Independent University, Bangladesh

Department of Computer Science & Engineering

SUMMER 2020

Assignment 4

Due: 26-09-2020, 11.59 pm.

topic: FunctioN, ARRAY, STRING

Point: 100p (10x10:100p)

|  |  |  |  |
| --- | --- | --- | --- |
| Name: Md. Al Abid Supto | Id: 1921719 | Sec: 11 | Point: |

Instructions:

1. Plagiarism will not be tolerated.

2. Do not copy from any online source or from a person.

3. If you could not solve any problem, leave it blank.

4. Partial marks will be given for partially solved solutions.

5. Do not forget to fill your name, id and section. Please leave the point block as it is. Failure to fill up your name, id and section will invalid the whole assignment.

6. You also have to rename the assignment file with your id. For instance, the file name is “ID\_ Assignment 4 Summer 2020” and your id is 12345. You have to rename it as “ID\_12345\_Assignment 4 Summer 2020”. Unable to follow this instruction may lead to cancel your assignment.

Problem Set:

1. Write a function that takes an integer as parameter and returns the reverse number and the sum of the digits of that reverse number.

|  |  |
| --- | --- |
| Sample Input | Sample Output |
| Enter a Number: 956 | Reverse Number: 659  Sum of the reverse number: 20 |
| Enter a Number: 123 | Reverse Number: 321  Sum of the reverse number: 6 |

2. Write a function that sorts an array of numbers. You have to use different function to create and print the unsorted array, then use the function to sort the array and print the sorted array.

3. Write a function that returns the minimum, maximum and the average value of an array passed as a parameter.

4. Write a function that takes a user input and print the number of places where input number is not present in an array.

Sample Input:

Search a number: 10

Sample output:

Array Elements: 2 5 7 10 9

10 is NOT present in 4 places

5. Take two user inputs: lower limit and upper limit. Populate a 2-dimensional array with random numbers within the range given by the user. Call a function that calculates the average value each of the rows.

6. Write a function that takes a string as a parameter, changes all the letters to uppercase letters and returns the updated string.

7. Write a function that takes a string as a parameter and check the string is a palindrome or not palindrome. Then returns the result to the main function.

8. Take a sentence as user input and call a function that prints it in backward order.

|  |  |
| --- | --- |
| Sample Input | Sample Output |
| Enter a sentence: DHAKA IS THE CAPITAL OF BANGLADESH | Backward sentence: BANGLADESH OF CAPITAL THE IS DHAKA |
| Enter a sentence: my name is nirob | Backward sentence: nirob is name my |

9. Write a function that takes an IUB student ID as a string parameter, the checks if the ID is valid or not. If the ID is valid then find which semester and year, he/she got admitted in IUB and their unique ID.

|  |  |
| --- | --- |
| Sample Input | Sample Input |
| IUB Student ID: 1821675 | The ID is valid  Year: 2018  Semester: Spring  Unique ID: 1675 |
| IUB Student ID: 1701500 | The ID is NOT valid |

10. Write a function that checks if a number is prime or not. If the number is prime the function returns true, otherwise false. Also try functions for checking perfect numbers and palindromes.

**Answer to the question no – 1:**

**#include <iostream>**

**using namespace std;**

**void display(int in, int reversedNumber, int remainder)**

**{**

**while(in != 0) {**

**remainder = in%10;**

**reversedNumber = reversedNumber\*10 + remainder;**

**in /= 10;**

**}**

**cout <<"Reversed Number = "<<reversedNumber<<endl;**

**}**

**void summition(int in, int sum, int m)**

**{**

**while(in>0)**

**{**

**m = in%10;**

**sum = sum+m;**

**in = in/10;**

**}**

**cout<<"Sum of the reverse number: "<<sum<<endl;**

**}**

**int main() {**

**int in, m, reversedNumber = 0, remainder, sum=0;**

**cout << "Enter an integer: ";**

**cin >> in;**

**display(in, reversedNumber, remainder);**

**summition(in, sum, m);**

**return 0;**

**}**

**Answer to the question no – 2:**

**#include <iostream>**

**#include <stdlib.h>**

**using namespace std;**

**void display(int array[], int size);**

**int main()**

**{**

**int arr[10];**

**cout<<"Before sorting : ";**

**for(int i =0 ; i<10;++i)**

**{**

**arr[i] = rand()%10;**

**cout<<arr[i]<<" ";**

**}**

**cout<<endl;**

**int arrSize = 10;**

**display(arr,arrSize);**

**cout<<"After sorting : ";**

**for(int i=0; i<arrSize; ++i)**

**{**

**cout<<arr[i]<<" ";**

**}**

**return 0;**

**}**

**void display(int array[], int size)**

**{**

**for(int i =0;i<size; ++i)**

**{**

**for(int j=0; j<size-1; ++j)**

**{**

**if(array[j]> array[j+1])**

**{**

**int a = array[j];**

**array[j] = array[j+1];**

**array[j+1] = a;**

**}**

**}**

**}**

**}**

**Answer to the question no – 3:**

**#include <iostream>**

**using namespace std;**

**int Max(int a[],int n);**

**int Min(int a[],int n);**

**float Average(int sum, int count);**

**int main()**

**{**

**int i, size=0, max, min, sum=0, count=0;**

**float average;**

**cout<<"Enter array size: ";**

**cin>>size;**

**int array[size];**

**cout<<"\nEnter array numbers: ";**

**for(i=0;i<size;i++)**

**{**

**cin>>array[i];**

**sum = sum+array[i];**

**count++;**

**}**

**max = Max(array, size);**

**min = Min(array, size);**

**average= Average(sum, count);**

**cout<<"Maximum element in the array is: " << max <<endl;**

**cout<<"Minimum element in the array is: " << min <<endl;**

**cout<<"All elements average is: " << average <<endl;**

**return 0;**

**}**

**int Max(int a[],int n)**

**{**

**int i, max;**

**max = a[0];**

**for(i=1;i<n;i++)**

**{**

**if(a[i]>max)**

**max =a[i];**

**}**

**return max;**

**}**

**int Min(int a[],int n)**

**{**

**int i, min;**

**min = a[0];**

**for(i=1;i<n;i++)**

**{**

**if(a[i]<min)**

**min =a[i];**

**}**

**return min;**

**}**

**float Average(int sum, int count)**

**{**

**float average = float(sum) / count;**

**return average;**

**}**

**Answer to the question no – 4:**

**#include<iostream>**

**using namespace std;**

**int display(int array[], int x, int value);**

**int main()**

**{**

**int arr[5]={2,5,7,10,9};**

**int in, result;**

**cout<< "Search a number: ";**

**cin>>in;**

**result = display( arr, 5, in);**

**cout<< "Array Elements: ";**

**for(int i=0; i<5; i++)**

**{**

**cout<<arr[i]<< " ";**

**}**

**cout<<endl;**

**cout<<in<< " is not present in "<<result<< " places"<<endl;**

**return 0;**

**}**

**int display(int array[], int size, int search)**

**{**

**int in=0, pos=0;**

**for(in=0; in<size; in++)**

**{**

**if(array[in]!=search)**

**{**

**pos++;**

**}**

**}**

**return pos;**

**}**

**Answer to the question no – 5:**

**#include <iostream>**

**#include<stdlib.h>**

**#include <ctime>**

**using namespace std;**

**void Average(int arrayrcv[][4]);**

**int main()**

**{**

**int in1,in2;**

**srand((unsigned) time(0));**

**cout<< "Enter lower limit : ";**

**cin>>in2;**

**cout<< "Enter upper limit : ";**

**cin>>in1;**

**int arr [5][4];**

**for(int x=0; x<5; x++)**

**{**

**for(int y=0; y<4; y++)**

**{**

**arr[x][y]= (rand() % (in1-in2)) + in2;**

**cout<<arr[x][y]<< " ";**

**}**

**cout<<endl;**

**}**

**Average(arr);**

**return 0;**

**}**

**void Average(int arrayrcv[][4])**

**{**

**for(int x=0; x<5; x++)**

**{**

**int sum =0;**

**for(int y=0; y<4; y++)**

**{**

**sum = sum + arrayrcv[x][y];**

**}**

**cout<< "Average of row "<<x+1<< " is = "<<(sum\*1.0)/4<<endl;**

**}**

**}**

**Answer to the question no – 6:**

**#include <iostream>**

**using namespace std;**

**void display(string rcv);**

**int main()**

**{**

**string in;**

**cout<< "Write a sentence in lowercase : ";**

**getline(cin, in);**

**display(in);**

**return 0;**

**}**

**void display(string rcv)**

**{**

**for(int i=0; rcv[i]!='\0'; i++)**

**{**

**if(rcv[i]>='a' && rcv[i]<='z')**

**{**

**rcv[i]=rcv[i]-32;**

**}**

**}**

**cout<< "Sentence in uppercase : "<<rcv<<endl;**

**}**

**Answer to the question no – 7:**

**#include <iostream>**

**using namespace std;**

**bool display(string out);**

**int main()**

**{**

**string in;**

**cout << "Enter a String: ";**

**cin >> in;**

**if(display(in) == true)**

**{**

**cout << " it is Palindrome "<<endl;**

**}**

**else**

**{**

**cout << "It is not Palindrome"<<endl;**

**}**

**return 0;**

**}**

**bool display(string out)**

**{**

**int i=0;**

**int a = out.size()-1;**

**while(a>0)**

**{**

**if(out[a] != out[i])**

**{**

**return false;**

**}**

**else**

**{**

**a--;**

**i++;**

**}**

**}**

**return true;**

**}**

**Answer to the question no – 8:**

**#include <iostream>**

**#include <bits/stdc++.h>**

**using namespace std;**

**string display(string rcv);**

**int main()**

**{**

**string in;**

**cout << "Enter a sentence: ";**

**getline(cin, in);**

**string rcv = display(in);**

**cout <<"Backward sentence: "<<rcv;**

**return 0;**

**}**

**string display(string rcv)**

**{**

**reverse(rcv.begin(), rcv.end());**

**rcv.insert(rcv.end(), ' ');**

**int n = rcv.length();**

**int count = 0;**

**for (int i = 0; i < n; i++)**

**{**

**if (rcv[i] == ' ')**

**{**

**reverse(rcv.begin() + count, rcv.begin() + i);**

**count = i+1;**

**}**

**}**

**rcv.pop\_back();**

**return rcv;**

**}**

**Answer to the question no – 9:**

**#include <iostream>**

**#include <string>**

**#include<stdlib.h>**

**using namespace std;**

**void display(string id);**

**int main()**

**{**

**string in;**

**cout<< "Enter your ID : ";**

**getline(cin, in);**

**display(in);**

**return 0;**

**}**

**void display(string rcv)**

**{**

**int number = rcv.length();**

**if(number == 7)**

**{**

**if(rcv[2] =='1' ||rcv[2] =='2' ||rcv[2] =='3')**

**{**

**cout<< "Year : 20"<< rcv[0] << rcv[1] << endl;**

**if(rcv[2]=='2')**

**cout<< "Semester :Spring"<<endl;**

**else if(rcv[2]=='3')**

**cout<< "Semester : Summer "<< endl;**

**else if(rcv[2]=='1')**

**cout<< "Semester : Autumn"<<endl;**

**cout<< "Unique ID : "<<rcv[3]<< rcv[4]<< rcv[5]<< rcv[6];**

**}**

**else**

**{**

**cout << "The ID is NOT valid";**

**}**

**}**

**else**

**{**

**cout << "The ID is NOT valid";**

**}**

**}**

**Answer to the question no – 10:**

**#include <iostream>**

**using namespace std;**

**bool display1(int);**

**int display2(int);**

**int display3 (int);**

**int main()**

**{**

**int in, rev,num, sum ;**

**cout<<"Enter any Number: " ;**

**cin>>in;**

**cout << endl;**

**if (display1(in))**

**{**

**cout << in <<" is a prime number."<<endl;**

**}**

**else**

**{**

**cout << in <<" is not a prime number."<<endl;**

**}**

**int r1= display2(in);**

**if(r1==in)**

**{**

**cout<<in <<" is A perfect number." << endl;**

**}**

**else**

**{**

**cout<<in<< " is not a Perfect Number."<< endl;**

**}**

**int r2= display3 (in);**

**if(in==r2)**

**{**

**cout<<in<<" is a Palindrome Number. \n" << endl;**

**}**

**else**

**{**

**cout<<in<<" is not a Palindrome Number. \n" << endl;**

**}**

**return 0;**

**}**

**bool display1(int a)**

**{**

**bool prime = true;**

**if (a == 0 || a == 1)**

**{**

**prime = false;**

**}**

**else**

**{**

**for (int i = 2; i <= a / 2; ++i)**

**{**

**if (a % i == 0)**

**{**

**prime = false;**

**break;**

**}**

**}**

**}**

**return prime;**

**}**

**int display2(int b)**

**{**

**int sum=0;**

**for(int i=1; i<b; i++)**

**{**

**if(b%i==0)**

**{**

**sum=sum+i;**

**}**

**}**

**return sum;**

**}**

**int display3 (int c)**

**{**

**int a,r,s=0;**

**a=c;**

**while(c>0)**

**{**

**r=c%10;**

**s=s\*10+r;**

**c=c/10;**

**}**

**return s;**

**}**