Real Time College

STRUCTURES

1. Write a program for Employees management.
   The structure:
   - First name and last name
   - ID
   - Status (enum) single/married
   - Age
   - Salary

   Program functionality:

   - Adding new employee
   - Removing employee by id
   - Show all employees

2. Date inside the structure: Struct date {int day, month year;}
   Season defined : enum season {fall, winter, spring, summer}
   Plant structure:
   Struct plant
   {
          Char name [100];
          Double water_per_day; //amount of litres to water per day
          Enum season flower_season;
          Date plant_date;
   }

   Write a program that declares its own plant, reads all the parameters from the user and builds the plant accordingly. At last print the parameters.

3.
   - Declare structure for point
   - Declare array of N points.
     Distance between two points calculates like this:
     $D^2 = (x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2$

     Write a function to calculate the distance between the points.

     Float distance(point a, point b)

     Find 2 points with highest distance.

4. Declare a circle:

    Struct circle{point center, double radius;}

    With the help of distance function, create another functions to check if the

    point is in the circle.

    Bool point_in_circ(circ* pcirc, point* ppoint)

5. You are given a frame:

SOF	
Dest[7:4]	Src[3:0]
Fid[7:0]	
Size[7:0]	
Data[7:0]	
…..	
……	
CRC[7:0]	

SOF = 0x10 – start of packet

Dest – destination to which frame is sent

Size – number of data bytes to be sent

CRC – sum of all data

For ease of use, size (size of the data) is set to 100.

-   Declare and create the structure and start it with some variables

- The frame is sent and received in outer workstation. Write a function that checks it:

  Bool Valid_Frame (frame rcvdFrame)

- Can you send the parameter rcvdFrame as by-val?

- The function has some more functions:

  o Dest field check: Dest 1 or 3

  o Size check: not specific for 100, a general check

  o CRC check : sum of all Data of the frame (only 8 LSBs)

    How many bits needed for full CRC? Do we have enough?

  o Write a function that validates Frames per Dest

    Example:

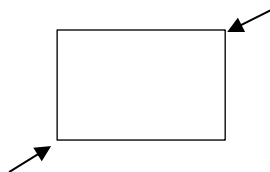   Dest=4 => Fid=6

    Wrong example:

    Dest=4 => Fid=3

  o Create a database of errors for each station and each check

  o What is the issue of the corrent program?

6. Declare a structure for a point

   Struct Point {float x,y;}

   Rectangle structure is defined by two opposite angles

   Struct Rec {point upright, point botLeft}

Given array with N point. Find the smallest rectangle having all the 4 points

from the array.