2)

A graph with a red line and a blue line

Description automatically generated

3)upper bound polynomial- 2n^2 + 2

Lower bound polynomial – 0.5 n^2 + 0.5

* *O*(*n^*2) – big O
* Ω(*n^*2) -big Omega
* Θ(*n^*2)- big theta

4)A graph of different types of data

Description automatically generated

5)

Yes,It will increase the run time of the algorithm . the runtime equation of the algorithm is

T(n)= n^2 + n +1 . Therefore, the value increased is ‘n’.

A graph of a function

Description automatically generated

6)The runtime equation of the algorithm is T(n)= n^2 + n +1 . Therefore, the value increased is ‘n’.

7) the working of the merge sort algorithm is shown in the solution\_7 file . the code for Merge sort is in MergeSort.py file