**Sri Sri University, Cuttack, Odisha.**

**Faculty of Science**

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| **Program: B.Sc. – Computer Science, Data Science, & Environmental Science**  **(2020-23 Batch)**  **Subject Code/Subject Name: Data Structure Laboratory**  **Assignment –III** | |
| **Full Name of the Student:** | VINAYAK SANJAY CHAVAN |
| **Full Roll Number:** | BCS-011 |
| **Program:** | B.Sc. (Computer Sc.) / B.Sc. (Data Sc.) / B.Sc. (Env. Sc.) |
| **Date:** | 1st March, 2021 (10.00 AM – 12.00 Noon) |
| **Signature** |  |

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| **All Questions are compulsory** | **Total Marks: 40** |

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| **Question (s)** | **Maximum Marks** |
| 1. Write a function which returns a string with its entire letters converted to lowercase.   **void strtolower(char \*s)**  **Your code:** **#include<iostream>**  **using namespace std;**  **void strolower(char\*);**  **int main(){**  **char str[1000],\*p;**  **cout<<"The string is: ";**  **cin.get(str,1000);**  **p=str;**  **strolower(p);**  **cout<<"The lowercase of string is: ";**  **for(int i=0;\*(p+i)!='\0';i++){**  **cout<<\*(p+i);**  **}**  **}**  **void strolower(char \*s){**  **for(int i=0;\*(s+i)!='\0';i++){**  **if((\*(s+i)>='A')&&(\*(s+i)<='Z')){**  **\*(s+i)=\*(s+i)+32;**  **}**  **}**  **}**  **Screenshot of output:** | 10 |
| 1. Write a function **strnset()** to set the first **n** characters in a string to specified character (input). If **n** is greater than the string length, then all characters are set.   **char\* strnset(char \*str, char ch, int n)**  **Your code:** **/\* Write a function strnset() to set the first n characters in a string to specified character (input). If n is greater than the string length, then all characters are set.**  **char\* strnset(char \*str, char ch, int n) \*/**  **#include<iostream>**  **using namespace std;**  **char\* strnset(char\*,char,int);**  **int main(){**  **char str[100],\*p,ch,\*s;**  **int num;**  **cout<<"Enter a string: ";**  **cin.get(str,100);**  **cout<<"The character to be printed is: ";**  **cin>>ch;**  **cout<<"The integer number is: ";**  **cin>>num;**  **p=str;**  **s=strnset(p,ch,num);**  **for(int i=0;\*(p+i)!='\0';i++){**  **cout<<\*(s+i);**  **}**  **}**  **char\* strnset(char \*s1,char h1,int n){**  **int length=0;**  **for(int i=0;\*(s1+i)!='\0';i++){**  **length++;**  **}**  **if(n<length){**  **for(int i=0;i<n;i++){**  **\*(s1+i)=h1;**  **}**  **}else{**  **for(int i=0;i<length;i++){**  **\*(s1+i)=h1;**  **}**  **}**  **return s1;**  **}**  **Screenshot of output:** | 10 |
| 1. Write a function to trim the leading whitespace characters in a string according to an integer flag.   The function prototype should be **void strtrim(char \*s, int flag)**  If flag equals 0, remove all whitespace from the beginning of the string (left trim)  If flag equals 1, remove all whitespace from end of the string (right trim).  If flag equals 2, remove all whitespace from both the ends of the string (trim).  **Your code:** **#include<iostream>**  **#include<cstring>**  **#define size 100**  **using namespace std;**  **char\* strtrim(char\*,int);**  **int main()**  **{**  **int flag;**  **char \*s,\*res;**  **char arr[size];**  **cout<<"Enter the string:"<<endl;**  **cin.getline(arr,size-1);**  **s=arr;**  **cout<<" 0 for left trim, 1 for right trim , 2 for both left strim and right strim "<<endl;**  **cout<<"Enter the integer flag:"<<endl;**  **cin>>flag;**    **cout<<"original String before removing white space:"<<s<<endl;**  **cout<<"length of original string :"<<strlen(s)<<endl;**  **res=strtrim(s,flag);**  **cout<<"new String after removing white spaces:"<< res<<endl;**  **cout<<"length of new string :"<<strlen(res)<<endl;**  **return 0;**  **}**  **char\* strtrim(char\*s,int flag)**  **{**  **int i,l\_count=0,r\_count=0;**  **if(flag==0)**  **{**  **for(l\_count=0;\*(s+l\_count)==' ';l\_count++)**  **{**  **}**    **return (s+l\_count);**    **}**    **else if(flag==1)**  **{**  **for(i=strlen(s)-1;\*(s+i)==' ';i--)**  **{**  **r\_count++;**  **}**    **\*(s+strlen(s)-r\_count)='\0';**    **return s;**  **}**    **else if(flag==2)**  **{**  **for(i=strlen(s)-1;\*(s+i)==' ';i--)**  **{**  **r\_count++;**  **}**    **\*(s+strlen(s)-r\_count)='\0';**    **for(l\_count=0;\*(s+l\_count)==' ';l\_count++)**  **{**  **}**    **return (s+l\_count);**  **}**    **}**  **Screenshot of output:** | 10 |
| 1. Write a function to find the norm of a matrix. The norm is defined as the square root of the sum of the squares of all elements in the matrix. Create the matrix dynamically using malloc() / calloc().   **Your code:** **#include <iostream>**  **#include <cstdlib>**  **#include <cmath>**  **using namespace std;**  **int main(){**  **int \*matrix1,\*sq\_matrix,sum,row,col;**    **cout<<"enter no. of rows in matrix: ";**  **cin>>row;**    **cout<<"enter no. of col in matrix: "<<endl;**  **cin>>col;**    **//using calloc**  **matrix1=(int\*)calloc(sizeof(int),row\*col);**  **sq\_matrix=(int\*)calloc(sizeof(int),row\*col);**    **cout<<"enter the elements of matrix: ";**  **for(int i=0; i<row\*col; i++){**  **cin>>\*(matrix1+i);**  **}**  **cout<<"the sq of the matrix: ";**  **for(int i=0; i<row\*col; i++){**  **\*(sq\_matrix+i)=pow(\*(matrix1+i),2);**  **}**    **for(int i=0; i<row\*col; i++){**  **cout<<\*(sq\_matrix+i)<<" ";**  **if ((i+1)% row==0){**  **cout <<endl;**  **}**  **}**    **cout<<"sum matrix: ";**  **for(int i=0; i<row\*col; i++){**  **sum+=\*(sq\_matrix+i);**  **}**    **cout<<sum<<endl;**  **cout<<"sq root of result: "<<sqrt(sum);**  **}**  **Screenshot of output:** | 10 |
| 1. Write a global function called **merge()** that merges two sorted int arrays by first allocating memory for a dynamic array with enough room for both int arrays and then inserting the elements of both arrays into the new array in sequence.   *Arguments: The two int arrays and their length.*  *Return value: A pointer to the new array.*  **Your code: /\* 5. Write a global function called merge() that merges**  **two sorted int arrays by first allocating memory for a dynamic**  **array with enough room for both int arrays and then inserting the**  **elements of both arrays into the new array in sequence \*/**    **#include <iostream>**  **#include <cstdlib>**  **#include <cmath>**  **using namespace std;**  **int \*merge(int\*,int\*,int,int);**  **int main(){**  **int \*matrix1, \*matrix2, len1, len2, len3, \*res;**  **cout<<"enter the 1st matrix length: ";**  **cin>>len1;**  **cout<<"enter the 2nd matrix length: ";**  **cin>>len2;**    **//calloc**  **matrix1=(int\*)calloc(sizeof(int\*),len1);**  **matrix2=(int\*)calloc(sizeof(int\*),len2);**  **cout<<"the first matrix is: ";**  **for(int i=0; i<len1; i++){**  **cin>>\*(matrix1+i);**  **}**    **cout<<"the second matrix is: ";**  **for(int j=0; j<len2; j++){**  **cin>>\*(matrix2+j);**  **}**    **len3 = len1 + len2;**  **res=(int\*)calloc(sizeof(int),len3);**  **res=merge(matrix1,matrix2,len1,len2);**  **cout<<"the resultant matrix is:";**  **for(int k=0; k<len3; k++){**  **cout<<\*(res+k)<<" ";**  **}**  **}**  **int\* merge(int \*arr1, int\* arr2, int l1, int l2){**  **int l3=0;**  **l3=l1+l2;**  **int \*arr3;**  **arr3=(int\*)calloc(sizeof(int),l3);**  **int i=0, j=0, k=0;**  **while((i<l1)&&(j<l2)){**  **if(\*(arr1+i)<\*(arr2+j)){**  **\*(arr3+k)=\*(arr1+i);**  **i++;**  **k++;**  **}else{**  **\*(arr3+k)=\*(arr2+j);**  **j++;**  **k++;**  **}**  **}**  **while(i<l1){**  **\*(arr3+k)=\*(arr1+i);**  **i++;**  **k++;**  **}**  **while(j<l2){**  **\*(arr3+k)=\*(arr2+j);**  **j++;**  **k++;**  **}**  **return arr3;**  **}**  **Screenshot of output:** | 10 |