Lab 7

Johnson Trotter program

CODE:-

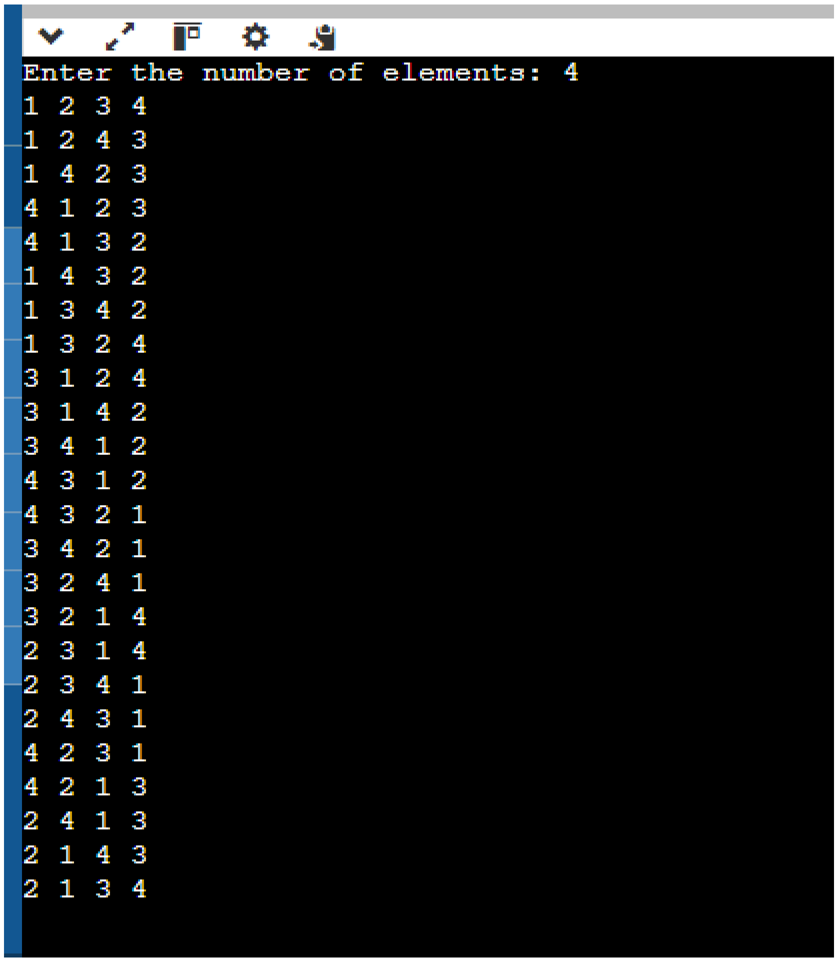
```
#include <stdio.h>

#include <stdlib.h>

#include <stdbool.h>


void printPermutation(int *perm, int size) {

        for (int i = 0; i < size; i++) {

                printf("%d ", perm[i]);

        }

        printf("\n");

}


int findLargestMobile(int *perm, int *dir, int size) {

        int largestMobileIndex = -1;

        int largestMobileValue = -1;


        for (int i = 0; i < size; i++) {

                int nextIndex = i + dir[i];

                if (nextIndex >= 0 && nextIndex < size && perm[i] > perm[nextIndex] && perm[i] >
largestMobileValue) {

                        largestMobileValue = perm[i];

                        largestMobileIndex = i;

                }

        }
```

```
    return largestMobileIndex;
}

void swap(int *a, int *b) {
    int temp = *a;
    *a = *b;
    *b = temp;
}

void generatePermutations(int n) {
    int *perm = (int *)malloc(n * sizeof(int));
    int *dir = (int *)malloc(n * sizeof(int));

    for (int i = 0; i < n; i++) {
        perm[i] = i + 1;
        dir[i] = -1; // Initialize all directions to left (-1)
    }

    printPermutation(perm, n);

    while (true) {
        int largestMobileIndex = findLargestMobile(perm, dir, n);
        if (largestMobileIndex == -1) {
            break; // No more mobile integers
        }

        int nextIndex = largestMobileIndex + dir[largestMobileIndex];
        swap(&perm[largestMobileIndex], &perm[nextIndex]);
        swap(&dir[largestMobileIndex], &dir[nextIndex]);

        for (int i = 0; i < n; i++) {
            if (perm[i] > perm[nextIndex]) {
                dir[i] = -dir[i]; // Reverse the direction
            }
        }

        printPermutation(perm, n);
    }

    free(perm);
    free(dir);
}

int main() {
    int n;
    printf("Enter the number of elements: ");
    scanf("%d", &n);

    generatePermutations(n);
```

    return 0;

}

OUTPUT:-



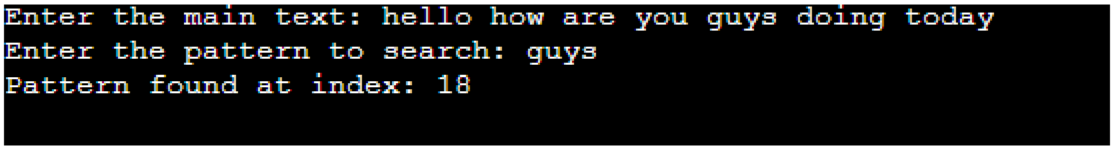
```
Enter the number of elements: 4
1 2 3 4
1 2 4 3
1 4 2 3
4 1 2 3
4 1 3 2
1 4 3 2
1 3 4 2
1 3 2 4
3 1 2 4
3 1 4 2
3 4 1 2
4 3 1 2
4 3 2 1
3 4 2 1
3 2 4 1
3 2 1 4
2 3 1 4
2 3 4 1
2 4 3 1
4 2 3 1
4 2 1 3
2 4 1 3
2 1 4 3
2 1 3 4
```

Substring matching program in main Text program   brute force technique

CODE:-

```
#include <stdio.h>

#include <string.h>

int substringMatch(char *text, char *pattern) {

    int textLength = strlen(text);
    int patternLength = strlen(pattern);

    for (int i = 0; i <= textLength - patternLength; i++) {
        int j;
        for (j = 0; j < patternLength; j++) {
            if (text[i + j] != pattern[j])
                break;
        }
        if (j == patternLength)
            return i;
    }
    return -1;
}

int main() {
    char text[100], pattern[100];

    printf("Enter the main text: ");
    fgets(text, sizeof(text), stdin);
    text[strcspn(text, "\n")] = '\0';

    printf("Enter the pattern to search: ");
    fgets(pattern, sizeof(pattern), stdin);
    pattern[strcspn(pattern, "\n")] = '\0';
    int index = substringMatch(text, pattern);


    if (index != -1)

        printf("Pattern found at index: %d\n", index);

    else

        printf("Pattern not found in the text.\n");


    return 0;

}
```

OUTPUT:-



```
Enter the main text: hello how are you guys doing today
Enter the pattern to search: guys
Pattern found at index: 18
```

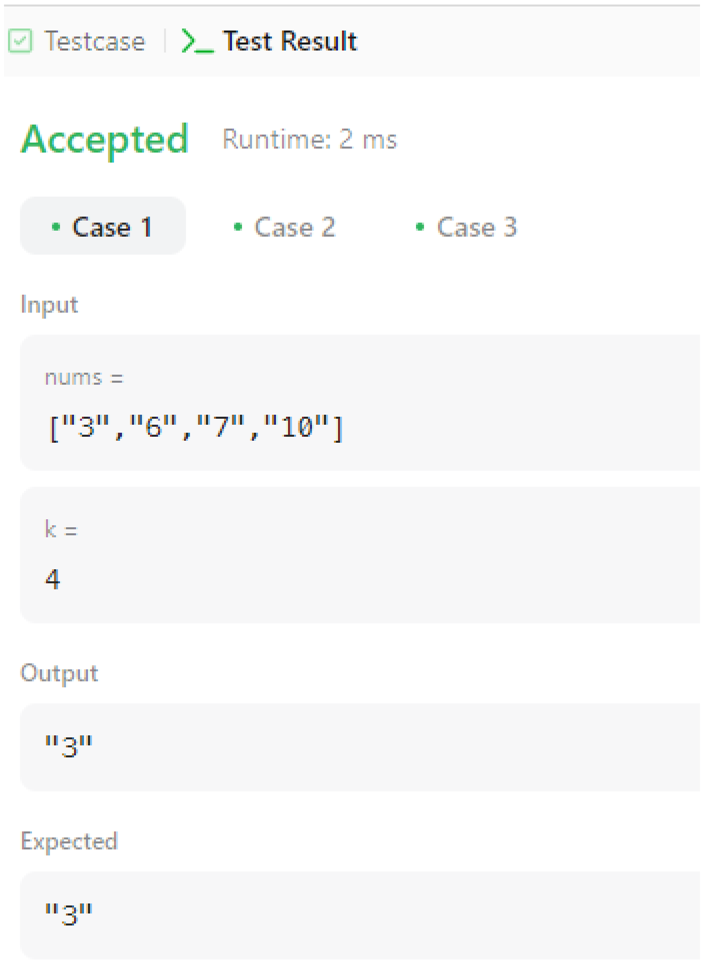
LEETCODE

To find the Kth largest integer in the given array

code:-

```
int compare(const void *a, const void *b) {

    const char *str1 = *(const char **)a;

    const char *str2 = *(const char **)b;


    int len1 = strlen(str1);

    int len2 = strlen(str2);

    if (len1 != len2) {

        return len2 - len1;

    }

    return strcmp(str2, str1);

}
```

```
char* kthLargestNumber(char **nums, int numsSize, int k) {
    qsort(nums, numsSize, sizeof(char*), compare);
    return nums[k - 1];
}
```
Ouput:-



Testcase | Test Result

Accepted Runtime: 2 ms

Input

```
nums =
["3","6","7","10"]
```

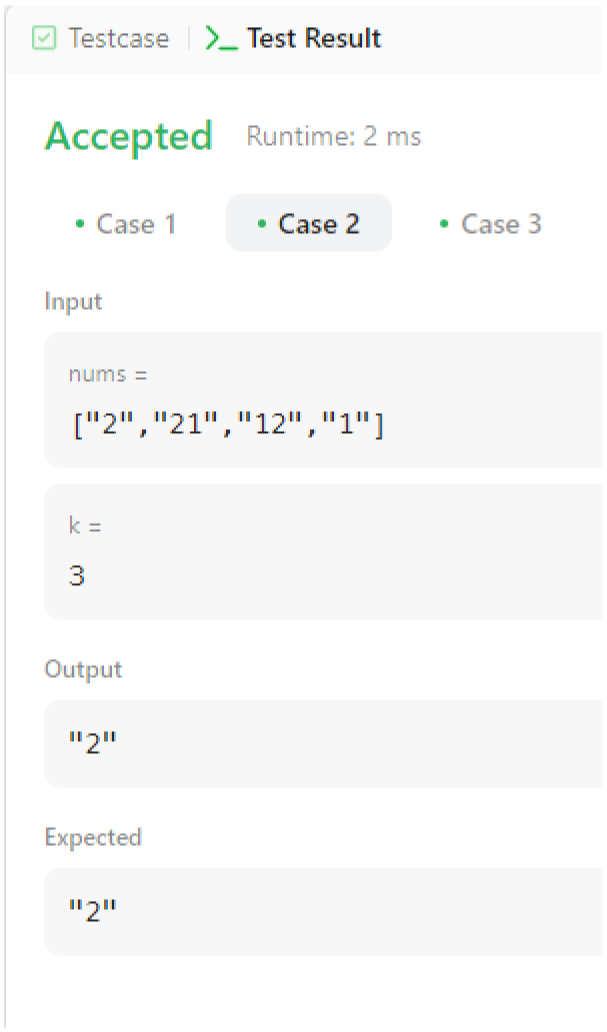
```
k =
4
```

Output

```
"3"
```

Expected

```
"3"
```



Accepted Runtime: 2 ms

Input

nums =

```
["2","21","12","1"]
```

k =

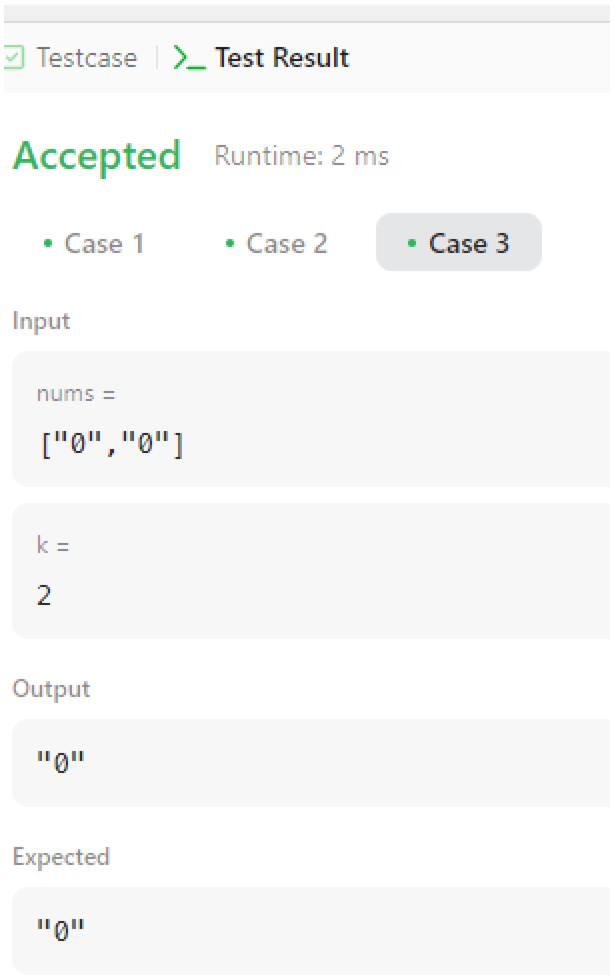
```
3
```

Output

```
"2"
```

Expected

```
"2"
```



Accepted Runtime: 2 ms

Input

```
nums =
["0","0"]
```

```
k =
2
```

Output

```
"0"
```

Expected

```
"0"
```