johnson_trotter.c

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```c
/*Implement Johnson Trotter algorithm to generate permutations.*/
#include <stdio.h>
int right=1;
int left=0;

int search(int n,int a[n],int mobile)
{
    int p;
    for (int i=0;i<n;i++)
    {
        if (a[i]==mobile)
        {
        p=i+1;
        }
    }
    return p;
}

int mobile_element(int n,int a[n],int dir[n])
{
    int prev=0;
    int mobile=0;
    for (int i=0;i<n;i++)
    {
        if (dir[a[i]-1]==right && i!=0)
        {
            if (a[i]>a[i-1] && a[i]>prev)
            {
                mobile=a[i];
                prev=mobile;
            }
        }
        if (dir[a[i]-1]==left && i!=(n-1))
        {
            if (a[i]>a[i+1] && a[i]>prev)
            {
               mobile=a[i];
               prev=mobile;
```

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                mobile=a[i];
                prev=mobile;
            }
        }
    }
    if (mobile==0 && prev==0)
    {
        return 0;
    }
    return mobile;
}

void printOnePermutation(int n,int a[n],int dir[n])
{

    int temp;
    int mobile=mobile_element(n,a,dir);
    int pos=search(n,a,mobile);
    if (dir[a[pos-1]-1]==right)
    {
        temp=a[pos-1];
        a[pos-1]=a[pos-2];
        a[pos-2]=temp;
    }
    else if (dir[a[pos-1]-1]==left)
    {
        temp=a[pos];
        a[pos]=a[pos-1];
        a[pos-1]=temp;
    }
    for (int i=0;i<n;i++)
    {
        if (a[i]>mobile)
        {
            if (dir[a[i]-1]==left)
            {
                dir[a[i]-1]=right;
```

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                dir[a[i]-1]=right;
            }
            else if (dir[a[i]-1]==right)
            {
                dir[a[i]-1]=left;
            }
        }
    }
    for (int i=0;i<n;i++)
    {
        printf("%d",a[i]);
    }
    printf("\n");
}

int fact(int n)
{
    int product=1;
    for (int i=1;i<=n;i++)
    {
        product=product*i;
    }
    return product;
}

void printPermutation(int n)
{
    int a[n];
    int dir[n];
    for (int i=0;i<n;i++)
    {
        a[i]=i+1;
        printf("%d",a[i]);
    }
    printf("\n");
    for (int i=0;i<n;i++)
    {
```

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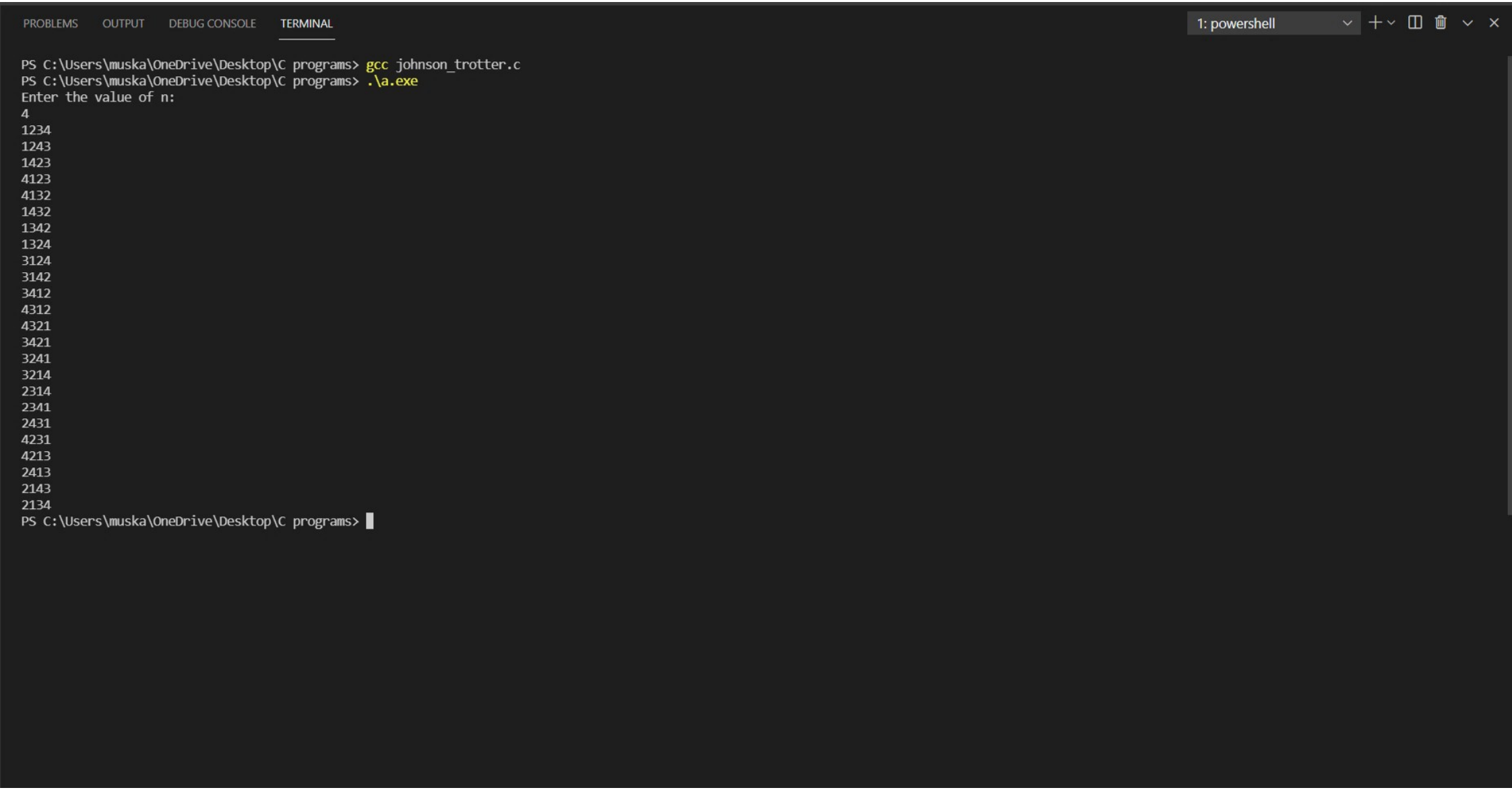
```c
{
    int a[n];
    int dir[n];
    for (int i=0;i<n;i++)
    {
        a[i]=i+1;
        printf("%d",a[i]);
    }
    printf("\n");
    for (int i=0;i<n;i++)
    {
        dir[i]=right;
    }
    for (int i=1;i<fact(n);i++)
    {
        printOnePermutation(n,a,dir);
    }

}

int main()
{
    int n;
    printf("Enter the value of n:\n");
    scanf("%d",&n);
    printPermutation(n);
    return 0;
}
```


PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
1: powershell
PS C:\Users\muska\OneDrive\Desktop\C programs> gcc johnson_trotter.c
PS C:\Users\muska\OneDrive\Desktop\C programs> .\a.exe
Enter the value of n:
4
1234
1243
1423
4123
4132
1432
1342
1324
3124
3142
3412
4312
4321
3421
3241
3214
2314
2341
2431
4231
4213
2413
2143
2134
PS C:\Users\muska\OneDrive\Desktop\C programs>