Vidyavardhaka College of Engineering

Gokulam III stage, Mysuru – 570 002
Autonomous Institute under Visvesvaraya Technological University (VTU)
Accredited by NBA (2020- 2023) & NAAC with 'A' Grade (2018 - 2023)

VVCE

Semester – IV

Course Name	: Python Programming Laboratory	Course Code :	20CS38
No. of Lecture Hours / Week	: 01	CIE Marks :	50
No. of Tutorial / Practical Hours / Week	: 02	SEE Marks :	50
Total No. of Lecture + Tutorial / Practical Hours	: 32	SEE Duration :	03 hr.
L:T:P	: 1:0:2	Credits :	02

Course Overview

The laboratory course Python Application Programming aims to introduce the students about the basics of writing and running python scripts. The students will be able to enhance their analyzing and problem-solving skills by implementing suitable functionality using core data structures like lists, dictionaries, tuples and sets in Python to store, process and sort the data.

Course Learning Objectives (CLO)

The course should enable the students to

- Learn the syntax and semantics of Python
- Interpret the use of procedural statement like assignment, conditional statements, loops and function call
- Demonstrate the use of built-in functions
- Infer the supported data structures like list, dictionaries and tuples in Python
- Describe the need for Object-oriented programming concepts in Python

Part – A

1. Define a method that getname() takes number as input (1/2/3) and returns a string as output (rock/paper/scissor). Develop a Python program using the method getname() to implement the Rock-Paper-Scissor game. Use random number generator for providing computer choice and manual entry for taking user choice. Once started, the game must continue till the user wishes to exit.

2. Develop a Python program to
   a) Extract substring present between @ and #.
   b) Count occurrence of character 'e' in a string without using built-in method.
   c) Accept a string and display only characters at the even positions of accepted string (ignoring the blank spaces) in reverse order.

3. Develop a Python program to
   a) Print all words present in a string along with their length and total words present in the string.
   b) Given a list, the task is to write a Python program to replace the grouping of the consecutive elements with a product of the frequency and Item.

4. a.Count the total number of apples bought by the guests in the given dictionary
AllGuests = {'Alice': {'apples': 5, 'mangoes': 12}, 'Bob': {'mangoes': 3, 'apples': 2}, 'Carol': {'cups': 3, 'apple pies': 1}}
b. Count the occurrence of all the characters in the string.

5. Design a Python program using Regular expressions to
a) Extract Email IDs from a given text.
b) Validate the user password with minimum length=6 and maximum length=16 and must have at least one lower-case letter, upper-case letter, number and special symbol (#, @, $, _).

6.Perform the following file operations using Python program:
a) Read a file content and copy only the contents at odd lines into a new file.
b) Remove all the occurrences of word "and" present in a file.

7. Develop a python program to create a class Employee with members' eid, name, place,and department. Include methods to accept and display details and a method to display employees details who belong to the same place.[OOP introducing]

8. Develop an application using the 'tkinter' GUI package to randomly assign program numbers for students and store the assigned details in a CSV file.

<u>Open ended Experiments:</u>

The student can choose to solve any one open-ended problem to illustrate python application in the domains specified below (but not restricted to) using various python packages

i. Excel file handling

ii. PDF/word file manipulation

iii. CSV file analysis

iv. GUI development for python application

Simple Games

1. **Design a Python program to implement the Rock-Paper-Scissor game**

```
def getname():
    print("Enter choice \n 1. Rock \n 2. paper \n 3. scissor \n")
    choice = int(input("User turn: "))
    while choice > 3 or choice < 1:
          choice = int(input("enter valid input: "))
    if choice == 1:
        choice_name = 'Rock'
    elif choice == 2:
        choice_name = 'paper'
    else:
        choice_name = 'scissor'
    return (choice,choice_name)


import random
print("Winning Rules of the Rock paper scissor game is as follows: \n" + "Rock vs paper
->paper wins \n" + "Rock vs scissor->Rock wins \n" + "paper vs scissor->scissor wins
\n")
while True:
    (choice,user_choice)=getname()
    print("user choice is: " + user_choice)
    print("\nNow its computer turn.....")

    comp_choice = random.randint(1, 3)
    while comp_choice == choice:
        comp_choice = random.randint(1, 3)

    if comp_choice == 1:
        comp_choice_name = 'Rock'
    elif comp_choice == 2:
        comp_choice_name = 'paper'
    else:
        comp_choice_name = 'scissor'

    print("Computer choice is: " + comp_choice_name)
    print(user_choice + " V/s " + comp_choice_name)

    if((choice == 1 and comp_choice == 2) or (choice == 2 and comp_choice ==1 )):
        print("paper wins => ", end = "")
        result = "paper"

    elif((choice == 1 and comp_choice == 3) or (choice == 3 and comp_choice == 1)):
        print("Rock wins =>", end = "")
```

```
        result = "Rock"
    else:
        print("scissor wins =>", end = "")
        result = "scissor"

    if result == user_choice:
        print("<== User wins ==>")
    else:
        print("<== Computer wins ==>")

    print("Do you want to play again? (Y/N)")
    ans = input()
    if ans == 'n' or ans == 'N':
   break
```

2. Develop a Python program to
   a) Extract substring present betweem @ and #

```
str="Good@morning#have a nice day"
index1 = str.find('@')   #4
index2 = str.find('#')   #12
substr = str[index1+1 : index2]
 print(substr)
```

   b) Count occurrence of character 'e' in a string

```
count = 0
str = input("Enter a String\n")
for letter in str:
        if letter == 'e':
             count = count+1
 print (count)
```

   c) Accept a string and display only characters at the even positions of accepted string (ignoring the blank spaces) in reverse order.

```
str=input("Enter a string\n")
str1=str.replace(" ","")
print(str1)
modified_str=str1[::-2]
print(modified_str)
```

3. Develop a Python program to

a) Print all words present in a string along with their length and total words present in the string.

```
str="how are you"
L = str.split()
print(L)
count=0
for word in L:
    print(word,":",len(word))
    count+=1
print("number of words:",count)
```

b) Given a list, the task is to write a Python program to replace the grouping of the consecutive elements with a product of the frequency and Item.

```
#initializing list
"""test_list = [3, 3, 3, 3, 6, 7, 5, 5, 5, 8,
          8, 6, 6, 6, 6, 6, 1, 1, 1, 2, 2]
"""
test_list = [3, 3, 6, 7, 5, 5, 6, 6, 6, 2, 2]
# printing original list
print("The original list is : " ,test_list)

res = []
count = 1
for idx in range(1, len(test_list)):
    # checking with prev element
    if test_list[idx - 1] != test_list[idx]:
        # appending product
        res.append((test_list[idx - 1] * count))
        count = 0
    count += 1
res.append((test_list[-1] * count))
# printing result
print("Elements after equal Consecution product : " ,res)
```

4. a) Count the total number of apples bought by the guests in the given dictionary
AllGuests = {'Alice': {'apples': 5, 'mangoes': 12}, 'Bob': {'mangoes': 3, 'apples': 2}, 'Carol': {'cups': 3, 'apple pies': 1}}

```
allGuests = {'Alice': {'apples': 5, 'pretzels': 12}, 'Bob': {'ham sandwiches': 3, 'apples': 7}, 'Carol': {'cups': 3, 'apple pies': 1}}
fruit = 'apples'
numBrought = 0
```

```
for k,v in allGuests.items():
    numBrought = numBrought + v.get(fruit, 0)
print(numBrought)
```

b)Count the occurrence of all the characters in the string.

```
str='good morning'
D=dict()
for ch in str:
    if ch in D:
        D[ch]=D[ch]+1
    else:
        D[ch]=1
print(D)
```

(Or)

```
str='good morning'
D=dict();
for ch in str:
    D[ch]=D.get(ch,0)+1
print(D)
```

5.**Design a Python program using Regular expressions to**

a) Extract Email IDs from a given text.

```
import re
 emailRegex = re.compile(r'''(
                [a-zA-Z0-9._%+-]+    # username
                @                    # @ symbol
                [a-zA-Z0-9.-]+       # domain name
                (\.[a-zA-Z]{2,4})    #dot-something
              )''',re.VERBOSE)
 matches = []
 text = "xyz@gmil.com and abc_987@vvce.ac.in are the mail ids. (897)-012-3456
ext.23 and 897.012-3456x23 are numbers"
 for groups in emailRegex.findall(text):
                matches.append(groups[0])
  print(matches)
```

b) Validate the user password with minimum length=6 and maximum length=16 and must have at least one lower-case letter, upper-case letter, number and special symbol (#, @, $, _).

```
import re
p= input("Input your password")
x = True
while x:
    if (len(p)<6 or len(p)>12):
        break
    elif not re.search("[a-z]",p):
        break
    elif not re.search("[0-9]",p):
        break
    elif not re.search("[A-Z]",p):
        break
    elif not re.search("[$#@_]",p):
        break
    elif re.search("\s",p):
        break
    else:
        print("Valid Password")
        x=False
        break
if x:
    print("Not a Valid Password")
```

6.Perform the following file operations using Python program:

a) Read a file content and copy only the contents at odd lines into a new file.

```
source_file = input("Enter the Source file name: ")
destination_file = input("Enter the Destination file name: ")
try:
    with open(source_file) as in_file, open(destination_file, "w") as out_file:
        list_of_lines = in_file.readlines()
        for i in range(0, len(list_of_lines)):
            if i % 2 != 0:
                out_file.write(list_of_lines[i])
except IOError:
```

```
    print("Error in file names")
```

b) Remove all the occurrences of word "and" present in a file.

d) Remove the word "the" present in a string

```
str='this is the sentence'
l=str.split()
while('the' in l):
        l.remove('the')
delimiter=' '
str=delimiter.join(l)
print(str)
```

Part B

Open-Ended Experiments: The student can choose to solve any one open-ended problem to illustrate python application in the domains specified below (but not restricted to) using various python packages

- Excel file handling
- PDF/word file manipulation
- CSV file analysis
- Web scraping
- Chatbot
- Image processing
- Database Management
- Network Programming
- GUI development for python application
- Simple Games

Experiment Weightage

Type of Experiment	Program-No	Weightage
Demonstration	1, 5	20%
Exercise	2,8,9	30%
Structured Enquiry	3,6,7,10	40%
Open ended enquiry	4	10%

Course Outcomes (COs)

At the end of the course, students will be able to

CO1	Demonstrate the usage of Python language syntax including control statements, loops, and functions
CO2	Design and Develop Python programs to implement the core data structures like lists, dictionaries, tuples and sets
CO3	Employ various IDEs for the development of python application for the given problem

CO – PO – PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												2		
CO		3											3		

2														
CO 3			1									1		
Avg.	2	3	1									2		