MCKV Institute of Engineering

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Subject: IT WORKSHOP LAB USING PYTHON **Code: PCC-CS393**
Stream: CSE **Credit: 3**

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. 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.
C. Write a python program to check whether a year is Leap Year.
D. Write a python program to check whether a entered character is lowercase (a to z) or uppercase (A to Z).
E. A student will not be allowed to sit in exam if his/her attendance is less than 75%. Write a python program to take following input from user (a) Number of classes held, (b) Number of classes attended. Print percentage of class attended, also print whether that particular student is allowed to sit in exam or not. Modify the above question to allow student to sit if he/she has medical cause. Ask user if he/she has medical cause or not ('Y' or 'N') and print accordingly.
F. An Electric Power Distribution Company charges its domestic consumers as follows:

Consumption Unit	Rate of Charge
0 – 200	Rs 0.50 per unit
201 – 400	Rs 100 + Rs 0.65 per unit
401 – 600	Rs 200 + Rs 0.80 per unit
Above 600	Rs 300 + Rs 1.00 per unit

Write a python program which will accept number of units from the consumer and display the amount to be paid.

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

A. Write a python program to calculate $y = x^n$, where x and n are user inputs, using loop.
B. Write a python to generate Fibonacci Series up-to n terms using loop.
C. Write a python program to generate all Prime Numbers within a range, where range is user input.
D. 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 automorphic numbers within range 11 to 100.
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:

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$	*	*	*	$		A	B	C	D	E	D	C	B	A					1
*	$		$	*		A	B	C	D		D	C	B	A				1	2
*		$		*		A	B	C				C	B	A			1	2	3
*	$		$	*		A	B						B	A		1	2	3	4
$	*	*	*	$		A								A		1	2	3	4	5

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D. A composite magic number is positive integer which is composite as well as magic number. Composite number is a number that has more than two factors (For example 10, factors are 1, 2, 5, 10). A magic number is a number in which eventual sum of the digits is equals to 1(For example 28 = 2+8= 10=1+0=1). Write a python program which accepts two positive integer m and n, where m is less than n. Display the composite magic positive integers that are in range between m and n (both inclusive) and output them along with frequency.
Example- m=10 and n=100
Composite magic integers are 10, 28, 46, 55, 64, 82, 91, 100
Frequency of composite magic integers is 8.

E. A circular prime number is a prime number that remains prime under cyclic shifts of digits. When the leftmost digit is removed and replaced at the end of remaining string of digits, the generated number is still prime. The process is repeated until the original number is reached again. A number is said to be prime if it has only two factors 1 and itself. Write a python program which will accept a positive number N and check whether it is a circular prime or not. The new numbers formed after shifting of digits should also be displayed.
Example- 131 – 311 – 113 [131 is Circular Prime]
197 – 971 – 719 [197 is Circular Prime]
1193 – 1931 – 9311 -3119 [1193 is circular Prime]
29 – 92 [29 is not circular prime]

Assignment: - 06/*Concept of Array*

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

B. Write a python program to store 6 elements in an array P, and 4 elements in an array Q and produce a third array R, containing all the elements of array P and Q. Display the resultant array.

C. 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.

D. 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

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

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

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

H. Write a python program to declare a square matrix A [][] of order (M X M) where M must be greater than 3 and less than 10. Allow the user to input positive integers into this matrix. Perform the following task on the matrix.

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Sort the non-boundary elements in ascending order using any standard sorting technique and rearrange them in the matrix. Calculate the sum of both diagonals. Display the original matrix, rearranged matrix, and only the diagonal elements of rearranged matrix with their sum.

INPUT M=4	OUTPUT Original Matrix	OUTPUT Rearranged Matrix	OUTPUT Rearranged Matrix
9 2 1 5 8 13 8 4 15 6 3 11 7 12 23 8	9 2 1 5 8 13 8 4 15 6 3 11 7 12 23 8	9 2 1 5 8 3 6 4 15 8 13 11 7 12 23 8	9 5 3 6 8 13 7 8 Sum of diagonal=59

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 separated by a space.
Example:
Input: Hello world!
Output: 1 9

B. Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized.
Input Format: The first line of the input contains a number n which represents the number of line. From second line there are statements which has to be converted. Each statement comes in a new line.
Output Format: Print statements with each word in capital letters.
Example:
Input: 2 Hello world Practice makes perfect
Output: HELLO WORLD PRACTICE MAKES PERFECT

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. Assuming that 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 user names 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

E. 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 function wellbracketed(s) that takes a string s containing parentheses and returns True if s is well bracketed and False otherwise.

Hint: Keep track of the nesting depth of brackets. Initially the depth is 0. The depth increases with each opening bracket and decreases with each closing bracket. What are the constraints on the value of the nesting depth for the string to be wellbracketed?

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Here are some examples to show how your function should work.
>>> wellbracketed("22")") False
>>> wellbracketed("(a+b)(a-b)") True
>>> wellbracketed("(a(b+c)-d)((e+f)") False

Assignment: - 08/*Concept of List, Tuple & Dictionaries & Functions*

A. Given a list iterate it and count the occurrence of each element and create a dictionary to show the count of each element.
Original list [11, 45, 8, 11, 23, 45, 23, 45, 89]
Printing count of each item {11: 2, 45: 3, 8: 1, 23: 2, 89: 1}

B. A positive integer m is a sum of squares if it can be written as k + l where k > 0, l > 0 and both k and l are perfect squares. Write a Python function sumofsquares(m) that takes an integer m returns True if m is a sum of squares and False otherwise. (If m is not positive, your function should return False.)

Here are some examples to show how your function should work.
>>> sumofsquares(41) True
>>> sumofsquares(30) False
>>> sumofsquares(17) True

C. A list rotation consists of taking the last element and moving it to the front. For instance, if we rotate the list [1,2,3,4,5], we get [5,1,2,3,4]. If we rotate it again, we get [4,5,1,2,3]. Write a Python function rotatelist(l,k) that takes a list l and a positive integer k and returns the list l after k rotations. If k is not positive, your function should return l unchanged. Note that your function should not change l itself, and should return the rotated list.

Here are some examples to show how your function should work.
>>> rotatelist([1,2,3,4,5],1)
[5, 1, 2, 3, 4]
>>> rotatelist([1,2,3,4,5],3)
[3, 4, 5, 1, 2]
>>> rotatelist([1,2,3,4,5],12)
[4, 5, 1, 2, 3]

D. A two dimensional matrix can be represented in Python row-wise, as a list of lists: each inner list represents one row of the matrix. For instance, the matrix
1 2 3
4 5 6

Would be represented as [[1,2,3],[4,5,6]].Write a Python function matmult (m1,m2) that takes as input two matrices using this row-wise representation and returns the matrix product m1*m2 using the same representation. You may assume that the input matrices are well-formed and have compatible dimensions. For instance:
>>> matmult([[1,2],[3,4]],[[1,0],[0,1]])
[[1,2],[3,4]]
>>> matmult([[1,2,3],[4,5,6]],[[1,4],[2,5],[3,6]])
[[14, 32], [32, 77]]

E. Given a string of odd length greater 7, return a string made of the middle three chars of a given String
Original String is JhonDipPeta
Middle three chars are Dip
Original String is Jasonay
Middle three chars are son

F. Given 2 strings, s1 and s2, create a new string by appending s2 in the middle of s1.

append Middle("Chrisdem", IamNewString) → "ChrIamNewStringisdem"

Assignment: - 9/*Modules*

A. Write a python program to implement basic calculator operations using user defined module.

Assignment: - 10/*Exception Handling*

A. Write a Program that prompts user to enter two numbers and displays their sum. Raise an exception and handle it if a non-number value is given as input.
B. Write a program that accepts date of birth along with other personal details of a person. Throw an exception if an invalid date is entered.
C. Write a program that finds square root of a number. Throw an exception if a negative number is entered.

Assignment: - 11/*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.

Assignment: - 12/*Concept of Class, Object, Methods, Inheritance*

A. Write a program to create a class named Demo. Define two methods Get_String() and Print_String(). Accept the string from user and print the string in upper case.
B. Write a program to create a class Circle. Perform the following operations on it.
   i) Define the attribute 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 retur
C. Write a program to create the class Point. Perform the following operations on it
   i) Initialize X and Y coordinates of the point.
   ii) Print the coordinates by defining the method Display().
   iii) Define the method Translate(X, Y) to move the point X units in Y direction and Y units in X direction.
D. 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).
E. Write a program to implement the concept of multilevel inheritance
   i) Create the parent class Shape. Initialize the constructor with colour.
   ii) Create another class named Rectangle which inherits the properties of parent class Shape. Define the attributes length and breadth in Rectangle class. Initialize the length and breadth inside the constructor of Rectangle class. Also call the constructor of the parent class to initialize the color of the Rectangle. Define the method calc_area() to return the area of the Rectangle.
   iii) Create another class named Triangle which inherits the properties of parent class Shape. Define the attributes base and height of Triangle class. Also call the constructor of the parent class to initialize the color of Triangle. Define the method calc_area() to return the area of the Triangle.
   iv) Also create the method Tring_Details() in the Triangle class and Rect_Details() in the Rectangle class to return complete details about the rectangle and triangle.
   v) Finally, create the instances of Rectangle and Triangle classes to return the area of the Rectangle and Triangle.

Home Assignment

F. Write a program that has class Time. Enter the time when user started an online test and completed the test. Subtract the two time values and display the duration in which the test was completed. Throw exception whenever need arises (like invalid data or start time is greater than the completion time).

G. Write a class Square that finds the square of a number. Throw an exception if instead of the number user enters a character.

1.

2.

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Signatures of the Faculty Members Signatures of HOD (CSE)

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