EUROPEAN UNIVERSITY OF LEFKE
Faculty of Engineering
Department of Software Engineering

COMP 217

DATA STRUCTURES

Lab Work No. 8

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Code :

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

int nsum(int n){
    return n == 0 ? 0 : n + nsum(n-1);
}
int noddsum(int n){
    return n == 0 ? 0 : 2*n-1 + noddsum(n-1);
}
int min(int arr[], int n){
    if (n == 0) return arr[0];
    int rm = min(arr, n-1);
    return arr[n-1] > rm ? rm : arr[n-1];
}
int linearSearch(int arr[], int n, int key){
    return n == 0 ? arr[0] == key : key == arr[n] ? 1 :
linearSearch(arr, n-1, key);
}
void printstring(const char *str, int n){
    if (n > 0) printstring(str, n-1);
    printf("%c",str[n]);
}
int isPalindrome(const char *str, int n){
    return n < strlen(str)/2 ? 1 : str[n-1] != str[strlen(str)-n] ?
0 : isPalindrome(str, n - 1);
}

int main(){
    int n,s;
    printf("Enter n to get the sum of natural numbers up to : ");
    scanf("%d",&n);
    printf("The sum of natural numbers up to n is %d\n",nsum(n));
    printf("Enter n to get the sum of the first n odd numbers : ");
    scanf("%d",&n);
    printf("The sum of the first n odd numbers is %d\n",noddsum(n));
    printf("Enter the size of the array : ");
    scanf("%d",&s);
    int arr[s];
```

```
    for(int i=0; i<s; i++){
        printf("Enter element %d : ",i);
        scanf("%d",&arr[i]);
    }
    printf("Smallest element in the array is %d\n",min(arr,s));
    printf("Enter n to check if it is in the array : ");
    scanf("%d",&n);
    printf("Is n an element in the array ?
%s\n",linearSearch(arr,s,n)?"yes":"no");
    char str[10];
    printf("Enter a string to print character by character : ");
    scanf("%s",str);
    printf("The string is : ");
    printstring(str,strlen(str));
    printf("\nIs it a palindrome ? %s\n",isPalindrome(str,
strlen(str))?"yes":"no");
    return 0;
}
```

Result :

```
C:\Windows\system32\cmd.e:
Enter n to get the sum of natural numbers up to : 5
The sum of natural numbers up to n is 15
Enter n to get the sum of the first n odd numbers : 6
The sum of the first n odd numbers is 36
Enter the size of the array : 4
Enter element 0 : 89
Enter element 1 : 36
Enter element 2 : 24
Enter element 3 : 71
Smallest element in the array is 24
Enter n to check if it is in the array : 24
Is n an element in the array ? yes
Enter a string to print character by character : madam
The string is : madam
Is it a palindrome ? yes

Press any key to continue . . .
```