WEEK 3

Implement Johnson Trotter algorithm to generate permutations.

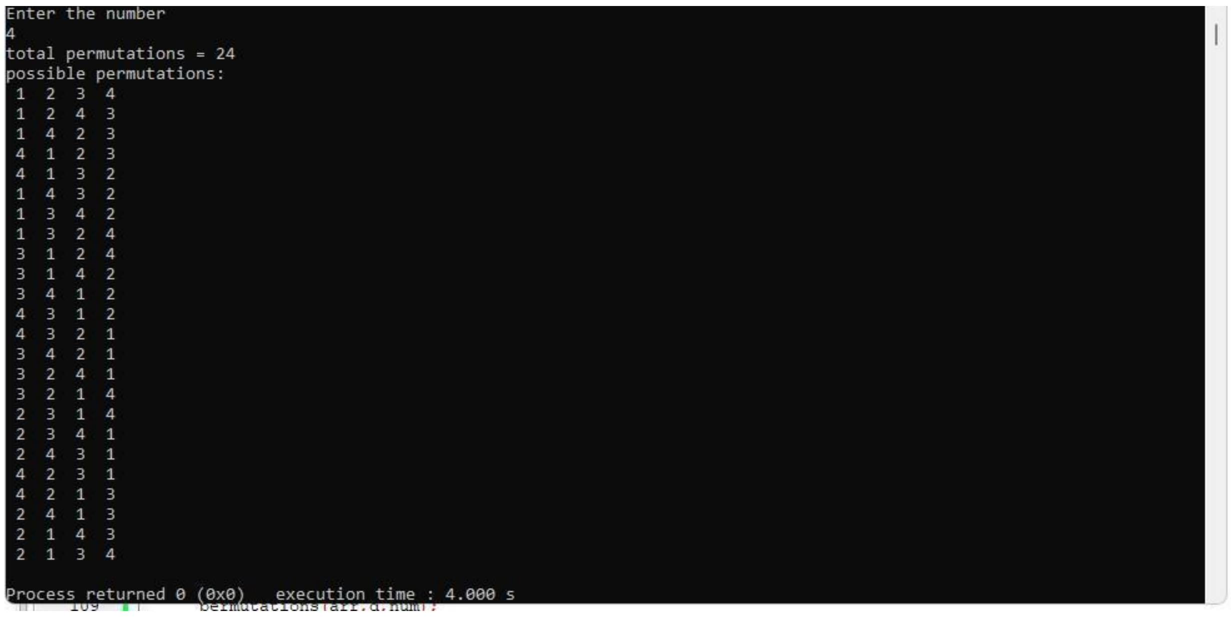
CODE:

```
#include <stdio.h>

#include <stdlib.h>

int flag = 0;

int swap(int *a,int *b) {

 int t = *a;

 *a = *b;

 *b = t;

}

int search(int arr[],int num,int mobile)

{

 int g;

 for(g=0;g<num;g++) {

 if(arr[g] == mobile)

    return g+1;

 else

    flag++;

 }

 return -1;
```

```
}

int find_Moblie(int arr[],int d[],int num)
{
 int mobile = 0;
 int mobile_p = 0;
 int i;
 for(i=0;i<num;i++)
 {
 if((d[arr[i]-1] == 0) && i != 0)
 {
 if(arr[i]>arr[i-1] && arr[i]>mobile_p)
 {
 mobile = arr[i];
 mobile_p = mobile;
 }
 else
    flag++;
 }
 else if((d[arr[i]-1] == 1) & i != num-1)
{
 if(arr[i]>arr[i+1] && arr[i]>mobile_p)
{
 mobile = arr[i];
 mobile_p = mobile;
 }
 else
   flag++;
 }
 else
   flag++;
 }
 if((mobile_p == 0) && (mobile == 0))
 return 0;
 else
 return mobile;
}
void permutations(int arr[],int d[],int num)
{
 int i;
 int mobile = find_Moblie(arr,d,num);
 int pos = search(arr,num,mobile);
 if(d[arr[pos-1]-1]==0)
 swap(&arr[pos-1],&arr[pos-2]);
 else
 swap(&arr[pos-1],&arr[pos]);
 for(int i=0;i<num;i++)
 {
 if(arr[i] > mobile)
 {
 if(d[arr[i]-1]==0)
 d[arr[i]-1] = 1;
 else
 d[arr[i]-1] = 0;
 }
 }
 for(i=0;i<num;i++)
 {
 printf(" %d ",arr[i]);
 } }
int factorial(int k)
{
 int f = 1;
 int i = 0;
 for(i=1;i<k+1;i++)
    f = f*i;
 return f;
}
int main()
```

```
{
 int num = 0;
 int i;
 int j;
 int z = 0;
 printf("Enter the number\n");
 scanf("%d",&num);
 int arr[num],d[num];
 z = factorial(num);
 printf("total permutations = %d",z);
 printf("\npossible permutations: \n");
 for(i=0;i<num;i++)
 {
 d[i] = 0;
 arr[i] = i+1;
 printf(" %d ",arr[i]);
 }
 printf("\n");
 for(j=1;j<z;j++) {
     permutations(arr,d,num);
     printf("\n");
    }
return 0;
}
```

OUTPUT:



```
Enter the number
4
total permutations = 24
possible permutations:
 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

Process returned 0 (0x0)   execution time : 4.000 s
```