**#include <stdio.h>**

**#include <stdlib.h>**

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

**//printf("\nSwapping %d and %d",\*a, \* b);**

**int t=\*a;**

**\*a=\*b;**

**\*b=t;**

**}**

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

**int g;**

**//printf("The array elements are ");**

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

**//printf("%d",arr[g]);**

**}**

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

**//printf("\narray element is %d",arr[g]);**

**if(arr[g]==mobile){**

**//printf("Mobile integer %d found in position %d",mobile, g+1);**

**return(g+1);**

**}**

**}**

**return(-1);**

**}**

**int find\_mobile(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 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;**

**}**

**}**

**}**

**if((mobile\_p==0) && (mobile==0)){**

**return(0);**

**}**

**else{**

**return(mobile\_p);**

**}**

**}**

**void permutations(int arr[], int d[], int num){**

**//printf("\inside perutations\n");**

**int i;**

**int mobile=find\_mobile(arr, d, num);**

**//printf("Mobile integer is %d\n",mobile);**

**int pos=search(arr, num, mobile);**

**//printf("\nSwap pos=%d",pos);**

**if(d[arr[pos-1]-1]==0){**

**//printf("Swap %d to the left hand side\n",mobile);**

**swap(&arr[pos-1], &arr[pos-2]);**

**}**

**else{**

**//printf("Swap %d to the right hand side\n",mobile);**

**swap(&arr[pos-1],&arr[pos]);**

**}**

**for(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;**

**}**

**}**

**}**

**//printf("\nResult of the permutation\n");**

**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("Johnson trotter algorithm to find all permutations of given numbers\n");**

**printf("Enter the number\n");**

**scanf("%d",&num);**

**int arr[num], d[num];**

**z=factorial(num);**

**printf("Total permutations=%d");**

**printf("\nAll possible permutations are:\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++){**

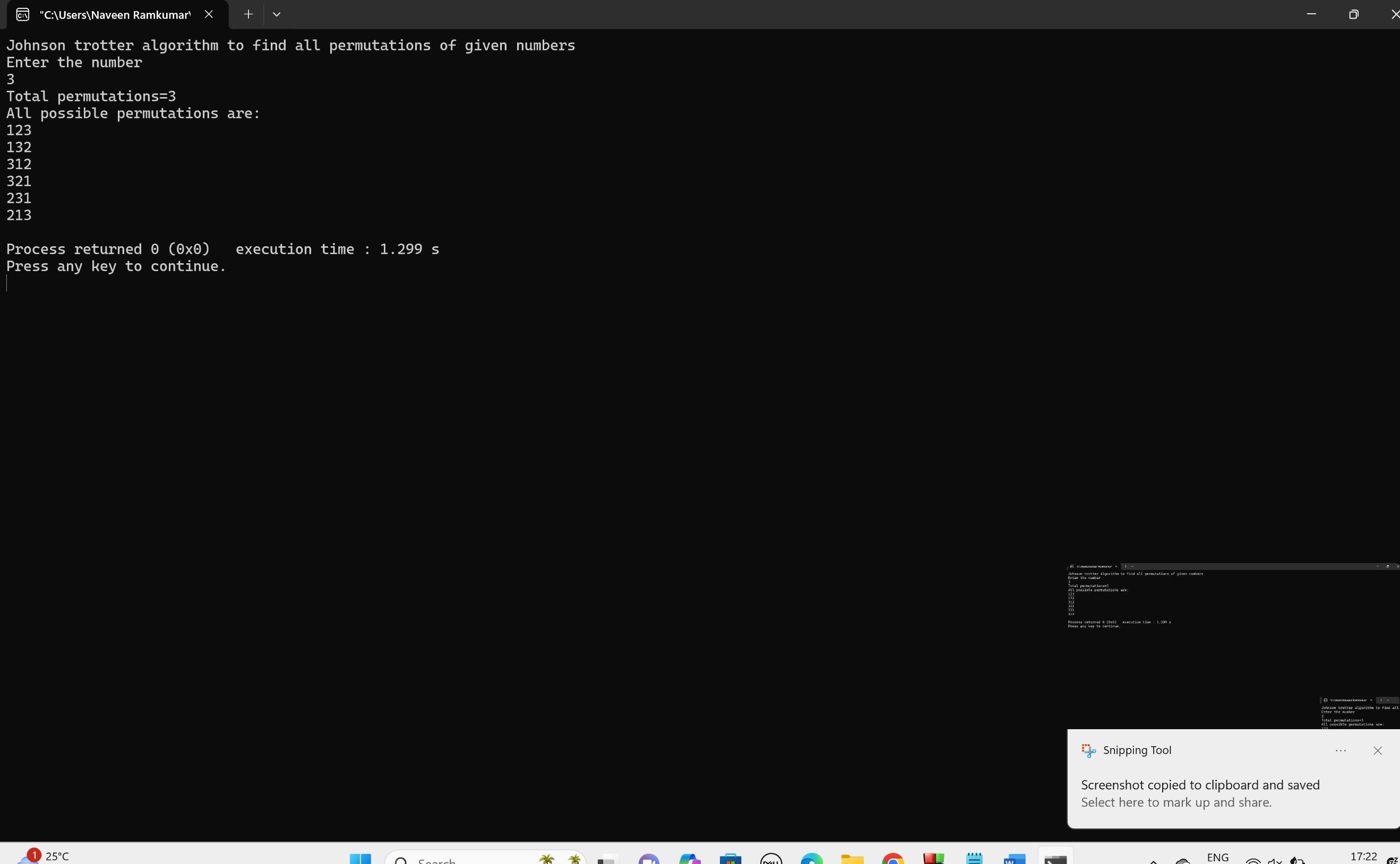
**permutations(arr, d, num);**

**printf("\n");**

**}**

**return(0);**

**}**

****