C Language Tutorial
(Basic to Advanced)

Topics to be covered :
Installation + Setup
Chapter 1 - Variables, Data types + Input/Output
Chapter 2 - Instructions & Operators
Chapter 3 - Conditional Statements
Chapter 4 - Loop Control Statements
Chapter 5 - Functions & Recursion
Chapter 6 - Pointers
Chapter 7 - Arrays
Chapter 8 - Strings
Chapter 9 - Structures
Chapter 10 - File I/O
Chapter 11 - Dynamic Memory Allocation

Structures
(Chapter 9)

1. **Structures**

```c
# include <stdio.h>
# include <string.h>

struct student {
   char name[100];
   int roll;
   float cgpa;
};

typedef struct ComputerEngineeringStudent{
   int roll;
   float cgpa;
   char name[100];
} coe;

void printInfo(struct student s1);

int main() {
```

```c
struct student s1;
// s1.name = "Shradha"; // not a modifiable value
strcpy(s1.name,"Shradha");
s1.roll = 64;
s1.cgpa = 9.2;

printf("student info : \n");
printf("name = %s\n", s1.name);
printf("roll no = %d\n", s1.roll);
printf("cgpa = %f\n", s1.cgpa);


//array of structures
struct student IT[60];
struct student COE[60];
struct student ECE[60];

//declaration
struct student s2 = {"Rajat", 1552, 8.6};
struct student s3 = {0};

printf("roll no of s2 = %d\n", s2.roll);
printf("roll no of s3 = %d\n", s3.roll);

//pointer to structure
struct student *ptr = &s1;
printf("student.name = %s\n", (*ptr).name);
printf("student.roll = %d\n", (*ptr).roll);
printf("student.cgpa = %f\n", (*ptr).cgpa);

//arrow operator
printf("student->name = %s\n", ptr->name);
printf("student->roll = %d\n", ptr->roll);
printf("student->cgpa = %f\n", ptr->cgpa);

//Passing structure to function
printInfo(s1);

//typedef keyword
coe student1;
student1.roll = 1664;
student1.cgpa = 6.7;
```

```
   strcpy(student1.name, "sudhir");

   return 0;
}

void printInfo(struct student s1) {
   printf("student info : \n");
   printf("name = %s\n", s1.name);
   printf("roll no = %d\n", s1.roll);
   printf("cgpa = %f\n", s1.cgpa);

   //change
   s1.roll = 1660; //but it won't be reflected to the main function
                   //as structures are passed by value
}
```

> Some more Qs

```
# include <stdio.h>
# include <string.h>

//user defined
typedef struct student {
   int roll;
   float cgpa;
   char name[100];
} stu ;

typedef struct computerengineeringstudent {
   int roll;
   float cgpa;
   char name[100];
} coe;

struct address {
   int houseNo;
   int block;
   char city[100];
   char state[100];
};

struct vector {
   int x;
```

```
   int y;
};

void calcSum(struct vector v1, struct vector v2, struct vector sum);

struct complex {
   int real;
   int img;
};

typedef struct BankAccount {
   int accountNo;
   char name[100];
} acc ;

int main() {
   acc acc1 = {123, "shradha"};
   acc acc2 = {124, "rajat"};
   acc acc3 = {125, "sudhir"};

   printf("acc no = %d", acc1.accountNo);
   printf("name = %s", acc1.name);
   return 0;
}

void calcSum(struct vector v1, struct vector v2, struct vector sum) {
   sum.x = v1.x + v2.x;
   sum.y = v1.y + v2.y;

   printf("sum of x is : %d\n", sum.x);
   printf("sum of y is : %d\n", sum.y);
}
```