Question No.	Question
1	What is aliasing?
2	What is garbage collection?
3	What is mutability and why is it dangerous in certain scenarios?
4	What is cloning?
5	Differentiate between deep and shallow copies
6	How nested lists are stored in memory?
7	How strings are stored in memory
8	Why tuples take less memory than lists?
9	How set index position is decided?
10	Why mutable types are not allowed in sets/dicts

```python
a = 4
```

```python
id(a)
```

    11126784

```python
id(4)
```

    11126784

```python
hex(11126784)
```

    '0xa9c800'

```python
a = 4
b = a
```

```python
print(id(a))
print(id(b))
```

    11126784
    11126784

```python
c = b
```

```python
print(id(c))
```

    11126784

```python
del a
```

```python
a
```

    NameError   Traceback (most recent call last)
    <ipython-input-23-3f786850e387> in <module>
    ----> 1 a

    NameError: name 'a' is not defined

```python
print(b)
```

    4

```python
del b
print(c)
```

    4

```python
a = 'DSMP 2022-23'
b = a
c = b
```

```
import sys
sys.getrefcount('DSMP 2022-23')
```

```
    3
```

```
L = [1,2,3]
print(id(L))

L.append(4)
print(L)
print(id(L))
```

```
    139652074757168
    [1, 2, 3, 4]
    139652074757168
```

```
T = (1,2,3)
print(id(T))

T = T + (4,)

print(T)
print(id(T))
```

```
    139652076050304
    (1, 2, 3, 4)
    139652075362160
```

```
a = [1,2,3]
b = a

b.append(4)
print(b)
```

```
    [1, 2, 3, 4]
```

```
print(a)
```

```
    [1, 2, 3, 4]
```

```
def func(data):
  data.append(4)

a = [1,2,3]
func(a[:])
print(a)
```

```
    [1, 2, 3]
```

```
a = [1,2,3]
# cloning
b = a[:]

id(a)
```

```
    139652074408688
```

```
id(b)
```

```
    139652074409728
```

```
b.append(4)
b
```

```
    [1, 2, 3, 4]
```

```
a
```

```
    [1, 2, 3]
```

```
a = {'name':'nitish','age':33}
# aliasing->cloning
b = a.copy()

b['gender'] = 'male'

print(b)
print(a)
```

```
    {'name': 'nitish', 'age': 33, 'gender': 'male'}
    {'name': 'nitish', 'age': 33}
```

```
a = [1,2,3]
# shallow
b = a.copy()

b.append(4)

print(a)
print(b)
```

```
    [1, 2, 3]
    [1, 2, 3, 4]
```

```
a = [1,2,3,[4,5]]
a
```

```
    [1, 2, 3, [4, 5]]
```

```
print(id(a[-1]))
print(id(b[-1]))
```

```
    139652074560480
    139652074560480
```

```
b = a.copy()
b
```

```
    [1, 2, 3, [4, 5]]
```

```
print(id(a))
print(id(b))
```

```
    139652074868240
    139652074561280
```

```
b[-1][0] = 400
print(b)
```

```
    [1, 2, 3, [400, 5]]
```

```
a
```

```
    [1, 2, 3, [400, 5]]
```

```
import copy
```

```
a = [1,2,3,[4,5]]
a
```

```
    [1, 2, 3, [4, 5]]
```

```
b = a[:]
b
```

```
    [1, 2, 3, [4, 5]]
```

```
b[-1][0] = 400
b
```

```
    [1, 2, 3, [400, 5]]
```

```
a
```

```
[1, 2, 3, [400, 5]]
```

```python
print(id(a[-1]))
print(id(b[-1]))
```

```
139652075071600
139652074658464
```

```python
# [:] -> shallow copy
```

```python
s = 'hello'
```

```python
id(s)
```

```
139652297075120
```

```python
id(s[0])
```

```
139652626357424
```

```python
id('h')
```

```
139652626357424
```

```
{12,}
```