DSA - Assignment

NAME: SUYASH CHINTAWAR

ROLL NO.:191IT109

TOPIC: SORTING - 1

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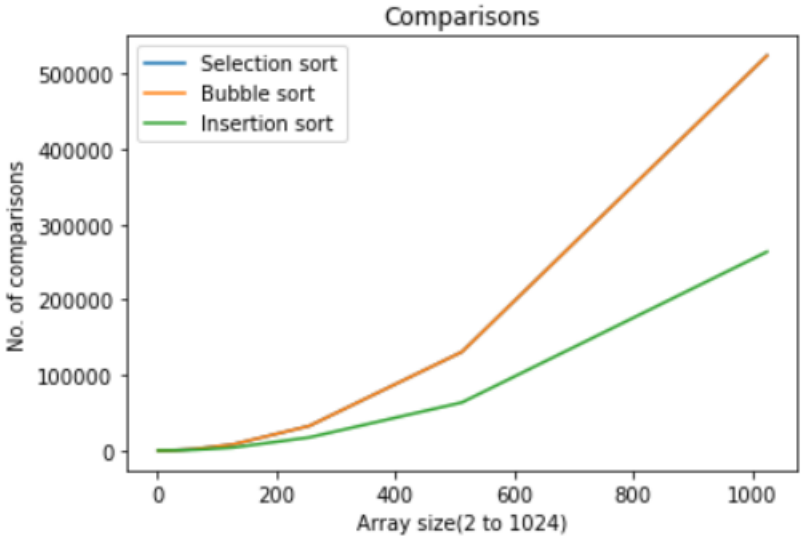
Graph for comparisons in sorting techniques:

```
In [10]: #No. of comparisons
x=[2,4,8,16,32,64,128,256,512,1024]

y1=[1,6,28,120,496,2016,8128,32640,130816,523776]
y2=[1,6,28,120,496,2016,8128,32640,130816,523776]
y3=[2,6,17,96,261,1003,3940,17414,63731,263582]

plt.plot(x,y1,label='Selection sort')
plt.plot(x,y2,label='Bubble sort')
plt.plot(x,y3,label='Insertion sort')
plt.title('Comparisons')
plt.xlabel('Array size(2 to 1024)')
plt.ylabel('No. of comparisons')
plt.legend()
plt.show()
```



Graphs have been plotted using python

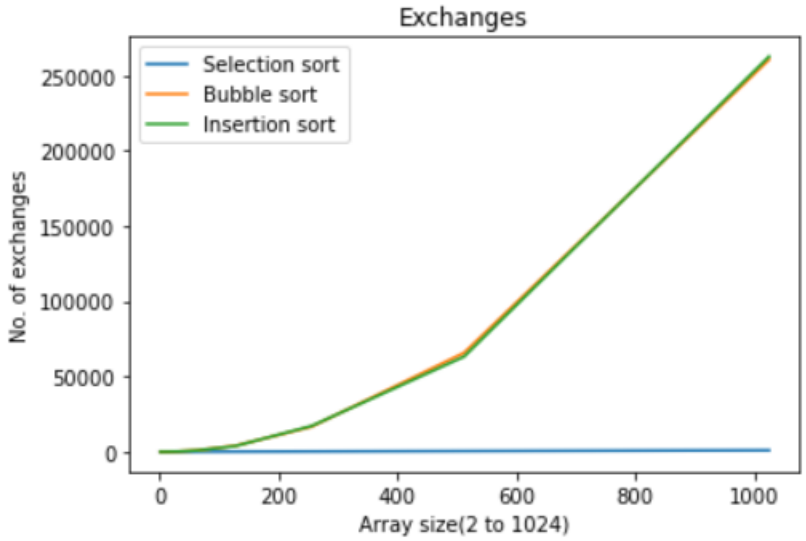
Here, the graphs of selection sort and bubble sort overlap, that is why graph for selection sort is not visible.

Graph for exchanges in sorting techniques:

```
In [12]: #No. of exchanges
x=[2,4,8,16,32,64,128,256,512,1024]

y1=[1,2,5,13,28,62,123,252,505,1018]
y2=[0,3,17,37,255,992,4003,16686,65749,260449]
y3=[1,3,10,81,230,940,3813,17159,63220,262559]

plt.plot(x,y1,label='Selection sort')
plt.plot(x,y2,label='Bubble sort')
plt.plot(x,y3,label='Insertion sort')
plt.title('Exchanges')
plt.xlabel('Array size(2 to 1024)')
plt.ylabel('No. of exchanges')
plt.legend()
plt.show()
```



Here, the graphs of insertion sort and bubble sort almost overlap and graph for selection sort is almost flat compared to other two graphs.

README:

- Initially, the user will be prompted to choose which sorting technique he wants to be analyzed amongst 3 choices. If any other choice entered then the program ends with a message “Select a number in 1-3 only, please run again!!”
- If a choice is selected, then the analysis of the sorting technique is shown in the console by taking arrays of sizes=2,4,8,16,…,1024 randomly filled every time and then sorted using the chosen sorting technique.
- Analysis will show the output of the no. of comparisons and the no. of exchanges used to implement the chosen sorting technique of the array size that will be shown respectively.
- Similarly, user can then choose whether to continue the program, if yes then the program will redirect to the menu again to choose a new sorting technique else the program ends.