DATA TYPE

1. BUILD IN DATA TYPE :- int , float , char,....

2. DERIVED DATA TYPE :- array , function , pointer

3. USER DEFINED DATA TYPE :- structure , union , enum

USER DEFINED DATA TYPE

STRUCTURE

COLLECTION OF DIFFERENT DATA TYPE.

with the help of structure we can create user - defined data type. e.g.

1.
```
struct   student // tag name
{
        char  name[10]; // members  or field
        int   roll;

} a, b , c ;  // no. of  records ( variables).
```

student

name	roll
10	4

-- 14 bytes --

---

	name	roll
a	aa	40
b	bb	21
c	cc	23

```
a . name  = "aa"      a . roll =  40
```

varaible . member
(record name)

WHY STRUCTURE IS USED ?

USING ARRAY

---

name[]	marks []	sorted marks
aa	40	21
bb	21	23
cc	23	40

USING STRUCTURE USED

---

name	marks
aa	40
bb	21
cc	23

SORTED MARKS

---

name	marks
bb	21
cc	23
aa	40

---

2. struct book
```
{
        char   title[40];
        char   pub[40];
        char   author[30];
        int    pages;
        float  price;

} a , b ;
```
3. struct date
```
{
        int  day ;
        int  month ;
        int  year ;

} a , b , c , d ;
```

INITIAZATION OF STRUCTURE

```
struct   student  a = { "india" , 32 } ;
a . name   = "india"
a . roll   =  32
```

```
#include<stdio.h>

                //    SIMPLE STRUCTURE


                // INPUT  AND  PRINT ONE RECORD.

struct  student
{
        char  name[10];
        int   roll;
};

int     main()
{
        struct  student a;

        printf(" ENTER NAME AND ROLL \n ");

        scanf("%s%d", a.name , &a.roll);

        printf(" NAME = %s \n" , a.name);  // aa
```

```
printf(" ROLL = %d \n" , a.roll); //  30

printf(" SIZEOF THE STUDENT = %d \n", sizeof(struct student)); // 16
}
```

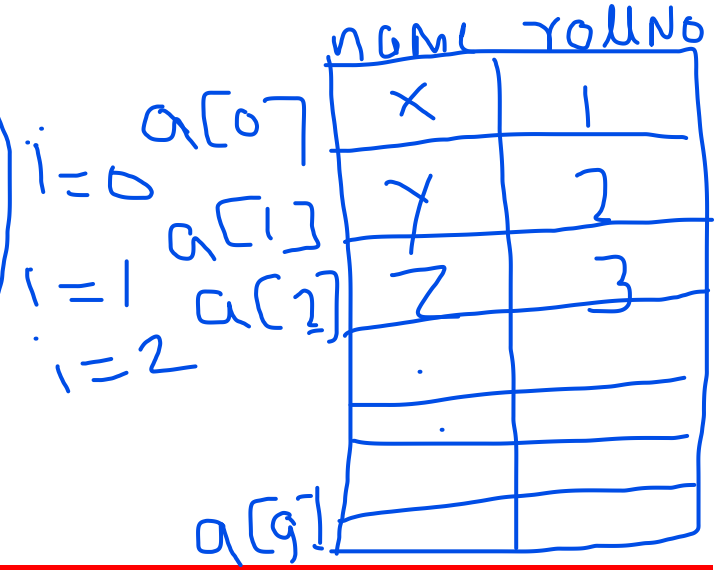
```
//   ARRAY  OF   STRUCTURE

        //   INPUT  AND  PRINT  N  RECORDS

#include<stdio.h>

  struct    student
  {
        char  name[10];
        int   roll;

  } a[10];
```



```
int     main()
{       int  i , n ;

            printf(" ENTER NO. OF RECORDS \n ");

            scanf("%d", &n);

            for( i = 0 ; i < n ; i++ )
            {
                  printf(" ENTER NAME AND ROLL \n ");

                  scanf("%s%d", a[i].name , &a[i].roll);

            } // INPUT  N RECORDS
            for( i = 0 ; i < n ; i++ )
            {
                  printf(" NAME = %s \n" , a[i].name);

                  printf(" ROLL = %d \n" , a[i].roll);

            } // PRINT  N RECORDS
```

```
}

/*
-----------------------------------------------------------------
                name        roll
      i = 0     a[0]     aa     30
     i = 1     a[1]     bb    31
     i = 2     a[2]     cc     32
           .
           .
        a[9]

-----------------------------------------------------------------
//      ARRAY  WITHIN  STRUCTURE

#include<stdio.h>

struct   student                    //  size of the record
 {
char  name[10];          //      name  roll  m[0]  m[1]  m[2]  s , p

                int   roll;      // a   10      4       4      4      4      4   4

        int   m[3];      //          --- 34 bytes ----
        float s , p;
```

```
    } a ;

int    main()
{     int   j ;

      printf(" ENTER NAME AND ROLL \n ");
      scanf("%s%d", a.name, &a.roll);

            a.s = 0 ;
            for( j = 0 ; j < 3 ; j++ )
            {
                  printf(" ENTER MARKS \n ");
                  scanf("%d", &a . m[j]);
                  a . s  = a . s + a . m[j];
            }
      a . p = a . s / 3 ;
      printf(" NAME = %s \n " , a.name);
      printf(" ROLL = %d\n" , a.roll );
      printf(" TOTAL = %f\n" , a.s );
      printf(" PER = %f\n" , a.p );

}
```

// ARRAY WITHIN STRUCTURE AND ARRAY OF STRUCTURE

```
#include<stdio.h>

  struct  student
```

```
{
     char  name[10];
    int   roll;
    int   m[3];
    float s , p;

} a[10] ;

int    main()
{          int  i , j , n ;

           printf(" ENTER NO. OF STUDENTS \n ");
           scanf("%d" , &n );
           for( i = 0 ; i < n ; i++ )
           {
                 printf(" ENTER NAME AND ROLL \n");

                 scanf("%s%d",a[i].name,&a[i].roll);

                 a[i].s = 0 ;

                 printf(" ENTER 3 SUB. MARKS \n");
                 for( j = 0 ;j < 3 ; j++ )
                 {
```

```
                    scanf("%d",&a[i].m[j]);

                    a[i].s = a[i].s + a[i].m[j] ;
                }

                a[i].p = a[i].s / 3 ;
            } // i

            printf(" name \t roll \t total \t\t per \n");

            for( i = 0 ; i < n ; i++ )
            {
printf("%s \t%d \t%f \t%f \n",a[i].name,a[i].roll,a[i].s,a[i].p);

            }
}
```