

# Advanced Algorithms - Assignment 1

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## Instructions:

- *This document must be submitted along with your implementation file.*
- *You are required to run at least 3 test cases with your implementation and fill in the tables given.*
- *You may add more columns in case you have run more test cases*
- *Reallocation threshold is the percentage of the array filled after which your implementation reallocates memory*
- *Deallocation threshold is the percentage of the array emptied after which your implementation deallocates memory.*
- *Vary the thresholds in the test cases and note the time taken for the basic operation*
- *The final section is optional and can be used if you would like to give the evaluators additional information about your assignment*

## 1) Dynamic Table with Structure Hacking

	Test Case 1	Test Case 2	Test Case 3	Test Case 4
<b>Reallocation Threshold</b>	100%	100%	90%	90%
<b>Deallocation Threshold</b>	25%(75% of the array is lost)	35%	25%	35%
<b>Number of times copy was called</b>	37(37 elements were copied)	63	65	74
<b>Total time</b>	49062ns	57550ns	51350ns	58063ns
<b>Average time taken</b>	490.62ns (100 pushes + pops)	575.50ns	513.50ns	580.63ns

## 2) Dynamic Table without Structure Hacking

	Test Case 1	Test Case 2	Test Case 3	Test Case 4
Reallocation Threshold	100%	100%	90%	90%
Deallocation Threshold	25%	35%	25%	35%
Number of times copy was called	37	63	65	74
Total time	49376	58911	51265	58392
Average time taken	493.76ns	589.11ns	512.65ns	583.92ns

## 3) Splay Tree

	Test Case 1	Test Case 2	Test Case 3	Test Case 4
Number of rotations	225	2414	5408	12537
Total time	60212ns	336303ns	675798ns	1368238ns
Average time taken	602.12ns (benchmark_count=100)	672.606ns (benchmark_count=500)	675.798ns (benchmark_count=1000)	684.119ns (benchmark_count=2000)

## 4) Additional details:

In the splay tree experiment: I first got the number of rotations and then commented out all the printf statements to see actual performance because as benchmark\_count increases, the number of printf statements also increase and hence true performance cannot be known.