# DATA STRUCTURES

```
#Creating lists with same data type
a = [1,2,3,4,5,6,7,8,9,10]
print(a)
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

```
#Creating lists with different data type
b = [1,3.14,'prafful']
print(b)
```

```
[1, 3.14, 'prafful']
```

# List operations

### Accessing items

```
print(a[8])
print(b[-1])
```

```
12
papya
```

```
print(a[7])
print(a[-1])
```

```
10
12
```

### modifying items

```
a[3] = 12
print(a)
```

```
[1, 2, 3, 12, 5, 6, 7, 8, 9, 10]
```

```
b[2] = "prafful mn"
print(b)
```

```
[1, 3.14, 'prafful mn']
```

### Adding items

```
#append()
a.append(67)
a
```

```
[1, 2, 3, 12, 5, 6, 7, 8, 9, 10, 12, 12, 67, 67, 67, 67, 67]
```

```
#insert()
b.insert(6,"papya")
b
```

```
[1, 3.14, 'papya', 'prafful mn', 'papya', 'papya']
```

**Removing items**

```
#remove()
a.remove(2)
a
```

```
[1, 3, 5, 6, 7, 8, 9, 10, 12]
```

```
#pop()
b.pop(1)
b
```

```
[1, 'papya', 'papya']
```

**Other operations**

```
#len
len(a)
```

```
9
```

```
#sort and reverse
a.sort()
a.reverse()
a
```

```
[12, 10, 9, 8, 7, 6, 5, 3, 1]
```

**Iterations through a list**

```
a = [1,22,33,21,43]
for i in a:
  print(i)
```

```
1
22
33
```

```
21
43
```

# Tuple

```
num = (11,22,33,44)
print(num[1])
```

```
22
```

# Dictionary

```
student = {
    "name" : "prafful",
    "age" : 24,
    "city" : "pune"
}
print(student)
```

```
{'name': 'prafful', 'age': 24, 'city': 'pune'}
```

```
#accessing:
print(student["city"])
```

```
pune
```

```
#Modifying
student["age"] = 19
print(student)
```

```
{'name': 'prafful', 'age': 19, 'city': 'pune'}
```

```
#adding:
student["clg"] = "shridevi"
print(student)
```

```
{'name': 'prafful', 'age': 19, 'city': 'pune', 'clg': 'shridevi'}
```

```
#remove
del student["clg"]
print(student)
```

```
{'name': 'prafful', 'age': 19, 'city': 'pune'}
```

**Iterating through a Dictionary**

```
for key,value in student.items():
  print(key,value)
```

```
name prafful
age 19
city pune
```

# Set

```
num = {1,2,3,4,5,6,7,8,9,67}
print(num)
```

```
{1, 2, 3, 4, 5, 6, 7, 8, 9, 67}
```

```
num.add(100)
print(num)
```

```
{1, 2, 3, 4, 5, 6, 7, 8, 9, 67, 99, 100, 23, 55}
```

```
num.remove(55)
print(num)
```

```
{1, 2, 3, 4, 5, 6, 7, 8, 9, 67, 99, 23}
```

# Set operatons

```
a ={1,2,3,4,5,6}
b ={4,3,56,7,8,9}
#Union
a | b
```

```
{1, 2, 3, 4, 5, 6, 7, 8, 9, 56}
```

```
#intersection
a & b
```

```
{3, 4}
```

```
#Difference
a - b
```

```
{1, 2, 5, 6}
```

# hands on practice

```
#Manipulating Lists
fruits = ["apple","licchi","orange","melon"]
fruits.append("grapes")
```

```
fruits.remove("melon")
print(fruits)
```

```
['apple', 'licchi', 'orange', 'grapes']
```

```
#creating a dictionary
book = {
    "title" : "python Basics",
    "author" : "john",
    "year" : 2021
}
print(book["title"])
book["year"] = 2024
print(book)
```

```
python Basics
{'title': 'python Basics', 'author': 'john', 'year': 2024}
```

# problem solved

```
#merge two lists
list1 = [2,3,4,5]
list2 = [6,7,77,88]
merged_list = list1 + list2
print(merged_list)
```

```
[2, 3, 4, 5, 6, 7, 77, 88]
```

```
#dictionary operation
student = {"name": "Bob","age" : 24,"marks" : 93}
print("name:",student["name"])
student["marks"] = 98
print("updated Marks:",student["marks"])
```

```
name: Bob
updated Marks: 98
```

```
#find maximum and minimum in a list
A = [11,23,55,67,55,55,22]
max(A)
print("minimum: ", min(A))
```

```
minimum:  11
```

```
#count frequency of Elements in a List
numbers = [1,2,2,3,3,3,4,4,4,4]
frequency = {}
```

**to find whether it is polindrome**

```python
#Polindrome (integer polindrome)
number = int(input("enter a number: "))
reverse_number = 0
temp = number

while temp > 0:
  digit = temp % 10
  reverse_number = reverse_number * 10 + digit
  temp = temp // 10

if number == reverse_number:
  print(f"{number} is a polindrome")
else:
  print(f"{number} is not a polindrome")
```

```
enter a number: 242
242 is a polindrome
```

```python
#Polindrome (string polindrome)
num = input("Enter a word: ")
if num == num[::-1]:
  print(f"{num} is a polindrome")
else:
  print(f"{num} is not a polindrome")
```

```
Enter a word: SOS
SOS is a polindrome
```

```python
class Solution(object):
    def isPalindrome(self, x):
        if x < 0 or (x % 10 == 0 and x != 0):
            return False
        reversed_half = 0
        while x > reversed_half:
            reversed_half = reversed_half * 10 + x % 10
            x //= 10
        return x == reversed_half or x == reversed_half // 10
solution = Solution()
print(solution.isPalindrome(121))
print(solution.isPalindrome(-121))
print(solution.isPalindrome(10))
print(solution.isPalindrome(0))
```

```
True
False
False
True
```