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Course : BTech in CSE (Specialization in Cyber Security) - Sem 3

Subject : Python Programming Language (Practicals)

# Practical 1

Q : Explore Different Data Types in Python

Sol :

```
_int_ = 3
_str_ = "Chaman Deshmukh"
_list_ = ['Chaman','Deshmukh']
_tuple_ = ('Chaman',' Deshmukh')
_set_ = {"Chaman","Deshmukh"}
_dic_ = { 'name':'Chaman Deshmukh', 'course':'B.Tech(III)',
'subject':'Python'}

print('Integer :',_int_, 'Type :',type(_int_))
print('String :',_str_, 'Type :',type(_str_))
print('List :',_list_, 'Type :',type(_list_))
print('Tuple :',_tuple_, 'Type :',type(_tuple_))
print('Set :',_set_, 'Type :',type(_set_))
print('Dict :',_dic_, 'Type :',type(_dic_))
```

Output :

```
1 _int_ = 3
2 _str_ = "Chaman Deshmukh"
3 _list_ = ['Chaman','Deshmukh']
4 _tuple_ = ('Chaman',' Deshmukh')
5 _set_ = {"Chaman","Deshmukh"}
6 _dic_ = { 'name':'Chaman Deshmukh', 'course':'B.Tech(III)'
7         'subject':'Python'}
8 print('Integer :',_int_, 'Type :',type(_int_))
9 print('String :',_str_, 'Type :',type(_str_))
10 print('List :',_list_, 'Type :',type(_list_))
11 print('Tuple :',_tuple_, 'Type :',type(_tuple_))
12 print('Set :',_set_, 'Type :',type(_set_))
13 print('Dict :',_dic_, 'Type :',type(_dic_))
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~/python/prt/prt_1/program_1.py  FT: PYTHON  BN: 1  7% LN: 1
1 change; before #135  3 seconds ago
0: Cryptography-  1: Python*
[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_1]$ py
thon -u program_1.py
Integer : 3 Type : <class 'int'>
String : Chaman Deshmukh Type : <class 'str'>
List : ['Chaman', 'Deshmukh'] Type : <class 'list'>
Tuple : ('Chaman', ' Deshmukh') Type : <class 'tuple'>
Set : {'Chaman', 'Deshmukh'} Type : <class 'set'>
Dict : {'name': 'Chaman Deshmukh', 'course': 'B.Tech(III)',
'subject': 'Python'} Type : <class 'dict'>
[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_1]$
CHR 37% 05/03 15:08:56
```

# Practical 2

### Q : Python Program to Swap Two Variables

Sol :

```
a = int(input("Enter A : "))
b = int(input("Enter B : "))
print("Before : \nA : {} \nB : {}".format(a,b))

tmp = a
a = b
b = tmp

print("After: \nA : {} \nB : {}".format(a,b))
```

Output :

```
1 a = int(input("Enter A : "))
2 b = int(input("Enter B : "))
3 print("Before : \nA : {} \nB : {}".format(a,b))
4 tmp = a
5 a = b
6 b = tmp
7
8 print("After: \nA : {} \nB : {}".format(a,b))
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<n/prt/prt_2/program_1.py FT: PYTHON BN: 1 11% LN: 1
"program_1.py" 9L, 176B written
```

Q : Write a Python function that finds all the permutations of the members of a list.

Sol :

```
def per(lst, p = 0) :
    if len(lst) == p :
        print(lst)
    else :
        for i in range(p, len(lst)) :
            lst[p], lst[i] = lst[i], lst[p]
            per(lst, p + 1)
            lst[p], lst[i] = lst[i], lst[p]
```

```

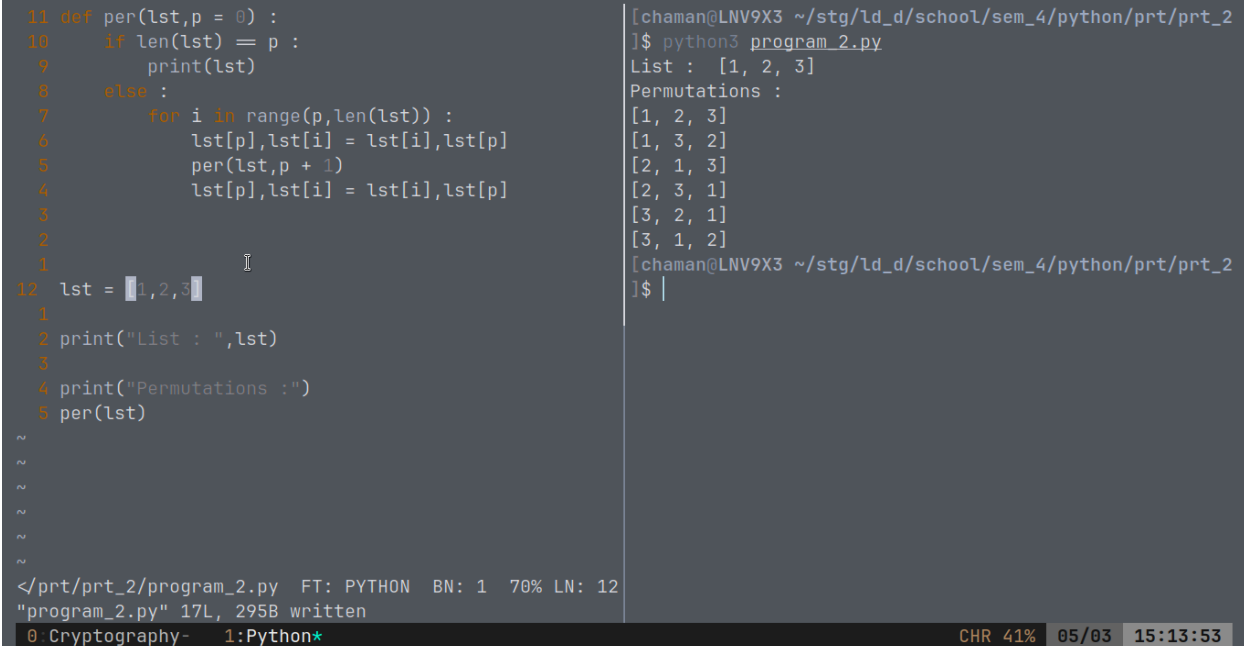
lst = [1,2,3]

print("List : ",lst)

print("Permutations :")
per(lst)

```

Output :



```

11 def per(lst,p = 0) :
10     if len(lst) == p :
9         print(lst)
8     else :
7         for i in range(p,len(lst)) :
6             lst[p],lst[i] = lst[i],lst[p]
5             per(lst,p + 1)
4             lst[p],lst[i] = lst[i],lst[p]
3
2
1
12 lst = [1,2,3]
1
2 print("List : ",lst)
3
4 print("Permutations :")
5 per(lst)
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</prt/prt_2/program_2.py FT: PYTHON BN: 1 70% LN: 12
"program_2.py" 17L, 295B written
0 Cryptography- 1:Python* CHR 41% 05/03 15:13:53

```

Q : Write a Python function to find the union and intersection of two lists.

Sol :

```

def union(lst_1,lst_2) :
    lst_3 = []
    lst_3 = set(lst_1+lst_2)
    lst_3 = list(lst_3)
    return lst_3

def diff(lst_1,lst_2) :
    lst_3 = []
    lst_3 = list(set(list(set(lst_1)-set(lst_2)) +
list(set(lst_2)-set(lst_1))))
    return lst_3

_list_ = [1,2,3,4,5,8,8,0,1,6,7]
_list2_ = [1,2,3,4,5,6,7,8,0,4,1,6,9]

print(_list_)

```

```
print(_list2_)
```

```
print('Union : {}'.format(union(_list_,_list2_)))
```

```
print('Difference : {}'.format(diff(_list_,_list2_)))
```

```
11 def union(lst_1,lst_2) :
10     lst_3 = []
9     lst_3 = set(lst_1+lst_2)
8     lst_3 = list(lst_3)
7     return lst_3
6
5 def diff(lst_1,lst_2) :
4     lst_3 = []
3     lst_3 = list(set(list(set(lst_1)-set(lst_2)) +
2     return lst_3
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12
1 _list_ = [1,2,3,4,5,8,8,0,1,6,7]
2 _list2_ = [1,2,3,4,5,6,7,8,0,4,1,6,9]
3
4 print(_list_)
5 print(_list2_)
6
7 print('Union : {}'.format(union(_list_,_list2_)))
8 print('Difference : {}'.format(diff(_list_,_list2_)))
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</prt/prt_2/program_3.py FT: PYTHON BN: 1 60% LN: 12
10 fewer lines
0: Cryptography- 1: Python* NCH 89% 05/03 18:28:14
```

Q : Python program to generate the prime numbers from 1 to N.

Sol :

```
n = int(input("Enter : "))
```

```
for num in range(2,n) :
    p=True
    for i in range(2,num) :
        if (num%i==0) :
            p=False
    if p :
        print(num)
```



0: Cryptography- 1: Python\*

CHR 44% 05/03 15:17:05

# Practical 3

Q : Write a program for Merge Sort.

Sol :

```
import random
def __merge_sort__(_list_):
    if len(_list_) > 1 :

        left_list = _list_[:len(_list_)//2]
        right_list = _list_[len(_list_)//2:]

        __merge_sort__(left_list)
        __merge_sort__(right_list)

    i = j = k = 0

    while i < len(left_list) and j < len(right_list):
        if left_list[i] < right_list[j] :
            _list_[k] = left_list[i]
            i+=1
        else :
            _list_[k] = right_list[j]
            j+=1
        k+=1
    while i < len(left_list) :
        _list_[k] = left_list[i]
        i+=1
        k+=1
    while j < len(right_list) :
        _list_[k] = right_list[j]
        j+=1
        k+=1

size = int(input("Enter Size : "))
_list_ = random.sample(range(100),size)
print("Before :",_list_)
__merge_sort__(_list_)
print("After : {}".format(_list_))
```

Output :



```
program_1.py program_2.py program_3.py
1 import random
2 def __merge_sort__(list_):
3     if len(list_) > 1 :
4         left_list = list[:len(list_)//2]
5         right_list = list[len(list_)//2:]
6
7         __merge_sort__(left_list)
8         __merge_sort__(right_list)
9
10        i = j = k = 0
11
12        while i < len(left_list) and j < len(right_list):
13            if left_list[i] < right_list[j] :
14                list_[k] = left_list[i]
15                i+=1
16            else :
17                list_[k] = right_list[j]
18                j+=1
19                k+=1
20        while i < len(left_list) :
21            list_[k] = left_list[i]
22            i+=1
23            k+=1
24        while j < len(right_list) :
25            list_[k] = right_list[j]
26            j+=1
27            k+=1
28
29 size = int(input("Enter Size : "))
30 _list_ = random.sample(range(100),size)
31 print("Before :",_list_)
32 __merge_sort__(list_)
33 print("After : {}".format(_list_))
~
< d/school/sem_4/python/prt_3/program_2.py FT: PYTHON BN: 2 2% LN: 1:1
34 lines yanked into ""
0 Cryptography 1:Python* 2 vim- CHR 96% 20/03 22:19:43
```

Q : Write a program for Bubble Sort.

Sol :

```
import random
```

```
def __bubble_sort__(lst):
    for i in range(len(lst)):
        for j in range(len(lst)):
            if lst[i]<lst[j]:
                temp = lst[j]
                lst[j] = lst[i]
                lst[i] = temp
    return lst
```

```
_list_ = random.sample(range(100),10)
print("Before :",_list_)
print("After :",__bubble_sort__(_list_))
```

Output :

```
program_1.py  program_2.py  program_3.py
1 import random
2
3 def __bubble_sort__(lst):
4     for i in range(len(lst)):
5         for j in range(len(lst)):
6             if lst[i]<lst[j]:
7                 temp = lst[j]
8                 lst[j] = lst[i]
9                 lst[i] = temp
10    return lst
11
12 _list_ = random.sample(range(100),10)
13 print("Before :",_list_)
14 print("After :",__bubble_sort__(_list_))
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```

```

size = int(input("Enter Size : "))
_list_ = random.sample(range(100),size)
print("Before :",_list_)
__quick_sort__(_list_, 0, len(_list_)-1)
print("After : {}".format(_list_))

```

Output :

```

program_3.py program_3.py
3 import random
4
5 def __quick_sort__(lst, _left_, _right_):
6     if _left_ < _right_ :
7         block = __partition__(lst, _left_, _right_)
8         __quick_sort__(lst, _left_, block - 1)
9         __quick_sort__(lst, block + 1, _right_)
10
11 def __partition__(lst, left, right):
12     i = left
13     j = right - 1
14     pivot = lst[right]
15
16     while i < j :
17         while i < right and lst[i] < pivot :
18             i += 1
19         while j > left and lst[j] >= pivot :
20             j -= 1
21         if i < j:
22             lst[i], lst[j] = lst[j], lst[i]
23     if lst[i] > pivot:
24         lst[i], lst[right] = lst[right], lst[i]
25     return i
26
27 size = int(input("Enter Size : "))
28 _list_ = random.sample(range(100),size)
29 print("Before :",_list_)
30 __quick_sort__(_list_, 0, len(_list_)-1)
31 print("After : {}".format(_list_))
<d/school/sem_4/python/prt/prt_3/program_3.py FT: PYTHON BN: 3 12% LN: 4:5

[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_3]$ python3 program_3.py
Enter Size : 10
Before : [96, 55, 6, 89, 54, 10, 20, 44, 28, 2]
After : [2, 6, 10, 20, 28, 44, 54, 55, 89, 96]
[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_3]$ python3 program_3.py
Enter Size : 18
Before : [14, 60, 29, 79, 55, 40, 11, 35, 84, 20, 71, 8, 67, 92, 97, 17, 44, 34]
After : [8, 11, 14, 17, 20, 29, 34, 35, 40, 44, 55, 60, 67, 71, 79, 84, 92, 97]
[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_3]$

0 Cryptography 1:Python* 2 vim- CHR 98% 20/03 22:25:13

```

# Practical 4

Q : Write a Python program to list only directories, files and all directories, files in a specified path.

Sol :

```
import os

_path_ = input("Enter Path : ")

if _path_ :
    for folder in os.scandir(_path_) :
        if folder.is_dir() :
            print(folder.path)
else :
    _path_ = os.getcwd()
    print("Path : ",_path_)
    for folder in os.scandir(_path_) :
        if folder.is_dir() :
            print(folder.path)
```

Output :

```

program_1.py program_2.py program_3.py program_4.py
1 import os
2
3
4 if _path_ :
5     for folder in os.scandir(_path_) :
6         if folder.is_dir() :
7             print(folder.path)
8 else :
9     _path_ = os.getcwd()
10    print("Path : ",_path_)
11    for folder in os.scandir(_path_) :
12        if folder.is_dir() :
13            print(folder.path)
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[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_4]$ python program_1.py
Enter Path :
Path : /home/chaman/stg/ld_d/school/sem_4/python/prt/prt_4
[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_4]$ python program_1.py
Enter Path : /home/chaman/stg/ld_d/school/sem_4/python/prt/prt_4
/home/chaman/stg/ld_d/school/sem_4/python/prt/prt_4
/home/chaman/stg/ld_d/school/sem_4/python/prt/prt_1
/home/chaman/stg/ld_d/school/sem_4/python/prt/prt_3
/home/chaman/stg/ld_d/school/sem_4/python/prt/prt_2
[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_4]$

```

```

<ython/prt/prt_4/program_1.py FT: PYTHON BN: 1 7% LN: 1:1
14 lines yanked into "*"

```

0 Cryptography- 1:Python\* 2 LSS 3 DAA 4 Temp BAT 78% 30/03 04:44:39

Q : Write a Python program to scan a specified directory and identify the subdirectories and files.

Sol :

```
import os
```

```

_path_ = input("Enter Path : ")

if _path_ :
    for curr,folder,file in os.walk(_path_) :
        print("Current Dir : ",curr)
        print("Folders : ",folder)
        print("Files : ",file)
else :
    _path_ = os.getcwd()
    print("Path : ",_path_)
    for curr,folder,file in os.walk(_path_) :
        print("Current Dir : ",curr)
        print("Folders : ",folder)
        print("Files : ",file)

```

Output :

```

program_1.py program_1.py program_3.py program_4.py
1 import os
2 _path_ = input("Enter Path : ")
3
4 if _path_ :
5     for folder in os.scandir(_path_) :
6         if folder.is_dir() :
7             print(folder.path)
8 else :
9     _path_ = os.getcwd()
10    print("Path : ",_path_)
11    for folder in os.scandir(_path_) :
12        if folder.is_dir() :
13            print(folder.path)
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```

```

    print("Created : ",datetime.fromtimestamp(os.stat(_path_).st_ctime))
    print("Last Modified : ",datetime.fromtimestamp(os.stat(_path_).st_mtime))
    print("Last Accessed : ",datetime.fromtimestamp(os.stat(_path_).st_atime))
else :
    _path_ = os.getcwd()
    print("Path : ",_path_)
    print("Mode : ",os.stat(_path_).st_mode)
    print("Owner : ",os.stat(_path_).st_dev)
    print("Created : ",datetime.fromtimestamp(os.stat(_path_).st_ctime))
    print("Last Modified : ",datetime.fromtimestamp(os.stat(_path_).st_mtime))
    print("Last Accessed : ",datetime.fromtimestamp(os.stat(_path_).st_atime))

```

Output :

```

program_1.py program_2.py program_3.py program_4.py
1 import os
2 from datetime import datetime
3 _path_ = input("Enter Path : ")
4
5 if _path_ :
6     print("Mode : ",os.stat(_path_).st_mode)
7     print("Owner : ",os.stat(_path_).st_dev)
8     print("Created : ",datetime.fromtimestamp(os.stat(_p
9     print("Last Modified : ",datetime.fromtimestamp(os.s
10    print("Last Accessed : ",datetime.fromtimestamp(os.s
11 else :
12     _path_ = os.getcwd()
13     print("Path : ",_path_)
14     print("Mode : ",os.stat(_path_).st_mode)
15     print("Owner : ",os.stat(_path_).st_dev)
16     print("Created : ",datetime.fromtimestamp(os.stat(_p
17     print("Last Modified : ",datetime.fromtimestamp(os.s
18     print("Last Accessed : ",datetime.fromtimestamp(os.s

```

```

[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_4]$ python program_3.py
Enter Path :
Path : /home/chaman/stg/ld_d/school/sem_4/python/prt/prt_4
Mode : 16877
Owner : 2050
Created : 2023-03-28 11:11:22.892519
Last Modified : 2023-03-28 11:11:22.892519
Last Accessed : 2023-03-30 04:41:18.739394
[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_4]$

```

python/prt/prt\_4/program\_3.py FT: PYTHON BN: 3 5% LN: 1:1  
19 lines yanked into "+

0 Cryptography- 1:Python\* 2 LSS 3 DAA 4 Temp BAT 73% 30/03 05:03:53

Q : Write a Python program to access environment variables and the value of the environment variable.

Sol :

```

import os

print("Environment Variables : ",os.environ)
print("\n\nValue of Env Variable for HOME : ",os.getenv('HOME'))

```

Output :

```

program_1.py program_2.py program_3.py program_4.py
2 import os
1
3 print("Environment Variables : ",os.environ)
1 print("\n\nValue of Env Variable for HOME : ",os.getenv('HOME'))
2

[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_4]$ python program_4.py
Environment Variables : environ({'BROWSER': 'w3m', 'DBUS_SESSION_BUS_ADDRESS': 'unix:path=/run/user/1000/bus', 'DEBUGINFOD_URLS': 'https://debuginfod.archlinux.org', 'DISPLAY': ':0', 'EDITOR': 'vim', 'FZF_DEFAULT_OPTS': '--layout=reverse', 'HOME': '/home/chaman', 'INVOCATION_ID': 'c423d6e3abcf48c3afe8445a793119d9', 'KEYTIMEOUT': '1', 'LANG': 'en_IN.UTF-8', 'LC_COLLATE': 'C', 'LESSHISTFILE': '/home/chaman/.cache/less/history', 'LOGNAME': 'chaman', 'MAIL': '/var/spool/mail/chaman', 'MOTD_SHOWN': 'pam', 'OLDPWD': '/home/chaman/stg/ld_d/school/sem_4/python/prt/prt_4', 'PATH': '/home/chaman/.cargo/bin:/usr/local/sbin:/usr/local/bin:/usr/bin:/usr/sbin:/site_perl:/usr/bin/vendor_perl:/usr/bin/core_perl:/home/chaman/.local/bin', 'PWD': '/home/chaman/stg/ld_d/school/sem_4/python/prt/prt_4', 'SHELL': '/usr/bin/zsh', 'SHLVL': '2', 'SYSTEMD_EXEC_PID': '295', 'TERM': 'tmux-256color', 'TERMINAL': 'st', 'TERM_PROGRAM': 'tmux', 'TERM_PROGRAM_VERSION': '3.3a', 'TMUX': '/tmp/tmux-1000/default,618952,3', 'TMUX_PANE': '%13', 'USER': 'chaman', 'WATCH_INTERVAL': '0.1', 'WINDOWID': '29360134', 'WINDOWPATH': '1', 'XAUTHORITY': '/tmp/Xauthority', 'XDG_CACHE_DIR': '/home/chaman/.cache', 'XDG_CONFIG_DIR': '/home/chaman/.config', 'XDG_DOCUMENTS_DIR': '/home/chaman/docs', 'XDG_DOWNLOAD_DIR': '/home/chaman/dwla', 'XDG_HOME_DIR': '/home/chaman', 'XDG_RUNTIME_DIR': '/run/user/1000', 'XDG_SEAT': 'seat0', 'XDG_SESSION_CLASS': 'user', 'XDG_SESSION_ID': '1', 'XDG_SESSION_TYPE': 'tty', 'XDG_VTNR': '1', 'ZDOTDIR': '/home/chaman/.config/zsh', '_': '/usr/bin/python'})

Value of Env Variable for HOME : /home/chaman
[chaman@LNV9X3 ~/stg/ld_d/school/sem_4/python/prt/prt_4]$

<hon/prt/prt_4/program_4.py FT: PYTHON BN: 4 60% LN: 3:14
"program_4.py" 5L, 122B [w]
0 Cryptography- 1:Python* 2 LSS 3 DAA 4 Temp
BAT 73% 30/03 05:05:08

```