**import** java.util.\*;

**public** **class** lab3 {

**public** **static** **void** main(String[] args) {

// **TODO** Auto-generated method stub

Scanner in = **new** Scanner(System.***in***);

Scanner in1 = **new** Scanner(System.***in***);

Scanner in2 = **new** Scanner(System.***in***);

**boolean** check = **true**;

String userInput;

**int** k = 0;

**int** n = 0;

// time begin

**while**(check){

System.***out***.println("Enter Q to Quit");

System.***out***.println("Enter K to change k value");

System.***out***.println("Enter N to change N value");

System.***out***.println("Enter C for calculation of time");

System.***out***.println("Enter P for print k");

userInput = in.next();

**if**(userInput.charAt(0) == 'q' || userInput.charAt(0) == 'Q'){

check = **false**;

}

**else** **if**(userInput.charAt(0) == 'k' || userInput.charAt(0) == 'K'){

System.***out***.println("Please enter K value");

k = in1.nextInt();

**continue**;

}

**else** **if**(userInput.charAt(0) == 'n' || userInput.charAt(0) == 'N'){

System.***out***.println("Please enter N value");

n = in2.nextInt();

**continue**;

}

**else** **if**(userInput.charAt(0) == 'c' || userInput.charAt(0) == 'C'){

**double** startTime = System.*nanoTime*();

*loop*(n,k);

**double** estimatedTime = System.*nanoTime*() - startTime;

**double** estimatedTimeInMilSec = estimatedTime / 1000000;

**if**(estimatedTimeInMilSec < 1000){

System.***out***.println("time used " + estimatedTimeInMilSec + " milliSecond");

}

**else**{

System.***out***.println("time used " + (estimatedTimeInMilSec/1000) + " Second");

}

}

**else** **if**(userInput.charAt(0) == 'p' || userInput.charAt(0) == 'P'){

*loop1*(n,k);

}

**else**{

System.***out***.println("invalid input");

**continue**;

}

}

}

**public** **static** **void** loop(**int** n, **int** k){

**int** counter = 0;

// create an int array of size k

// k is the number of loop

**int**[] a = **new** **int**[k];

// zero out the array

**for**(**int** j = 0; j < a.length; j++){

a[j] = 0;

}

// loop index keep track of which loop currently being iterated.

**int** i = 0;

//each loop is to iterate n times

**while**(counter < Math.*pow*(n, k)){

a[i] = a[i] + 1;

**if**(a[i] == n){

a[i] = 0;

i++;

}

**else** **if** (a[i] < n){

i = 0;

}

counter++;

}

}

**public** **static** **void** loop1(**int** n, **int** k){

**int** counter = 0;

// create an int array of size k

// k is the number of loop

**int**[] a = **new** **int**[k];

// zero out the array

**for**(**int** j = 0; j < a.length; j++){

a[j] = 0;

}

// loop index keep track of which loop currently being iterated.

**int** i = 0;

//each loop is to iterate n times

**while**(counter < Math.*pow*(n+1, k)){

a[i] = a[i] + 1;

*printArr*(a);

**if**(a[i] == n && i == k - 1){

i = 0;

}

**else** **if**(a[i] == n){

a[i] = 0;

i++;

}

**else** **if** (a[i] < n){

i = 0;

}

counter++;

}

}

**public** **static** **void** printArr(**int**[] arr){

**for**(**int** g = 0; g < arr.length; g++){

System.***out***.print(arr[g]);

}

System.***out***.print(" \n");

}

}