

# VASAVI COLLEGE OF ENGINEERING

(AUTONOMOUS)  
(Affiliated to Osmania University)

Hyderabad - 500 031.

DEPARTMENT OF : CSE

NAME OF THE LABORATORY : PPS LAB

Name K. SREE INDIRA SIVAN Roll No. 1602-21-733-052 Page No. \_\_\_\_\_

## PRELAB QUESTIONS: 10

1) Define structure:

Ans: Structure is a collection of logically related elements which may be of same (or) different type.

2) Differentiate between array and structure:

Ans: Arrays: It is a collection of elements which are of same datatype.

Structure: It is collection of elements which may be of same (or) different datatypes.

3) How to access members of a structure?

Ans: Members of a structure are accessed by:

struct tagname

{ datatype1 var.name1;  
datatype2 var.name2;

}

Struct tagname t1;

t1.var.name1; } accessing members.  
t1.var.name2;

4) Give the syntax for declaration of a structure:

Ans: Syntax for declaration of structure.

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Name K. SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. \_\_\_\_\_

Tagged:

```
Struct tagname  
{ datatype v1;  
  datatype v2;  
};
```

tag struct tagname structure  
variable name;

typedef:

```
typedef struct  
{ datatype v1;  
  datatype v2;  
} VARIABLE-NAME;  
VARIABLE-NAME/  
variables;  
ENUM TYPE
```

5) Write the short notes on command line arguments:

Ans:  
Command line arguments are nothing simple arguments that are specified after the name of the program in the system's command line and these argument values are passed on to your program during program execution.

\* There are 2 types of arguments:..

- an integer argument.
- array of points to strings .

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NAME OF THE LABORATORY : PPSLAB

Name K.SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 137

## PRELAB PROGRAMS: 10

- 1) Program to perform arithmetic operations (add function ,  
Subtract function on complex numbers using structures);

```
#include <stdio.h>
typedef struct
{ int real;
  int img;
} COMPLEX;
```

```
COMPLEX add( COMPLEX C1, COMPLEX C2)
{ COMPLEX A;
  A.real = C1.real + C2.real;
  A.img = C1.img + C2.img;
  return A;
}
```

```
COMPLEX sub(COMPLEX C1, COMPLEX C2)
{ COMPLEX S;
  S.real = C1.real - C2.real;
  S.img = C1.img - C2.img;
  return S;
}
```

```
int main()
{ COMPLEX C1,C2;
  COMPLEX A,S;
```

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NAME OF THE LABORATORY : PPS LAB

Name K SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 138

```
printf("Enter the real and imaginary part of first complex
number:\n");
scanf("%d",&c1.real);
scanf("%d",&c1.img);
printf("C1=(%d + %di)\n",c1.real,c1.img);
printf("Enter the real and imaginary part of second complex
number:\n");
scanf("%d",&c2.real);
scanf("%d",&c2.img);
printf("C2=(%d + %di)\n",c2.real,c2.img);
A=add(C1,C2);
printf("Sum of the 2 complex numbers is (%d + %di)\n",
A.real,A.img);
S=sub(C1,C2);
printf("Difference of the 2 complex numbers is (%d + %di)\n",
S.real,S.img);
return 0;
}
```

- 2) Program to store the student records & display them using the pointer:

```
#include<stdio.h>
typedef struct {
    char name[30];
    char branch[5];
```

①

OUTPUT:

Enter the real and imaginary part of first complex number:

8

7

$$c_1 = (8+7i)$$

Enter the real and imaginary part of second complex number:

9

14

$$c_2 = (9+14i)$$

Sum of the 2 complex numbers is  $(17+21i)$ .

Difference of the 2 complex numbers is  $(-1+7i)$ .

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NAME OF THE LABORATORY : PPS LAB

Name K. SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 139.

2) int rno;  
double no;  
} Student;  
int main()  
{ student s,\*p;  
p=&s;  
printf("Enter the name of the student:");  
scanf("%30[^\\n]",s.name);  
printf("Enter the branch:");  
scanf("%s",s.branch);  
printf("Enter the roll number:");  
scanf("%d",&s.rno);  
printf("Enter the mobile number:");  
scanf("%lf",&s.no);  
printf("Student name: %s\\n", p->name);  
printf("Branch: %s \\n", p->branch);  
printf("Roll number: %d \\n", p->rno);  
printf("Mobile number: %.0lf \\n", p->no);  
return 0;  
}

3) Write a program to create an array of structure variables, read & display the details.

→ OUTPUT:

② Enter the name of the student : sivani

Enter the branch: cse

Enter the roll number: 052

Enter the mobile number: 9391616262

Student name: sivani

Branch: cse

Roll number: 52

Mobile number: 9391616262

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NAME OF THE LABORATORY : PPS LAB

Name J.K.SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 140

```
#include<stdio.h>
#include <string.h>
typedef struct {
    char name[30];
    char branch[5];
    int rno;
    double no;
} Student;
int main()
{
    int n, i;
    printf("Enter no.of students : ");
    scanf("%d", &n);
    Student s[n];
    for(i=0; i<n; i++)
    {
        printf("Enter the name of the student : ");
        scanf("%30[^\\n]", s[i].name);
        printf("Enter the branch : ");
        scanf("%s", s[i].branch);
        printf("Enter the roll number : ");
        scanf("%d", &s[i].rno);
        printf("Enter the mobile number : ");
        scanf("%lf", &s[i].no);
    }
}
```

② ③ →

OUTPUT:

Enter no. of students : 2

Enter the name of the student : Rahul.

Enter the branch : CSE

Enter the roll number : 15

Enter the mobile number : 8526794162.

Enter the name of the student : Vikram.

Enter the branch : EEE

Enter the roll number : 22.

Enter the mobile number : 9876458231

Student name : Rahul.

Branch : CSE

Roll number : 15

Mobile number : 8526794162

Student name : Vikram.

Branch : EEE

Roll number : 22.

Mobile number : 9876458231.

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NAME OF THE LABORATORY : PPS. LAB

Name K. SREE INDIRASIVANI Roll No. 1602-21-733-052 Page No. 141

```
for(i=0; i<n; i++)
{
    printf("Student name: %s\n", s[i].name);
    printf("Branch: %s\n", s[i].branch);
    printf("Roll number: %d\n", s[i].rno);
    printf("Mobile number: %.0lf\n", s[i].no);
}
return 0;
}
```

- 4) Write a program to read the book details & print them according to alphabetical order of the book-name:

```
#include <stdio.h>
typedef struct
{
    char name[30];
    int page;
    char author[30];
} book;
int main()
{
    int n, i, j;
    printf("Enter no. of books");
    scanf("%d", &n);
    book a[n];
    book b;
```

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DEPARTMENT OF : CSE

NAME OF THE LABORATORY : PPS LAB

Name K-SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 142.

```
for(i=0; i<n; i++)
{
    printf("Enter details of %d books\n", i+1);
    scanf("%s", a[i].name);
    scanf("%d", a[i].pages);
    scanf("%s", a[i].author);

}

for(i=0; i<n; i++)
{
    for(j=0; j<n-i-1; j++)
    {
        if(a[j].name > a[j+1].name)
        {
            b = a[j];
            a[j] = a[j+1];
            a[j+1] = b;
        }
    }
}

for (i=0; i<n; i++)
{
    printf("name: %s |t pages: %d |t author: %s",
           a[i].name, a[i].pages, a[i].author);
}

return 0;
}
```

→ OUTPUT:

Enter the no. of books = 2

Enter the details of 1 book:

Wings of fire.

2000

APJ ABDULKALAM

Enter the details of 2 book:

Sunrise.

300.

Praneetha

name : Sunrise pages : 300 author : Praneetha

name : wings of fire pages : 2000 author : APJABDULKALAM

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DEPARTMENT OF : CSE

NAME OF THE LABORATORY : PPS LAB

Name K. SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 137 143

- AIM: Program to illustrate the use of structures  
READ AND DISPLAY A POINT:
- PROBLEM STATEMENT: Write a program to define the point structure, read a point display it and also its size.
- PROGRAM:
- ```
#include <stdio.h>
struct point
{
    int x-coordinate;
    int y-coordinate;
};

int main()
{
    struct point p;
    printf("Enter a point :\n");
    scanf("%d", &p.x-coordinate);
    scanf("%d", &p.y-coordinate);
    printf("Point = (%d, %d) \n", p.x-coordinate, p.y-coordinate);
    printf("Size=%d", sizeof(p));
    return 0;
}
```

→ OUTPUT:

Enter a point:

2

Point = (2,3)

Size = 8

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DEPARTMENT OF : CSE

NAME OF THE LABORATORY : PPS LAB

Name K SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 14/458

→ AIM: Program to illustrate the use of structures & union.

## PROGRAM ON UNION:

→ PROBLEM STATEMENT: Program to illustrate union:

→ PROGRAM:

```
#include <stdio.h>
union point
{
    int x_coordinate;
    int y_coordinate;
};

int main()
{
    union point P;
    printf("Enter a point :\n");
    scanf("%d", &P.x_coordinate);
    scanf("%d", &P.y_coordinate);
    printf("Point = (%d, %d)\n", P.x_coordinate, P.y_coordinate);
    printf("Size = %d", sizeof(P));
    return 0;
}
```

→ OUTPUT:

Enter a point:

2

3

Point = (2,3)

Size = 4

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(AUTONOMOUS)  
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DEPARTMENT OF : CSE

NAME OF THE LABORATORY : PPS LAB

Name K. SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 139 145

- AIM: Program to illustrate passing structures to functions
- PROBLEM STATEMENT: Write a program to perform arithmetic operations on rational numbers using functions & structures.
- PROGRAM:

```
#include <stdio.h>
typedef struct
{
    int num;
    int den;
} RATIONAL;

RATIONAL add(RATIONAL R1, RATIONAL R2)
{
    RATIONAL A;
    A.num = (R1.num * R2.den) + (R2.num * R1.den);
    A.den = R1.den * R2.den;
    return A;
}

RATIONAL sub(RATIONAL R1, RATIONAL R2)
{
    RATIONAL S;
    S.num = (R1.num * R2.den) - (R2.num * R1.den);
    S.den = R1.den * R2.den;
    return S;
}
```

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DEPARTMENT OF : CSE

NAME OF THE LABORATORY : PPS LAB

Name K.SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 146

RATIONAL multiply(RATIONAL R1, RATIONAL R2)

{ RATIONAL M;

M.num = (R1.num \* R2.num);

M.den = (R1.den \* R2.den);

return M;

}

RATIONAL div(RATIONAL R1, RATIONAL R2)

{ RATIONAL D;

D.num = R1.num \* R2.den;

D.den = R1.den \* R2.num;

return D; }

int main()

{ RATIONAL s,d,p,q;

RATIONAL F1,F2;

printf("Enter the numerator & denominator of fraction 1:\n");

scanf("%d", &F1.num);

scanf("%d", &F1.den);

printf("Enter the numerator & denominator of fraction 2:\n");

scanf("%d", &F2.num);

scanf("%d", &F2.den);

sum = s = add(F1, F2);

printf("Sum of the 2 fractions is %d / %d\n", s.num, s.den);

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DEPARTMENT OF : CSE

NAME OF THE LABORATORY : PPS LAB

Name K.SREE INDIRASIVANI Roll No. 1602-21-733-052 Page No. 147

d = sub(F1, F2);

printf("Difference of the 2 fractions is %d/%d\n", d.num,  
d.den);

p = multiply(F1, F2);

printf("Product of the 2 fractions is %d/%d\n", p.num, p.den);

q = div(F1, F2);

printf("Division of the 2 fractions is %d/%d\n", q.num,  
q.den);

return 0;

}

→ OUTPUT:

Enter the numerator & denominator of fraction 1:

10

20

Enter the numerator & denominator of fraction 2:

30

40

Sum of the 2 fractions is 1000/800.

Difference of the 2 fractions is -200/800.

Product of the 2 fractions is 300/800.

Division of the 2 fractions is 400/600.

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DEPARTMENT OF : CSE

NAME OF THE LABORATORY : PPSLAB.

Name K. SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 148.

→ AIM: Program to sort the structures

SORTING STRUCTURES:

→ PROBLEM STATEMENT: Write a program to read faculty details and display them. Sort them according to  
(i) department (ii) experience.

→ PROGRAM:

```
#include <stdio.h>
#include <string.h>
typedef struct
{
    char name[30];
    char department[10];
    int experience;
} FACULTY;

void sort1(FACULTY F[], int s)
{
    int i, j;
    FACULTY t;
    for(i=0; i<s-1; i++)
    {
        for(j=0; j<s-1; j++)
        {
            if(F[j].experience < F[j+1].experience)
            {
                t = F[j];
                F[j] = F[j+1];
                F[j+1] = t;
            }
        }
    }
}
```

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DEPARTMENT OF : CSE

NAME OF THE LABORATORY : PPSLAB

Name K'SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 149.

```
void sort2(FACULTY F[], int s)
{ int i,j;
FACULTY t;
for(i=0; i<s-1; i++)
{ for(j=0; j<s-1; j++)
{ if (strcmp(F[j].department, F[j+1].department) > 0).
{ t=F[j];
F[j]=F[j+1];
F[j+1]=t;
}
}
}
int main()
{ int n,i;
printf("Enter the number of faculty:");
scanf("%d",&n);
FACULTY F[n];
for(i=0;i<n; i++)
{ printf("Enter the faculty details :\n");
scanf("%s", F[i].name);
scanf("%d", &F[i].experience);
scanf("%s", F[i].department); }
```

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NAME OF THE LABORATORY : PPS LAB

Name K SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 150

```
sort1(F,n);
printf("Sorting according to experience:\n");
for(i=0; i<n; i++)
{
    printf("Details of faculty %d:\n", i+1);
    printf("NAME: %s\n", F[i].name);
    printf("EXPERIENCE: %d\n", F[i].experience);
    printf("DEPARTMENT: %s\n", F[i].department); }
```

```
sort2(F,n);
printf("Sorting according to department:\n");
for(i=0; i<n; i++)
{
    printf("Details of faculty %d:\n", i+1);
    printf("NAME: %s\n", F[i].name);
    printf("EXPERIENCE: %d\n", F[i].experience);
    printf("DEPARTMENT: %s\n", F[i].department); }
```

return 0;

}

---

Details of faculty 3:

NAME: Sushma.  
EXPERIENCE: 8  
DEPARTMENT: ece.

→ OUTPUT:

Enter the number of faculty : 3

Enter the faculty details :

sushma

8

ece

Enter the faculty details :

rajesh

15

CSE

Enter the faculty details :

adithya

6

civil.

→ Sorting according to experience :

Details of faculty 1 :

- NAME : rajesh

EXPERIENCE : 15

DEPARTMENT : CSE

Details of faculty 2 :

- NAME : Sushma

EXPERIENCE : 8

DEPARTMENT : ece

Details of faculty 3 :

- NAME : adithya

EXPERIENCE : 6

DEPARTMENT : civil

→ Sorting according to department .

Details of faculty 1 :

- NAME : adithya

EXPERIENCE : 6

DEPARTMENT : civil

• Details of faculty 2 :

- NAME : Rajesh

EXPERIENCE : 15

DEPARTMENT : CSE