Lab Assignment Copy

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**Ramakrishna Mission Vivekananda Centenary College Rahara, Kolkata-118**

**Programming Fundamentals using C Lab**

**Dept-CS Sem-[[1]](#footnote-1)st**

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| **11.** | **Write a c program to find factorial of a given number.** |  |  |
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| **Functions and pointers** | |  |  |
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| --- | --- | --- | --- |
| **21.** | **Write a C Program to find the cube and square root of a number using two different functions without using the standard math library functions.** |  |  |
| **22.** | **Write a C program to calculate simple interest using function. The amount, rate of interest and number of year’s term will be given by the user.** |  |  |
| **23.** | **Write a C program to swap two numbers using call by reference** |  |  |
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| **27.** | **Write a c program to multiply two matrices** |  |  |
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| **29.** | **Write a c program to find the length of a string without strlen() function** |  |  |
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| **Structures and Unions** | |  |  |
| **32.** | **Write a c program to create your data type to store data of 10 books and print the data in proper format.** |  |  |
| **33.** | **Write a c program to store student records as structures and sort them by age or roll number.** |  |  |
| **File and Command line Arguments** | |  |  |
| **34.** | **Write a c program to copy one file into another file where the file names will be provided through command line. The input will be like: mycopy<source file><destination file>** |  |  |
| **35.** | **Write a c program to read and write stored student record into a file.** |  |  |

1. Write a c program to print the sum of two numbers where the numbers will be given by the user.

CODE-

#include <stdio.h>

int main() {

int num1, num2, sum;

printf("Enter two numbers: ");

scanf("%d %d", &num1, &num2);

sum = num1 + num2;

printf("The sum of the two numbers is %d\n", sum);

return 0;

}

OUTPUT-

Enter two numbers: 5 13

The sum of the two numbers is 18

1. Write a c program to swap two numbers using third variable or without third variable

CODE\_1-

#include <stdio.h>

int main() {

int num1, num2, temp;

printf("Enter two numbers: ");

scanf("%d %d", &num1, &num2);

temp = num1;

num1 = num2;

num2 = temp;

printf("After swapping, the first number is %d and the second number is %d\n", num1, num2);

return 0;

}

OUTPUT-

Enter two numbers: 13 19

After swapping, the first number is 19 and the second number is 13

CODE\_2-

#include <stdio.h>

int main() {

int num1, num2;

printf("Enter two numbers: ");

scanf("%d %d", &num1, &num2);

num1 = num1 + num2;

num2 = num1 - num2;

num1 = num1 - num2;

printf("After swapping, the first number is %d and the second number is %d\n", num1, num2);

return 0;

}

OUTPUT-

Enter two numbers: 36 98

After swapping, the first number is 98 and the second number is 36

1. Write a c program to find the size of int, float, double, and char

CODE-

#include <stdio.h>

int main() {

int int\_size = sizeof(int);

float float\_size = sizeof(float);

double double\_size = sizeof(double);

char char\_size = sizeof(char);

printf("The size of int is %lu bytes\n", int\_size);

printf("The size of float is %lu bytes\n", float\_size);

printf("The size of double is %lu bytes\n", double\_size);

printf("The size of char is %lu bytes\n", char\_size);

return 0;

}

OUTPUT-

The size of int is 4 bytes

The size of float is 0 bytes

The size of double is 0 bytes

The size of char is 1 bytes

1. Write a c program to print the ASCII value of a character

CODE-

#include <stdio.h>

int main() {

char c;

printf("Enter a character: ");

scanf("%c", &c);

printf("The ASCII value of %c is %d\n", c, c);

return 0;

}

OUTPUT-

Enter a character: r

The ASCII value of r is 114

1. Write a c program to check whether a given number is even or odd.

CODE-

#include <stdio.h>

int main() {

int num;

printf("Enter a number: ");

scanf("%d", &num);

if (num % 2 == 0) {

printf("%d is an even number.\n", num);

} else {

printf("%d is an odd number.\n", num);

}

return 0;

}

OUTPUT-

Enter a number: 25

25 is an odd number.

1. Write a c program to find largest number among three numbers using ternary operator and smallest among them using nested if-else.

CODE\_1-

#include<stdio.h>

int main(){

    int a , b , c , g;

    printf("Value of a , b , c = ");

    scanf("%d%d%d",&a,&b,&c);

    g=(a>b)?((a>c)?a:c):((b>c)?b:c);

    printf("Largest = %d",g);

}

OUTPUT-

Value of a , b , c = 23 29 37

Largest = 37

CODE\_2-

#include <stdio.h>

int main() {

int num1, num2, num3, smallest;

printf("Enter three numbers: ");

scanf("%d %d %d", &num1, &num2, &num3);

if (num1 < num2 && num1 < num3) {

smallest = num1;

} else if (num2 < num1 && num2 < num3) {

smallest = num2;

} else {

smallest = num3;

}

printf("The smallest number is %d\n", smallest);

return 0;

}

OUTPUT-

Enter three numbers: 39 38 19

The smallest number is 19

1. Write a c program to check leap year of a given year.

CODE-

#include <stdio.h>

int main() {

int year;

printf("Enter a year: ");

scanf("%d", &year);

if ((year % 4 == 0 && year % 100 != 0) || year % 400 == 0) {

printf("%d is a leap year.\n", year);

} else {

printf("%d is not a leap year.\n", year);

}

return 0;

}

OUTPUT-

Enter a year: 2023

2023 is not a leap year.

1. Write a c program to make a simple calculator.

CODE-

#include <stdio.h>

int main() {

char operator;

float num1, num2, result;

printf("Enter an operator (+, -, \*, /): ");

scanf("%c", &operator);

printf("Enter two numbers: ");

scanf("%f %f", &num1, &num2);

switch (operator) {

case '+':

result = num1 + num2;

break;

case '-':

result = num1 - num2;

break;

case '\*':

result = num1 \* num2;

break;

case '/':

result = num1 / num2;

break;

default:

printf("Invalid operator.\n");

break;

}

printf("The result is: %f\n", result);

return 0;

}

OUTPUT-

Enter an operator (+, -, \*, /): /

Enter two numbers: 39 6

The result is: 6.500000

1. Write a c program to check whether a given number is prime or not

CODE-

#include<stdio.h>

int main(){

    int n,i,m=0,pn=0;

    printf("Enter a Number=");

    scanf("%d",&n);

    m=n/2;

    if(n>1){

        for (i = 2; i < m; i++)

        {

            if (n%i==0)

            {

                printf("Not a Prime Number");

                pn=1;

                break;

            }

        }

        if (pn==0)

        {

            printf("Prime Number");

        }

    }

    else

    {

        printf("Not a Prime Number");

    }

    return 0;

}

OUTPUT-

Enter a Number=11

Prime Number

1. Write a c program to calculate the sum of n natural numbers. The inputs will be provided by the user.

CODE-

#include <stdio.h>

int main() {

int n, i, sum;

printf("Enter a number: ");

scanf("%d", &n);

sum = 0;

for (i = 1; i <= n; i++) {

sum += i;

}

printf("The sum of the first %d natural numbers is %d.\n", n, sum);

return 0;

}

OUTPUT-

Enter a number: 18

The sum of the first 18 natural numbers is 171.

1. Write a c program to find factorial of a given number.

CODE-

#include <stdio.h>

int main() {

int num, fact;

printf("Enter a number: ");

scanf("%d", &num);

fact = 1;

for (int i = 1; i <= num; i++) {

fact \*= i;

}

printf("The factorial of %d is %d.\n", num, fact);

return 0;

}

OUTPUT-

Enter a number: 5

The factorial of 5 is 120.

1. Write a c program to reverse a given number.

CODE-

#include <stdio.h>

int main() {

int num, rev, rem;

printf("Enter a number: ");

scanf("%d", &num);

rev = 0;

while (num != 0) {

rem = num % 10;

rev = rev \* 10 + rem;

num /= 10;

}

printf("The reversed number is %d.\n", rev);

return 0;

}

OUTPUT-

Enter a number: 2369

The reversed number is 9632.

1. Write a c program to print the day of 1st January of any year inputted by the user, considering the first January of 1900 is Monday.

CODE-

**#include<stdio.h>**

**int main(){**

**int year, year\_gap, leap=0, total\_day, ref\_2=400, ref=1900, day;**

**printf("enter a year greater than 1900 = ");**

**scanf("%d",&year);**

**if(year>ref)**

**{**

**year\_gap=year-ref;**

**for(;ref<year;ref++)**

**{**

**if(ref%400==0 || ref%100!=0 && ref%4==0)**

**{**

**leap++;**

**}**

**}**

**total\_day=((year\_gap-leap)\*365)+(leap\*366);**

**day=total\_day%7;**

**switch(day)**

**{**

**case 0:**

**printf("Monday");**

**break;**

**case 1:**

**printf("Tuesday");**

**break;**

**case 2:**

**printf("Wednesday");**

**break;**

**case 3:**

**printf("Thursday");**

**break;**

**case 4:**

**printf("Friday");**

**break;**

**case 5:**

**printf("Saturday");**

**break;**

**case 6:**

**printf("Sunday");**

**break;**

**}**

**}**

**return 0;**

**}**

OUTPUT-

enter a year greater than 1900 = 2023

Sunday

1. Write a c program to display Armstrong numbers between 1 to 1000

CODE-

#include <stdio.h>

int main() {

int num, sum;

for (int i = 1; i <= 1000; i++) {

num = i;

sum = 0;

while (num > 0) {

int rem = num % 10;

sum += rem \* rem \* rem;

num /= 10;

}

if (sum == i) {

printf("%d is an Armstrong number\n", i);

}

}

return 0;

}

OUTPUT-

1 is an Armstrong number

153 is an Armstrong number

370 is an Armstrong number

371 is an Armstrong number

407 is an Armstrong number

1. Write a C program to check a given number is palindrome or not.

CODE-

#include <stdio.h>

int main() {

int num, rev=0, rem, ex;

printf("Enter a number: ");

scanf("%d", &num);

ex = num;

while (num != 0) {

rem = num % 10;

rev = rev \* 10 + rem;

num /= 10;

}

if (ex == rev) {

printf("%d is a palindrome number.\n", ex);

} else {

printf("%d is not a palindrome number.\n", ex);

}

return 0;

}

OUTPUT-

Enter a number: 121

121 is a palindrome number.

1. Write a C program to print the following pattern for n number of lines where n will be given by the user:

\*

\* \*

\* \* \*

\* \* \* \*

CODE-

#include <stdio.h>

int main() {

int n;

printf("Enter the number of lines: ");

scanf("%d", &n);

for (int i = 1; i <= n; i++) {

for (int j = 1; j <= i; j++) {

printf("\*");

}

printf("\n");

}

return 0;

}

OUTPUT-

Enter the number of lines: 4

\*

\*\*

\*\*\*

\*\*\*\*

1. Write a C program to print the following pattern for n number of lines where n will be given by the user:

\*

\* \*

\* \* \*

\* \* \* \*

CODE-

#include <stdio.h>

int main() {

int n;

printf("Enter the number of lines: ");

scanf("%d", &n);

for (int i = 1; i <= n; i++) {

for (int j = 1; j <= n - i; j++) {

printf(" ");

}

for (int j = 1; j <= i; j++) {

printf("\*");

}

printf("\n");

}

return 0;

}

OUTPUT-

Enter the number of lines: 4

\*

\*\*

\*\*\*

\*\*\*\*

1. Write a C program to print the following pattern for n number of lines where n will be given by the user:

2

4 6

12 14 16

32 34 36 38

CODE-

#include<stdio.h>

int main()

{

int n,i,j,a=2;

printf("Enter a Number:");

scanf("%d",&n);

for(i=1;i<=n;i++)

{

for(j=1;j<=i;j++)

{

printf("%d",a);

printf(" ");

if(i!=j)

{

a=a+2;

}

}

a=a\*2;

printf("\n");

}

return 0;

}

OUTPUT-

Enter a Number:4

2

4 6

12 14 16

32 34 36 38

1. Write a C program to print the following pattern for n number of lines where n will be given by the user:

1

2 3

4 5 6

7 8 9 10

CODE-

#include <stdio.h>

int main() {

int n;

printf("Enter the number of lines: ");

scanf("%d", &n);

int num = 1;

for (int i = 1; i <= n; i++) {

for (int j = 1; j <= i; j++) {

printf("%d ", num);

num++;

}

printf("\n");

}

return 0;

}

OUTPUT-

Enter the number of lines: 4

1

2 3

4 5 6

7 8 9 10

1. Write a C program to find out the area and perimeter of a rectangle using two different functions.

CODE-

#include <stdio.h>

int area(int length, int breadth) {

return length \* breadth;

}

int perimeter(int length, int breadth) {

return 2 \* (length + breadth);

}

int main() {

int length, breadth;

printf("Enter the length of the rectangle: ");

scanf("%d", &length);

printf("Enter the breadth of the rectangle: ");

scanf("%d", &breadth);

int area\_of\_rectangle = area(length, breadth);

int perimeter\_of\_rectangle = perimeter(length, breadth);

printf("The area of the rectangle is: %d\n", area\_of\_rectangle);

printf("The perimeter of the rectangle is: %d\n", perimeter\_of\_rectangle);

return 0;

}

OUTPUT-

Enter the length of the rectangle: 5

Enter the breadth of the rectangle: 6

The area of the rectangle is: 30

The perimeter of the rectangle is: 22

1. Write a C Program to find the cube and square root of a number using two different functions without using the standard math library functions.

CODE-

#include <stdio.h>

int cube(int num) {

int cube = num \* num \* num;

return cube;

}

int squareRoot(int num) {

int sqrt = 0;

for (int i = 1; i \* i <= num; i++) {

sqrt = i;

}

return sqrt;

}

int main() {

int number;

printf("Enter a number: ");

scanf("%d", &number);

int cubeResult = cube(number);

printf("Cube of %d is: %d\n", number, cubeResult);

int sqrtResult = squareRoot(number);

printf("Square root of %d is: %d\n", number, sqrtResult);

return 0;

}

OUTPUT-

Enter a number: 25

Cube of 25 is: 15625

Square root of 25 is: 5

1. Write a C program to calculate simple interest using function. The amount, rate of interest and number of year’s term will be given by the user.

CODE-

#include <stdio.h>

float calculate\_simple\_interest(float principal, float rate, int years) {

return (principal \* rate \* years) / 100;

}

int main() {

float principal, rate, interest;

int years;

printf("Enter principal amount: ");

scanf("%f", &principal);

printf("Enter rate of interest: ");

scanf("%f", &rate);

printf("Enter number of years: ");

scanf("%d", &years);

interest = calculate\_simple\_interest(principal, rate, years);

printf("Simple interest: %.2f\n", interest);

return 0;

}

OUTPUT-

Enter principal amount: 25000

Enter rate of interest: 5

Enter number of years: 5

Simple interest: 6250.00

1. Write a C program to swap two numbers using call by reference

CODE-

#include<stdio.h>

void swap(int \*x , int \*y)

{

\*x=\*x+\*y;

\*y=\*x-\*y;

\*x=\*x-\*y;

}

int main()

{

int a , b ;

printf("Enter the value of a & b = ");

scanf("%d%d",&a,&b);

swap(&a,&b);

printf("Current value of a = %d\n",a);

printf("Current value of b = %d\n",b);

}

OUTPUT-

Enter the value of a & b = 5 9

Current value of a = 9

Current value of b = 5

1. Write a c Program to search a particular element in an Array.

CODE-

**#include <stdio.h>**

**int main() {**

**int array[100], element, size, found = 0;**

**int i ;**

**printf("Enter the size of the array: ");**

**scanf("%d", &size);**

**printf("Enter the elements of the array: ");**

**for (i = 0; i < size; i++) {**

**scanf("%d", &array[i]);**

**}**

**printf("Enter the element to search: ");**

**scanf("%d", &element);**

**for (i = 0; i < size; i++) {**

**if (array[i] == element) {**

**found = 1;**

**break;**

**}**

**}**

**if (found == 1) {**

**printf("The element is present in the array at index %d.\n", i);**

**printf("The element is %d.\n", array[i]);**

**} else {**

**printf("The element is not present in the array.\n");**

**}**

**return 0;**

**}**

OUTPUT-

Enter the size of the array: 5

Enter the elements of the array: 1 2 3 4 5

Enter the element to search: 3

The element is present in the array at index 2.

The element is 3.

1. Write a c Program to Find the Maximum and Minimum in an Array.

CODE-

#include <stdio.h>

int main() {

int array[100], size, max, min;

printf("Enter the size of the array: ");

scanf("%d", &size);

printf("Enter the elements of the array: ");

for (int i = 0; i < size; i++) {

scanf("%d", &array[i]);

}

max = array[0];

min = array[0];

for (int i = 1; i < size; i++) {

if (array[i] > max) {

max = array[i];

}

if (array[i] < min) {

min = array[i];

}

}

printf("The maximum element in the array is %d.\n", max);

printf("The minimum element in the array is %d.\n", min);

return 0;

}

OUTPUT-

Enter the size of the array: 5

Enter the elements of the array: 1 2 3 4 5

The maximum element in the array is 5.

The minimum element in the array is 1.

1. Write a c program to get n number of integers from the user and store them in an array. Now, do the addition and the multiplication of the entire array element and show the results. 0<n<100

CODE-

#include <stdio.h>

int main() {

int n;

printf("Enter the number of integers (less than 100): ");

scanf("%d", &n);

if (n <= 0 || n >= 100) {

printf("Please enter a valid number between 1 and 99.\n");

return 1;

}

int arr[n];

printf("Enter %d integers:\n", n);

for (int i = 0; i < n; i++) {

scanf("%d", &arr[i]);

}

int sum = 0;

int product = 1;

for (int i = 0; i < n; i++) {

sum += arr[i];

product \*= arr[i];

}

printf("Sum of the entered integers: %d\n", sum);

printf("Product of the entered integers: %d\n", product);

return 0;

}

OUTPUT-

Enter the number of integers (less than 100): 5

Enter 5 integers:

21

23

18

19

123

Sum of the entered integers: 204

Product of the entered integers: 20317878

1. Write a c program to multiply two matrices.

CODE-

#include <stdio.h>

#define MAX\_SIZE 10

void matrixMultiplication(int mat1[MAX\_SIZE][MAX\_SIZE], int mat2[MAX\_SIZE][MAX\_SIZE], int result[MAX\_SIZE][MAX\_SIZE], int rows1, int cols1, int cols2) {

for (int i = 0; i < rows1; i++) {

for (int j = 0; j < cols2; j++) {

result[i][j] = 0;

for (int k = 0; k < cols1; k++) {

result[i][j] += mat1[i][k] \* mat2[k][j];

}

}

}

}

void displayMatrix(int matrix[MAX\_SIZE][MAX\_SIZE], int rows, int cols) {

printf("Resultant Matrix:\n");

for (int i = 0; i < rows; i++) {

for (int j = 0; j < cols; j++) {

printf("%d ", matrix[i][j]);

}

printf("\n");

}

}

int main() {

int mat1[MAX\_SIZE][MAX\_SIZE], mat2[MAX\_SIZE][MAX\_SIZE], result[MAX\_SIZE][MAX\_SIZE];

int rows1, cols1, rows2, cols2;

printf("Enter the number of rows and columns for first matrix (max 10 x 10): ");

scanf("%d %d", &rows1, &cols1);

printf("Enter elements of first matrix:\n");

for (int i = 0; i < rows1; i++) {

for (int j = 0; j < cols1; j++) {

scanf("%d", &mat1[i][j]);

}

}

printf("Enter the number of rows and columns for second matrix (max 10 x 10): ");

scanf("%d %d", &rows2, &cols2);

if (cols1 != rows2) {

printf("Matrix multiplication not possible.\n");

return 1;

}

printf("Enter elements of second matrix:\n");

for (int i = 0; i < rows2; i++) {

for (int j = 0; j < cols2; j++) {

scanf("%d", &mat2[i][j]);

}

}

matrixMultiplication(mat1, mat2, result, rows1, cols1, cols2);

displayMatrix(result, rows1, cols2);

return 0;

}

OUTPUT-

Enter the number of rows and columns for first matrix (max 10 x 10): 2 2

Enter elements of first matrix:

5 6 8 9

Enter the number of rows and columns for second matrix (max 10 x 10): 2 2

Enter elements of second matrix:

7 8 6 2

Resultant Matrix:

71 52

110 82

1. Write a c program to create a square matrix of size m dynamically. Value of m will be provided by the user. Calculate the sum of all the left diagonal elements of the sum of all the right diagonal elements of the matrix. Print the two sums.

CODE-

#include <stdio.h>

#include <stdlib.h>

int main() {

int m;

printf("Enter the size of the square matrix: ");

scanf("%d", &m);

if (m <= 0) {

printf("Invalid size for matrix.\n");

return 1;

}

int \*\*matrix = (int \*\*)malloc(m \* sizeof(int \*));

for (int i = 0; i < m; i++) {

matrix[i] = (int \*)malloc(m \* sizeof(int));

}

printf("Enter elements of the square matrix:\n");

for (int i = 0; i < m; i++) {

for (int j = 0; j < m; j++) {

scanf("%d", &matrix[i][j]);

}

}

int leftDiagonalSum = 0;

int rightDiagonalSum = 0;

for (int i = 0; i < m; i++) {

leftDiagonalSum += matrix[i][i];

rightDiagonalSum += matrix[i][m - i - 1];

}

printf("Sum of left diagonal elements: %d\n", leftDiagonalSum);

printf("Sum of right diagonal elements: %d\n", rightDiagonalSum);

// Freeing dynamically allocated memory

for (int i = 0; i < m; i++) {

free(matrix[i]);

}

free(matrix);

return 0;

}

OUTPUT-

Enter the size of the square matrix: 3 3

Enter elements of the square matrix:

7 8 9 4 5 6 1 2 3

Sum of left diagonal elements: 9

Sum of right diagonal elements: 18

1. Write a c program to find the length of a string without strlen() function.

CODE-

#include <stdio.h>

int stringLength(char str[]) {

int length = 0;

while (str[length] != '\0') {

length++;

}

return length;

}

int main() {

char inputString[100];

printf("Enter a string: ");

scanf("%s", inputString);

int len = stringLength(inputString);

printf("Length of the string: %d\n", len);

return 0;

}

OUTPUT-

Enter a string: Hello

Length of the string: 5

1. Write a c program to compare two strings lexicographically.

CODE-

#include <stdio.h>

int compareStrings(char str1[], char str2[]) {

int i = 0;

while (str1[i] != '\0' || str2[i] != '\0') {

if (str1[i] != str2[i]) {

return str1[i] - str2[i];

}

i++;

}

return 0;

}

int main() {

char string1[100], string2[100];

printf("Enter first string: ");

scanf("%s", string1);

printf("Enter second string: ");

scanf("%s", string2);

int result = compareStrings(string1, string2);

if (result == 0) {

printf("Strings are equal.\n");

} else if (result < 0) {

printf("String 1 is lexicographically smaller than String 2.\n");

} else {

printf("String 1 is lexicographically greater than String 2.\n");

}

return 0;

}

OUTPUT-

Enter first string: Hi

Enter second string: Hello

String 1 is lexicographically greater than String 2.

1. Write a c program to reverse a string without the library function.

CODE-

#include <stdio.h>

void reverseString(char str[]) {

int length = 0;

while (str[length] != '\0') {

length++;

}

int start = 0;

int end = length - 1;

while (start < end) {

char temp = str[start];

str[start] = str[end];

str[end] = temp;

start++;

end--;

}

}

int main() {

char inputString[100];

printf("Enter a string: ");

scanf("%s", inputString);

printf("Original String: %s\n", inputString);

reverseString(inputString);

printf("Reversed String: %s\n", inputString);

return 0;

}

OUTPUT-

Enter a string: Mate

Original String: Mate

Reversed String: etaM

1. Write a c program to create your data type to store data of 10 books and print the data in proper format.

CODE-

#include <stdio.h>

#define MAX\_BOOKS 10

#define MAX\_TITLE\_LENGTH 100

#define MAX\_AUTHOR\_LENGTH 50

struct Book {

char title[MAX\_TITLE\_LENGTH];

char author[MAX\_AUTHOR\_LENGTH];

int year;

float price;

};

int main() {

struct Book books[MAX\_BOOKS];

printf("Enter information for 10 books:\n");

for (int i = 0; i < MAX\_BOOKS; i++) {

printf("Book %d\n", i + 1);

printf("Enter title: ");

scanf("%s", books[i].title);

printf("Enter author: ");

scanf("%s", books[i].author);

printf("Enter year of publication: ");

scanf("%d", &books[i].year);

printf("Enter price: ");

scanf("%f", &books[i].price);

}

printf("\nDisplaying information of all 10 books:\n");

for (int i = 0; i < MAX\_BOOKS; i++) {

printf("Book %d\n", i + 1);

printf("Title: %s\n", books[i].title);

printf("Author: %s\n", books[i].author);

printf("Year of publication: %d\n", books[i].year);

printf("Price: $%.2f\n", books[i].price);

printf("\n");

}

return 0;

}

OUTPUT-

Enter information for 10 books:

Book 1

Enter title: abc

Enter author: zxd

Enter year of publication: 2023

Enter price: 200

Book 2

Enter title: fer

Enter author: ree

Enter year of publication: 2012

Enter price: 365

Book 3

Enter title: wqw

Enter author: dss

Enter year of publication: 2022

Enter price: 230

Book 4

Enter title: iii

Enter author: qwq

Enter year of publication: 2015

Enter price: 599

Book 5

Enter title: qwe

Enter author: qwr

Enter year of publication: 2015

Enter price: 365

Book 6

Enter title: fgr

Enter author: rtg

Enter year of publication: 1932

Enter price: 1230

Book 7

Enter title: fgf

Enter author: gfh

Enter year of publication: 2016

Enter price: 533

Book 8

Enter title: rfr

Enter author: tyh

Enter year of publication: 2003

Enter price: 2366

Book 9

Enter title: rty

Enter author: ere

Enter year of publication: 2013

Enter price: 366

Book 10

Enter title: qwr

Enter author: ert

Enter year of publication: 2022

Enter price: 500

Displaying information of all 10 books:

Book 1

Title: abc

Author: zxd

Year of publication: 2023

Price: $200.00

Book 2

Title: fer

Author: ree

Year of publication: 2012

Price: $365.00

Book 3

Title: wqw

Author: dss

Year of publication: 2022

Price: $230.00

Book 4

Title: iii

Author: qwq

Year of publication: 2015

Price: $599.00

Book 5

Title: qwe

Author: qwr

Year of publication: 2015

Price: $365.00

Book 6

Title: fgr

Author: rtg

Year of publication: 1932

Price: $1230.00

Book 7

Title: fgf

Author: gfh

Year of publication: 2016

Price: $533.00

Book 8

Title: rfr

Author: tyh

Year of publication: 2003

Price: $2366.00

Book 9

Title: rty

Author: ere

Year of publication: 2013

Price: $366.00

Book 10

Title: qwr

Author: ert

Year of publication: 2022

Price: $500.00

1. Write a c program to create your data type to store data of 10 books and print the data in proper format.

CODE-

#include <stdio.h>

#include <string.h>

#define MAX\_STUDENTS 5

#define MAX\_NAME\_LENGTH 50

struct Student {

int rollNumber;

char name[MAX\_NAME\_LENGTH];

int age;

};

void swap(struct Student \*a, struct Student \*b) {

struct Student temp = \*a;

\*a = \*b;

\*b = temp;

}

void sortByRollNumber(struct Student students[], int n) {

for (int i = 0; i < n - 1; i++) {

for (int j = 0; j < n - i - 1; j++) {

if (students[j].rollNumber > students[j + 1].rollNumber) {

swap(&students[j], &students[j + 1]);

}

}

}

}

void sortByAge(struct Student students[], int n) {

for (int i = 0; i < n - 1; i++) {

for (int j = 0; j < n - i - 1; j++) {

if (students[j].age > students[j + 1].age) {

swap(&students[j], &students[j + 1]);

}

}

}

}

void displayStudents(struct Student students[], int n) {

printf("Student Records:\n");

for (int i = 0; i < n; i++) {

printf("Roll Number: %d, Name: %s, Age: %d\n", students[i].rollNumber, students[i].name, students[i].age);

}

}

int main() {

struct Student students[MAX\_STUDENTS];

printf("Enter student details for %d students:\n", MAX\_STUDENTS);

for (int i = 0; i < MAX\_STUDENTS; i++) {

printf("Enter details for student %d:\n", i + 1);

printf("Roll Number: ");

scanf("%d", &students[i].rollNumber);

printf("Name: ");

scanf("%s", students[i].name);

printf("Age: ");

scanf("%d", &students[i].age);

}

int choice;

printf("\nEnter sorting criteria:\n");

printf("1. Sort by Roll Number\n");

printf("2. Sort by Age\n");

printf("Enter your choice (1 or 2): ");

scanf("%d", &choice);

if (choice == 1) {

sortByRollNumber(students, MAX\_STUDENTS);

printf("\nSorted by Roll Number:\n");

displayStudents(students, MAX\_STUDENTS);

} else if (choice == 2) {

sortByAge(students, MAX\_STUDENTS);

printf("\nSorted by Age:\n");

displayStudents(students, MAX\_STUDENTS);

} else {

printf("\nInvalid choice.\n");

}

return 0;

}

OUTPUT-

Enter student details for 5 students:

Enter details for student 1:

Roll Number: 737

Name: Abhirup

Age: 18

Enter details for student 2:

Roll Number: 788

Name: Ajay

Age: 19

Enter details for student 3:

Roll Number: 736

Name: Sanjay

Age: 21

Enter details for student 4:

Roll Number: 764

Name: Gaurav

Age: 19

Enter details for student 5:

Roll Number: 744

Name: Arun

Age: 18

Enter sorting criteria:

1. Sort by Roll Number

2. Sort by Age

Enter your choice (1 or 2): 1

Sorted by Roll Number:

Student Records:

Roll Number: 736, Name: Sanjay, Age: 21

Roll Number: 737, Name: Abhirup, Age: 18

Roll Number: 744, Name: Arun, Age: 18

Roll Number: 764, Name: Gaurav, Age: 19

Roll Number: 788, Name: Ajay, Age: 19

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