MCKV Institute of Engineering

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Subject: IT WORKSHOP (USING PYTHON) LAB **Code: PC - CS 392**

Stream: CSE – DS **Credit: 1.5**

Assignment: - 01/ ***Introduction to python Program and concept of Data Types***

A. Write a program to print MCKVIE and Computer Science & Engineering. Apply \n in your program.
B. Consider the radius of a Circle and write a python program to calculate area and perimeter and display the results.

Assignment: - 02/ ***Concept of Variables and Operators***

A. Write a python program to swap two variables using and without using third variable.
B. Consider the basic pay of an employee as user input. AGP is 50% of the basic pay. Company provides 50% DA and 15% HRA on the merged basic. Write a python program to calculate and display total salary of the employee.

Assignment: - 03/ ***Concept of Operators and Conditional Statement***

A. Write a python program to find the greatest among three numbers.
B. Write a python program to check whether a year is Leap Year.
C. In general, an equation of the form $ax^2 + bx + c = 0$ is known as quadratic equation. Accept the values of a, b, and c from the user and write a python program to calculate the roots of the given quadratic equation.

Assignment: - 04/ ***Concept of Loop Structure and Use of break keyword***

A. Write a python to generate Fibonacci Series up-to n terms using loop.
B. Write a python program to generate all Prime Numbers within a range, where range is user input.
C. Write a python program to reverse a number and check whether it is a Palindrome.

Assignment: - 05/ ***Loop Structure continued…***

A. An automorphic number is the number which contained in last digit(s) of its square. Example 25 is an automorphic number as its square is 625 and 25 is present as the last two digits. Write a python script to print all two digits automorphic numbers.
B. A number is said to be a special number, if the sum of the factorial of the digits of a number is same as the original number. Example-145 is a special number, because 1! + 4! + 5! =145. Write a python script to print all special numbers within range 100 to 999.
C. Write three separate python programs to generate the following patterns:

```
    *
  * * *
* * * * *
  * * *
    *
```

```
        1
      2 1
    3 2 1
  4 3 2 1
5 4 3 2 1
```

```
A B C D E D C B A
A B C D   D C B A
A B C       C B A
A B           B A
A               A
```

Assignment: - 06/ *Concept of List*

A. Write a python program to find out the largest and smallest element from a 1D and 2D list.

B. Remove all the duplicate element from a list.

C. Take 2 multiplication compatible matrices as input and show the result of multiplication in matrix format.

Home Assignment

D. Write a menu driven python program to sort a list on n numbers using the following sorting techniques:
(a)Bubble Sort. (b) Selection sort. (c) Insertion Sort.

E. Write a menu driven python program to search an element from list on n numbers using following searching techniques: (a) Linear Search (b) Binary Search

F. Write a menu driven python program to implement a stack operation (Push, Pop, and Display) using array.

G. Write a menu driven python program to implement a Linear Queue using array.

H. Write a menu driven python program to implement a Circular Queue using array.

Assignment: - 07/*Concept of String Manipulation*

A. Write a program that accepts a sentence and calculate the number of upper-case letters and lower-case letters.
Input Format: The first line of the input contains a statement.
Output Format: Print the number of upper case and lower case respectively.
Example:
Input: Hello world!
Output: 1 9

B. Write a program to show all the common words between two strings.

C. Write a program that accepts a comma-separated sequence of words as input and prints the words in a comma-separated sequence after sorting them alphabetically.
Input Format: The first line of input contains words separated by the comma.
Output Format: Print the sorted words separated by the comma.
Example:
Input: without, hello, bag, world
Output: bag, hello, without, world

D. If we have some email addresses in the "username@companyname.com" format, please write program to print the company name of a given email address. Both usernames and company names are composed of letters only.
Input Format: The first line of the input contains an email address.
Output Format: Print the company name in single line.
Example;
Input: john@google.com
Output: google

Assignment: - 08/ *Concept of Set, Tuple & Dictionaries, Functions & Exception Handling*

A. Take a string as input. Form a dictionary which will have each unique word present in the string as key and frequency of the word as value.
Original string: Python is inspired by Monty Python
Printing count of each item {"Python": 2, "is": 1, "inspired": 1, "by": 1, "Monty": 1}

B. A string with parentheses is well bracketed if all parentheses are matched: every opening bracket has a matching closing bracket and vice versa. Write a Python program using function to check an expression is well bracketed or not.

C. Write ratotalist(), Python function which will take 3 paramaters as input . 1st parameter is a list which to be rotated, 2nd parameter will be the number times it will be rotated and 3rd one will the direction ("Left" / "Right"). The function will return a new rotated list. Number of rotation must be less than the number of element in the list, else it will throw a user define exception and return the original list. By default number of rotation will be 1 and direction of rotation will be "Left".

Here are some examples to show how your function should work.
>>> rotatelist([1,2,3,4,5], 1,"Right")
[5, 1, 2, 3, 4]
>>> rotatelist([1,2,3,4,5], 3, "Left")
[4, 5, 1, 2, 3]

D. Write a recursive Python code to implement a soltions for Tower of Hanio for 'n' disk.

Assignment: - 9/*Concept of Class, Object, Methods, Inheritance, Modules*

A. Write a program to create a class Circle. Perform the following operations on it.
   i) Define the attribute/variable radius.
   ii) Define the constructor with one argument containing radius.
   iii) Define the method named get_radius() which returns the radius of the circle.
   iv) Define the method named calc_area() which return the area of the circle
B. Write a program to implement single inheritance
   i) Create the parent class Circle. Initialize the constructor with the radius of the circle.
   ii) Define the method get_radius() and calc_area() to know the radius and area of the circle.
   iii) Create the child class named Cylinder. Initialize the value of the height within the constructor and call the constructor of the parent class to initialize the radius of the cylinder.
   iv) Finally define the method calc_area() in class cylinder to calculate the area of cylinder (2*pi*r*(h+r)).
C. Write a program to implement the concept of multilevel inheritance
   i) Create the parent class StLine. Initialize the constructor with length the straight line.
   ii) Create another class named Square which inherits the properties of parent class StLine. Initialize the side of the square by using the constructor of the parent class. Define the method calc_area() to return the area of the Square.
   iii) Create another class named Cube which inherits the properties of parent class Square. Define the attributes height of Cube class. Also call the constructor of the parent class for the edges of the cube. Define the method calc_area() to return the area of the Cube.
   iv) Finally, create the instances of StLine, Square, and Cube classes to return the area of the of the respective classes.
D. Write a program to implement the concept multiple inheritance
   i) Define a class SqrArea. With in this class define a method cal_area() to calculate the area of a square.
   ii) Define a class SqrPeri. With in this class define a method cal_peri() to calculate the peripheral of a square.
   iii) Define a class Sqr for square by inheriting the SqrArea and SqrPeri class. Initialize the constructor with length the side. Define a method show() to show the area and the peripheral of the square.

E. Write a program to implement the concept of module and operator overloading
   i) Define a module name powerset, which consist of the PowerSet.
   ii) In PowerSet class, overload the +, *, and - to perform Set Union, Set Intersection and Set difference respectively.
   iii) Import this module to perform the Set Union, Set Intersection and Set difference on Sets.

Assignment: - 10/ *Concept of Files*

A. Write a program in python to create a text file and write the text "Welcome to Python" in the file.
B. Write a program in python to store the first n prime numbers in text file.
C. Write program in Python to store Fibonacci numbers between 0 to n, in a text file.
D. Write a program in Python to read line(s) of a text file and display the lines.
E. Write a program in Python to find the size of a file.

1. _____

2. _____

Signatures of the Faculty Members Signatures of HOD (CSE)