**PG-DHPCAP MARCH 2023**

**Programming Concepts – C, C++ DS Assignments for evaluation**

* Write a program that reads an array of 100 integers. Display all the pairs of elements whose sum is 50.
* Allocate a memory block (size - 100) using malloc and initialize it. Increase size (new size - 150) of the block using realloc and check if previously initialized (0 to 99 locations) values are still present. Initialize the newly added memory locations (99 to 149). Finally resize it to half of current size (new size 75) using realloc and check if previously intialized values (0 to 75) still exist.
* Create an array of student structure for 100 students. Randomly initialize marks for 3 subjects. Calculate total marks and grades (1st, 2nd, 3rd …). Count and display the number of students in each grade.
* Write a base class - “object” which contains member functions for calculating surface area and volume. Create three different classes for “Cylinder”, “Cube” and “Sphere” which derive “object” class. In the main function, calculate surface area and volume for “Cylinder”, “Cube” and “Sphere” classes.
* Write a C program for a singly linked list. Using the functionality of functions available in singly linked list, implement stack. Test different stack operations in the main function.