LetsUpgrade Data Structure and Algorithm Essentials
Assignment 5 | 22nd January 2021

Question 1

Name 5 sorting algorithms, also write their time complexities(best, average, worst).

Answer:

Sorting Algorithm	Time Complexities		
	Best Case	Average Case	Worst Case
Selection Sort	$O(n^2)$	$O(n^2)$	$O(n^2)$
Bubble Sort	$O(n)$	$O(n^2)$	$O(n^2)$
Insertion Sort	$O(n)$	$O(n^2)$	$O(n^2)$
Quick Sort	$(n \log n)$	$(n \log n)$	$O(n^2)$
Merge Sort	$(n \log n)$	$(n \log n)$	$(n \log n)$

Question 2

Implement selection sort algorithm using Python.

Answer:

```
def selectionSort(array, size):
    for step in range(size):
        min_idx = step
        for i in range(step + 1, size):
            if array[i] < array[min_idx]:
                min_idx = i
        (array[step], array[min_idx]) = (array[min_idx], array[step])
data = [64, 25, 12, 22, 11]
size = len(data)
```

```
selectionSort(data, size)
print('Sorted Array:', data)
```

Output:

```
Sorted Array: [11, 12, 22, 25, 64]
```

Question 3

Implement pop operation of the stack

Answer:

```
def pop(self):
    if len(self.stack) <= 0:
        return ("No element in the Stack")
    else:
        return self.stack.pop()
Stack = [12, 13, 14]
print('Popped Element: ', Stack.pop())
```

Output:

```
Popped Element:  14
```

Question 4

Implement dequeue operation of the queue

Answer:

```
q=[12, 13, 14]
def dequeue():
    if not q:
        print("Queue is Empty")
    else:
```

```
        e=q.pop(0)
        print("Deleted element: ",e)
while True:
    dequeue()
    break
```

Output:

```
Deleted element:  12
```

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