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ALGO LAB 1
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Q1.
WAP in C to input n integers in to an array. Let us assume that there can be duplicates elements. Write a program to search an element in the array in such a way that we get the highest frequency if there are duplicate elements.

Code:

```
#include<stdio.h>

int main() {

	int n;
	scanf("%d", &n);
	int arr[n], arr2[n];
	for (int i = 0; i < n; i++) {
		scanf("%d", (arr + i));
		arr2[i] = arr[i];
	}

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

```
    printf("%d\n", freq);

    for (int i = 0; i < n; i++) {
        int c = 0;
        for (int j = i; j < n; j++) {
            if (arr2[i] == arr2[j]) {
                c++;
            }
        }
        if (c == freq) {
            printf("Number with highest frequency: %d with count = %d\n", arr[i],
freq);
        }
    }


    return 0;
}
```

Output:

```
C:\Users\KIIT\Desktop\Algo Lab>lab1q1
10
1 4 2 3 5 6 3 2 4 5
2
Number with highest frequency: 4 with count = 2
Number with highest frequency: 2 with count = 2
Number with highest frequency: 3 with count = 2
Number with highest frequency: 5 with count = 2
```

Q2.

WAP for finding i and j in an array A for any key such that $A[j]^2 + A[i]^2 == key$.

Code:

```
#include<stdio.h>

int main() {

	int n;
	scanf("%d", &n);
	int arr[n];
	for (int i = 0; i < n; i++) {
		scanf("%d", (arr + i));
	}

	int key, flag = 1;
	scanf("%d", &key);

	for (int i = 0; i < n; i++) {
		for (int j = i + 1; j < n; j++) {
			int a = arr[i] * arr[i] + arr[j] * arr[j];
			if (a == key) {
				flag = 0;
				printf("Pair : %d, %d\n", arr[i], arr[j]);
			}
		}
	}

	if (flag) {
		printf("No pairs found\n");
	}

	return 0;
}
```

Output:

```
C:\Users\KIIT\Desktop\Algo Lab>lab1q2
5
1 2 3 4 5
25
Pair : 3, 4
```

Q3.
Suppose an array A has n distinct integers. Increasing sequence is given as A[0].....A[k] and decreasing sequence is given as A[k+1].....A[n-1]. Write a program for finding k.

Code:

```
#include<stdio.h>

int main() {

	int n;
	scanf("%d", &n);
	int arr[n];
	for (int i = 0; i < n; i++) {
		scanf("%d", (arr + i));

		if (i && (arr[i] < arr[i - 1])) {
			printf("Index : %d", (i - 1));
			break;
		}
	}


	return 0;
}
```

Output:

```
C:\Users\KIIT\Desktop\Algo Lab>lab1q3
10
-2 3 5 13 20 17 12 6 1 0
Index : 4
```

Q4.

WAP to display an array of n integers (n>1) in O(n) time, where at every index of the array should contain the product of all elements in the array except the element at the given index. No additional array declaration is allowed.

Example: Input : 10, 4, 1, 6, 2

Output : 48,120,480,80,240

Code:

```
#include<stdio.h>

int main() {

	int n, tot = 1;
	scanf("%d", &n);
	int arr[n];
	for (int i = 0; i < n; i++) {
		scanf("%d", (arr + i));
		tot *= arr[i];
	}

	for (int i = 0; i < n - 1; i++) {
		printf("%d, ", tot / arr[i]);
	}
	printf("%d\n", tot / arr[n - 1]);



	return 0;
}
```

Output:

```
C:\Users\KIIT\Desktop\Algo Lab>lab1q4
5
10 4 1 6 2
48, 120, 480, 80, 240
```