

**DSA**

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**CLASS SECTION**: FA23 / BS (AI)

 “On my honor, as student of Sir Syed CASE Institute Islamabad, I have neither given nor received unauthorized assistance on this academic work.”

**LAB** 9

**QUESTION 1:**

Write a C++ program to which will create a static array of size 10 now pass this array to a

function which will print the array elements using recursion

**CODE:**

#include <iostream>

using namespace std;

void recursePrint(char \*arr, int index)

{

    if (arr[index] == '\0') // base case

    {

        return;

    }

    else

    {

        cout << arr[index] << endl;

        index++;

        recursePrint(arr,index);

    }

}

int main()

{

    char arr[10]{'1', '2', '3', '4', '5', '6', '7', '8', '9', '0'};

    int index = 0;

    recursePrint(arr, index);

    return 0;

}

**OUTPUT:**

1

2

4

5

6

7

8

9

0

…………………………………………………………………….

**QUESTION 2:**

Create a C++ program to check a number is a prime number or not, using recursion

**CODE:**

#include <iostream>

using namespace std;

bool recursePrime(int n, int i = 2)

{

  if (n <= 2)

  {

    return (n == 2) ? true : false;

  }

  if (n % 2 == 0)

  {

    return false;

  }

  if (i \* i > n)

  {

    return true;

  }

  return recursePrime(n, i + 1);

}

int main()

{

  cout << "Enter number to check: ";

  int input;

  cin >> input;

  if (recursePrime(input))

  {

    cout << "Number is prime" << endl;

  }

  else

  {

    cout << "Number is not prime" << endl;

  }

}

**OUTPUT:**

Enter number to check: 7

Number is prime

…………………………………………………………………….

**QUESTION 3:**

Create a C++ program which takes two integers from user. Your program should also have a recursive function which will display odd numbers between the ranges given by user.

**CODE:**

#include <iostream>

using namespace std;

void recursiveOdd(int n, int m)

{

    if (n > m)

    {

        return;

    }

    else

    {

        if (n % 2 == 0)

        {

            cout << n << " ";

        }

        n++;

        recursiveOdd(n, m);

    }

}

int main()

{

    int n, m;

    cout << "Enter starting number: ";

    cin >> n;

    cout << "Enter ending number: ";

    cin >> m;

    cout << "Odd numbers between " << n << " and " << m << " are: " << endl;

    recursiveOdd(n, m);

    return 0;

}

**OUTPUT:**

Enter starting number: 1

Enter ending number: 10

Odd numbers between 1 and 10 are:

2 4 6 8 10

…………………………………………………………………….

**QUESTION 4:**

Write a program to create a static character array. Write a recursive function FindPalindrome which should tell whether or not the entered set of characters is palindromic sequence

**CODE:**

#include<iostream>

using namespace std;

bool FindPalindrome(char \*arr,int LIndex ,int FIndex=0)

{

    if (arr[FIndex]==arr[LIndex])

    {

        if (FIndex == LIndex)

        {

            return true;

        }

        return FindPalindrome(arr,LIndex-1,FIndex+1);

    }

    else

    {

        return false;

    }

}

int main()

{

    string str;

    cout << "Enter a word: ";

    cin >> str;

char arr[str.length()];

for (int i = 0; i < str.length(); i++)

{

    arr[i] = str[i];

}

int index=sizeof(arr)-1;

if(FindPalindrome(arr,index))

{

    cout<<"Your word is a palindrome"<<endl;

}

else

{

    cout<<"Your word is not a palindrome"<<endl;

}

 return 0;

}

**OUTPUT:**

Enter a word: racecar

Your word is a palindrome

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