

Can Tasar

Introduction to software development homework

C HOMEWORKS – ARRAYS

Question 1: Write a C program to sort a numeric array and a string array.

```
#include <stdio.h>

int main() {
    int n;

    printf("number of elements in array: ");
    scanf("%d", &n);
    int arr[n];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < n; i++) {
        printf("index %d: ", i);
        scanf("%d", &arr[i]);
    }

    printf("Your array: \n");
    for (int i = 0; i < n; i++)
        printf("%d ", arr[i]);
    printf("\n");

    for (int i = 0; i < n-1; i++) {
        for (int j = 0; j < n-i-1; j++) {
            if (arr[j] > arr[j+1]) {
                int temp = arr[j];
                arr[j] = arr[j+1];
                arr[j+1] = temp;
            }
        }
    }

    printf("sorted array: \n");
    for (int i = 0; i < n; i++)
        printf("%d ", arr[i]);
    printf("\n");

    return 0;
}
```

Question 2: Write a C program to test if an array contains a specific value

```
#include <stdio.h>

int main() {
    int n;
    int find;

    printf("number of elements in array: ");
    scanf("%d", &n);
    int arr[n];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < n; i++) {
        printf("index %d: ", i);
        scanf("%d", &arr[i]);
    }
    printf("value to check: ");
    scanf("%d", &find);

    printf("Your array: \n");
    for (int i = 0; i < n; i++)
        printf("%d ", arr[i]);
    printf("\n\n");

    for (int i = 0; i < n; i++) {
        if (arr[i] == find)
        {
            printf("%d founded in array \n", find);
            return 0;
        }
    }

    printf("%d not founded in array \n", find);

    return 0;
}
```

Question 3: Write a C program to find the index of an array element.

```
#include <stdio.h>

int main() {
    int n;
    int find;

    printf("number of elements in array: ");
    scanf("%d", &n);
    int arr[n];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < n; i++) {
        printf("arr[%d]: ", i);
        scanf("%d", &arr[i]);
    }
    printf("value you want to find the index: ");
    scanf("%d", &find);

    printf("Your array: \n");
    for (int i = 0; i < n; i++)
        printf("%d ", arr[i]);
    printf("\n\n");

    for (int i = 0; i < n; i++) {
        if (arr[i] == find)
        {
            printf("%d in %d. index in array \n", find, i);
            return 0;
        }
    }
    printf("%d not foundeed in array \n", find);
    return 0;
}
```

Question 4: Write a C program to remove a specific element from an array.

```
#include <stdio.h>

int main() {
    int n;
    int remove;

    printf("number of elements in array: ");
    scanf("%d", &n);

    int arr[n];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < n; i++) {
        printf("arr[%d]: ", i);
        scanf("%d", &arr[i]);
    }

    printf("value you want to remove: ");
    scanf("%d", &remove);

    printf("Your array: \n");
    for (int i = 0; i < n; i++)
        printf("%d ", arr[i]);
    printf("\n\n");

    for (int i = 0; i < n; i++) {
        if (arr[i] == remove)
        {
            for (; i < n; i++) {
                arr[i] = arr[i+1];
            }
        }
    }

    printf("New array: \n");
    for (int i = 0; i < n - 1; i++)
        printf("%d ", arr[i]);
    printf("\n\n");

    return 0;
}
```

Question 5: Write a C program to insert an element (specific position) into an array

```
#include <stdio.h>

int main() {
    int n;
    int value, index;

    printf("Number of elements in array: ");
    scanf("%d", &n);

    int arr[n + 1];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < n; i++) {
        printf("arr[%d]: ", i);
        scanf("%d", &arr[i]);
    }

    printf("Value you want to insert: ");
    scanf("%d", &value);
    printf("Index of value you want to insert: ");
    scanf("%d", &index);

    if (index < 0 || index > n) {
        printf("Invalid index!!!!");
        return 1;
    }

    for (int i = n; i > index; i--) {
        arr[i] = arr[i - 1];
    }

    arr[index] = value;

    printf("Your array: \n");
    for (int i = 0; i < n + 1; i++)
        printf("%d ", arr[i]);
    printf("\n\n");

    return 0;
}
```

Question 6: Write a C program to reverse an array of integer values

```
#include <stdio.h>

int main() {
    int n;

    printf("number of elements in array: ");
    scanf("%d", &n);
    int arr[n];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < n; i++) {
        printf("arr[%d]: ", i);
        scanf("%d", &arr[i]);
    }

    printf("Your array: \n");
    for (int i = 0; i < n; i++)
        printf("%d ", arr[i]);
    printf("\n");

    int start = 0, end = n - 1;

    while (start < end)
    {
        int tmp = arr[start];
        arr[start] = arr[end];
        arr[end] = tmp;
        start++;
        end--;
    }

    printf("reversed array: \n");
    for (int i = 0; i < n; i++)
        printf("%d ", arr[i]);
    printf("\n");

    return 0;
}
```

Question 7: Write a C program to find the common elements between two arrays of integers.

```
#include <stdio.h>

int main() {
    int size1, size2;

    printf("number of elements in first array 1: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }
    printf("number of elements in second array: ");
    scanf("%d", &size2);
    int arr2[size2];
    printf("Enter the elements of array 2:\n");
    for (int i = 0; i < size2; i++) {
        printf("arr2[%d]: ", i);
        scanf("%d", &arr2[i]);
    }

    printf("Your first array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\nYour second array: \n");
    for (int i = 0; i < size2; i++)
        printf("%d ", arr2[i]);
    printf("\n\n");

    printf("same values in both array: ");
    for (int i = 0; i < size1; i++) {
        for (int j = 0; j < size2; j++) {
            if (arr1[i] == arr2[j]) {
                printf("%d ", arr1[i]);
                break;
            }
        }
    }

    return 0;
}
```


Question 8: Write a C program to remove duplicate elements from an array

```
#include <stdio.h>

int main() {
    int size1, count = 0;
    printf("number of elements in array: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }
    printf("array with duplicate elements: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\n");

    for (int i = 0; i < size1; i++) {
        for (int j = 0; j < i; j++) {
            if (arr1[i] == arr1[j]) {
                count++;
            }
        }
    }
    printf("count %d\n", count);

    int arr2[size1-count-1];
    int k = 0;

    for (int i = 0; i < size1; i++) {
        for (int j = 0; j < i; j++) {
            if (arr1[i] == arr1[j]) {
                break;
            }else
            {
                arr2[k] = arr1[i];
                k++;
                break;
            }
        }
    }
    printf("\narray without duplicate elements: \n");
    for (int i = 0; i < size1-count-1; i++)
        printf("%d ", arr2[i]);
    printf("\n");
    return 0;
}
```

Question 9: Write a C program to test the equality of two arrays.

```
#include <stdio.h>

int main() {
    int size1;

    printf("number of elements in arrays: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }
    int arr2[size1];
    printf("Enter the elements of array 2:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr2[%d]: ", i);
        scanf("%d", &arr2[i]);
    }

    printf("Your first array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\nYour second array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr2[i]);
    printf("\n\n");

    for (int i = 0; i < size1; i++) {
        if (arr1[i] != arr2[i]) {
            printf("The arrays are not equal.\n");
            return 0;
        }
    }
    printf("The arrays are equal.\n");

    return 0;
}
```

Question 10: Write a C program to separate even and odd numbers of an given array of integers. Put all even numbers first, and then odd numbers.

```
#include <stdio.h>

int main() {
    int size1;

    printf("number of elements in arrays: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }

    printf("Your first array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\n\n");

    printf("even: ");
    for (int i = 0; i < size1; i++) {
        if (arr1[i] % 2 == 0) {
            printf("%d ", arr1[i]);
        }
    }
    printf("\n");
    printf("odd: ");
    for (int i = 0; i < size1; i++) {
        if (arr1[i] % 2 == 1) {
            printf("%d ", arr1[i]);
        }
    }
    printf("\n");

    return 0;
}
```

Question 11: Write a C program to find the k largest elements in a given array. Elements in the array can be in any order.

```
#include <stdio.h>

int main() {
    int size1;

    printf("number of elements in arrays: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }

    printf("Your array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\n\n");

    int largest = arr1[0];
    for (int i = 0; i < size1; i++) {
        if (arr1[i] > largest) {
            largest = arr1[i];
        }
    }

    printf("largest elements in a given array %d", largest);

    return 0;
}
```

Q12- Write a C program to find the numbers greater than the average of the numbers of a given array.

```
#include <stdio.h>

int main() {
    int size1;

    printf("number of elements in arrays: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }

    printf("Your array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\n\n");

    int sum = 0;
    for (int i = 0; i < size1; i++) {
        sum += arr1[i];
    }
    int avr = sum / size1;
    printf("greater than avr: ");
    for (int i = 0; i < size1; i++) {
        if (arr1[i] > avr)
        {
            printf("%d ", arr1[i]);
        }
    }
    return 0;
}
```

Q13- Write a C program to find the length of the longest consecutive sequence of a given array of integers.

```
#include <stdio.h>

int main() {
    int size1;

    printf("number of elements in arrays: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }
    printf("\n");

    printf("Your array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\n\n");

    for (int i = 0; i < size1-1; i++) {
        for (int j = 0; j < size1-i-1; j++) {
            if (arr1[j] > arr1[j+1]) {
                int temp = arr1[j];
                arr1[j] = arr1[j+1];
                arr1[j+1] = temp;
            }
        }
    }

    printf("longest consecutive sequence: %d\n", arr1[size1 - 1]);
    int len = 0;
    while (arr1[size1 - 1] / 10 > 0)
    {
        len++;
        arr1[size1 - 1] = arr1[size1 - 1] / 10;
    }
    printf("LENGHT of longest consecutive sequence: %d\n", len + 1);

    return 0;
}
```

14- Write a C program to divide a given array of integers into given k non-empty subsets whose sums are all equal. Return true if all sums are equal otherwise return false.

```
#include <stdio.h>

int main() {

    int a[100];
    int k;
    int n;
    int sum=0;
    int count=0;
    printf("Enter the size of array: ");
    scanf("%d",&n);
    for(int i=0;i<n;i++){
        printf("Enter the %d.element: ",i+1);
        scanf("%d",&a[i]);
    }
    printf("Enter the k: ");
    scanf("%d",&k);
    for(int i=0;i<n;i++){
        sum=sum+a[i];
    }
    int subsetSum=sum/k;
    if(sum%k!=0){
        printf("False");
    }
    else{
        printf("True");
        for(int i=0;i<n;i++){
            for(int j=0;j<n;j++){
                if(a[i]+a[j]==subsetSum){
                    printf("{%d,%d}",a[i],a[j]);
                }
            }
        }
    }

    return 0;
}
```

15. Write a C program to multiply corresponding elements of two arrays of integer

```
#include <stdio.h>

int main() {
    int size1;

    printf("number of elements in arrays: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array 1:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }
    int arr2[size1];
    printf("Enter the elements of array 2:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr2[%d]: ", i);
        scanf("%d", &arr2[i]);
    }

    printf("Your first array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\nYour second array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr2[i]);
    printf("\n\n");

    for (int i = 0; i < size1; i++) {
        printf("index %d: %d * %d = %d\n", i, arr1[i], arr2[i], arr1[i] * arr2[i]);
    }

    return 0;
}
```


Q16 -Write a C program to merge two given sorted array of integers and create a new sorted array.

```
#include <stdio.h>
int main() {
    int size1;

    printf("number of elements in arrays: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array 1:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }
    int arr2[size1];
    printf("Enter the elements of array 2:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr2[%d]: ", i);
        scanf("%d", &arr2[i]);
    }
    printf("Your first array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\nYour second array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr2[i]);
    printf("\n\n");

    int newArray[size1 + size1];
    int i=0, j=0, k=0;

    while (i < size1 && j < size1) {
        if (arr1[i] <= arr2[j]) {
            newArray[k++] = arr1[i++];
        } else {
            newArray[k++] = arr2[j++];
        }
    }
    while (i < size1) {
        newArray[k++] = arr1[i++];
    }
    while (j < size1) {
        newArray[k++] = arr2[j++];
    }
    printf("\nsorted array: \n");
    for (int i = 0; i < size1 + size1; i++)
        printf("%d ", newArray[i]);
    return 0;
}
```

Q17 Write a C program to calculate the median of an given unsorted array of integers

```
#include <stdio.h>

int main() {
    int size1;

    printf("number of elements in arrays: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }
    printf("\n");

    printf("Your array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\n\n");

    for (int i = 0; i < size1-1; i++) {
        for (int j = 0; j < size1-i-1; j++) {
            if (arr1[j] > arr1[j+1]) {
                int temp = arr1[j];
                arr1[j] = arr1[j+1];
                arr1[j+1] = temp;
            }
        }
    }

    if (size1 % 2 == 0) {
        int mid1 = arr1[size1 / 2 - 1];
        int mid2 = arr1[size1 / 2];
        printf("median of array: %d\n", (mid1 + mid2) / 2);
    } else
        printf("median of array: %d\n", arr1[size1 / 2]);
    return 0;
}
```

Q18 Write a C program to find a number that appears only once in a given array of integers, all numbers occur twice.

```
#include <stdio.h>

int main() {
    int size1;

    printf("Number of elements in the first array: ");
    scanf("%d", &size1);

    int arr1[size1];

    printf("Enter the elements of the array:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }

    printf("Your first array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\n\n");

    printf("Values that appear only once in the array: ");
    for (int i = 0; i < size1; i++) {
        int count = 0;
        for (int j = 0; j < size1; j++) {
            if (arr1[j] == arr1[i]) {
                count++;
            }
        }
        if (count == 1) {
            printf("%d ", arr1[i]);
        }
    }

    return 0;
}
```

Q19 Write a C program to remove all occurrences of a specified value in a given array of integers and return the new length of the array.

```
#include <stdio.h>

int main() {
    int n;
    int remove;

    printf("number of elements in array: ");
    scanf("%d", &n);

    int arr[n];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < n; i++) {
        printf("arr[%d]: ", i);
        scanf("%d", &arr[i]);
    }

    printf("value you want to remove: ");
    scanf("%d", &remove);

    printf("Your array: \n");
    for (int i = 0; i < n; i++)
        printf("%d ", arr[i]);
    printf("\n\n");

    int count = 0;
    for (int i = 0; i < n; i++) {
        if (arr[i] == remove)
        {
            count++;
            for (; i < n; i++) {
                arr[i] = arr[i+1];
            }
        }
    }

    printf("New array: \n");
    for (int i = 0; i < n - count; i++)
        printf("%d ", arr[i]);
    printf("\n\n");
    printf("New Lenght: %d\n", n - count);

    return 0;
}
```

Q20 Write a C program to find the number of elements that is higher than the average of given array of integers.

```
#include <stdio.h>

int main() {
    int size1;

    printf("number of elements in arrays: ");
    scanf("%d", &size1);
    int arr1[size1];
    printf("Enter the elements of array:\n");
    for (int i = 0; i < size1; i++) {
        printf("arr1[%d]: ", i);
        scanf("%d", &arr1[i]);
    }
    printf("\n");

    printf("Your array: \n");
    for (int i = 0; i < size1; i++)
        printf("%d ", arr1[i]);
    printf("\n\n");

    int avr=0;
    for (int i = 0; i < size1; i++)
    {
        avr += arr1[i];
    }
    avr = avr/ size1;

    int count = 0;
    for (int i = 0; i < size1; i++)
    {
        if (arr1[i] > avr)
            count++;
    }
    printf("number of elements that is higher than the average of array: %d",
count);
    return 0;
}
```