

Assignment 1: Programming in C and Python

1. Insert an element at end of array

In C:

```
#include <stdio.h>

int main() {
    int arr[100], n, element, i;

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

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

    printf("Enter the element to insert at the end: ");
    scanf("%d", &element);
    arr[n] = element;
    n++;
    printf("Array after insertion:\n");
    for(i = 0; i < n; i++) {
        printf("%d ", arr[i]);
    }
    return 0;
}
```

In Python:

```
arr = []

n = int(input("Enter number of elements in the array: "))
print("Enter the elements:")
for _ in range(n):
    arr.append(int(input()))

element = int(input("Enter the element to insert at the end: "))
arr.append(element)

print("Array after insertion:")
print(arr)
```

2. Find largest element in array

In C:

```
#include <stdio.h>
int main() {
    int arr[100], n, i, max;
    printf("Enter number of elements in the array: ");
    scanf("%d", &n);
    printf("Enter %d elements:\n", n);
    for(i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
    max = arr[0];
    for(i = 1; i < n; i++) {
        if(arr[i] > max) {
            max = arr[i];
        }
    }
    printf("Largest element: %d\n", max);
    return 0;
}
```

In Python:

```
arr = []
n = int(input("Enter number of elements: "))
for _ in range(n):
    arr.append(int(input()))
print("Largest element:", max(arr))
```

3. Find second largest element

In C:

```
#include <stdio.h>
#include <limits.h>
int main() {
    int arr[100], n, i, first, second;
    printf("Enter number of elements: ");
    scanf("%d", &n);
    if(n < 2) {
        printf("At least two elements required.\n");
        return 0;
    }
    for(i = 0; i < n; i++) scanf("%d", &arr[i]);
    first = second = INT_MIN;
    for(i = 0; i < n; i++) {
        if(arr[i] > first) {
            second = first;
            first = arr[i];
        }
    }
}
```

```

    }
    else if(arr[i] > second && arr[i] != first) {
        second = arr[i];
    }
}
if(second == INT_MIN)
    printf("No second largest element.\n");
else
    printf("Second largest element: %d\n", second);
return 0;
}

```

In Python:

```

n = int(input("Enter number of elements: "))
if n < 2:
    print("At least two elements required.")
    exit()
arr = [int(input()) for _ in range(n)]
first = second = float('-inf')
for num in arr:
    if num > first:
        second = first
        first = num
    elif num > second and num != first:
        second = num
if second == float('-inf'):
    print("No second largest element.")
else:
    print("Second largest element:", second)

```

4. Move all zeros to end

In C:

```

#include <stdio.h>

void moveZerosToEnd(int arr[], int n) {
    int count = 0;

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

    while (count < n) {

```

```

        arr[count++] = 0;
    }
}

int main() {
int arr[100], n;
printf("Enter number of elements: ");
scanf("%d", &n);
printf("Enter elements:\n");
for (int i = 0; i < n; i++) {
    scanf("%d", &arr[i]);
}

moveZerosToEnd(arr, n);
printf("Array after moving zeros to end:\n");
for (int i = 0; i < n; i++) {
    printf("%d ", arr[i]); }
return 0;
}

```

In Python:

```

def moveZerosToEnd(arr):
    count = 0
    for i in range(len(arr)):
        if arr[i] != 0:
            arr[count] = arr[i]
            count += 1
    while count < len(arr):
        arr[count] = 0
        count += 1

arr = list(map(int, input("Enter elements separated by space: ").split()))
moveZeroesToEnd(arr)
print("Array after moving zeros to end:")
print(*arr)

```

5. Rotate array by one

```
#include <stdio.h>

void rotateByOne(int arr[], int n) {
    int last = arr[n - 1];

    for (int i = n - 1; i > 0; i--) {
        arr[i] = arr[i - 1];
    }
    arr[0] = last;
}

int main() {
    int arr[100], n;
    printf("Enter number of elements: ");
    scanf("%d", &n);
    printf("Enter elements:\n");
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
    rotateByOne(arr, n);
    printf("Array after rotating by one:\n");
    for (int i = 0; i < n; i++) {
        printf("%d ", arr[i]);
    }
    return 0;
}
```

In Python:

```
def rotate_by_one(arr):
    last = arr[-1]
    for i in range(len(arr) - 1, 0, -1):
        arr[i] = arr[i - 1]
    arr[0] = last

arr = list(map(int, input("Enter elements separated by space: ").split()))

rotate_by_one(arr)
print("Array after rotating by one:")
print(*arr)
```

5. Check if array is sorted

In C:

```
#include <stdio.h>

int Sorted(int arr[], int n) {
    for (int i = 0; i < n - 1; i++) {
        if (arr[i] > arr[i + 1])
```

```

        return 0;
    }
    return 1;
}

int main() {
    int arr[100], n;
    printf("Enter number of elements: ");
    scanf("%d", &n);
    printf("Enter elements:\n");
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
    if (Sorted(arr, n))
        printf("Array is sorted.\n");
    else
        printf("Array is not sorted.\n");
    return 0;
}

```

In Python:

```

def sorted(arr):
    for i in range(len(arr) - 1):
        if arr[i] > arr[i + 1]:
            return False
    return True

arr = list(map(int, input("Enter elements separated by space: ").split()))
if sorted(arr):
    print("Array is sorted.")
else:
    print("Array is not sorted.")

```

7.Reverse a string

In C:

```

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

int main() {
    char str[100], temp;
    int i, j;
    printf("Enter a string: ");
    scanf("%s", str);
    i = 0;
    j = strlen(str) - 1;

    while (i < j) {
        temp = str[i];
        str[i] = str[j];
        str[j] = temp;
    }
}

```

```

        i++;
        j--;
    }

    printf("Reversed string: %s\n", str);

    return 0;
}

```

In Python:

```

s = input("Enter a string: ")
print("Reversed string:", s[::-1])

```

8. Check if string is palindrome

In C:

```

#include <stdio.h>

#include <string.h>

int main() {
    char str[100];
    int i, j, isPalindrome = 1;

    printf("Enter a string: ");

    scanf("%s", str);

    i = 0;
    j = strlen(str) - 1;

    while (i < j) {
        if (str[i] != str[j]) {
            isPalindrome = 0;
            break;
        }
        i++;
        j--;
    }

    if (isPalindrome)

        printf("Palindrome\n");
    else
        printf("Not Palindrome\n");

    return 0;
}

```

In Python:

```

s = input("Enter a string: ")
if s == s[::-1]:

```

```

    print("Palindrome")
else:
    print("Not Palindrome")

```

9. Count frequency of array elements

In C:

```

#include <stdio.h>

int main() {

    int arr[100], freq[100], n, i, j, count;
    printf("Enter number of elements: ");
    scanf("%d", &n);
    printf("Enter elements:\n");
    for (i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
        freq[i] = -1;
    }

    for (i = 0; i < n; i++) {

        if (freq[i] == -1) {
            count = 1;
            for (j = i + 1; j < n; j++) {
                if (arr[i] == arr[j]) {
                    count++;
                    freq[j] = 0;
                }
            }
            freq[i] = count;
        }
    }

    printf("Element Frequencies:\n");

    for (i = 0; i < n; i++) {

        if (freq[i] != 0)
            printf("%d: %d\n", arr[i], freq[i]);
    }
    return 0;
}

```

In Python:

```

arr = list(map(int, input("Enter elements: ").split()))
for num in set(arr):
    print(num, ":", arr.count(num))

```

10. Array DS

In C :


```
#include <stdio.h>
void reverseArray(int arr[], int n) {
    int temp, i = 0, j = n - 1;
    while (i < j) {
        temp = arr[i];
        arr[i] = arr[j];
        arr[j] = temp;
        i++;
        j--;
    }
}
int main() {
    int arr[100], n;
    scanf("%d", &n);
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
    reverseArray(arr, n);
    for (int i = 0; i < n; i++) {
        printf("%d ", arr[i]);
    }
    return 0;
}
```

In Python:

```
arr = input().split()
arr.reverse()
print(*arr)
```