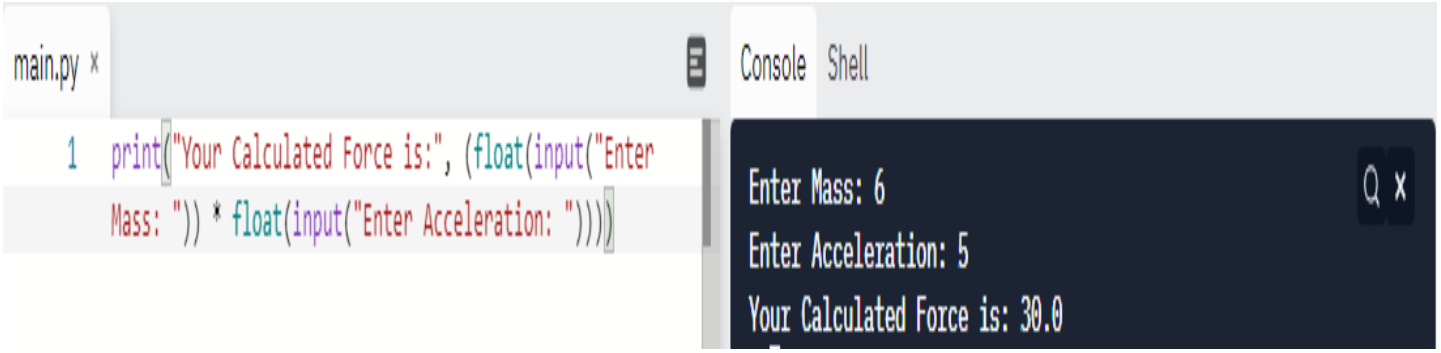
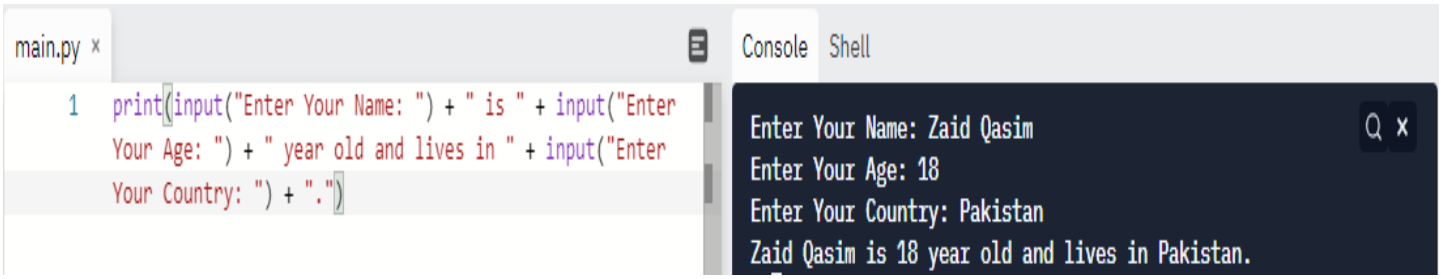
Lab1:-

Question 1:-



Question 2:-



Lab 2:-

Question 1:-

main.py

```
1  import numpy as np
2  def insert(End_value,Start_value,value):
3    for i in range(End_value,Start_value,-1):
4      arr[i] = i - 1
5    arr[Start_value] = value
6  arr = np.array([input(f"Enter Player {i+1} Name: ") for i
   in range (int(input("How Many Player are there: ")))])
7  for x in range(len(arr)):
8    print(arr[x],end="")
```

Console Shell

```
How Many Player are there: 4
Enter Player 1 Name: Z
Enter Player 2 Name: a
Enter Player 3 Name: i
Enter Player 4 Name: d
Zaid
```

Question 2:-

main.py

```
1  import numpy as np
2  thislist = []
3  length = int(input("How Many Player are there: "))
4  value = input("Enter Value: ")
5  index = int(input("Enter Index: "))
6  arr = np.array(["" for i in range (length + 1)])
7  for i in range(length):
8    arr[i] = input("How Many Player are there: ")
9  for i in range(length):
10   thislist.insert(i, arr[i])
11 print("Given Array = ",thislist)
12 thislist.insert(index,value)
13 for i in range(4):
14   arr[i] = thislist[i]
15 print(arr)
```

Console Shell

```
How Many Player are there: 3
Enter Value: Z
Enter Index: 0
How Many Player are there: i
How Many Player are there: a
How Many Player are there: d
Given Array =  ['i', 'a', 'd']
['Z' 'i' 'a' 'd']
```

Question 3:-

main.py

```
1  import numpy as np
2  thislist = []
3  length = int(input("Enter Length: "))
4  index = int(input("Enter Index: "))
5  arr = np.array(["" for i in range (length)])
6  for i in range(length):
7    arr[i] = input("Enter Array: ")
8  for i in range(length):
9    thislist.insert(i, arr[i])
10 print(thislist)
11 thislist.pop(index)
12 arr[length-1] = ""
13 for i in range(length-1):
14     arr[i] = thislist[i]
15 print(arr)
```

Console Shell

```
Enter Length: 5
Enter Index: 0
Enter Array: o
Enter Array: Z
Enter Array: a
Enter Array: i
Enter Array: d
['o', 'Z', 'a', 'i', 'd']
['Z' 'a' 'i' 'd' '']
```

Lab 3:-

Question 1:-

main.py

```
1  from numpy import array
2  Array_1 = array([[0 for i in range(1,10)]for j in range(1,
   10)])
3  print(Array_1)
4  for i in range(0,9):
5    for j in range(0,9):
6      Array_1[i][j] = (i+1)*(j+1);
7  print()
8  print(Array_1)
```

Console Shell

```
[[0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0]
 [0 0 0 0 0 0 0 0 0]]

[[ 1  2  3  4  5  6  7  8  9]
 [ 2  4  6  8 10 12 14 16 18]
 [ 3  6  9 12 15 18 21 24 27]
 [ 4  8 12 16 20 24 28 32 36]
 [ 5 10 15 20 25 30 35 40 45]
 [ 6 12 18 24 30 36 42 48 54]
 [ 7 14 21 28 35 42 49 56 63]
 [ 8 16 24 32 40 48 56 64 72]
 [ 9 18 27 36 45 54 63 72 81]]
```

Question 2:-

main.py

```
1  from numpy import array
2  m1 = array([[1,2,3,4],[5,6,7,8]])
3  m2 = array([[1,2,3],[4,5,6],[7,8,9],[10,11,12]])
4  m = array([[0 for i in range(3)]for j in range(2)],dtype
   = object)
5  for i in range(2):
6    for j in range(4):
7      for k in range(3):
8        m[i][k] = m[i][k] + (m1[i][j] * m2[j][k])
9  print(m)
```

Console Shell

```
[[70 80 90]
 [158 184 210]]
>
```

Question 3:-

main.py

```
1  from numpy import array
2  Array_1 = array([[1,2,3],[4,5,6],[9,8,9]])
3  Value = 0
4  Value0 = 0
5  for i in range(3):
6    Value = Value + Array_1[i][i]
7  t = 2
8  for i in range(3):
9    Value0 = Value0 + Array_1[i][t]
10   t = t -1
11 Value = Value - Value0
12 if Value < 0:
13   Value = -1 * Value
14 print(Value)
```

Console Shell

```
2
>
```

Lab5:-

Question 1:-

main.py

```
from numpy import array
def BinarySearch(array, number,first,last):
  index = -1
  first = 0
  last = len(array)-1
  while(first <= last):
    mid = int((first + last) / 2)
    if (array[mid] == number):
      index = mid
      break
    elif (number > array[mid]):
      first = mid + 1
    elif (number < array[mid]):
      mid = first - 1
  return index
array = array([i for i in range (1,10)])
index = BinarySearch(array, int(input("Enter Number: ")),
0,len(array)-1)
if (index >= 0):
  print("Your Guess is Right with Index:",index)
else:
  print("Your Guess is Wrong")
```

Console Shell

```
Enter Number: 9
Your Guess is Right with Index: 8
```

Question 2:-

main.py

```
from numpy import array
def MatchingIntegers(integer,queries):
  checker = array([0,0,0])
  for i in range(3):
    for j in range(3):
      if(queries[i] == integer[j]):
        checker[i] = checker[i] + 1
  return checker
integer = array([1,1,2])
queries = array([1,2,3])
print(MatchingIntegers(integer,queries))
```

Console Shell

```
[2 1 0]
```

Lab6:-

Question 1:-

main.py

```
class Node:
    def __init__(self, data):
        self.data = data
        self.next = None
class LinkedList:
    def __init__(self):
        self.start = None
    def Insert(self, value):
        newNode = Node(value)
        if(self.start == None):
            self.start = newNode
            return
        else:
            temp = self.start
        while(temp.next != None):
            temp = temp.next
        temp.next = newNode
    def Delete(self):
        nodeToDelete = self.start
        self.start = self.start.next
        nodeToDelete = None
    def Print(self):
        temp = self.start
        i = 1
        if(temp != None):
            while (temp != None):
                print(f"{i}.",temp.data, end = " \t")
                i = i + 1
                temp = temp.next
        else:
            print("The list is now empty.")
        print()
        print()
MyList = LinkedList()
MyList.Insert(10)
MyList.Insert(20)
MyList.Insert(30)
print("Given List: ")
MyList.Print()
print("First Time Deletion: ")
MyList.Delete()
MyList.Print()
print("Second Time Deletion: ")
MyList.Delete()
MyList.Print()
print("Third Time Deletion: ")
MyList.Delete()
MyList.Print()
```

Console Shell

```
Given List:
1. 10   2. 20   3. 30

First Time Deletion:
1. 20   2. 30

Second Time Deletion:
1. 30

Third Time Deletion:
The list is now empty.
```

Question 2:-

main.py

```
class Node:
    def __init__(self, data):
        self.data = data
        self.next = None
class LinkedList:
    def __init__(self):
        self.start = None
    def Insert(self, Value):
        newNode = Node(Value)
        if(self.start == None):
            self.start = newNode
            return
        else:
            temp = self.start
            while(temp.next is not None):
                temp = temp.next
            temp.next = newNode
    def Sort(self):
        while True:
            swapped = 0
            temp = self.start
            while(temp.next is not None):
                num0 = temp.data
                num1 = temp.next.data
                if(num0 > num1):
                    temp.data = num1
                    temp.next.data = num0
                    swapped = 1
                else:
                    temp = temp.next
            if swapped == 0:
                break
    def Print(self):
        temp = self.start
        i = 1
        if(temp is not None):
            while (temp is not None):
                print(f"{i}.",temp.data, end = " \t")
                i = i + 1
                temp = temp.next
        print()
        print()
MyList = LinkedList()
MyList.Insert(50)
MyList.Insert(30)
MyList.Insert(8)
MyList.Insert(65)
MyList.Insert(89)
MyList.Insert(85)
MyList.Insert(7)
print("Given List: ")
MyList.Print()
print("Your Sorted List is: ")
MyList.Sort()
MyList.Print()
```

Console Shell

```
Given List:
1. 50   2. 30   3. 8    4. 65   5. 89   6. 85   7. 7

Your Sorted List is:
1. 7    2. 8    3. 30   4. 50   5. 65   6. 85   7. 89
```

Lab7:-

Question 1:-

main.py

```
class Node:
  def __init__(self, data):
    self.data = data
    self.next = None
    self.prev = None
class LinkedList:
  def __init__(self):
    self.head = None
  def push_back(self, newElement):
    newNode = Node(newElement)
    if(self.head == None):
      self.head = newNode
      return
    else:
      temp = self.head
      while(temp.next != None):
        temp = temp.next
      temp.next = newNode
      newNode.prev = temp
  def push_at(self):
      nodeToDelete = self.head
      self.head = nodeToDelete.next
      self.head.prev = None
      nodeToDelete = None
      temp = self.head
      while(temp.next != None):
        temp = temp.next
      temp = temp.prev
      temp.next = 0
  def PrintList(self):
    temp = self.head
    if(temp != None):
      print("The list contains:", end=" ")
      while (temp != None):
        if (temp == 0):
          break
        else:
          print(temp.data, end=" ")
          temp = temp.next
      print()
    else:
      print("The list is empty.")
MyList = LinkedList()
MyList.push_back(10)
MyList.push_back(20)
MyList.push_back(30)
MyList.PrintList()
MyList.push_at()
MyList.PrintList()
```

Console Shell

```
The list contains: 10 20 30
The list contains: 20
>
```

Lab8:-

Question 1:-

main.py

```
class Node:
    def __init__(self, data):
        self.data = data
        self.next = None
class LinkedList:
    def __init__(self):
        self.start = None
    def Push(self, value):
        newNode = Node(value)
        if(self.start == None):
            self.start = newNode
            return
        else:
            temp = self.start
        while(temp.next != None):
            temp = temp.next
        temp.next = newNode
    def Print(self):
        temp = self.start
        i = 1
        if(temp != None):
            while (temp != None):
                print(f"{i}.",temp.data, end = " \t")
                i = i + 1
                temp = temp.next
        else:
            print("The list is now empty.")
        print()
        print()
    def Pop(self):
        temp0 = self.start
        temp1 = temp0.next
        if(temp0 != None):
            while (temp1.next != None):
                temp0 = temp0.next
                if(temp0.data == self.start):
                    break
                temp1 = temp0.next

                temp0.next = None
                print("Your Poped Item is:",temp1.data)
                temp1.next = None
MyList = LinkedList()
MyList.Push(10)
MyList.Push(20)
MyList.Push(30)
MyList.Pop()
MyList.Pop()
```

Console Shell

```
Your Poped Item is: 30
Your Poped Item is: 20
```

Question 2:-

main.py

```
1  def Push(array, top, max, item):
2      if(top == max):
3          print("Sorry :( Your Stack is Full")
4      else:
5          top[0] += 1
6          array[top[0]] = item
7  def Pop(array, top):
8      item = 0
9      if(top[0] == -1):
10         print("Enter Elemet First")
11     else:
12         for x in range(top[0],-1,-1):
13             print(array[top[0]],end="")
14             array[top[0]] = 0
15             top[0] -= 1
16 max = int(input("Enter Number Of Element: "))
17 array = [0 for i in range(max)]
18 top = [-1]
19 for i in range(max):
20     Push(array,top, max-1, input("Enter Item: "))
21 print("Your Array in reverse Order is: ",end="")
22 Pop(array, top)
23 print()
```

Console Shell

```
Enter Number Of Element: 5
Enter Item: 5
Enter Item: 4
Enter Item: 3
Enter Item: 2
Enter Item: 1
Your Array in reverse Order is: 12345
```