VIVEKANANDA INSTITUTE OF PROFESSIONAL STUDIES

VIVEKANANDA SCHOOL OF INFORMATION TECHNOLOGY

योगः कर्मसु कौशलम्
IN PURSUIT OF PERFECTION

BACHELOR OF COMPUTER APPLICATION

PROGRAMMING USING 'C' LANGUAGE LAB FILE

BCA 171

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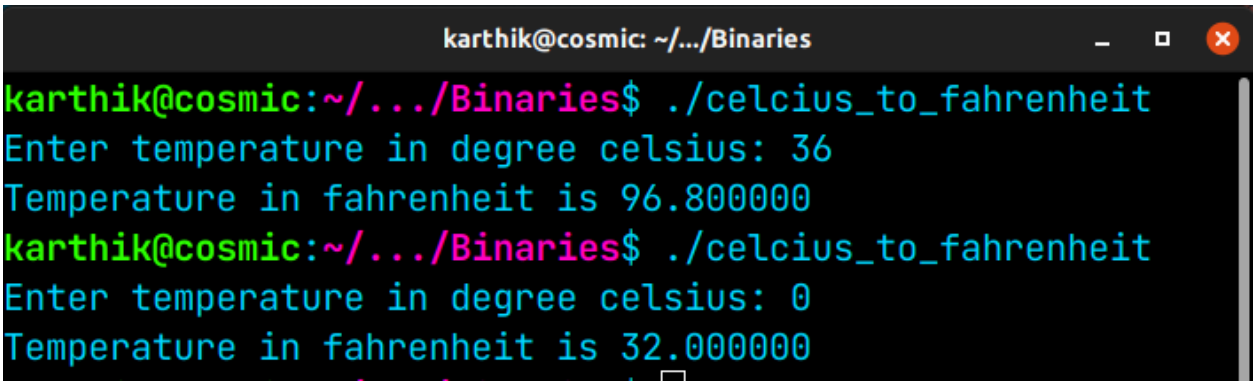
	using recursive functions	
15	**Write a program to perform matrix addition, matrix multiplication, and matrix transpose on 2-d arrays.**	**36**

Q1. Write a program to convert Celcius to Farenheit by taking input from user.

Solution:

```
// Convert celsius to fahrenheit by taking input from the user

#include <stdio.h>

int main()
{
   int celsius;
   printf("Enter temperature in degree celsius: ");
   scanf("%d", &celsius);
   printf("Temperature in fahrenheit is %f\n", (celsius*1.8)+(32));
}
```

Output:

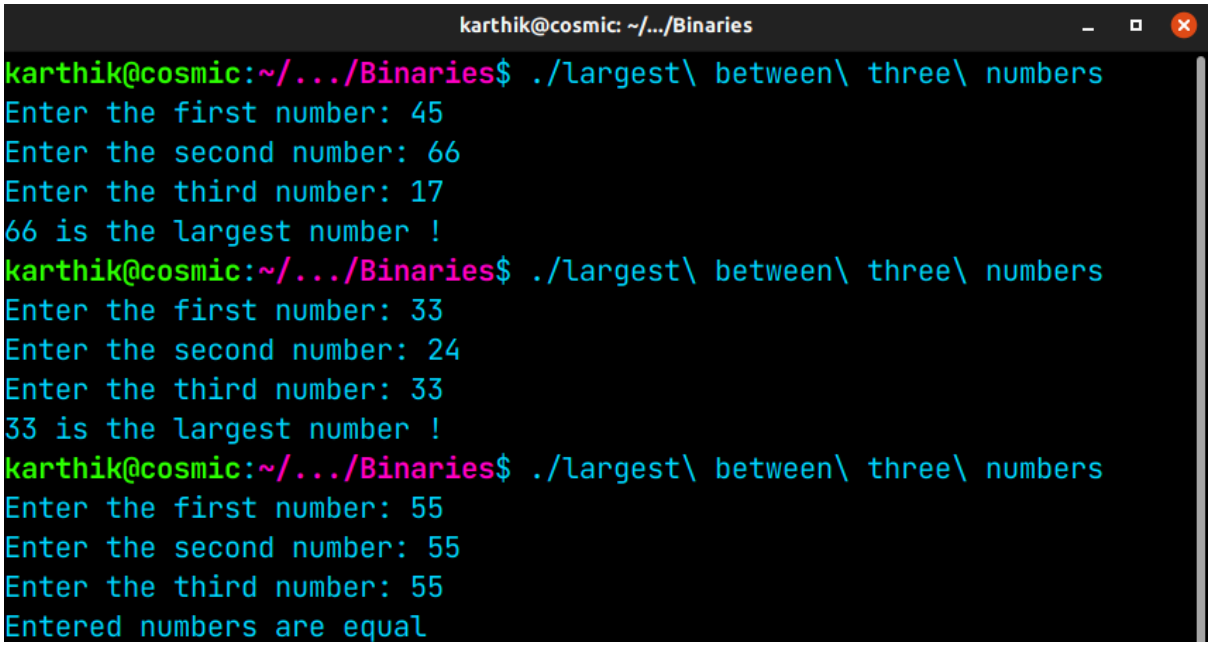


Q2. Write a program to find the greatest numbers among 3 numbers given by user

Solution:

```
// Write a C program to find the greatest numbers among 3 numbers given by user

#include <stdio.h>

int main()
{
	int a,b,c;
	printf("Enter the first number: ");
	scanf("%d", &a);
	printf("Enter the second number: ");
	scanf("%d", &b);
	printf("Enter the third number: ");
	scanf("%d", &c);
	if (((a>b)&&(a>c))||((a==b)&&(a>c)))
	{
		printf("%d is the largest number !",a);
	}
	else if (((b>a)&&(b>c))||((b==c)&&(b>a)))
	{
		printf("%d is the largest number !",b);
	}
	else if (((c>a)&&(c>b))||((a==c)&&(a>b)))
	{
		printf("%d is the largest number !",c);
	}
	else
	{
		printf("Entered numbers are equal");
	}
	printf("\n");
}
```

Output:


karthik@cosmic: ~/.../Binaries
karthik@cosmic:~/.../Binaries$ ./largest\ between\ three\ numbers
Enter the first number: 45
Enter the second number: 66
Enter the third number: 17
66 is the largest number !
karthik@cosmic:~/.../Binaries$ ./largest\ between\ three\ numbers
Enter the first number: 33
Enter the second number: 24
Enter the third number: 33
33 is the largest number !
karthik@cosmic:~/.../Binaries$ ./largest\ between\ three\ numbers
Enter the first number: 55
Enter the second number: 55
Enter the third number: 55
Entered numbers are equal

Q3. Write a program check if a number is prime or not

Solution:

```
// Find if entered number is a prime number

#include <stdio.h>

int prime_num(int number);

int prime_num(int number)
{
   int i, j=(number/2);
   for (i=2;i<=j;i++)
   {
      if (number%i==0)
      {
         return 0;
      }
   }
   return 1;
}

int main()
{
   int n; int if_prime;
   printf("Enter a number: ");
   scanf("%d", &n);
   if (n<0)
   {
      printf("Negative numbers can't be prime!\n"); return 0;
   }
   else if (n<=1)
   {
      printf("%d is neither prime nor composite!\n", n); return 0;
   }
   else
   {
      if_prime=prime_num(n);
      if (if_prime==1)
      {
         printf("%d is a prime number\n", n);
```

```
        }
        else
        {
            printf("%d is not a prime number\n", n);
        }
    }
}
```

Output:

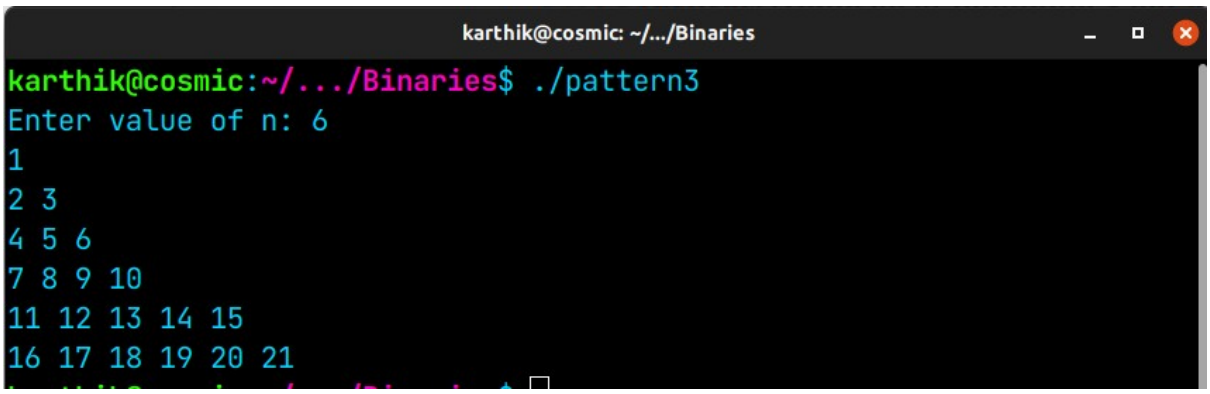
Q4. Write a program to display the following pattern upto n

1
2 3
4 5 6
7 8 9 10

Solution:

```
#include <stdio.h>

int main()
{
   int i=1, j=1, n=1, r;
   printf("Enter value of n: ");
   scanf("%d", &r);
   for (i=1; i<=r; i++)
   {
      for (j=1; j<=i; j++)
      {
         printf("%d ", n);
         n++;
      }
      printf("\n");
   }
}
```

Output:



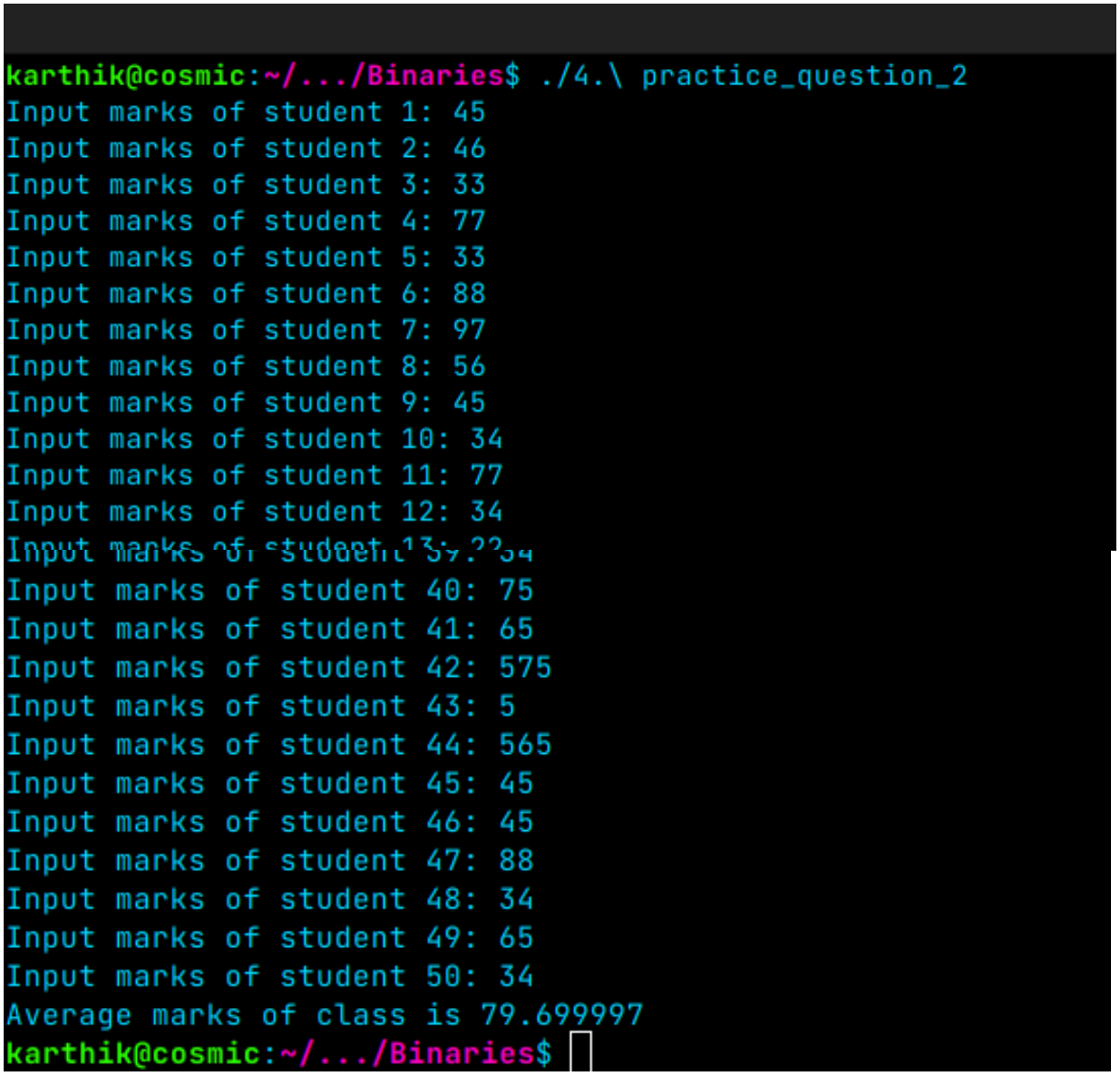
Q5. Write a program to input marks of 50 students using an array and display the average marks of the class

Solution:

// Write a program to input marks of 50 students using an array and display the average marks of the class.

```
#include <stdio.h>

int main()
{
   float sum=0, average=0;
   int students[50], i, j;
   for (i = 0; i < 50; i++)
   {
      printf("Input marks of student %d: ", i+1);
      scanf("%d", &students[i]);
   }
   for (i = 0; i < 50; i++)
   {
      sum += students[i];
   }
   printf("Average marks of class is %f\n", sum/50);
}
```

Output:


karthik@cosmic:~/.../Binaries$ ./4.\ practice_question_2
Input marks of student 1: 45
Input marks of student 2: 46
Input marks of student 3: 33
Input marks of student 4: 77
Input marks of student 5: 33
Input marks of student 6: 88
Input marks of student 7: 97
Input marks of student 8: 56
Input marks of student 9: 45
Input marks of student 10: 34
Input marks of student 11: 77
Input marks of student 12: 34
Input marks of student 40: 75
Input marks of student 41: 65
Input marks of student 42: 575
Input marks of student 43: 5
Input marks of student 44: 565
Input marks of student 45: 45
Input marks of student 46: 45
Input marks of student 47: 88
Input marks of student 48: 34
Input marks of student 49: 65
Input marks of student 50: 34
Average marks of class is 79.699997
karthik@cosmic:~/.../Binaries$

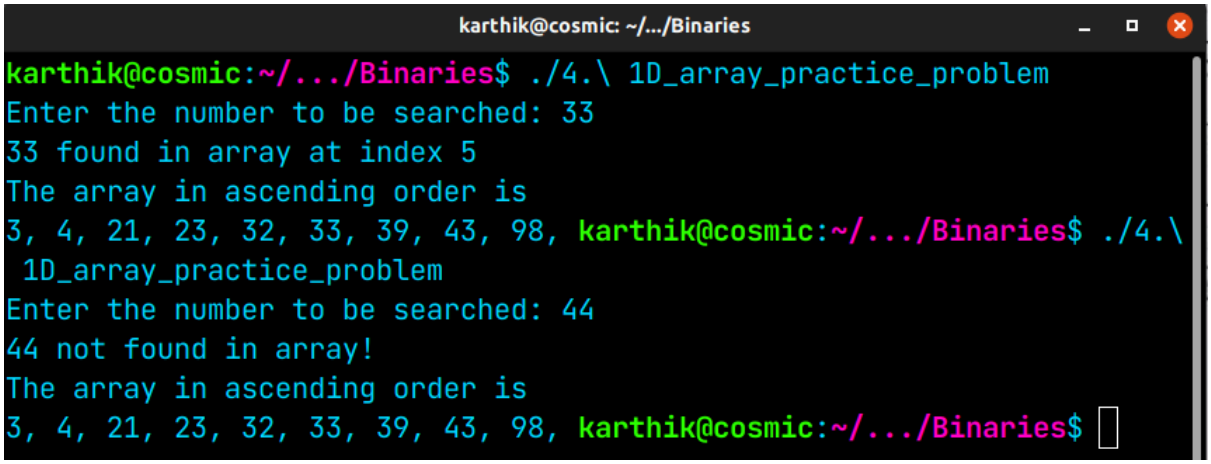
Q6. Write a program to search for a number entered by the user in a given array and display the array in ascending order.

Solution:

```
// Write a program to search for a number entered by the user in a given array and display the array in ascending order

#include <stdio.h>

int main()
{
   int array[]={3,4,43,23,32,33,21,39,98};
   int i,j,n,flag=0, temp;
   printf("Enter the number to be searched: ");
   scanf("%d", &n);
   for (i=0; i<9; i++)
   {
      if (n==array[i])
      {
         printf("%d found in array at index %d\n", n,i);
         flag=1;
      }
   }
   if(flag==0)
   {
      printf("%d not found in array!\n",n);
   }
   // Sorting the array
   for (i=0; i<9; i++)
   {
      for (j=i+1;j<9;j++)
      {
         if (array[i]>array[j])
         {
            temp=array[i];
            array[i]=array[j];
            array[j]=temp;
         }
      }
```

```
    }
    // Displaying the array in ascending order
    printf("The array in ascending order is\n");
    for (i=0; i<9; i++)
    {
        printf("%d, ", array[i]);
    }
}
```

Output:



Q7. Write a program to check if a string is palindrome or not

Solution:

```
// Write a program to check if a string is palindrome or not

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

int main()
{
   int i=0, j=0, flag=1;
   char text[100];
   printf("Enter string: ");
   fgets(text, 100, stdin);
   int len=strlen(text);

   for (i=(len-2); i>=0; i--)
   {
      if(text[i]!=text[j])
      {
         flag=0; i=-1;
      }j++;
   }
   if(flag==1)
   {
      printf("Text is palindrome\n");
   }
   else
   {
      printf("Text is not palindrome\n");
   }
}
```

Output:


karthik@cosmic: ~/.../Binaries
karthik@cosmic:~/.../Binaries$ ./2.\ check\ string\ for\ palindrome
Enter string: aibohphobia
Text is palindrome
karthik@cosmic:~/.../Binaries$ ./2.\ check\ string\ for\ palindrome
Enter string: chemistry
Text is not palindrome

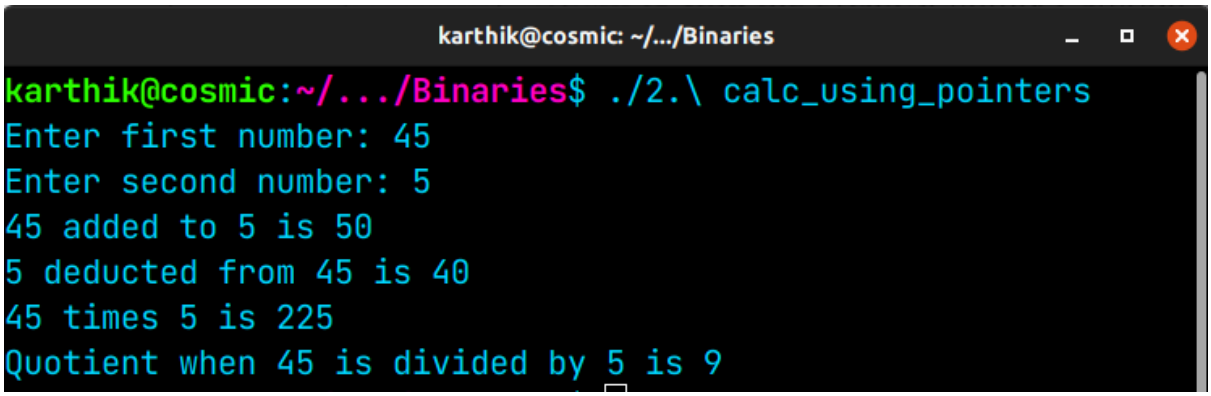
Q8. Write a program to add, subtract, multiply and divide two numbers using pointers

Solution:

// Write a program to add, subtract, multiply and divide two numbers using pointers

```
#include <stdio.h>

int main()
{
   int a, b;
   printf("Enter first number: ");
   scanf("%d", &a);
   printf("Enter second number: ");
   scanf("%d", &b);
   int* ptr1= &a;
   int* ptr2= &b;
   printf("%d added to %d is %d\n", *ptr1, *ptr2, *ptr1+*ptr2);
   printf("%d deducted from %d is %d\n", *ptr2, *ptr1, *ptr1-*ptr2);
   printf("%d times %d is %d\n", *ptr1, *ptr2, *ptr1**ptr2);
   printf("Quotient when %d is divided by %d is %d\n", *ptr1, *ptr2,
(*ptr1)/(*ptr2));
}
```

Output:



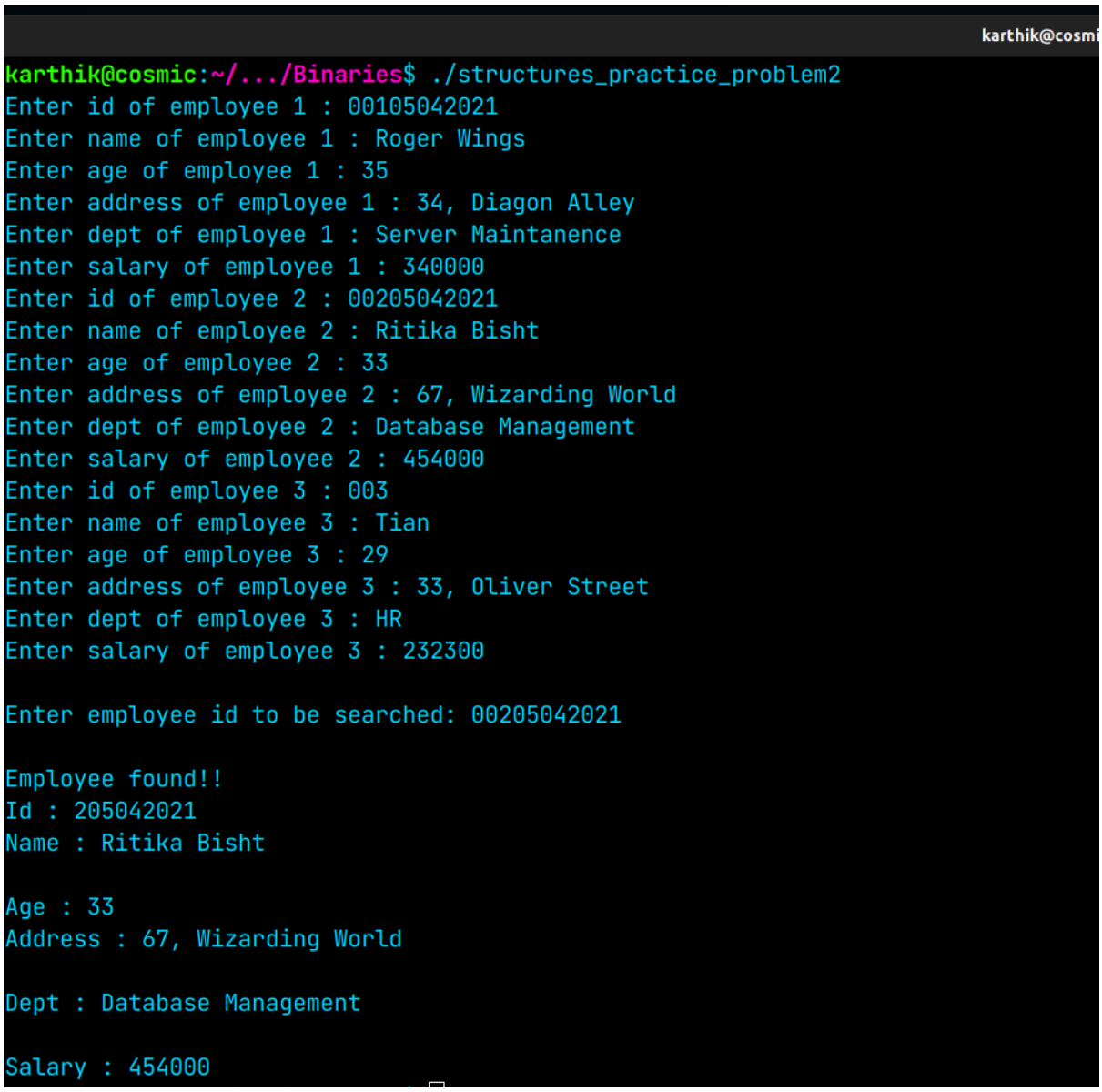
Q9. Write a program to create a structure for employees containing the following data members: Employee ID, Employee Name, Age, Address, Department and Salary.
Input data for 10 employees and display the details of the employee from the employee ID given by the user.

Solution

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

void discard_remainder_of_line( void )
{
   int c;
   // discarding the leftovers of a scanf
   do
   {
      c = getchar();

   } while ( c != EOF && c != '\n' );
}

int main()
{
  int i=0;
  typedef struct employee
  {
    long int id;
    char name[30];
    int age;
    char address[100];
    char dept[30];
    long int salary;
  }emp;

  emp list[5];

  for (i = 0; i<10;i++)
  {
    printf("Enter id of employee %d : ", i+1);
```

```
    scanf("%ld", &(list[i].id));
    discard_remainder_of_line();
    printf("Enter name of employee %d : ", i+1);
    fgets(list[i].name, sizeof(list[i].name), stdin);
    printf("Enter age of employee %d : ", i+1);
    scanf("%d", &(list[i].age));
    discard_remainder_of_line();
    printf("Enter address of employee %d : ", i+1);
    fgets(list[i].address, sizeof(list[i].address), stdin);
    printf("Enter dept of employee %d : ", i+1);
    fgets(list[i].dept, sizeof(list[i].dept), stdin);
    printf("Enter salary of employee %d : ", i+1);
    scanf("%ld", &list[i].salary);
    discard_remainder_of_line();
  }

  long int emp_id;
  printf("\nEnter employee id to be searched: ");
  scanf("%ld", &emp_id);
  discard_remainder_of_line();

  // Linear search
  for (i=0; i<10; i++)
  {
    if (list[i].id==emp_id)
    {
      printf("\nEmployee found!!\n");
      printf("Id : %ld \n", list[i].id);
      printf("Name : %s \n", list[i].name);
      printf("Age : %d\n", list[i].age);
      printf("Address : %s \n", list[i].address);
      printf("Dept : %s \n", list[i].dept);
      printf("Salary : %ld \n", list[i].salary);
      return 0;
    }
  }
  printf("\nEmployee not found!!");
}
```

Output


karthik@cosmi
karthik@cosmic:~/.../Binaries$ ./structures_practice_problem2
Enter id of employee 1 : 00105042021
Enter name of employee 1 : Roger Wings
Enter age of employee 1 : 35
Enter address of employee 1 : 34, Diagon Alley
Enter dept of employee 1 : Server Maintanence
Enter salary of employee 1 : 340000
Enter id of employee 2 : 00205042021
Enter name of employee 2 : Ritika Bisht
Enter age of employee 2 : 33
Enter address of employee 2 : 67, Wizarding World
Enter dept of employee 2 : Database Management
Enter salary of employee 2 : 454000
Enter id of employee 3 : 003
Enter name of employee 3 : Tian
Enter age of employee 3 : 29
Enter address of employee 3 : 33, Oliver Street
Enter dept of employee 3 : HR
Enter salary of employee 3 : 232300
Enter employee id to be searched: 00205042021
Employee found!!
Id : 205042021
Name : Ritika Bisht
Age : 33
Address : 67, Wizarding World
Dept : Database Management
Salary : 454000

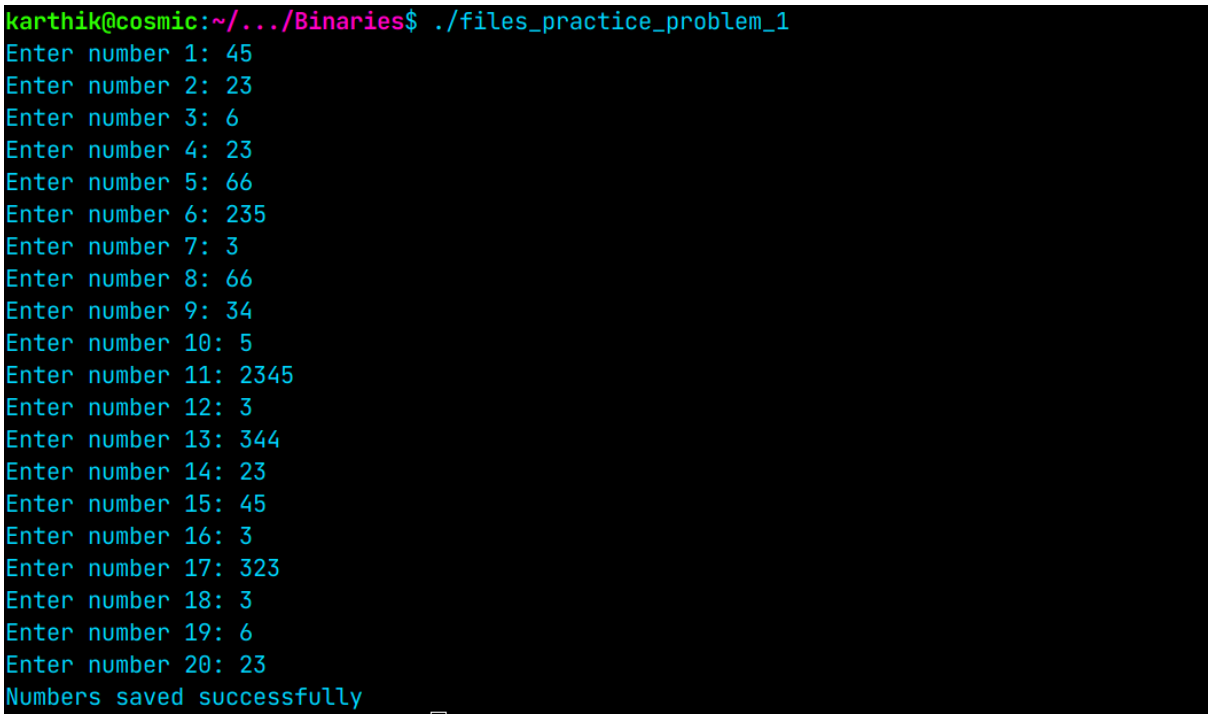
Q10. Write a program to create two files with names EvenFile and OddFile. Input 20 numbers from the user and save even numbers in EvenFile and odd numbers in OddFile.

Solution

```
/* Write a program to create two files with names EvenFile and OddFile.
Input 20 numbers from the user and save even numbers in EvenFile and odd
numbers in OddFile.*/

#include <stdio.h>

int main()
{
   // Input 20 numbers from the user

   int numbers[20], num, num1;

   for(int i=0; i<(sizeof(numbers)/sizeof(int)); i++)
   {
      printf("Enter number %d: ", i+1);
      scanf("%d", &numbers[i]);
   }

   // Save even numbers in EvenFile and odd numbers in OddFile

   FILE * odd = fopen("OddFile.txt", "w");
   FILE * even = fopen("EvenFile.txt", "w");

   for (int i=0; i<(sizeof(numbers)/sizeof(int)); i++)
   {
      if ((numbers[i]%2)==0)
      {
         putw(numbers[i], even);
      }
      else
      {
         putw(numbers[i], odd);
      }
   }
```

```
    printf("Numbers saved successfully\n");

    fclose(odd);
    fclose(even);
}
```

Output



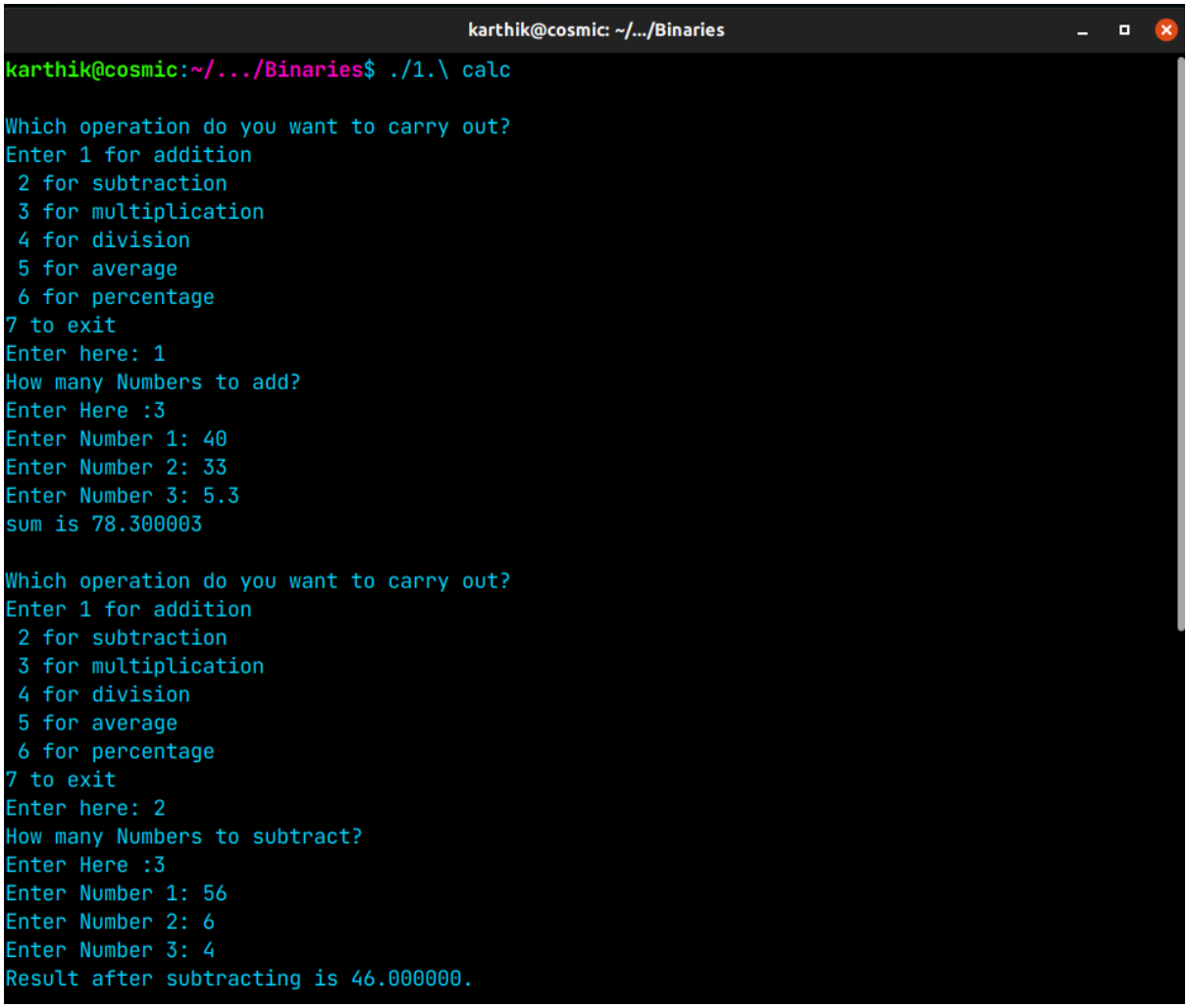
Q11. Write a menu driven program to construct a calculator for following arithmetic operations: addition, subtraction, multiplication, division, average and percentage

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

int main()
{
    int i, operation, len;
    float sum, num, sub, prod, percent;
    while (1)
    {
```

```
printf("\nWhich operation do you want to carry out?\nEnter 1 for addition\
n 2 for subtraction\n 3 for multiplication\n 4 for division\n 5 for average\n 6 for
percentage \n7 to exit\nEnter here: ");
scanf("%d", &operation);
switch (operation)
{
case 1:
   sum=0;
   printf("How many Numbers to add?\nEnter Here :");
   scanf("%d", &len);
   for (i=0; i<len; i++)
   {
      printf("Enter number %d: ", i+1);
      scanf("%f", &num);
      sum+=num;
   }
   printf("sum is %f", sum);
   break;
case 2:
   printf("How many Numbers to subtract?\nEnter Here :");
   scanf("%d", &len);
   int first;
   printf("Enter number 1: ");
   scanf("%d", &first);
   sub=first;
   for (i=1; i<len; i++)
   {
      printf("Enter number %d: ", i+1);
      scanf("%f", &num);
      sub-=num;
   }
   printf("Result after subtracting is %f.", sub);
   break;
case 3:
   printf("How many Numbers to take product of?\nEnter Here :");
   scanf("%d", &len);
   prod=1;
   for (i=0; i<len; i++)
   {
      printf("Enter number %d: ", i+1);
      scanf("%f", &num);
```

```
            prod*=num;
        }
        printf("Product is %f.", prod);
        break;
    case 4:
        int div, divs;
        printf("Enter dividend: ");
        scanf("%d", &div);
        printf("Enter divisor: ");
        scanf("%d", &divs);
        printf("Quotient is %d and remainder is %d\n", (div/divs),(div%divs) );
        break;
    case 5:
        printf("How many Numbers to average?\nEnter Here :");
        scanf("%d", &len);
        sum=0;
        for (i=0; i<len; i++)
        {
            printf("Enter number %d: ", i+1);
            scanf("%f", &num);
            sum+=num;
        }
        printf("Average is %f", sum/len);
        break;
    case 6:
        float n, p;
        printf("Enter number and what percentage of it is to be calculated.\n");
        printf("Enter number: ");
        scanf("%f", &n);
        printf("Enter what percentage of it is to be calculated: ");
        scanf("%f", &p);
        percent=(n/100)*p;
        printf("%f percentage of %f is %f", p, n, percent);
        break;
    case 7:
        printf("Abort!\n");return 0;
    }
    printf("\n");
  }
}
```

Output


karthik@cosmic: ~/.../Binaries
karthik@cosmic:~/.../Binaries$ ./1.\ calc
Which operation do you want to carry out?
Enter 1 for addition
2 for subtraction
3 for multiplication
4 for division
5 for average
6 for percentage
7 to exit
Enter here: 1
How many Numbers to add?
Enter Here :3
Enter Number 1: 40
Enter Number 2: 33
Enter Number 3: 5.3
sum is 78.300003
Which operation do you want to carry out?
Enter 1 for addition
2 for subtraction
3 for multiplication
4 for division
5 for average
6 for percentage
7 to exit
Enter here: 2
How many Numbers to subtract?
Enter Here :3
Enter Number 1: 56
Enter Number 2: 6
Enter Number 3: 4
Result after subtracting is 46.000000.

```
Which operation do you want to carry out?
Enter 1 for addition
 2 for subtraction
 3 for multiplication
 4 for division
 5 for average
 6 for percentage
7 to exit
Enter here: 3
How many Numbers to take product of?
Enter Here :4
Enter Number 1: 45.3
Enter Number 2: 53
Enter Number 3: 55.34
Enter Number 4: 3
Product is 398597.375000.

Which operation do you want to carry out?
Enter 1 for addition
 2 for subtraction
 3 for multiplication
 4 for division
 5 for average
 6 for percentage
7 to exit
Enter here: 5
How many Numbers to average?
Enter Here :3
Enter Number 1: 55
Enter Number 2: 77
Enter Number 3: 5
Average is 45.666668
```

```
Which operation do you want to carry out?
Enter 1 for addition
 2 for subtraction
 3 for multiplication
 4 for division
 5 for average
 6 for percentage
7 to exit
Enter here: 6
Enter number and what percentage of it is to be calculated.
Enter number: 80
Enter what percentage of it is to be calculated: 20
20.000000 percentage of 80.000000 is 16.000000

Which operation do you want to carry out?
Enter 1 for addition
 2 for subtraction
 3 for multiplication
 4 for division
 5 for average
 6 for percentage
7 to exit
Enter here: 7
Abort!
```

Q12. Write a menu driven program to perform the following operations:

(i) Print armstrong numbers upto N
(ii) Display prime numbers between 1 to N
(iii) Reverse of an integer

Solution

```
#include <stdio.h>
int prime_num(int number);
int sum_pow(int number, int digits);
int count_digits(int number);
int reverse(int number);

int count_digits(int number)
{
   if (number>0)
   {
      number=number/10;
      return 1 + count_digits(number);
   }
   else
   {
      return 0;
   }
}

int sum_pow(int number, int digits)
{
   int i, j=digits, digit=1;
   if (number>0)
   {
      for (i=1;1<=j;j--)
      {
         digit=digit*(number%10);
      }
```

```
        return digit+ sum_pow((number/10), digits);
    }
    else
        digit-=1;
        return digit;
}

int prime_num(int number)
{
    int i, j=(number/2);
    for (i=2;i<=j;i++)
    {
        if (number%i==0)
        {
            return 0;
        }
    }
    return 1;
}

int reverse(int number)
{
    int num1=0;
    while (number>0)
    {
        num1=(num1*10)+(number%10);
        number/=10;
    }
    return num1;
}

int main()
{
    int n, operation, i,num, og_num;
    while (1)
    {
        printf("Input which operation is to be performed\n");
        printf("1 to print armstrong numbers upto N\n");
        printf("2 to print prime numbers between 1 to N\n");
        printf("3 to reverse an integer\n");
        printf("4 to quit the program\n");
```

```
printf("Enter here: ");
scanf("%d", &operation);
switch (operation)
{
case 1:
   printf("Enter value of n: ");
   scanf("%d", &n);
   for (i=0; i<n; i++)
   {
      int digits, sum;
      digits=count_digits(i);
      sum=sum_pow(i, digits);
      if (sum==i)
      {
         printf("%d, ", i);
      }
   }
   break;
case 2:
   printf("Enter N: ");
   scanf("%d", &n);
   printf("Prime numbers between 1 and %d are: ", n);
   for (i=1; i<=n; i++)
   {
      if(prime_num(i)==1)
      {
         printf("%d, ", i);
      }
   }
   break;
case 3:
   printf("Enter a number: ");
   scanf("%d",&num);
   og_num=num;
   num=reverse(num);
   printf("Reverse of %d is %d\n", og_num, num);
   break;
case 4:
   printf("Abort!\n");
   return 0;
}
```

```
        printf("\n");
    }
}
```

Output

```
karthik@cosmic:~/.../Binaries$ ./2.\ num_ops
Input which operation is to be performed
1 to print armstrong numbers upto N
2 to print prime numbers between 1 to N
3 to reverse an integer
4 to quit the program
Enter here: 1
Enter value of n: 154
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 153,
Input which operation is to be performed
1 to print armstrong numbers upto N
2 to print prime numbers between 1 to N
3 to reverse an integer
4 to quit the program
Enter here: 2
Enter N: 30
Prime numbers between 1 and 30 are: 1, 2, 3, 5, 7, 11, 13, 17, 19, 23, 29,
Input which operation is to be performed
1 to print armstrong numbers upto N
2 to print prime numbers between 1 to N
3 to reverse an integer
4 to quit the program
Enter here: 3
Enter a number: 2374
Reverse of 2374 is 4732
```

```
karthik@cosmic:~/.../Binaries$ ./2.\ num_ops
Input which operation is to be performed
1 to print armstrong numbers upto N
2 to print prime numbers between 1 to N
3 to reverse an integer
4 to quit the program
Enter here: 4
Abort!
```

Q13. Write a program to convert a hexadecimal number into a binary number

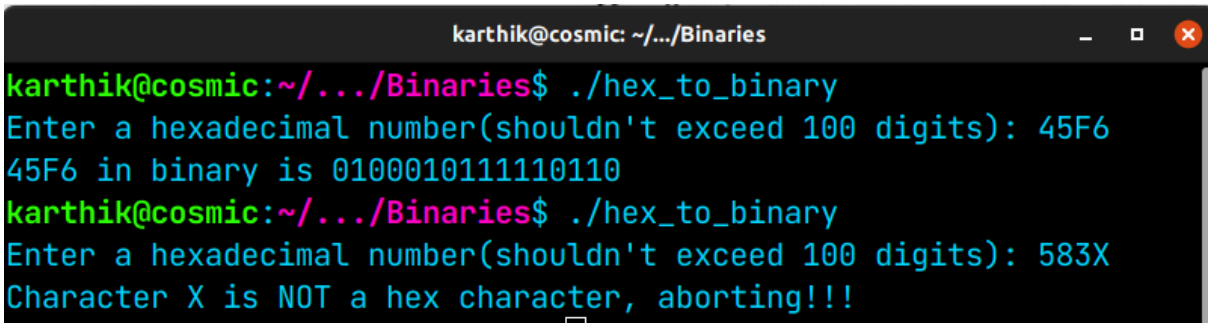
Solution

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

int main()
{
   char num_in_hex[100];

   printf("Enter a hexadecimal number(shouldn't exceed 100 digits): ");
   scanf("%s", num_in_hex);

   // length of the hexadecimal number is the iterative count
   long int iter=strlen(num_in_hex);

   // store binary equivalent of the hexadecimal number here
   // This is better than printing in each iteration since incase a non-hex
character homes in between , we can throw an "invalid character message
without printing the preceding characters"
   char num_in_binary[400]="\0";
   char invalid_error[1];

   for (int i=0; i<iter; i++)
   {
      switch (num_in_hex[i])
      {
      case '0':
         strcat(num_in_binary,"0000");
         break;
      case '1':
         strcat(num_in_binary,"0001");
         break;
      case '2':
         strcat(num_in_binary,"0010");
         break;
      case '3':
         strcat(num_in_binary,"0011");
```

```
        break;
    case '4':
        strcat(num_in_binary,"0100");
        break;
    case '5':
        strcat(num_in_binary,"0101");
        break;
    case '6':
        strcat(num_in_binary,"0110");
        break;
    case '7':
        strcat(num_in_binary,"0111");
        break;
    case '8':
        strcat(num_in_binary,"1000");
        break;
    case '9':
        strcat(num_in_binary,"1001");
        break;
    case 'A':
    case 'a':
        strcat(num_in_binary,"1010");
        break;
    case 'B':
    case 'b':
        strcat(num_in_binary,"1011");
        break;
    case 'C':
    case 'c':
        strcat(num_in_binary,"1100");
        break;
    case 'D':
    case 'd':
        strcat(num_in_binary,"1101");
        break;
    case 'E':
    case 'e':
        strcat(num_in_binary,"1110");
        break;
    case 'F':
    case 'f':
```

```
            strcat(num_in_binary,"1111");
            break;
        default:
            invalid_error[0]=num_in_hex[i];
            i=iter;break;
        }
    }
    if (invalid_error[0] != '\0')
    {
        printf("Character %c is NOT a hex character, aborting!!!\
n",invalid_error[0]);
    }
    else
    {
        printf("%s in binary is ", num_in_hex);
        printf("%s\n",num_in_binary);
    }
}
```

Output



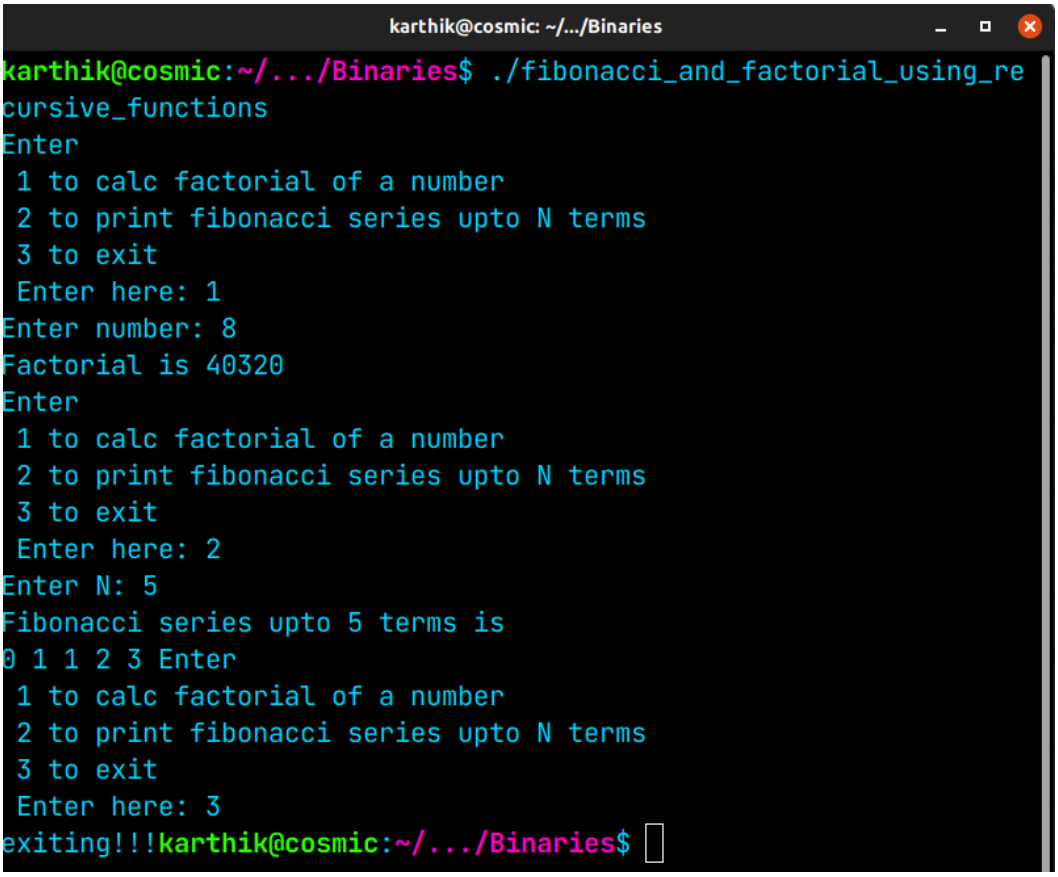
Q14. Write a program to calculate factorial of a number and display fibonacci series upto N terms using recursive functions

Solution

```
#include <stdio.h>

int factorial(int n)
{
   if (n!=0)
   {
      return n*factorial(n-1);
   }
   else
      return 1;
}

void fibonacci(int n)
{
   static int n1=0,n2=1,n3;
   if(n>0)
   {
      n3 = n1 + n2;
      n1 = n2;
      n2 = n3;
      printf("%d ",n3);
      fibonacci(n-1);
   }
}

int main()
{
   int choice, num, n;

   while (1)
   {
      printf("Enter \n 1 to calc factorial of a number \n 2 to print fibonacci series
upto N terms\n 3 to exit\n Enter here: ");
      scanf("%d", &choice);
      switch (choice)
```

```
        {
        case 1:
            printf("Enter number: ");
            scanf("%d", &num);
            printf("Factorial is %d\n", factorial(num));
            break;
        case 2:
            printf("Enter N: ");
            scanf("%d", &n);
            printf("Fibonacci series upto %d terms is \n", n);
            printf("0 1 ");fibonacci(n-2);
            break;
        case 3:
            printf("exiting!!!");return 0;
        }
    }
}
```

Output



Q15. Write a program to perform (i)matrix addition, (ii)matrix multiplication and (iii) matrix transporse on 2D arrays

```
#include <stdio.h>

int main()
{
   while(1==1)
   {
      int operation;
      int i, j, k, rows0, cols0, rows1, cols1, matrix0[10][10], matrix1[10][10],
matrix2[10][10];
      printf("Choose which operation do you want to execute\n");
      printf("Enter\n");
      printf("1 for matrix Addition\n");
      printf("2 for matrix Multiplication\n");
      printf("3 for matrix Transpose\n");
      printf("4 to exit\n");
      printf("Enter here: ");
      scanf("%d", &operation);
      switch (operation)
      {
         case 1:
            printf("Number of rows and columns shouldn't exceed 10\n");
            printf("Enter number of rows: ");
            scanf("%d",&rows0);
            printf("Enter number of columns: ");
            scanf("%d",&cols0);

            printf("Input values for First Matrix\n");
            for(i=0; i<rows0; i++)
            {
               printf("Enter row %d with each value separated with space\n", i+1);
               for(j=0; j<cols0; j++)
               {
                  scanf("%d", &matrix0[i][j]);
               }
            }

            printf("Input values for second Matrix\n");
```

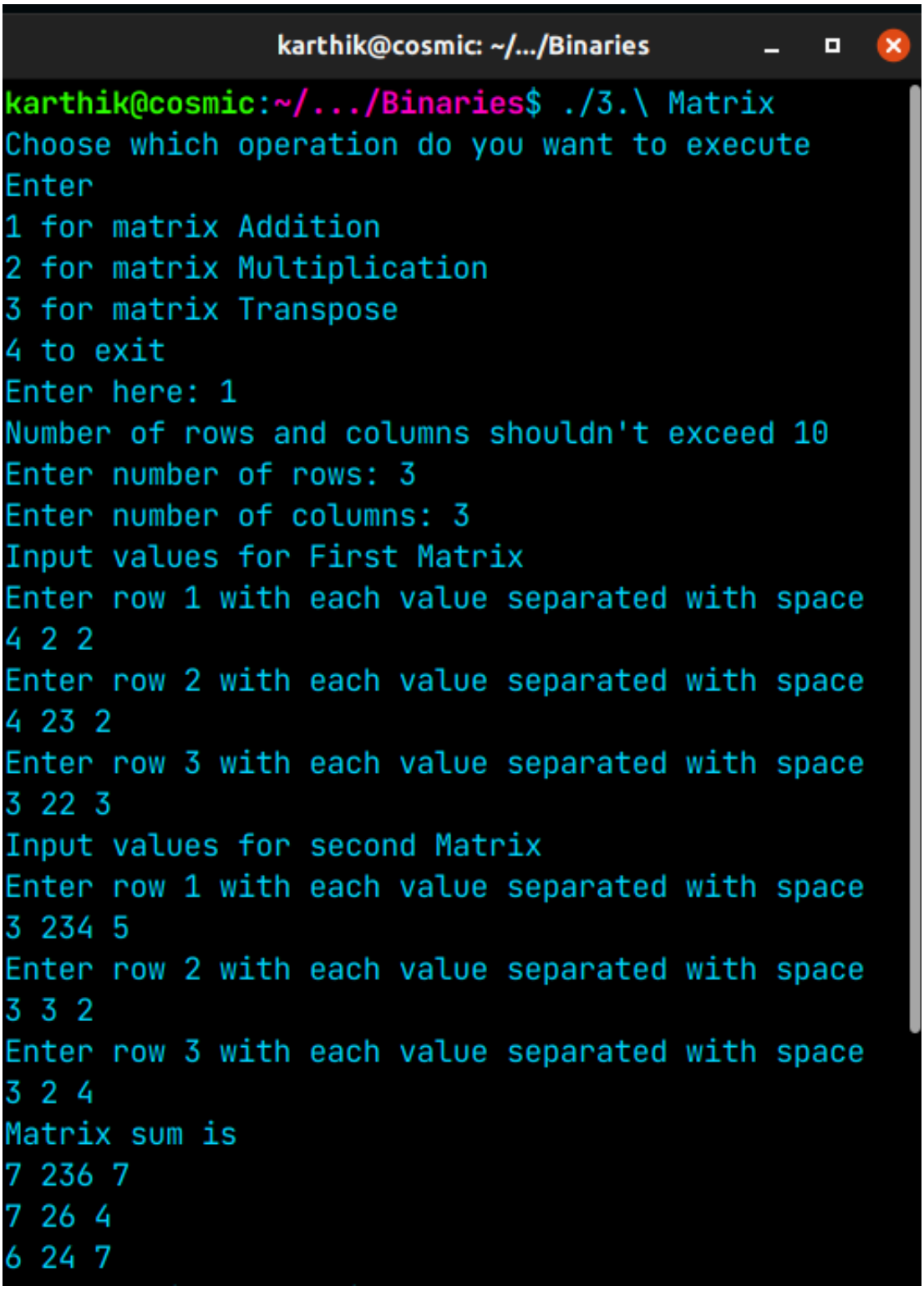
```
    for(i=0; i<rows0; i++)
    {
       printf("Enter row %d with each value separated with space\n", i+1);
       for(j=0; j<cols0; j++)
       {
          scanf("%d", &matrix1[i][j]);
       }
    }

    for(i=0; i<rows0; i++)
    {
       for(j=0; j<cols0; j++)
       {
          matrix2[i][j] = matrix0[i][j] + matrix1[i][j];
       }
    }

    printf("Matrix sum is \n");
    for(i=0; i < rows0; i++)
    {
       for(j=0; j<cols0; j++)
       {
          printf("%d ", matrix2[i][j]);
       }
       printf("\n");
    }
    break;
 case 2:
    printf("Number of Rows and columns shouldn't exceed 10\n");
    printf("Enter number of rows and columns for first Matrix\n");
    printf("Enter number of rows: ");
    scanf("%d", &rows0);
    printf("Enter number of columns: ");
    scanf("%d", &cols0);

    printf("Enter number of rows and columns for second Matrix\n");
    printf("Enter number of rows: ");
    scanf("%d", &rows1);
    printf("Enter number of columns: ");
    scanf("%d", &cols1);
```

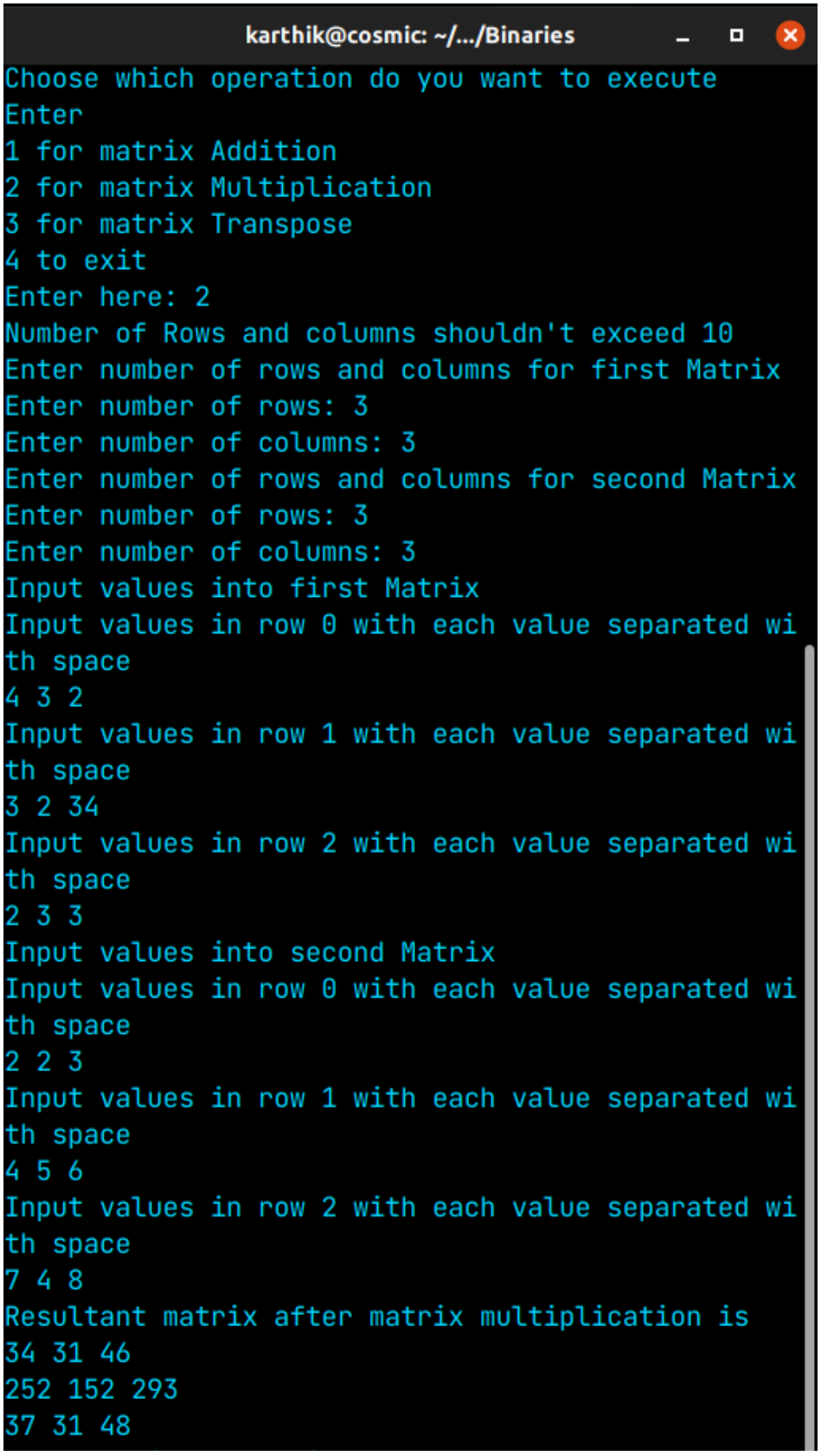
```
        if (cols0!=rows1)
        {
           printf("Number of columns in first matrix should be equal to
number of rows in second matrix\n");
           return 0;
        }

        printf("Input values into first Matrix\n");

        for(i = 0; i < rows0; i++)
        {
           printf("Input values in row %d with each value separated with
space\n", i);
           for(j=0; j< cols0; j++)
           {
              scanf("%d", &matrix0[i][j]);
           }
        }

        printf("Input values into second Matrix\n");

        for(i = 0; i < rows1; i++)
        {
           printf("Input values in row %d with each value separated with
space\n", i);
           for(j=0; j< cols1; j++)
           {
              scanf("%d", &matrix1[i][j]);
           }
        }

        // Matrix multiplication

        for (i=0; i<rows0; i++)
        {
           for (j=0; j< cols1; j++)
           {
              matrix2[i][j]=0;
              for(k=0;k<rows1;k++)
              {
                 matrix2[i][j]+=(matrix0[i][k]*matrix1[k][j]);
```

```
                }
            }
        }

        printf("Resultant matrix after matrix multiplication is\n");
        for(i=0; i < rows0; i++)
        {
            for(j=0; j<cols1; j++)
            {
                printf("%d ", matrix2[i][j]);
            }
            printf("\n");
        }
        break;
    case 3:
        printf("Number of rows and columns shouldn't exceed 10\n");
        printf("Enter  number of rows: ");
        scanf("%d", &rows0);
        printf("Enter number of columns: ");
        scanf("%d", &cols0);
        for(i = 0; i < rows0; i++)
        {
            printf("Input values in row %d with each value separated with
space\n", i);
            for(j=0; j< cols0; j++)
            {
                scanf("%d", &matrix0[i][j]);
            }
        }

        // Transporse the matrix
        for (i = 0; i < rows0; i++)
        {
            for (j=0; j< cols0; j++)
                matrix1[j][i] = matrix0[i][j];
        }

        printf("Resultant matrix after matrix transporse is\n");
        for(i=0; i < rows0; i++)
        {
            for(j=0; j<cols0; j++)
```

```
                {
                    printf("%d ", matrix1[i][j]);
                }
                printf("\n");
            }
            break;
        case 4:
            printf("exiting!!!\n");return 0;
    }
  }
}
```

Output


karthik@cosmic: ~/.../Binaries
karthik@cosmic:~/.../Binaries$ ./3.\ Matrix
Choose which operation do you want to execute
Enter
1 for matrix Addition
2 for matrix Multiplication
3 for matrix Transpose
4 to exit
Enter here: 1
Number of rows and columns shouldn't exceed 10
Enter number of rows: 3
Enter number of columns: 3
Input values for First Matrix
Enter row 1 with each value separated with space
4 2 2
Enter row 2 with each value separated with space
4 23 2
Enter row 3 with each value separated with space
3 22 3
Input values for second Matrix
Enter row 1 with each value separated with space
3 234 5
Enter row 2 with each value separated with space
3 3 2
Enter row 3 with each value separated with space
3 2 4
Matrix sum is
7 236 7
7 26 4
6 24 7


karthik@cosmic: ~/.../Binaries
Choose which operation do you want to execute
Enter
1 for matrix Addition
2 for matrix Multiplication
3 for matrix Transpose
4 to exit
Enter here: 2
Number of Rows and columns shouldn't exceed 10
Enter number of rows and columns for first Matrix
Enter number of rows: 3
Enter number of columns: 3
Enter number of rows and columns for second Matrix
Enter number of rows: 3
Enter number of columns: 3
Input values into first Matrix
Input values in row 0 with each value separated wi
th space
4 3 2
Input values in row 1 with each value separated wi
th space
3 2 34
Input values in row 2 with each value separated wi
th space
2 3 3
Input values into second Matrix
Input values in row 0 with each value separated wi
th space
2 2 3
Input values in row 1 with each value separated wi
th space
4 5 6
Input values in row 2 with each value separated wi
th space
7 4 8
Resultant matrix after matrix multiplication is
34 31 46
252 152 293
37 31 48

```
karthik@cosmic:~/.../Binaries$ ./3.\ Matrix
Choose which operation do you want to execute
Enter
1 for matrix Addition
2 for matrix Multiplication
3 for matrix Transpose
4 to exit
Enter here: 3
Number of rows and columns shouldn't exceed 10
Enter  number of rows: 3
Enter number of columns: 3
Input values in row 0 with each value separated wi
th space
4 23 2
Input values in row 1 with each value separated wi
th space
3 3 2
Input values in row 2 with each value separated wi
th space
4 2 2
Resultant matrix after matrix transporse is
4 3 4
23 3 2
2 2 2
Choose which operation do you want to execute
Enter
1 for matrix Addition
2 for matrix Multiplication
3 for matrix Transpose
4 to exit
Enter here: 4
exiting!!!
karthik@cosmic:~/.../Binaries$
```