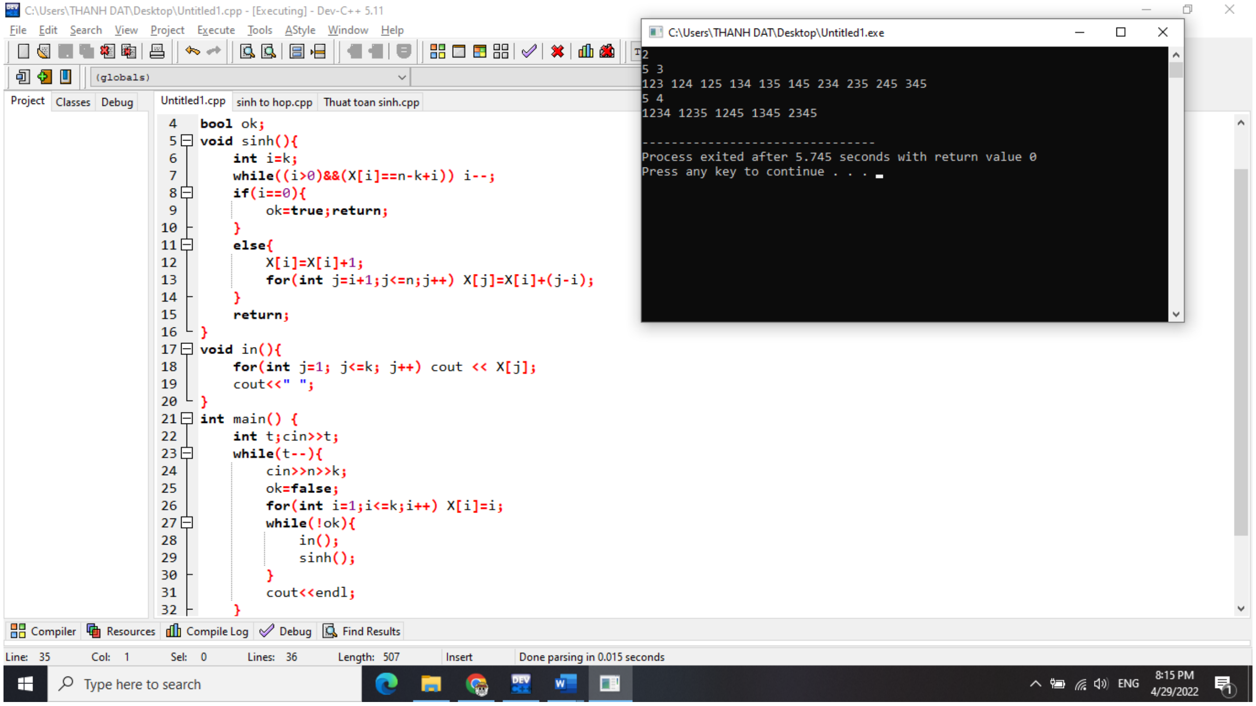
Nguyễn Thành Đạt – B19DCVT081

❖ Mô hình thuật toán sinh

- Sinh tổ hợp chập k của n


C:\Users\THANH DAT\Desktop\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
(globals)
Project Classes Debug
Untitled1.cpp sinh to hop.cpp Thuat toan sinh.cpp
Compiler Resources Compile Log Debug Find Results
Line: 35 Col: 1 Sel: 0 Lines: 36 Length: 507 Insert Done parsing in 0.015 seconds
Type here to search
ENG 8:15 PM 4/29/2022
C:\Users\THANH DAT\Desktop\Untitled1.exe

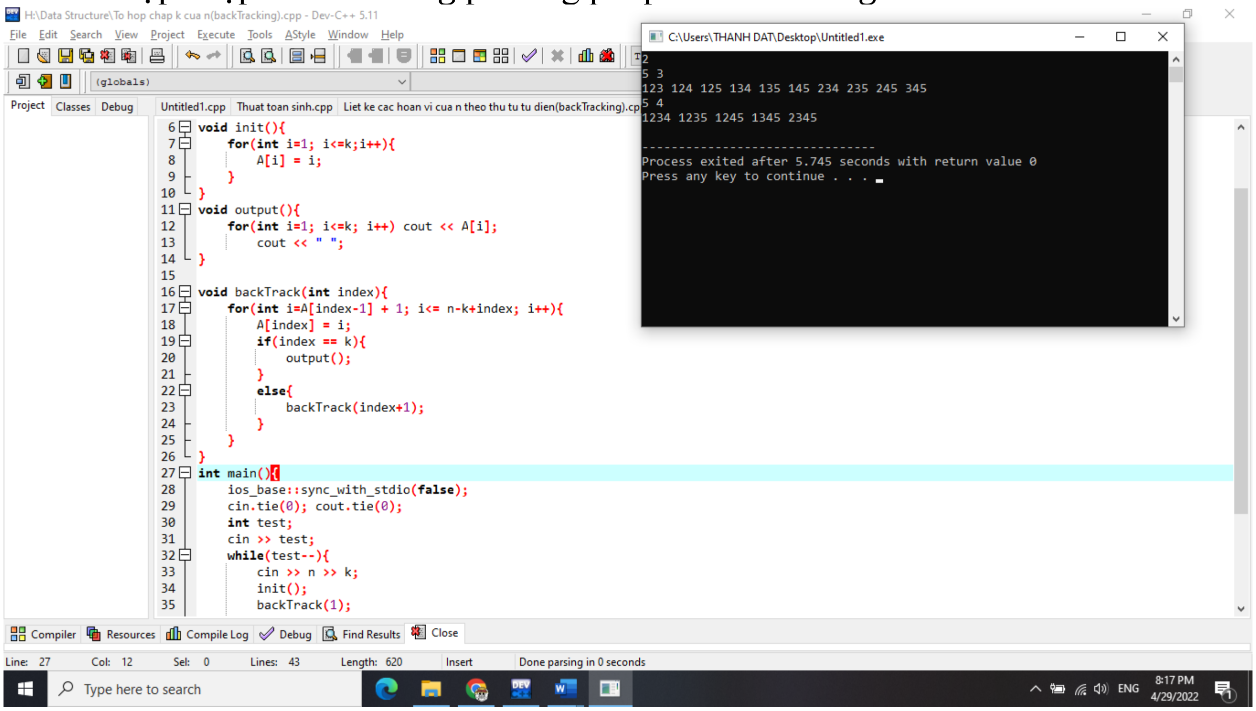
```
bool ok;
void sinh(){
    int i=k;
    while((i>0)&&(X[i]==n-k+i)) i--;
    if(i==0){
        ok=true;return;
    }
    else{
        X[i]=X[i]+1;
        for(int j=i+1;j<=n;j++) X[j]=X[i]+(j-i);
    }
    return;
}
void in(){
    for(int j=1; j<=k; j++) cout << X[j];
    cout<<" ";
}
int main() {
    int t;cin>>t;
    while(t--){
        cin>>n>>k;
        ok=false;
        for(int i=1;i<=k;i++) X[i]=i;
        while(!ok){
            in();
            sinh();
        }
        cout<<endl;
    }
```

```
2
5 3
123 124 125 134 135 145 234 235 245 345
5 4
1234 1235 1245 1345 2345

--------------------------------
Process exited after 5.745 seconds with return value 0
Press any key to continue . . .
```

```
#include <iostream>
using namespace std;
int  X[1000],n,k;
bool ok;
void sinh(){
    int i=k;
    while((i>0)&&(X[i]==n-k+i))   i--;
    if(i==0){
            ok=true;return;
    }
    else{
            X[i]=X[i]+1;
            for(int j=i+1;j<=n;j++) X[j]=X[i]+(j-i);
    }
    return;
}
void in(){
    for(int j=1; j<=k; j++) cout << X[j];
    cout<<" ";
}
```

```
int main() {
	int t;cin>>t;
	while(t--){
		cin>>n>>k;
		ok=false;
		for(int i=1;i<=k;i++) X[i]=i;
		while(!ok){
			in();
			sinh();
		}
		cout<<endl;
	}
	return 0;
}
```

- Sinh tổ hợp chập k của n bằng phương pháp backTracking

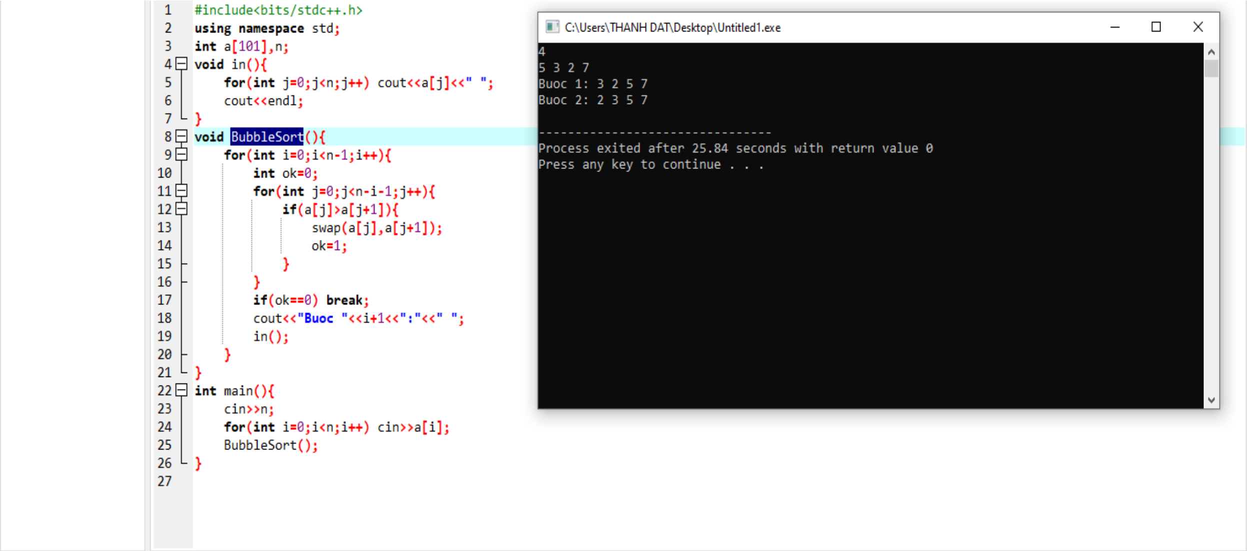


```
void init(){
    for(int i=1; i<=k;i++){
        A[i] = i;
    }
}
void output(){
    for(int i=1; i<=k; i++) cout << A[i];
        cout << " ";
}

void backTrack(int index){
    for(int i=A[index-1] + 1; i<= n-k+index; i++){
        A[index] = i;
        if(index == k){
            output();
        }
        else{
            backTrack(index+1);
        }
    }
}
int main(){
    ios_base::sync_with_stdio(false);
    cin.tie(0); cout.tie(0);
    int test;
    cin >> test;
    while(test--){
        cin >> n >> k;
        init();
        backTrack(1);
```

```
2
5 3
123 124 125 134 135 145 234 235 245 345
5 4
1234 1235 1245 1345 2345

--------------------------------
Process exited after 5.745 seconds with return value 0
Press any key to continue . . .
```

```
#include<bits/stdc++.h>
using namespace std;
// sinh tá»• há»£p
int A[100];
int n , k;
void init(){
    for(int i=1; i<=k;i++){
        A[i] = i;
    }
}
void output(){
    for(int i=1; i<=k; i++) cout << A[i];
        cout << " ";
}

void backTrack(int index){
    for(int i=A[index-1] + 1; i<= n-k+index; i++){
        A[index] = i;
        if(index == k){
            output();
        }
        else{
            backTrack(index+1);
        }
    }
}
int main(){
    ios_base::sync_with_stdio(false);
    cin.tie(0); cout.tie(0);
    int test;
    cin >> test;
    while(test--){
        cin >> n >> k;
        init();
        backTrack(1);
        cout << endl;
    }

    return 0;
}
```

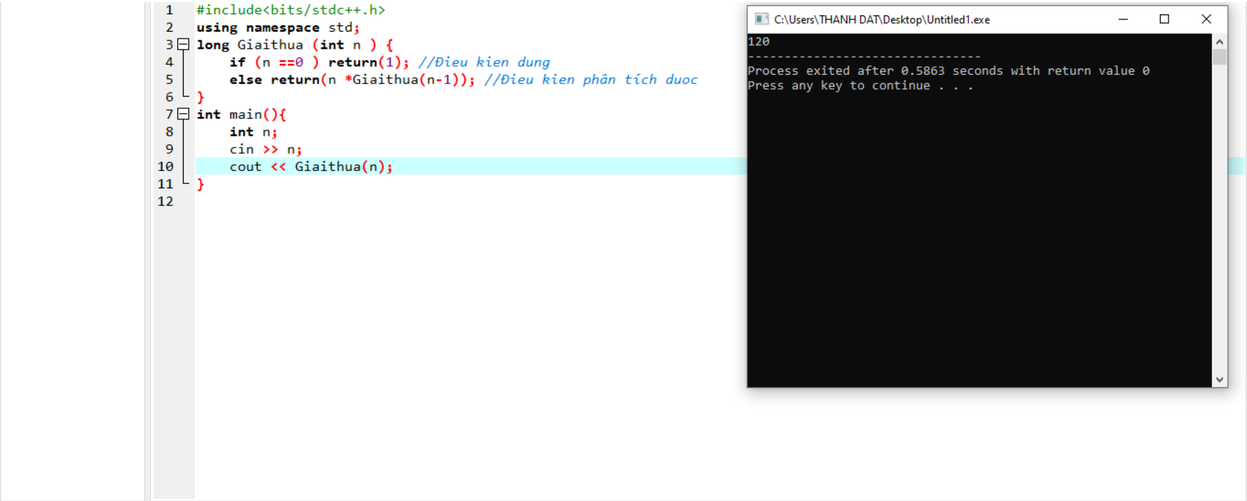
- ❖ Mô hình thuật toán tham lam
    - Thuật toán sắp xếp BubbleSort



```
#include<bits/stdc++.h>
using namespace std;
int a[101],n;
void in(){
    for(int j=0;j<n;j++) cout<<a[j]<<" ";
    cout<<endl;
}
void BubbleSort(){
    for(int i=0;i<n-1;i++){
        int ok=0;
        for(int j=0;j<n-i-1;j++){
            if(a[j]>a[j+1]){
                swap(a[j],a[j+1]);
                ok=1;
            }
        }
        if(ok==0) break;
        cout<<"Buoc "<<i+1<<":"<<" ";
        in();
    }
}
int main(){
    cin>>n;
    for(int i=0;i<n;i++) cin>>a[i];
    BubbleSort();
}
```

```
4
5 3 2 7
Buoc 1: 3 2 5 7
Buoc 2: 2 3 5 7

--------------------------------
Process exited after 25.84 seconds with return value 0
Press any key to continue . . .
```

- ❖ Mô hình thuật toán đệ qui
  - Tính n!



```
#include<bits/stdc++.h>
using namespace std;
long Giaithua (int n ) {
    if (n ==0 ) return(1); //Đieu kien dung
    else return(n *Giaithua(n-1)); //Đieu kien phân tích duoc
}
int main(){
    int n;
    cin >> n;
    cout << Giaithua(n);
}
```

```
120
--------------------------------
Process exited after 0.5863 seconds with return value 0
Press any key to continue . . .
```