Question No.2

Dictionary Inseration, Deletion, and Searching Algorithms Test

```python
import timeit
def dict_insertion(dict, key, value):
    dict[key] = value
    return dict

def dict_deletion(dict, key):
    if key in dict:
        del dict[key]
    return dict

def dict_search(dict, key):
    for k, v in dict.items():
        if k == key:
            return v

dict = {1:"A", 2:"B", 3:"C", 4:"D"}

# Insertion
print("Insertion")
print("Self-Made Insertion: ",
timeit.timeit("dict_insertion(dict,5,'E');",globals=globals(), number=5))
print("Built-in Insertion: ", timeit.timeit("dict[5]='E';",globals=globals(),
number=5))

# Deletion:
print("\nDeletion")
print("Self-Made Deletion: ", timeit.timeit("d = dict.copy();
dict_deletion(d,3);",globals=globals(), number=5))
print("Built-in Deletion: ", timeit.timeit("d = dict.copy();
d.pop(3);",globals=globals(), number=5))

# Searching
print("\nSearching")
print("Self-Made Searching: ",
timeit.timeit("dict_search(dict,3)",globals=globals(), number=5))
print("Built-in Searching: ", timeit.timeit("dict.get(3)",globals=globals(),
number=5))

# Output:

Insertion
Self-Made Insertion:  3.00002284348011e-06
Built-in Insertion:   1.100008375942707e-06

Deletion
Self-Made Deletion:  3.999972250312567e-06
Built-in Deletion:   2.2999593056738377e-06

Searching
Self-Made Deletion:  3.700028173625469e-06
Built-in Deletion:   1.600012183189392e-06
```

Tuple Inseration, Deletion, and Searching Algorithms Test

Tuples are immutable. So, we simulate insertion/deletion by creating a new tuple

```python
def tuple_insertion(tup,value,pos):
    sub_tup = tup[:pos]
    post_tup = tup[pos+1:]
    return sub_tup + (value,) + post_tup

def tuple_deletion(tup, value):
    for i in range(len(tup)):
        if tup[i] == value:
            idx = i
            break
    sub_tup = tup[:idx]
    post_tup = tup[idx+1:]
    return sub_tup + post_tup

def tuple_search(tup, value):
    for i in range(len(tup)):
        if tup[i] == value:
            return i

tup = (1,2,3,4,5,6)

# Insertion
print("Insertion")
print("Self-Made Insertion: ",
timeit.timeit("tuple_insertion(tup,0,3)",globals=globals(), number=5))
print("Built-in Insertion: ", timeit.timeit("new_tup =
tup[:3]+(0,)+tup[3:]",globals=globals(), number=5))

# Deletion:
print("\nDeletion")
print("Self-Made Deletion: ",
timeit.timeit("tuple_deletion(tup,3)",globals=globals(), number=5))
print("Built-in Deletion: ", timeit.timeit("new_tup =
tup[:3]+tup[3+1:]",globals=globals(), number=5))

# Searching
print("\nSearching")
print("Self-Made Searching: ", timeit.timeit("tuple_search(tup,
3)",globals=globals(), number=5))
print("Built-in Searching: ", timeit.timeit("tup.index(3)",globals=globals(),
number=5))
# Output
Insertion
Self-Made Insertion:  5.999987479299307e-06
Built-in Insertion:   2.8999638743698597e-06

Deletion
Self-Made Deletion:   8.100003469735384e-06
Built-in Deletion:    2.0999577827751637e-06

Searching
Self-Made Searching:  3.89997148886323e-06
Built-in Searching:   8.200004231184721e-06
```