Bahria University,

Karachi Campus



COURSE: CSC-221 DATA STRUCTURES AND ALGORITHM

TERM: FALL 2020, CLASS: BSE- 3 (A)

Submitted By:

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(ADIL WAHEED) (65190)

Submitted To:

Engr. Dr. Farah/ Engr. Ramshaa

Signed Remarks: Score:

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| SNO | DATE | LAB NO | LAB OBJECTIVE | SIGN |
| 01 | 1-10-2020 | 01 | ONE AND TWO DIMENSIONAL ARRAY |  |
| 02 | 09-10-20 | 02 | Linear Search & Sorting Algorithms |  |
| 03 | 13-10-20 | 03 | Recusrion |  |
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LAB EXPERIMENT NO.

\_\_\_03\_\_\_\_

LIST OF TASKS

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| --- | --- |
| TASK NO | OBJECTIVE |
| 01 | Write a code which prints the following series:  2 4 8 - - - - n |
| 02 | Write a program which takes input of an integer number and returns the sum of all numbers. i.e., if input is 3453 then the output should be 15 (3+4+5+3). |
| 03 | Write a program to calculate binomial coefficients of any given number using recursion. |
| 04 | Calculation of number of moves for N number of disk in Tower of Hanoi problem using recursion. |
| 05 | Write a program to calculate H.C.F of two numbers, using recursion. |
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Submitted On:

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(Date: 13/10/20)

**Task No. 1:**

1. Write a code which prints the following series:

2 4 8 - - - - n

**Solution:**

public static void series(int a) //5,4,3,2,1

{

if (a>1)

{

//5-1=4,3,2,1

series(a-1 );

Console.Write("{0} ,", Math.Pow(2,(a-1)));

}

}

static void Main(string[] args)

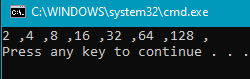
{

series(8);

Console.WriteLine();

}

**OUTPUT**:

****

**Task No. 2:**

Write a program which takes input of an integer number and returns the sum of all numbers. i.e., if input is 3453 then the output should be 15 (3+4+5+3).

**Solution:**

int[] a = new int[5];

int sum = 0;

Console.WriteLine("ENTER NUMBER");

for (int i = 0; i < a.Length; i++)

{

a[i] = Convert.ToInt32(Console.ReadLine());

sum += a[i];

}

for (int i = 0; i < a.Length; i++)

{

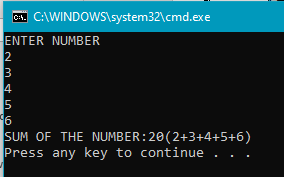
Console.Write("SUM OF THE NUMBER:{0}({1}+{2}+{3}+{4}+{5})", sum, a[0], a[1], a[2], a[3], a[4]);

break;

}

Console.WriteLine();

**OUTPUT**:

****

**Task No. 3:**

Write a program to calculate binomial coefficients of any given number using recursion.

**Solution:**

public static long nfact(long a)

{

if (a==0)

{

return 1;

}

return a \* nfact(a - 1);

}

static void Main(string[] args)

{

long n, k,t;

long binomial;

Console.WriteLine("note n is greater than k");

Console.WriteLine("Enter the value of n");

n = Convert.ToInt64(Console.ReadLine());

Console.WriteLine("Enter the value of k");

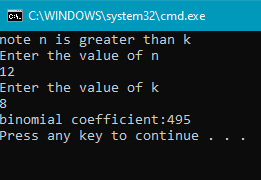
k = Convert.ToInt64(Console.ReadLine());

binomial = nfact(n) / (nfact(k) \* nfact(n - k));

Console.WriteLine("binomial coefficient:{0}",binomial);

}

**OUTPUT**:

****

**Task No. 4:**

Calculation of number of moves for N number of disk in Tower of Hanoi problem using recursion.

**Solution:**

public static int moves(int disc)

{

if (disc==0)

{

Console.WriteLine("Enter Above Value");

return 0;

}

else if (disc == 1)

{

return 1;

}

else

{

return 2 \* moves(disc - 1) + 1;

}

}

static void Main(string[] args)

{

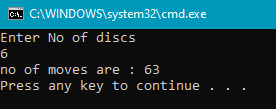
Console.WriteLine("Enter No of discs");

int discs = int.Parse(Console.ReadLine());

Console.WriteLine("no of moves are : " + moves(discs));

}

**OUTPUT**:



**Task No. 4:**

Write a program to calculate H.C.F of two numbers, using recursion.

**Solution:**

static int hcf(int a, int b)

{

// Everything divides 0

if (a == 0)

return b;

if (b == 0)

return a;

// base case

if (a == b)

return a;

// a is greater

if (a > b)

return hcf(a - b, b);

return hcf(a, b - a);

}

static void Main(string[] args)

{

int a , b;

Console.WriteLine("Enter the value of a");

a = Convert.ToInt32(Console.ReadLine());

Console.WriteLine("Enter the value of b");

b = Convert.ToInt32(Console.ReadLine());

Console.WriteLine("HCF of " + a + " and " + b + " is " + hcf(a, b));

}

**OUTPUT**:

