Data Structures and Algorithms

Assignment - 1

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1. Implementation of Structures Lab

(Define a structure named Time with members hours, minutes and seconds. Write a C Program to input two times, add them, and display the result in proper time format.)

```
#include <stdio.h>
Struct Time
{
  int hours;
  int minutes;
  int seconds;
};
Void inputTime (Struct Time * t)
{
Printf ("Enter hours:");
Scanf ("%d, & t -> hours);
```

```
    Printf ("Enter minutes:");
    Scanf ("%d", &t -> minutes);
    Printf ("Enter seconds:");
    Scanf ("%d" &t -> seconds);
}
void addTimes (Struct Time t1, Struct Time t2;
Struct Time* result)
{
  result -> seconds = t1. seconds + t2. seconds;
  result -> minutes = t1. minutes + t2. minutes +
(result -> seconds /60);
  result -> seconds %= 60;
  result -> hours = t1. hours + t2. hours + (result ->
minutes /60);
  result -> minutes %= 60;
}
void displayTime (Struct Time t)
{
Printf ("Time: %02d: %02d: %02d\n", t. hours,
    t. minutes, t. seconds); }
```

```
int main()
{
Struct Time t1, t2, Sum;
Printf ("Enter first time: \n");
Input Time (&t1);
Printf ("Enter Second time: \n");
Input Time (&t2);
addTimes (t1, t2, &Sum);
Printf ("Sum of times: \n");
display Time (Sum);
return 0;
}
```

OutPut:

```
Enter first time:
Enter hours: 5
Enter minutes: 30
Enter Seconds: 24
Enter hours: 3
Enter minutes: 22
Enter Seconds: 14
Sum of times:
```

Time: 08: 52: 38

2. Implementation of Structures using Pointers.

(Create a structure named book to store book details like title, author & Price. Write a C Program to input details for three books, find the most expensive & the lowest Priced books and display their information.)

```
#include <stdio.h>
#include <string.h>
Struct Book
{
char title [50];
char author [50];
float Price;
};
Int main ()
{
Struct Book books [3];
Int i, min - Index = 0, max - index = 0;
Printf ("Enter details of 3 books : \n");
```

```
for (i=0 ; i<3 ; i++)
{
  Printf ("Book %d : \n", i+1);
  Printf ("Title :");
  Scanf ("%s", books[i].title);
  Printf ("Author :");
  Scanf ("%s, books[i].author);
  Printf ("Price :");
  Scanf ("%f, &books[i].Price);
}
for (i=1 ; i<3 ; i++)
{
If (books[i].Price < books[min-index].Price)
{
  min-index = i;
}
if (books[i].Price > books[min-index].Price)
{
  max-index = i;
}
}
```

```
Book 3:
Printf ("\n Most Expensive book : \n");
Printf ("Title : %s\n", books [max- index].title);
Printf ("Author : %s\n", books [max- index]. author);
Printf ("Price : %.2f \n", books [max- index]. Price);
Printf ("\n Lowest Priced book : \n");
Printf ("Title : %s\n", books [min- index] . title);
Printf ("Author : %s\n", books [min - index]. author);
Printf ("Price : %.2f \n", books [min - index] . Price);
return 0;
}
```

Output:

```
Enter details of 3 books:
Book 1:
Title : The Alchemist
Author: Paulo coelho
Price: 500
Book 2:
Title : Wings of fire
Author: APJ. Abdul Kalam
Price : 200
```

Book 3 :

Title : Harry Potter

Author : J.K Rowling

Price : 350

Most expensive book :

Title : The Alchemist

Author : Paulo Coelho

Price : 500.00

Lowest Priced book :

Title : Wings of fire

Author : APJ. Abdul Kalam

Price : 200.00