

BCS230

Lab12 Handout and Assignment

This lab handout provides tasks that students are required to attempt during lab session. Lab objectives are for students to practice with recursion, pointers and algorithms.

Task1:

Review and discussion relate to Quiz2.

Task2:

Step1: Modify the following recursive function to find the sum of all numbers that are multiples of 5 from 0 to 100.

Step2: Delete the local variable 'result' and make all needed changes to the code to work correctly.

Step3: Replace the if-statement with the conditional operator.

```
int sum(int num){  
    int result;  
    if (num == 1)  
        result = 1;  
    else  
        result = num + sum(num-1);  
    return result;  
}
```

Task3:

Step1: Use the following recursive method to search an array of at least 10 elements.

Step2: Modify the function by replacing the array by using pointers.

Step3: Create a dynamic array of 20 items, assign elements values randomly, then ask the user to input the search number, and then check if the number is there.

```

int bSearch(const int a[], int lo, int hi, int X){
    int m = (lo + hi) /2;
    if(lo > hi) return -1;    // base
    if(a[m] == X) return m;  // base
    if(a[m] > X)
        return bSearch(a, lo, m-1, X);
    else
        return bSearch(a, m+1, hi, X);
}

```

Task4:

Step1: Run the following program and check its output.

Step2: pass, no need to do it.

Step3: count how many moves are required.

```

#include<iostream>
using namespace std;
//tower of HANOI function implementation
void TOH( int n, char Sour, char Aux, char Des){
    if( n==1 ){
        cout<<"Move Disk "<<n<<" from "<<Sour<<" to "<<Des<<endl;
        return;
    }
    TOH(n-1, Sour, Des, Aux);
    cout<<"Move Disk "<<n<<" from "<<Sour<<" to "<<Des <<endl;
    TOH(n-1, Aux, Sour, Des);
}

//main program
int main(){
    int n;
    cout<<"Enter no. of disks:";
    cin>>n;
    //calling the TOH
    TOH(n, 'A', 'B', 'C');
    return 0;
}

```

LAB12 - ASSIGNMENT

Problem: A palindrome is a string that reads the same both forward and backward. For example, the string “madam” is a palindrome. Write a program that uses a recursive function to check whether a string is a palindrome. Your program must contain a value-returning recursive function that returns true if the string is a palindrome and false otherwise. Do not use any global variables, use the appropriate parameters.

Submission instructions:

- Due date is May/01st @ 11:59pm.
- Submit your source code via Blackboard only.
- Check rubric.