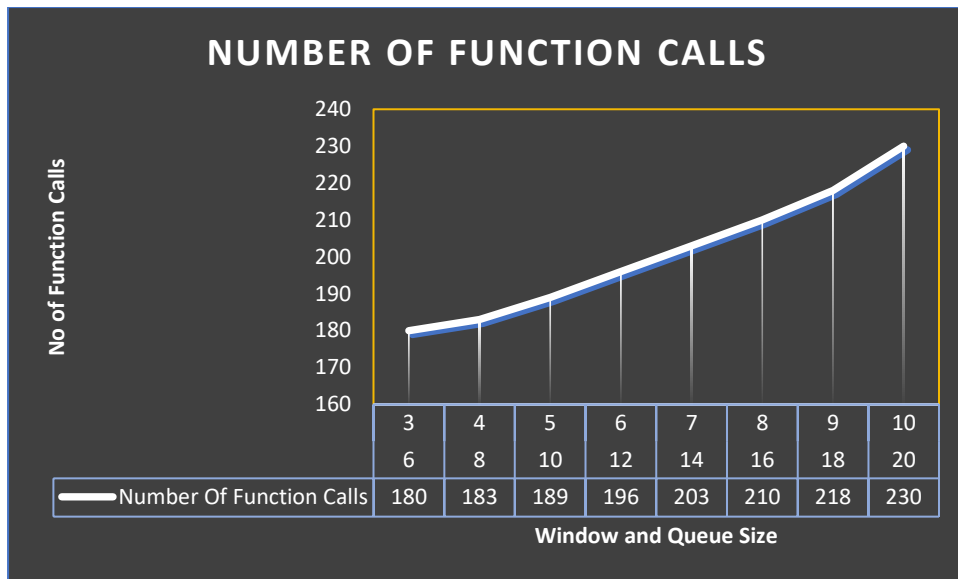
getWindow:2
 getWindow:3
 giveTicket:
 giveTicket:
 giveTicket:
 getWindow:1
 getWindow:2
 getWindow:3

Tabular format for different combination of Window and Queue size :

Number of Function Calls	Queue Size	Window Size	Timetaken(Seconds)
180	6	3	0.00104403495788574
183	8	4	0.00102114677429199
189	10	5	0.00101089477539062
196	12	6	0.00199484825134277
203	14	7	0.00199413299560546
210	16	8	0.00199484825134277
218	18	9	0.00199341773986816
230	20	10	0.00333952903747558

Graphical Representation





Overall analysis :

As the input size increases processing time also increased. Which indirectly denotes , more loop instructions has to perform as the input size increases.

Even we could able to see number of methods/ function calls has been increased as input size increases. Which intern tells the for larger input size it is executing more instructions

Typical Methods/Function call coverage for the whole executions for windows 3 and Queue 6,

```

.....__main__.....
.....split_input_line.....
.....__init__.....
.....split_input_line.....
.....addPerson.....
.....eligibleQueueforInsert.....
.....sizeQ.....
.....sizeQ.....
.....enqueue.....
.....split_input_line.....
.....addPerson.....
.....eligibleQueueforInsert.....
.....sizeQ.....
.....sizeQ.....
.....enqueue.....
.....split_input_line.....
.....addPerson.....

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.....sizeQ.....
.....sizeQ.....
.....enqueue.....
.....split_input_line.....
.....getWindow.....
.....split_input_line.....
.....getWindow.....
.....split_input_line.....
.....isOpen.....
.....split_input_line.....
.....isOpen.....
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.....sizeQ.....
.....sizeQ.....
.....enqueue.....
.....split_input_line.....
.....getWindow.....
.....split_input_line.....
.....getWindow.....
.....split_input_line.....
.....getWindow.....
.....split_input_line.....
.....giveTicket.....
.....dequeue.....
.....isEmptyQ.....
.....isOpen.....
.....dequeue.....
.....isEmptyQ.....
.....isOpen.....
.....dequeue.....
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