Boys' High School and College

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Session 2020-2021

Round 7

Subject : Computer Science

Class : XI

Worksheet 5

Topic : Implementation of Algorithm for problem solving

Specimen Algorithms

Question 1:

A Palindrome is a word that may read the same in either direction.

Accept a sentence in UPPER CASE which is terminated by either “.” “?” or “!”

Each word of the sentence is separated by a single blank space.

Perform the following tasks:

(a) Display the count of palindrome words in the sentence.

(b) Display the Palindromic words in the sentence. Example MADAM, LIRIL, ARORA

Input : MOM AND DAD ARE GOING TO ARORA AUNTIE WITH LIRIL

Output : MOM

DAD

ARORA

LIRIL

Number of Palindromic words : 4

Now here we will write 2 algorithms one for the main() method and the other for a function isPalin()

Algorithm for the main() method

Step 1 : Start of Algorithm

Step 2: Input a sentence and store it in a String variable ‘s’.

Step 3: Convert the sentence into upper case.

Step 4: Count the number of words using for loop each word separated by space and sentence ending with ‘.’ ‘?’ or ‘!’ and store it in variable ‘c’.

Step 5: Create a String array word[] of size ‘c’.

Step 6: Start a for loop x=0 to less than ‘c’, extract each word and store into the word[] array.

Step 7: Declare an integer variable ‘count’ and initialize it to 0.

Step 8: Start a for loop y=0 to less than c and repeat step 9.

Step 9 : Call the function isPalin(). If returned value is true, then increase the count variable and print the word.

Step 10: If count of palindromic words is not equal to zero, then print the value stored in the variable 'count'.

Algorithm for the function boolean isPalin(String s)

Step 1: Start the algorithm for the function isPalin()

Step 2: Find the length of the string s and store it in variable 'len'.

Step 3: Declare and initialize a String variable rev= "" for storing the reverse of the string s.

Step 4: Start a reverse loop of z = len- 1 to 0 and repeat Step 5.

Step 5 : Extract characters from the end of the original string and add them to the variable ‘rev’.

Step 6: If the reserve word obtained (rev) is equal to the original String (s) , then return true otherwise return false.

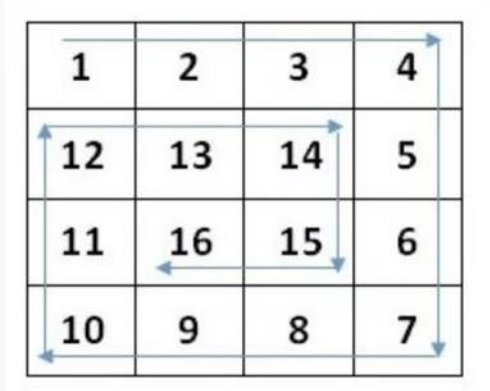
Step 7: End of algorithm for the function isPalin()

Similarly if you have more functions , then just write their algorithms in a similar fashion one after the other.

Question 2:

Write a program in Java to fill a square matrix of size ‘n*n’ in a circular or spiral manner, taking ‘n’ as input .

For example if n=4,then n*n=16,hence the array will be filled as given below



This program is known as Spiral Matrix

Algorithm for Spiral Matrix which has only main() method

Step 1: Start of algorithm

Step 2: Input the size of circular Matrix and store it in integer variable ‘n'

Step 3: Create an integer square array of size n*n which will be the circular Matrix

Step 4: Declare and Initialize variables k=0(for storing index of last column), r1=0(for storing index of first row), r2=n-1(for storing index of last row)

Step 5: Start a while loop till k<=n*n and repeat steps 6 to 10

Step 6:

a. Start a for loop from i=c1 to c2, where ‘i’ increases by 1 every time and perform step(b)

b. Store the natural numbers in the first row using A[r1][i] = k++

Step 7:

a. Start a for loop from j=r1+1 to r2, where ‘j’ increases by 1 every time and perform step(b)

b. Store the natural numbers in the last column using A[j][c2] = k++

Step 8:

a. Start a for loop from i=c2-1 to c1, where ‘i’ decreases by 1 every time and perform step(b)

b. Store the natural numbers in the last row using A[r2][i] = k++

Step 9:

a. Start a for loop from j=r2-1 to r1+1, where 'j' decreases by 1 every time and perform step(b)

b. Store the natural numbers in the first column using A[j][c1] = k++

Step 10:

Update the variable c1,c2,r1 and r2

Step 11: Display the circular matrix A[]

Step 12 : End of Algorithm

This is how you write algorithm in your ISC Practical Examination and your Assignment File(Project)