Lab Programs 4

Data Structures

Objectives

In this lab programs, you learn about

- List Indexes
- List Mutable Type
- Slicing List
- Nested List
- The del Statement
- List Functions
- Tuple
- Tuple Construction
- Tuple Operations
- Set Data Type
- Set Creation
- Set Operations
- Dictionary Data Type
- Dictionary Creation
- Dictionary Operations
- Looping Thru Sequences
- Common Operations on Sequences

Prerequisites

Before working on this lab program, you must know

- How to develop Python programs.
- How to declare variables.
- How to use literals.
- About the expressions & operators.

Estimated time to complete this lab programs: 150 minutes

❖ Lab Program 01

1. Open the **LiClipse Python** project called **<Your-Name-Project**.>
2. Create a folder called **CHP-04** in **<Your-Enroll-Number>Project.**
3. Create a new Python file called **J01IntToStringEx1.py** in the **CHP-04 Package**.
4. Type the below code

```
a = 30
b = 31
print(a + b)
s1 = str(a)
s2 = str(b)
print(s1 + s2)
```

5. Save the program.
6. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 02

1. Create a new Python file called **J03TypeFunctionEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
a = 10
print(type(a))
b = 10.1
print(type(b))
c = True
print(type(c))
d = 'Wisen'
print(type(d))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 03

1. Create a new Python file called **J06EmptyListEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
regions = []

print(regions);
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 04

1. Create a new Python file called **J11ListWithDatasEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
regions = ['East', 'West', 'North', 'South']
print(regions)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 05

1. Create a new Python file called **J21EmptyListUsingConstructorEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
colors = list()
print(colors)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 06

1. Create a new Python file called **J31ListWithDataUsingConstructorEx1.py** in the CHP-04 Package.
2. Type the below code

```
mylist = list('Wisen')

colors = list(('Blue', 'Red', "Green"))

print(mylist)
print(colors)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 07

1. Create a new Python file called **J36NonIterableEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
mydata = list(123)
print(mydata)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 08

1. Create a new Python file called **J41ListCreationUsingComprehensionEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,3,4,5]
outdatas = [  e + 10 for e in datas  ]
print(outdatas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 09

1. Create a new Python file called **J51ListCreationUsingComprehensionWithConditionEx2.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,3,4,5]
outdatas = [  e + 10 for e in datas if e % 2 == 0 ]
print(outdatas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 10

1. Create a new Python file called **J56ListSizeEx1.py** in the **CHP-04 Package**.
2. Type the below code

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

```
print(len(datas))
datas1 = []
print(len(datas1))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 11

1. Create a new Python file called **J61AccessListElementEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
mylist = list('Wisen')
colors = list(('Blue', 'Red', "Green"))
print(mylist[0])
print(colors[1])
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 12

1. Create a new Python file called **J71ListMutableTypeEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
colors = list(('Blue', 'Red', ''Green''))
colors[2] = 'White'
print(colors)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 13

1. Create a new Python file called **J81ListSlicingEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,3,4,5]
newList = datas[1:3]
```

```
print(newList)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 14

1. Create a new Python file called **J91SliceAssignmentEx1.py** in the CHP-04 Package.
2. Type the below code

```
datas = [1,2,3,4,5,6,7,8,9,10]
datas[1:4] = [102,103]
print(datas)

datas1 = [1,2,3,4,5,6,7,8,9,10]
datas1[1:4] = []
print(datas1)

datas2 = [1,2,3,4,5,6,7,8,9,10]
datas2[:] = []
print(len(datas2))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 15

1. Create a new Python file called **K01NestedListEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [[1,2,3], [4,5,6], [7,8,9], [10, 11, 12]]
print(datas)
print(len(datas))
print(len(datas[0]))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 16

1. Create a new Python file called **K11HeterogeneousListEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,'Wisen',True,11.2]
print(datas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 17

1. Create a new Python file called **K13DelStatementEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = ['A', 'B', 'C', 'D', 'C', 'I', 'J', 'K']
del datas[1]
print(datas)

del datas[3:6]
print(datas)

del datas[:]
print(datas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 18

1. Create a new Python file called **K16AppendEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,3,4]
datas.append(5)
datas[len(datas):] = [6]
print(datas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 19

1. Create a new Python file called **K21InsertEx1.py** in the **CHP-04 Package**.
2. Type the below code

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

```
datas.insert(2, 'A')
print(datas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 20

1. Create a new Python file called **K31ExtendEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,3,4,5]
alpha = ['A', 'B','C']
datas.extend(alpha)
print(datas)

datas[len(datas):] = alpha
print(datas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 21

1. Create a new Python file called **K36CopyEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,3,4,5]
newList = datas.copy()
print(newList)

newList1 = datas[:]
print(newList1)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 22

1. Create a new Python file called **K41SortEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [5,2,10,4,8,6,9,7,1]
datas.sort()
print(datas)

datas.sort(reverse=True)
print(datas)

datas = [5,2,4,True,9,1]
datas.sort()
print(datas)

datas = [5,2,'A',4,True,9,1]
datas.sort()
print(datas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 23

1. Create a new Python file called **K46ReverseEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,3,4,5]
datas.reverse()
print(datas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 24

1. Create a new Python file called **K51RemoveEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,3,4,5,3]
datas.remove(3)
print(datas)

datas.remove(7)
print(datas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 25

1. Create a new Python file called **K56POPEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = ['A', 'B', 'C', 'D', 'C']
elem = datas.pop(3)
print(elem)

elem = datas.pop()
print(elem)

elem = datas.pop(8)
print(elem)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 26

1. Create a new Python file called **K61ClearEx1.py** in the CHP-04 Package.
2. Type the below code

```
datas = [1,2,3,4,5,3]
datas.clear()
print(datas)

datas1 = [1,2,3,4,5,3]
del datas[:]
```

```
print(datas1)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 27

1. Create a new Python file called **L01SimpleTupleEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = 1, 2, 3, 4, 5
print(datas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 28

1. Create a new Python file called **L01SimpleTupleEx2.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = 1, 2, 3, 4, 5
print(datas)

datas1 = ('A', 'B', 'C', 'D', 'E')
print(datas1)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 29

1. Create a new Python file called **L06TupleIndexAndSliceEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = 'A', 'B', 'C', 'D', 'C'
print(datas[1])
print(datas[3:5])
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 30

1. Create a new Python file called **L11TupleImmutableEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = 1, 2, 3, 4, 5
datas[1] = 'A'
print(datas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 31

1. Create a new Python file called **L16EmptyTupleEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = ()
print(datas)
print(type(datas))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 32

1. Create a new Python file called **L21SingleElementTupleEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = 'A'
print(type(datas))
```

```
datas1 = 'A',
print(type(datas1))


datas = ('A')
print(type(datas))

datas = ('A',)
print(type(datas))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 33

1. Create a new Python file called **L26TupleCreationUsingConstructorEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = tuple()
print(datas)

datas1 = tuple(('A', 'B', 'C', 'D', 'E'))
print(datas1)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 34

1. Create a new Python file called **L31TupleParenthesesSyntaxAmibuguityEx1.py** in the CHP-04 Package.
2. Type the below code

```
datas = tuple(('A', 'B', 'C', 'D', 'E'))
print(datas)

datas1 = tuple('A', 'B', 'C', 'D', 'E')
print(datas1)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 35

1. Create a new Python file called **L51SetCreationUsingCurlyBracesEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = {1,2,3,4,1,4}
print(datas)
print(type(datas))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 36

1. Create a new Python file called **L56EmptySetCreationUsingCurlyBracesEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = {}
print(datas)
print(type(datas))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 37

1. Create a new Python file called **L61SetCreationUsingSetFunctionEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = set()
print(datas)
print(type(datas))


datas1 = set('ABCDEAB')
print(datas1)
print(type(datas1))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 38

1. Create a new Python file called **L66SetCreationUsingComprehensionEx1.py** in the **CHP-04 Package**.

2. Type the below code

```
datas = {1,2,3,4,5,6,7,8}
outdatas = {  elem for elem in datas if elem % 2 != 0 }
print(outdatas)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 39

1. Create a new Python file called **L71SetOperationEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas1 = {1,2,3,4,5}
datas2 = {4,5,6,7,8}
print(datas1 | datas2)
print(datas1 & datas2)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 40

1. Create a new Python file called **L71SetOperationEx2.py** in the **CHP-04 Package**.
2. Type the below code

```
datas1 = {1,2,3,4,5}
datas2 = {4,5,6,7,8}
print(datas1 - datas2)
print(datas1 ^ datas2)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 41

1. Create a new Python file called **M01SimpleDictionaryEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = dict()
print(datas)
print(type(datas))

mobilenos = dict([(9003131555, 'Wisen'),
        (9871243522, 'Mary'), (9827831734, 'John')])
print(mobilenos)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 42

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1. Create a new Python file called **M06DictionaryCreationUsingDictFunctionEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
mobilenos = {9003131555: 'Wisen', 9871243522: 'Mary', 9827831734: 'David'}
print(mobilenos)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 43

1. Create a new Python file called **M11DictCreationUsingComprehensionEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = {1,2,3,4,5,6,7,8}
outdatas = { elem: elem ** 2 for elem in datas }
print(outdatas)
print(type(outdatas))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 44

1. Create a new Python file called **M16AccessDictionaryElementEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
students = {428: 'Mary Brown', 512: 'David Jones', 212: 'John Peter'}
```

```
print(students[512])
print(students[0])
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 45

1. Create a new Python file called **M21ModifyDictionaryElementEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
students = {428: 'Mary Brown', 512: 'David Jones', 212: 'John Peter'}
print(428 in students)
print(111 in students)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 46

1. Create a new Python file called **M26CheckKeyAvailableEx1.py** in the CHP-04 Package.
2. Type the below code

```
students = {428: 'Mary Brown', 512: 'David Jones', 212: 'John Peter'}
students[512] = 'Ali Khan'
print(students)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 47

1. Create a new Python file called **M31RetrieveAllKeysEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
students = {428: 'Mary Brown', 512: 'David Jones', 212: 'John Peter'}
studentIDs = students.keys()
```

```
print(studentIDs)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 48

1. Create a new Python file called **M51LoopingThruSequencesEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
countries = ['India Capital', 'USA Capital', "France Capital"]
capitals = ['New Delhi', 'Newyork', "Paris"]
for coun, cap in zip(countries, capitals):
    print(coun, cap)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 49

1. Create a new Python file called **M56LoopingMultipleSequencesEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [7, 4, 5, 1,9,2,8,7]
for idx, val in enumerate(datas):
    print(idx, val)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 50

1. Create a new Python file called **M61LoopingSequenceInReverseEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,3,4,5]
for i in reversed(datas):
```

```
    print(i)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 51

1. Create a new Python file called **M66LoopingSequenceInSortedEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [7,2,1,4,5,0]
for i in sorted(datas):
    print(i)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 52

1. Create a new Python file called **M71LoopingThruDictionariesEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
students = {428: 'Mary Brown', 512: 'David Jones', 212: 'John Peter'}
for k, v in students.items():
    print(k, v)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 53

1. Create a new Python file called **M81InOperationEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
regions = ['East', 'West', 'North', 'South']
print("West" in regions)
```

```
datas1 = ('A', 'B', 'C', 'D', 'E')
print("F" in  datas1)

datas2 = {1,2,3,4,1,4}
print(1 in  datas2)

students = {428: 'Mary Brown', 512: 'David Jones', 212: 'John Peter'}
print(428 in  students)
print("Mary Brown" in  students)
print(200 in  students)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 54

1. Create a new Python file called **M83NotInOperationEx1.py** in the CHP-04 Package.
2. Type the below code

```
regions = ['East', 'West', 'North', 'South']
print("West" not in regions)

datas1 = ('A', 'B', 'C', 'D', 'E')
print("F" not in  datas1)

datas2 = {1,2,3,4,1,4}
print(1 not in  datas2)

students = {428: 'Mary Brown', 512: 'David Jones', 212: 'John Peter'}
print(428 not in  students)
```

```
print("Mary Brown" not in  students)
print(200 not in  students)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 55

1. Create a new Python file called **M85PlusOperationEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
regions = ['East', 'West', 'North', 'South']
datas1 = ['A', 'B', 'C', 'D', 'E']
newSeq = regions + datas1
print(newSeq)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 56

1. Create a new Python file called **M87MultiplyOperationEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
regions = ['East', 'West', 'North', 'South']
newSeq = regions * 2
print(newSeq)
print(regions * 1)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 57

1. Create a new Python file called **M89LenOperationEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
regions = ['East', 'West', 'North', 'South']
```

```
size = len(regions)
print(size)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 58

1. Create a new Python file called **M90MinOperationEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas1 = ['S', 'X', 'A', 'N', 'E']
print(min(datas1))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 59

1. Create a new Python file called **M91MaxOperationEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas1 = ['S', 'X', 'A', 'N', 'E']
print(max(datas1))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 60

1. Create a new Python file called **M92CountOperationEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas1 = ['S', 'X', 'A', 'N', 'E', 'S', 'U', 'S']
print(datas1.count('S'))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 61

1. Create a new Python file called **M93IndexEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,'A',3,4,5,'A',1,2,3,'A']
idx = datas.index('A')
print(idx)

idx1 = datas.index('A', 7)
print(idx1)

idx2 = datas.index('A', 3,8)
print(idx2)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 62

1. Create a new Python file called **M94ValueErrorEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
datas = [1,2,'A',3,4,5,'A',1,2,3,'A']
idx = datas.index('X')
print(idx)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 63

1. Create a new Python file called **M97SequenceComparisonEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
print((1, 2, 3) < (1, 2, 4))
print([1, 2, 3] < [1, 2, 4])
print('ABC' < 'C' < 'CD' < 'Pascal')
```

```
print((1, 2, 3, 4) > (1, 2, 4))
print((1, 2) > (1, 2, -1))
print((1, 2, 3) == (1.0, 2.0, 3.0))
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?

❖ Lab Program 64

1. Create a new Python file called **M98RangeEx1.py** in the **CHP-04 Package**.
2. Type the below code

```
newList = list(range(5))
print(newList)

newList1 = list(range(2, 10))
print(newList1)

newList2 = list(range(2, 10, 2))
print(newList2)
```

3. Save the program.
4. Execute the program.

Program Output

What you learnt from this program?