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A-28

LAB Assignment 8

1. Write a C Program to find an array of Fibonacci numbers.

Program:-

```c
#include <stdio.h>

int main()
{
    int index , j , count , num ;
    printf("\nEnter the size of array : ");
    scanf("%d",&index);
    int fib[index];
    fib[0] = 1 ;
    fib[1] = 1 ;
    count = index-2;
    for (j = 0 ; j < count ; j++ ){
        fib[j+2] = fib [j+1] + fib[j];
    }
    printf("The %d numbers in  fibonacci sequence is\n", index);
    for (num =0 ; num < index ; num++){
        printf(" %d ",fib[num]);
    }
    printf("\n\n");
    return 0;
}
```

Output:-

```
Enter the size of array : 8
The 8 numbers in  fibonacci sequence is
 1  1  2  3  5  8  13  21

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```

2. Write a C Program to find out the largest even integer stored in the array of N integers, where N is the user input.

Program:-

```
#include <stdio.h>
int main(){
    int index, i , j , larg , largi , flag =0;
    printf("Enter the number of elements to be added in array :");
    scanf("%d",&index);
    int arr[index];
    printf("Enter the %d elements in the array :\n", index);
    for (i = 0; i < index ;i++ ){
        scanf("%d", &arr[i]);
    }
    larg = 0;
    largi = 0;
    for (j = 0 ; j < index ; j++){
        if ((arr[j] > larg) && (arr[j] % 2 == 0)){
            larg = arr[j];
            largi = j ;
            flag = 1 ;
        }
    }
    if (flag == 0){
        printf("No even number in the given numbers\n\n");
    }
    else{
        printf("The largest even number is %d\n", larg);
        printf("The largest even numbers index in the array is %d\n\n",
(largi));
    }
    return 0;
}
```

Output:-

```
Enter the number of elements to be added in array :5
Enter the 5 elements in the array :
5
6
7
8
9
The largest even number is 8
The largest even numbers index in the array is 3

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```

3. Write a C Program to arrange the numbers stored in an array so that it would display first, all the odd numbers, and then, all the even numbers of the list.

Program:-

```
#include <stdio.h>

int main(){
    int index, i , j ,k , temp =0 , flag =0;
    printf("Enter the number of elements to be added in array :");
    scanf("%d",&index);
    int arr[index];
    printf("Enter the %d elements in the array :\n", index);
    for (i = 0; i < index ;i++ ){
        scanf("%d", &arr[i]);
    }
    for (j = 0 ; j < (index-1) ; j++){
        for (k =0 ; k < ((index-j)-1) ; k++){
            if ((arr[k+1] % 2 == 1)&& (arr[k] %2==0)){
              temp = arr[k];
              arr[k]= arr[k+1];
              arr[k+1]=temp;
    }
    }
    }
     for (i = 0; i < index ;i++ ){
        printf("index [%d] is  %d\n", i, arr[i] );
    }
    printf("\n\n");
    return 0;
}
```

Output:-

```
Enter the number of elements to be added in array :5
Enter the 5 elements in the array :
6
7
8
9
10
index [0] is  7
index [1] is  9
index [2] is  6
index [3] is  8
index [4] is  10


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```

4. Write a C Program to display the entries of a numeric array in descending order of their values.

Program:-

```
#include <stdio.h>

int main(){
    int i , num , j , k , temp , index;
    printf("\n\nEnter the number of integers to be added in array : ");
    scanf("%d",&num);
    int arr[num];
    printf("Enter %d numbers to be stored in the array :\n",num);
    for (k=0 ; k< num ; k++){
        scanf("%d",&arr[k]);
    }
    for (i = 0 ; i< (num-1) ; i++ ){
        temp=arr[i];
        for (j = i ; j < (num-1) ; j++){
            if (arr[j+1] > temp){
                temp = arr[j+1];
                index = j+1;
            }
        }
        if (arr[i] !=temp){
            arr[index] = arr[i];
            arr[i] = temp;
        }
    }
     for (k = 0; k < num ;k++ ){
        printf("index [%d] is  %d\n", k, arr[k] );
    }
}
```

Output:-

```
Enter the number of integers to be added in array : 5
5
index [0] is  5
index [1] is  4
index [2] is  3
index [3] is  2
index [4] is  1
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```

5. Write a C Program to find the median of a list of N real numbers (user input). [Note: Median of a list of numbers is the middlemost element(s) of its sorted version.]

Program:-

```
#include <stdio.h>

int main(){
    int i , num , j=0, k , temp , mid ;
    float median;
    printf("\n\nEnter the number of integers to be added in array : ");
    scanf("%d",&num);
    int arr[num];
    printf("Enter %d numbers to be stored in the array :\n",num);
    for (k=0 ; k< num ; k++){
        scanf("%d",&arr[k]);
    }
    for (i=0 ; i < (num-1) ; i++ ){
        j=i+1;
        temp = arr[j];
        while ((temp < arr[j-1]) && (j>0)){
            arr[j]=arr[j-1];
            j--;
        }
        arr[j]= temp;
    }
    if (num % 2 != 0){
        mid = num / 2;
        printf("The median is : %d\n\n ",arr[mid]);
    }
    else{
        mid = ((num-1) / 2);
        median = (float) (arr[mid] + arr[mid + 1])  / 2;
        printf("The median is between %d and %d.\nThe average of both is
%.2f\n ", arr[mid] , arr[mid+1] , median);
    }
}
```

Output:-

```
Enter the number of integers to be added in array : 5
Enter 5 numbers to be stored in the array :
1
2
3
4
5
The median is : 3


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Enter the number of integers to be added in array : 6
Enter 6 numbers to be stored in the array :
1
2
3
4
5
6
The median is between 3 and 4.
The average of both is 3.50
```

6. Write a C Program to find the standard deviation of a list of real numbers.

$$\sigma = \sqrt{\frac{\sum (x - mean)^2}{n}}$$

Program:-

```
#include <stdio.h>
#include <math.h>
int main(){
    int i , num , j=0, k  ;
    float avg =0.0 ,sum=0.0 , nummean=0.0 , sqsum=0.0  , stddev=0.0;
    printf("\n\nEnter the number of integers to be added in array : ");
    scanf("%d",&num);
    float arr[num];
    printf("Enter %d numbers to be stored in the array :\n",num);
    for (k=0 ; k< num ; k++){
        scanf("%f",&arr[k]);
    }
    for (i = 0 ; i<num ; i++){
        sum += arr[i];
    }
    avg = (float) (sum / num);

    for (j = 0 ; j<num ; j++){
        nummean = (float)(arr[j] - avg);
        sqsum += (nummean * nummean);
    }
    stddev = sqrt(sqsum /num);
    printf("The standard deviation of the data is : %.3f \n\n",stddev);
}
```

Output:-

```
Enter the number of integers to be added in array : 5
Enter 5 numbers to be stored in the array :
88
55
22
1
29
The standard deviation of the data is : 29.967

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```