A Micro Project Report

on

Problem Solving using C Language

Submitted by

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NARASARAOPETA ENGINEERING COLLEGE: NARASARAOPET

(AUTONOMOUS)

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NARASARAOPETA ENGINEERING COLLEGE: NARASARAOPET

(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that Battula Sarath, Roll No: 23471A05BD, a Second Year Student of the Department of Computer Science and Engineering, has completed the Micro Project Satisfactorily in "Problem Solving using C Language" for the Academic Year 2024-2025..

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Transpose Square Matrix

AIM:

C program to Transpose Square Matrix

```
#include<stdio.h>
#include<conio.h>
void main()
{
   int a[3][3],b[3][3];
   int i,j;
   printf("enter matrix a values:\n");
   for(i=0;i<3;i++)
   {
      for(j=0;j<3;j++)
      {
         scanf("%d",&a[i][j]);
      }

   }
```

```
        for(i=0;i<3;i++)
        {
           for(j=0;j<3;j++)
           {

           b[j][i]=a[i][j];

           }
        }
        printf("transpose of a matrix are:\n");
        for(i=0;i<3;i++)
        {
           for(j=0;j<3;j++)
           {
              printf("%d\t",b[i][j]);
           }
           printf("\n");

        }
        getch();
 }
```

Output:-

Enter matrix a values:

1 2 3

4 5 6

7 8 9

Transpose of a matrix is:

1 4 7

2 5 8

3 6 9

Multiplication of a Matrix

Aim:

C program to Multiply Two PxQ & QxP Matrix

```
#include<stdio.h>
 #include<conio.h>
 void main()
 {
    int a[3][3],b[3][3],c[3][3];
    int i,j,k;
    printf("enter matrix a values:\n");
    for(i=0;i<3;i++)
    {
       for(j=0;j<3;j++)
       {
          scanf("%d",&a[i][j]);
       }
    }
       printf("enter matrix b values:\n");
```

```
for(i=0;i<3;i++)
{
   for(j=0;j<3;j++)
   {
      scanf("%d",&b[i][j]);
   }
}
for(i=0;i<3;i++)
{
   for(j=0;j<3;j++)
   {
      c[i][j]=0;
      for(k=0;k<3;k++)
      {
         c[i][j]=c[i][j]+a[i][k]*b[k][j];
      }
   }
}
printf("multiplication matrix are:\n");
for(i=0;i<3;i++)
{
```

```
            for(j=0;j<3;j++)
            {
               printf("%d\t",c[i][j]);
            }
            printf("\n");
        }
        getch();
 }
```

Output:-

```
Enter matrix a values:
1  2  3
4  5  6
7  8  9
Enter matrix b values:
9  8  7
6  5  4
3  2  1
Multiplication matrix are:
30    24    18
84    69    54
138   114   90
```

Matrix Thresholding

Aim:

Program in C to read square matrix of order n, find average of elements and then replace each element by 1 if it is greater than average otherwise replace by 0

```
#include<stdio.h>

 #include<conio.h>

 void main()

{

    int a[3][3],b[3][3];

    int i,j;

    int sum=0;

    float avg;

    printf("enter matrix a values:\n");

    for(i=0;i<3;i++)

    {

       for(j=0;j<3;j++)

       {

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

        }
```

```
}
   for(i=0;i<3;i++)
   {
      for(j=0;j<3;j++)
      {
      sum=sum+a[i][j];
      }
   }
   avg=sum/9.0;
   for(i=0;i<3;i++)
   {
      for(j=0;j<3;j++)
      {
         if(a[i][j]>avg)
         {
            a[i][j]=1;
         }
         else
         {
            a[i][j]=0;
         }
      }
```

```
        }
        printf("then matrix becoms:\n");
        for(i=0;i<3;i++)
        {
           for(j=0;j<3;j++)
           {
              printf("%d\t",a[i][j]);
           }
           printf("\n");
        }
        getch();
 }
```

output:-

Enter matrix a values:

1 2 3

4 5 6

7 8 9

Then the matrix becomes:

0 0 0

0 1 1

1 1 1

Cricketer records sorting

Aim:

A record contains name of cricketer, his age, number of test matches that he has played and the average runs that he has scored in each test match. Create an array of structure to hold records of 20 such cricketer and then write a program to read these records and arrange them in ascending order by average runs. Use the qusort() standard library function.

```
#include <stdio.h>

#include <stdlib.h>

#include <string.h>

#define NUM_CRICKETERS 20


struct Cricketer {

   char name[50];

   int age;

   int testMatches;

   float averageRuns;

};

int compareByAverageRuns(const void *a, const void *b) {

   struct Cricketer *cricketerA = (struct Cricketer *)a;
```

```
    struct Cricketer *cricketerB = (struct Cricketer *)b;

    if (cricketerA->averageRuns < cricketerB->averageRuns)
        return -1;
    else if (cricketerA->averageRuns > cricketerB->averageRuns)
        return 1;
    else
        return 0;
}

int main() {
    struct Cricketer cricketers[NUM_CRICKETERS];

    printf("Enter information for %d cricketers:\n", NUM_CRICKETERS);
    for (int i = 0; i < NUM_CRICKETERS; i++) {
        printf("\nCricketer %d\n", i + 1);
        printf("Enter name: ");
        scanf(" %[^\n]s", cricketers[i].name);
        printf("Enter age: ");
        scanf("%d", &cricketers[i].age);
        printf("Enter number of test matches: ");
```

```
        scanf("%d", &cricketers[i].testMatches);
        printf("Enter average runs: ");
        scanf("%f", &cricketers[i].averageRuns);
    }
    qsort(cricketers, NUM_CRICKETERS, sizeof(struct Cricketer),
compareByAverageRuns);

    printf("\nCricketers sorted by average runs (ascending order):\n");
    for (int i = 0; i < NUM_CRICKETERS; i++) {
        printf("Name: %s, Age: %d, Test Matches: %d, Average Runs: %.2f\n",
            cricketers[i].name, cricketers[i].age, cricketers[i].testMatches,
cricketers[i].averageRuns);
    }

    return 0;
}
```

Output:-

Enter information for 20 cricketers:

Cricketer 1

Enter name: Sachin Tendulkar

Enter age: 45

Enter number of test matches: 200

Enter average runs: 53.78

Cricketer 2

Enter name: Rahul Dravid

Enter age: 47

Enter number of test matches: 164

Enter average runs: 52.31

Cricketer 3

Enter name: Virat Kohli

Enter age: 31

Enter number of test matches: 102

Enter average runs: 52.04

Cricketer 4

Enter name: Ricky Ponting

Enter age: 40

Enter number of test matches: 168

Enter average runs: 51.85

Cricketer 5

Enter name: Brian Lara

Enter age: 44

Enter number of test matches: 131

Enter average runs: 52.88

Cricketer 6

Enter name: Jacques Kallis

Enter age: 39

Enter number of test matches: 166

Enter average runs: 55.37

Cricketer 7

Enter name: Kumar Sangakkara

Enter age: 42

Enter number of test matches: 134

Enter average runs: 57.40

Cricketer 8

Enter name: Steve Waugh

Enter age: 50

Enter number of test matches: 168

Enter average runs: 51.06

Cricketer 9

Enter name: Alastair Cook

Enter age: 38

Enter number of test matches: 161

Enter average runs: 45.35

Cricketer 10

Enter name: AB de Villiers

Enter age: 40

Enter number of test matches: 114

Enter average runs: 50.66

Cricketer 11

Enter name: Virender Sehwag

Enter age: 45

Enter number of test matches: 104

Enter average runs: 49.34

Cricketer 12

Enter name: Shane Warne

Enter age: 46

Enter number of test matches: 145

Enter average runs: 31.30

Cricketer 13

Enter name: Muttiah Muralitharan

Enter age: 48

Enter number of test matches: 133

Enter average runs: 23.08

Cricketer 14

Enter name: Michael Clarke

Enter age: 42

Enter number of test matches: 115

Enter average runs: 49.10

Cricketer 15

Enter name: Younis Khan

Enter age: 46

Enter number of test matches: 118

Enter average runs: 52.05

Cricketer 16

Enter name: Gautam Gambhir

Enter age: 42

Enter number of test matches: 58

Enter average runs: 41.95

Cricketer 17

Enter name: Hashim Amla

Enter age: 41

Enter number of test matches: 124

Enter average runs: 47.63

Cricketer 18

Enter name: Chris Gayle

Enter age: 45

Enter number of test matches: 103

Enter average runs: 42.02

Cricketer 19

Enter name: Kevin Pietersen

Enter age: 43

Enter number of test matches: 104

Enter average runs: 47.28

Cricketer 20

Enter name: Shane Watson

Enter age: 42

Enter number of test matches: 59

Enter average runs: 40.54

Cricketers sorted by average runs (ascending order):

Name: Muttiah Muralitharan, Age: 48, Test Matches: 133, Average Runs: 23.08

Name: Shane Warne, Age: 46, Test Matches: 145, Average Runs: 31.30

Name: Gautam Gambhir, Age: 42, Test Matches: 58, Average Runs: 41.95

Name: Chris Gayle, Age: 45, Test Matches: 103, Average Runs: 42.02

Name: Alastair Cook, Age: 38, Test Matches: 161, Average Runs: 45.35

Name: Kevin Pietersen, Age: 43, Test Matches: 104, Average Runs: 47.28

Name: Hashim Amla, Age: 41, Test Matches: 124, Average Runs: 47.63

Name: Younis Khan, Age: 46, Test Matches: 118, Average Runs: 52.05

Name: Virat Kohli, Age: 31, Test Matches: 102, Average Runs: 52.04

Name: Rahul Dravid, Age: 47, Test Matches: 164, Average Runs: 52.31

Name: Brian Lara, Age: 44, Test Matches: 131, Average Runs: 52.88

Name: Ricky Ponting, Age: 40, Test Matches: 168, Average Runs: 51.85

Name: Michael Clarke, Age: 42, Test Matches: 115, Average Runs: 49.10

Name: Virender Sehwag, Age: 45, Test Matches: 104, Average Runs: 49.34

Name: AB de Villiers, Age: 40, Test Matches: 114, Average Runs: 50.66

Name: Steve Waugh, Age: 50, Test Matches: 168, Average Runs: 51.06

Name: Jacques Kallis, Age: 39, Test Matches: 166, Average Runs: 55.37

Name: Kumar Sangakkara, Age: 42, Test Matches: 134, Average Runs: 57.40

Name: Sachin Tendulkar, Age: 45, Test Matches: 200, Average Runs: 53.78