**LAB 11 EXERCISES**

**QUESTION # 1**

Create a structure “Triangle” with the following properties: Base, Height, Area. In the main() function create an object of Triangle type and take the user input, storing it into Base and Height of the Triangle object. Finally, calculate the area by accessing these 2 values and also storing it in the Triangle object. Then, print all data of the Triangle object.

**QUESTION # 2**

Create a structure to store Student data. A student has RollNo, Name, Department, Batch, Section, CGPA. Store the information of 5 students using **array** and then find out the following information:

* Given a user input of “RollNo”, print all the data of that student on the screen.
* Loop through the array of students and only print the data of students who are in Batch 2022.

**QUESTION # 3**

Create a Date structure which has the properties Day, Month, Year. Create an object and initialize it with the current date. Take user input of D days, then modify your original date and print on the screen the date after D days have passed.

**QUESTION # 4**

Create a Time structure which has the properties Hours, Minutes, and Seconds. Create an object and initialize it with the current time. You have a meeting today at a certain time. Take this time as input into a new object. Then, subtract the 2 times and print on the screen the remaining duration until the meeting.

**QUESTION # 5**

A card has 2 properties. Rank (1-14) & Suit (diamond, hearts, spades, clubs). Create a structure for Card, and then generate a deck of 8 cards using rand() function to decide the rank and suit of each card. Create functions to perform the following operations:

* Shuffle the deck of cards in random order.
* Sort the deck of cards in ascending order of Rank.

Take user input in a loop where the user will enter his choice whether to shuffle the deck randomly or sort it into ascending order, and call the appropriate function. Your program should terminate when the user inputs the number 0.

**QUESTION # 6**

Using your previous code for Date and Time structure, create a new structure called DateTime using nested structures concept. It should have 2 members – Date & Time. Initialise your object with the current date & time. Create 2 functions to perform the following operations:

* Add 2 DateTime objects together
* Subtract 2 DateTime objects together

**QUESTION # 7**

A chess game is played on an 8x8 board. The **Board** has 64 squares (8 rows x 8 columns). Each **Square** on the board has the following properties: Row\_Num, Column\_Num, isOccupied (occupied or not occupied), Piece. Moreover, each **Piece** has the following properties: Type (King, Queen, Bishop, Knight, Rook, Pawn), Colour (White or Black). Using the concept of nested structures, implement the above blueprint for the chess board.

Then, your program should initialize a board and fill in all of the 64 squares randomly (each square can be empty, or have a random piece on it). Finally, print the data of only those squares which are OCCUPIED (they have a piece on it). The data to be printed is Row\_Num, Column\_Num, Type, Colour.