Heaven's Light is Our Guide

Rajshahi University of Engineering & Technology

Department of Electrical & Computer Engineering

Assignment

Assignment No: 1

Course Code	1104
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Submitted By:	Submitted To:
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INDEX

Total number of completed tasks: 20

Total number of incomplete tasks: 2

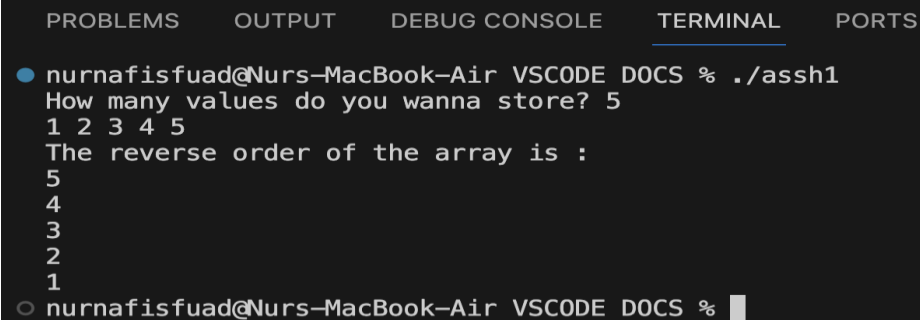| Name of the experiments	Status
1.Write a program in C to read n number of values in an array and display them in reverse order.	Complete
2. Write a program in C to find the sum of all elements of the array.	Complete
3. Write a program in C to copy the elements of one array into another array.	Complete
4.Write a program in C to count the total number of duplicate elements in an array.	Complete
5.Write a program in C to print all unique elements in an array.	Complete
6.Merge two arrays of same size sorted in descending order	Complete
7. Write a program in C to find the maximum and minimum elements in an array.	Complete
8.Write a program in C to delete an element at a desired position from an array.	Complete
9.Write a program in C to find the sum of the right diagonals of a matrix.	Incomplete
10. Write a program in C to find the sum of rows and columns of a matrix.	Incomplete
11. Write a program in C to find a pair with given sum in the array.	Complete
12. Write a program in C to move all zeroes to the end of a given array.	Complete
13. Write a program in C to check whether a number is a prime number or not using a function.	Complete
14. Write a program in C to check whether two given strings are an anagram.	Complete
15. Write a program in C to find the length of a string without using library functions.	Complete
16. Write a program in C to print individual characters of a string in reverse order.	Complete
17. Write a program in C to count the total number of vowels or consonants in a string.	Complete
18. Write a program in C to find the maximum number of characters in a string.	Complete
19. Write a program in C to find the frequency of characters.	Complete
20. Write a program in C to combine two strings manually.	Complete
21. Write a program in C to compute the sum of all elements in an array using pointers.	Complete
22. Write a program in C to print a string in reverse using a pointer.	Complete

● **Assignment 1:** Write a program in C to read n number of values in an array and display them in reverse order.

>Solution
Code:

```c
#include <stdio.h>
int main() {
  int a;
  printf("How many values do you wanna store? ");
  scanf("%d", & a);
  int arr[a];
  for (int i = 0; i < a; i++)
  {
    scanf("%d", & arr[i]);
  }
  printf("The reverse order of the array is : \n");
  for (int i = a - 1; i >= 0; i--)
  {
    printf("%d\n", arr[i]);
  }
  return 0;
}
```

Terminal:


```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

● nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh1
  How many values do you wanna store? 5
  1 2 3 4 5
  The reverse order of the array is :
  5
  4
  3
  2
  1
○ nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS %
```

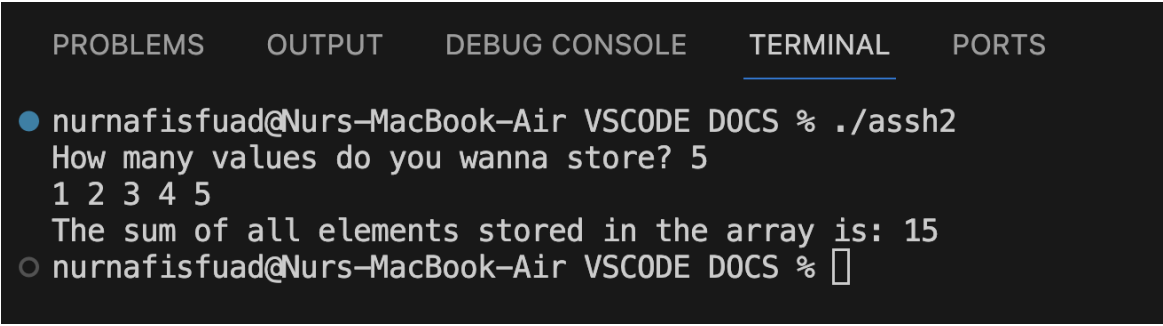● **Assignment 2:** Write a program in C to find the sum of all elements of the array.

>Solution
Code:

```c
#include <stdio.h>

int main() {
  int a, sum = 0;
  printf("How many values do you wanna store? ");
  scanf("%d", & a);
  int arr[a];
  for (int i = 0; i < a; i++)
  {
    scanf("%d", & arr[i]);
  }
  for (int i = 0; i < a; i++)
  {
    sum += arr[i];
  }
  printf("The sum of all elements stored in the array is: %d\n", sum);
  return 0;
}
```

Terminal:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

● nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh2
  How many values do you wanna store? 5
  1 2 3 4 5
  The sum of all elements stored in the array is: 15
○ nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ▯
```
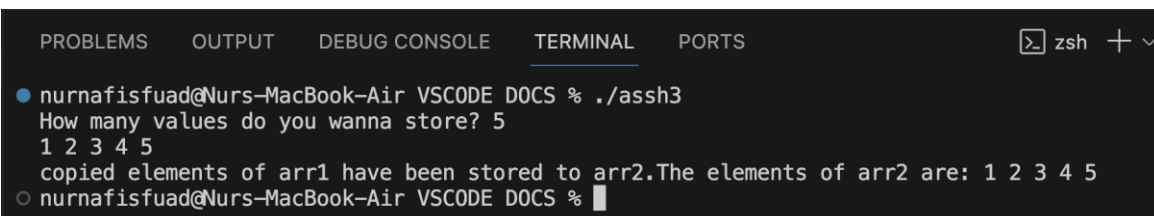
• **Assignment 3:** Write a program in C to copy the elements of one array into another array.

>Solution
Code:

```c
#include <stdio.h>
int main(){
    int a,sum=0 ;
    printf("How many values do you wanna store? ");
    scanf("%d",&a);
    int arr1[a];
    for (int i = 0 ; i<a ; i++)
    {
        scanf("%d",&arr1[i]);
    }
    int arr2[a];
    for (int i = 0 ; i<a ; i++)
    {
        arr2[i] = arr1[i];
    }
    printf("copied elements of arr1 have been stored to arr2.The elements of arr2
are: ");
    for (int i = 0 ; i<a ; i++)
    {
        printf("%d ",arr2[i]);
    }
    printf("\n");
}
```

Terminal:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS                    >_ zsh  + ∨

● nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh3
  How many values do you wanna store? 5
  1 2 3 4 5
  copied elements of arr1 have been stored to arr2.The elements of arr2 are: 1 2 3 4 5
○ nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ▮
```

● **Assignment 4:** Write a program in C to count the total number of duplicate elements in an array.

Sample Output:

Input the number of elements to be stored in the array:5

Input 5 elements in the array :

element - 0 : 1

element - 1 : 1

element - 2 : 2

element - 3 : 3

element - 4 : 3

Total number of duplicate elements found in the array: 2

>Solution
Code:

```c
#include <stdio.h>
int main(){
int a,count=0 ;
printf("Input the number of elements to be
stored in the array:");
scanf("%d",&a);
printf("Input %d elemnets in the array:\n",a);
int arr[a];
  for (int i = 0 ; i<a ; i++)
   {
       printf("element-%d: ",i);
       scanf("%d",&arr[i]);
   }
```

```c
for (int i = 0; i < a; i++) {
  for (int j = i + 1; j < a; j++) {
    if (arr[i] == arr[j]) {
      count++;
      break;
     }
    }
   }
printf("The number of duplicate
elements found in the array:
%d\n",count);
}
```

Terminal:

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS

● nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh4
Input the number of elements to be stored in the array:5
Input 5 elemnets in the array :
element-0: 1
element-1: 1
element-2: 2
element-3: 3
element-4: 3
The number of duplicate elements found in the array: 2
○ nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ▮

• Assignment 5: Write a program in C to print all unique elements in an array.

Print all unique elements of an array:

Input the number of elements to be stored in the array: 4

Input 4 elements in the array :

element - 0 : 3

element - 1 : 2

element - 2 : 2

element - 3 : 5

The unique elements found in the array are:

3 5

>Solution
Code:

```
#include <stdio.h>

int main() {
int a, count = 0;
printf("Input the number of elements to be stored
in the array: ");
scanf("%d", &a);

printf("Input %d elements in the array:\n", a);
int arr1[a], arr2[a];

  for (int i = 0; i < a; i++) {
     printf("element-%d: ", i);
     scanf("%d", &arr1[i]);
     }

for (int i = 0; i < a; i++) {
  int Unique = 1;
   for (int j = 0; j < a; j++) {
      if (i != j && arr1[i] == arr1[j]) {
      Unique = 0;
       break;
      }
      }

   If (Unique) {
   arr2[count] = arr1[i];
   count++;
    }
}

printf("The unique elements found in the array
are:\n");
   for (int i = 0; i < count; i++) {
      printf("%d ", arr2[i]);
      }
printf("\n");
return 0;
}
```

Terminal:

• Assignment 6: Merge two arrays of same size sorted in descending order

Merge two arrays of same size sorted in descending order.

Input the number of elements to be stored in the first array :3

Input 3 elements in the array :

element - 0 : 1

element - 1 : 4

element - 2 : 6

Input the number of elements to be stored in the second array :3

Input 3 elements in the array :

element - 0 : 2

element - 1 : 3

element - 2 : 7

The merged array in descending order is:

7 6 4 3 2 1

>Solution

Code:

```
#include <stdio.h>
int main(){
int a;
printf("Input the number of elements to be
stored in the first array:");
scanf("%d",&a);
printf("Input %d elemnets in the array :\n",a);
int arr1[a];
    for (int i = 0 ; i<a ; i++)
    {
        printf("element-%d: ",i);
        scanf("%d",&arr1[i]);
    }
int b;
printf("Input the number of elements to be
stored in the second array:");
scanf("%d",&b);
printf("Input %d elemnets in the array :\n",b);
int arr2[b];
    for (int i = 0 ; i<b ; i++)
    {
        printf("element-%d: ",i);
        scanf("%d",&arr2[i]);
    }

int arr3[a+b];
    for(int i=0 ;i<a;i++)
    {
        arr3[i] = arr1[i];
    }
    for(int i=a ,j=0;i<b,j<b;i++,j++)
    {
        arr3[i] = arr2[j];
    }
    int temp;
    for(int i=0; i<(a+b-1) ; i++)
    {
        for(int j=0 ; j<(a+b-1)-i ; j++ )
        {
            if(arr3[j]>arr3[j+1])
            {
                temp = arr3[j];
                arr3[j] = arr3[j+1];
                arr3[j+1] = temp;
            }
        }
    }
    for(int i=(a+b-1);i>=0;i--)
    {
        printf("%d ",arr3[i]);
    }
    printf("\n");

}
```

Terminal:

- **Assignment 7:** Write a program in C to find the maximum and minimum elements in an array.

Test Data :

Input the number of elements to be stored in the array :3

Input 3 elements in the array :

element - 0 : 45

element - 1 : 25

element - 2 : 21

Expected Output :

Maximum element is : 45

Minimum element is : 21

>Solution
Code:

```c
#include <stdio.h>
int main(){
int a,temp ;
printf("Input the number of elements to be
stored in the array:");
scanf("%d",&a);
printf("Input %d elemnets in the array
:\n",a);
int arr[a];
   for (int i = 0 ; i<a ; i++)
   {
      printf("element-%d: ",i);
      scanf("%d",&arr[i]);
   }

for(int i=0; i<a-1; i++)
  {
     for(int j=0 ; j<(a-1)-i ; j++ )
     {
        if(arr[j]>arr[j+1])
        {
           temp = arr[j];
           arr[j] = arr[j+1];
           arr[j+1] = temp;
        }
     }
  }
printf("Maximum element is : %d\n",arr[a-1]);
printf("Minimum element is : %d\n",arr[0]);
return 0;
}
```

Terminal:

• Assignment 8: Write a program in C to delete an element at a desired position from an array.

>Solution
Code:

```
#include <stdio.h>
int main(){
    int a,pos;
    printf("Input the number of elements to be
stored in the array:");
    scanf("%d",&a);
    printf("Input %d elemnets in the array :\n",a);
    int arr[a];
    for (int i = 0,j=1 ; i<a,j<=a ; i++,j++)
    {
        printf("element-%d at position %d: ",i,j);
        scanf("%d",&arr[i]);
    }
    printf("The element of what position do you
want to delete?\n");
    scanf("%d",&pos);
```

```
for(int i = pos ; i<a ; i++ ){
        arr[i-1] = arr[i];

    }
    printf("The new array with deleted element ");
    for(int i = 0 ; i<a-1 ; i++)
    {
        printf("%d ",arr[i]);
    }
    printf("\n");

}
```

Terminal:

• Assignment 11: Write a program in C to find a pair with given sum in the array.

Expected Output :

The given array : 6 8 4 -5 7 9

The given sum : 15

Pair of elements can make the given sum by the value of index 0 and 5

>Solution
Code:

```c
#include <stdio.h>
int main(){
    int a,pos,sum,n1,n2;
    printf("Input the number of elements to be
stored in the array:");
    scanf("%d",&a);
    printf("Input %d elemnets in the array :\n",a);
    int arr[a];
    for (int i = 0; i<a; i++)
    {
        printf("element-%d: ",i);
        scanf("%d",&arr[i]);
    }
    printf("The given array is ");
    for(int i=0; i<a ;i++){
        printf("%d ",arr[i]);
    }
    printf("\n");
    printf("The given sum : ");
    scanf("%d",&sum);
    for(int i = 0; i<a ;i++)
    {
        for(int j=i+1 ; j<a ; j++)
        {
            if(arr[i]+arr[j] == sum)
            {
                n1 = i;
                n2 = j;
            }
        }
    }
    printf("Pair of elements can make the given
sum by value of index %d and %d",n1,n2);
    printf("\n");
}
```

Terminal:


```
PROBLEMS  2    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh11
Input the number of elements to be stored in the array:6
Input 6 elemnets in the array :
element-0: 6
element-1: 8
element-2: 4
element-3: -5
element-4: 7
element-5: 9
The given array is 6 8 4 -5 7 9
The given sum : 15
Pair of elements can make the given sum by value of index 1 and 4
```

- **Assignment 12:** Write a program in C to move all zeroes to the end of a given array.

Expected Output :

The given array is : 2 5 7 0 4 0 7 -5 8 0

The new array is:

2 5 7 8 4 -5 7 0 0 0

>Solution
Code:

```
#include <stdio.h>
int main(){
    int a,temp,nzi=0;
    printf("Input the number of elements to be
stored in the array:");
    scanf("%d",&a);
    printf("Input %d elemnets in the array :\n",a);
    int arr[a];
    for (int i = 0 ; i<a ; i++)
    {
        printf("element-%d: ",i);
        scanf("%d",&arr[i]);
    }
    printf("The given array is: ");
    for(int i = 0 ; i<a ; i++ )
    {
        printf("%d ",arr[i]);
    }
    printf("\n The new array is:\n");
    for (int i = 0; i < a; i++) {
        if (arr[i] != 0) {
            temp = arr[i];
            arr[i] = arr[nzi];
            arr[nzi] = temp;
            nzi++;
        }
    }
    for(int i = 0 ; i<a ; i++)
    {
        printf("%d ",arr[i]);
    }
    printf("\n");
}
```

Terminal:

- **Assignment 13:** Write a program in C to check whether a number is a prime number or not using a function.

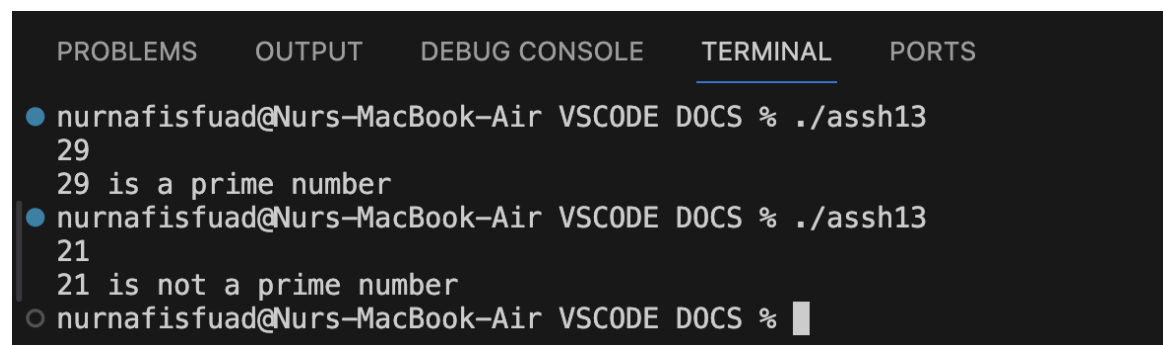>Solution

Code:

```
#include <stdio.h>
void prime( int a){
  int count=0;
  for (int i=2;i<a;i++){
    if(a%i ==0){
      count=1;}
  }

  if(count == 0){
    printf("%d is a prime number\n",a);}
    else printf("%d is not a prime number\n",a);
}
int main(){
int a;
scanf("%d",&a);
prime(a);
return 0;
}
```

Terminal:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

● nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh13
  29
  29 is a prime number
● nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh13
  21
  21 is not a prime number
○ nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ▊
```

- **Assignment 14:** Write a program in C to check whether two given strings are an anagram.

Test Data :

Input the first String : spare

Input the second String : pears

Expected Output :

spare and pears are Anagram.

>Solution
Code:

```c
#include <stdio.h>
#include <string.h>
void bubblesort(char arr[]){
    char temp;
    int n = strlen(arr);
    for(int i = 0 ; i<n-1 ; i++)
    {
        for(int j = 0 ; j<n-1-i ; j++)
        {
            if(arr[j]>arr[j+1])
            {
                temp = arr[j];
                arr[j] = arr[j+1];
                arr[j+1] = temp;
            }
        }
    }
}

int main()
{
char arr1[1000], arr2[1000], arr3[1000], arr4[1000];
    printf("Input the first String:");
    scanf("%s",&arr1);
    printf("Input the second String:");
    scanf("%s",&arr2);
    strcpy(arr3,arr1);
    strcpy(arr4,arr2);
    bubblesort(arr1);
    bubblesort(arr2);
    if(strcmp(arr1,arr2) == 0)
    {
        printf("%s and %s are Anagram\n",arr3,arr4);
    }
    else   printf("%s and %s are not Anagram\n", arr3,arr4);
}
```

Terminal:


```
PROBLEMS  2    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

● nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh14
  Input the first String:pears
  Input the second String:spare
  pears and spare are Anagram
○ nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ▊
```
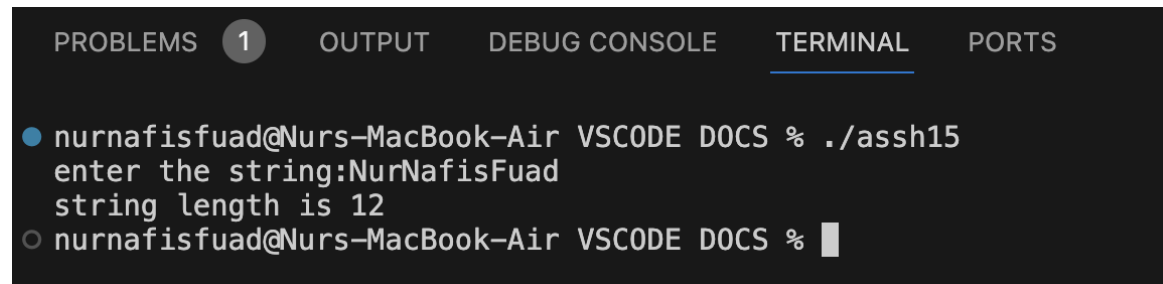
● **Assignment 15:** Write a program in C to find the length of a string without using library functions.

>Solution
Code:

```c
#include <stdio.h>
int main(){
    char str[1000000];
    printf("enter the string:");
    scanf("%s",&str);
    int count =0;
    int i =0;
    while(str[i] != '\0')
    {
        count++;
        i++;
    }
    printf("string length is %d\n",count);
}
```

Terminal:

PROBLEMS 1   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS

● nurnafisfuad@Nurs–MacBook–Air VSCODE DOCS % ./assh15
  enter the string:NurNafisFuad
  string length is 12
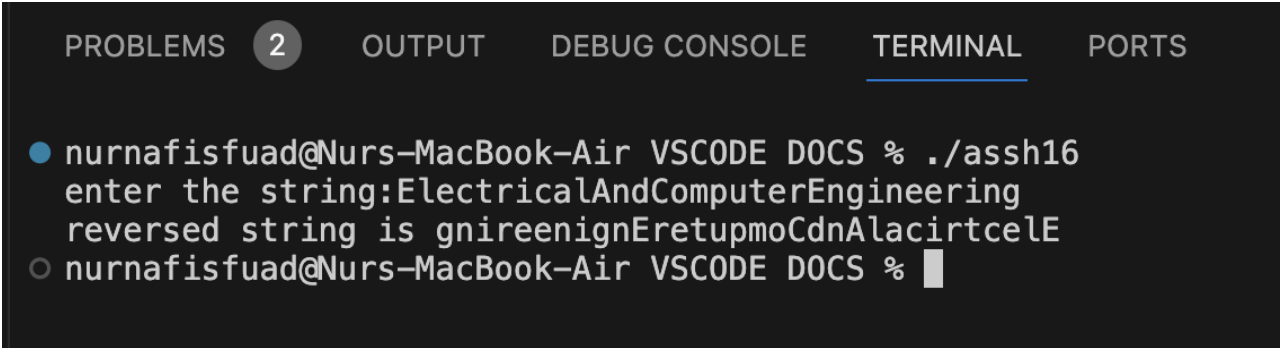○ nurnafisfuad@Nurs–MacBook–Air VSCODE DOCS %

- **Assignment 16:** Write a program in C to print individual characters of a string in reverse order.

>Solution
Code:

```
#include <stdio.h>
#include <string.h>
int main(){
    char str[1000000],revstr[1000000],temp;
    printf("enter the string:");
    scanf("%s",&str);
    for(int i = (strlen(str)-1),j=0 ; i>=0,j<strlen(str) ; i--,j++)
    {
        revstr[j] = str[i];
    }
    printf("reversed string is %s\n",revstr);
}
```

Terminal:

```
PROBLEMS  2     OUTPUT     DEBUG CONSOLE     TERMINAL     PORTS

nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh16
enter the string:ElectricalAndComputerEngineering
reversed string is gnireenignEretupmoCdnAlacirtcelE
nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS %
```

• Assignment 17: Write a program in C to count the total number of vowels or consonants in a string.

>Solution
Code:

```
#include <stdio.h>
#include <string.h>
int main(){
    char str[1000000];
    printf("enter the string:");
    scanf("%s",&str);
    int countV =0;
    int i =0;
    while(str[i] != '\0')
    {
        if((str[i] == 'a') ||(str[i] == 'A') ||(str[i] == 'e') ||(str[i] == 'E') ||
        (str[i] == 'I') ||(str[i] == 'i') ||(str[i] == 'o') ||(str[i] == 'O') ||(str[i] == 'U') ||(str[i] == 'u'))
        {
        countV++;
        }
        i++;
    }
    int countC= strlen(str) - countV;
    printf("Total number of vowels in the string is %d\n",countV);
    printf("Total number of consonants in the string is %d\n",countC);
}
```

Terminal:

● **Assignment 18:** Write a program in C to find the maximum number of characters in a string.

>Solution

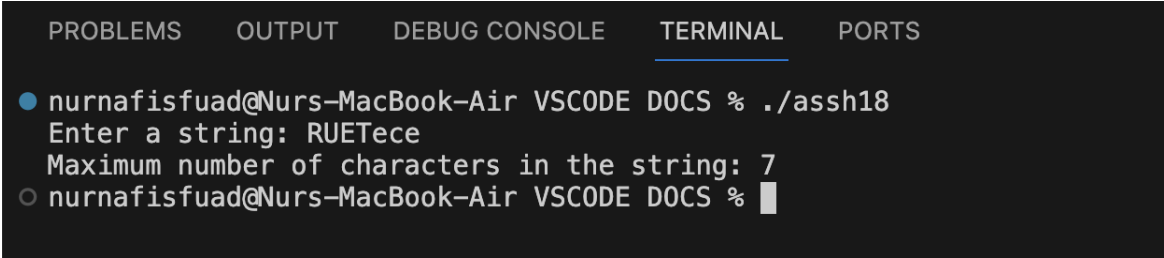*Code*:

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

int main() {
    char s[100];

    printf("Enter a string: ");
    fgets(s, sizeof(s), stdin);
    int l = strlen(s);
    if (s[l - 1] == '\n') {
        s[l - 1] = '\0';
    }
    int maxlen = 0;
    for (int i = 0; s[i] != '\0'; i++) {
        maxlen++;
    }

    printf("Maximum number of characters in the string: %d\n", maxlen);
    return 0;
}
```

Terminal:

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS

● nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh18
  Enter a string: RUETece
  Maximum number of characters in the string: 7
○ nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ▊

- **Assignment 19:** Write a program in C to find the frequency of characters.

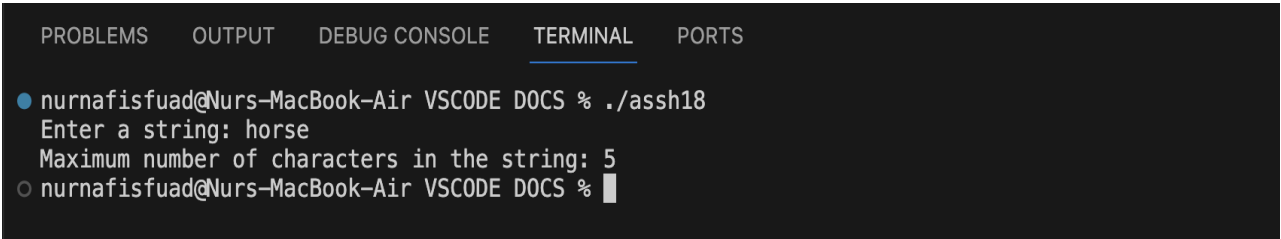>Solution
Code:

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

int main() {
    char s[100];
    printf("Enter a string: ");
    fgets(s, sizeof(s), stdin);
    int l = 0;
    for (int i = 0;s[i] != '\0'; i++) {
        l++;
    }

    printf("Maximum number of characters in the string: %d\n", l-1);

    return 0;
}
```

Terminal:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

● nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh18
  Enter a string: horse
  Maximum number of characters in the string: 5
○ nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS %
```

• Assignment 20: Write a program in C to combine two strings manually.

Test Data :

Input the first string : this is string one

Input the second string : this is string two

Expected Output :

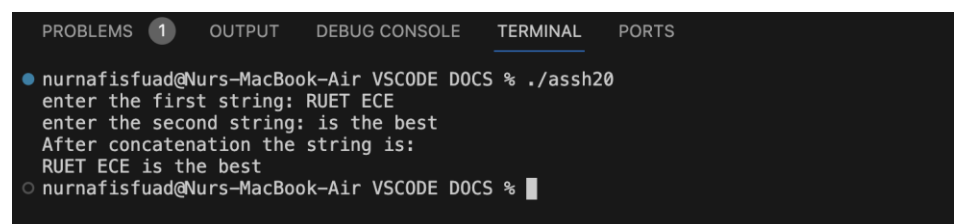After concatenation the string is :

this is string one this is string two

>Solution
Code:

```c
#include <stdio.h>
#include <string.h>
int main()
{
    char str1[100000],str2[100000],str3[200000];
    printf("enter the first string: ");
    fgets(str1, sizeof(str1), stdin);
    printf("enter the second string: ");
    fgets(str2, sizeof(str2), stdin);
    int n = strlen(str1)+strlen(str2)+1;
    for(int i = 0 ; i<strlen(str1)-1 ; i++)
    {
        str3[i] = str1[i];
    }
    str3[strlen(str1)-1] = ' ';
    for(int i = strlen(str1),j=0 ; i<n,j<strlen(str2) ; i++,j++)
    {
        str3[i] = str2[j];
    }
    printf("After concatenation the string is:\n%s",str3);
    return 0;
}
```

Terminal:

• Assignment 21: Write a program in C to compute the sum of all elements in an array using pointers.

>Solution
Code:

```c
#include <stdio.h>
#include <string.h>
int main() {
    int n;
    printf("How many numbers do you want to calculate the sum of?");
    scanf("%d",&n);
    int a[n];
    for (int i= 0 ; i<n ; i++)
    {
        scanf("%d",&a[i]);
    }
    int size = n;
    int *ptr = a;
    int sum = 0;
    for (int i = 0; i < size; i++) {
        sum += *ptr;
        ptr++;
    }


    printf("The sum of all elements in the array is: %d\n", sum);
    return 0;
}
```

Terminal:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh21
How many numbers do you want to calculate the sum of? 5
1 2 3 4 5
The sum of all elements in the array is: 15
nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS %
```

• Assignment 22: Write a program in C to print a string in reverse using pointer.

>Solution

Code:

```c
#include <stdio.h>
#include <string.h>
int main() {
    int n;
    printf("How many numbers do you want to store in the array? ");
    scanf("%d",&n);
    int a[n];
    for (int i= 0 ; i<n ; i++)
    {
        scanf("%d",&a[i]);
    }
    int size = n;
    int *ptr = &a[n-1];
    int sum = 0;
    for (int i = size-1; i >=0; i--) {
        printf("%d ",*ptr);
        ptr--;
    }
    printf("\n");
    return 0;
}
```

Terminal:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

● nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ./assh22
  How many numbers do you want to store in the array? 5
  1 2 3 4 5
  5 4 3 2 1
○ nurnafisfuad@Nurs-MacBook-Air VSCODE DOCS % ▌
```