#include <stdio.h>

#include <math.h>

#include <conio.h>

int nhapN();//Nhap vao so N> 0

int Fibonacci(int n);//Tim so Fibonancci thu n Fn = Fn-1 + Fn-2

int kiemtraFibonacci(int n);//Kiem tra so n có thuoc day Fibonacci hay khong Neu dung thi no thuoc phan tu thu may

int tongN(int n); // tong cac so tu 1 - N dung de quy

int giaithua(int n);//tinh giai thua N (su dung de quy)

int nguyento(int n); //kiem tra so n co la nguyen to hay khong (ham tra ve 1 neu dung)

int hoanhao(int n); //kiem tra n co la so hoan hao hay khong (ham tra ve 1 neu dung)

void allNguyenTo(int n); // in tat ca cac so nguyen to < n

void allHoanHao(int n); // in tat ca cac so hoan hao < n

void chuyendia(int n , char a, char b, char c);//Bai toan thap Ha Noi

int main(){

int chon;

do{

printf("\n\t\t MENU \n");

printf("\n\t1. Nhap so nguyen (N > 0).");

printf("\n\t2. Kiem tra so N co thuoc day Fibonacci hay khong?");

printf("\n\t3. Kiem tra N co la so nguyen to hay khong");

printf("\n\t4. Kiem tra N co la so hoan hao hay khong");

printf("\n\t5. Tinh tong S = 1 + 2 +.. +N (dung De quy)");

printf("\n\t6. Tinh Giai thua GT = 1\*2\*3\*..\*N (dung De quy)");

printf("\n\t7. Hien thi cac so nguyen to nho hon N");

printf("\n\t8. Hien thi cac so Hoan hao nho hon N");

printf("\n\t9. Bai toan thap Ha noi.");

printf("\n\t0. De thoat.\n");

printf("\nMoi chon chuc nang (0->8): ");

scanf("%d",&chon);

switch(chon) {

case 0 : break;

case 1:{

int n;

printf("\nVui long nhap vao N > 0: ");

nhapN(n);

break;

}

case 2:{

int i,n,d=0;

printf("\n\tn = ");

scanf("%d",&n);

for(i=0;i<=n;i++)

if(n==Fibonacci(i)){

d++;

}

if(d==1) printf("\t%d thuoc day fibonacci",n);

else printf("\t%d khong thuoc day fibonacci",n);

if(d==1)

printf("\n\tSo Fibonacci thu %d la: %d", n, kiemtraFibonacci(n));

break;

}

case 8:{

long long n,sum;

printf("Nhap N: ");

scanf("%d", &n);

for ( int number = 1;number <= n;number++){

sum =0;

for (int i = 1 ; i <= number;i++)

if (number%i==0)

sum+=i;

if (sum/2.0 == number)

printf("\n%d ",number);

}

break;

}

case 5:{

int i, num;

int result;

printf("\tNhap mot so bat ky: ");

scanf("%d", &num);

result = tongN(num);

printf("\n\tTong cac so tu 1 toi %d la: %d", num, result);

break;

}

case 3:{

int n;

printf("\n\tNhap n = ");

scanf("%d", &n);

if(n < 2){

printf("\n\t%d khong phai so nguyen to", n);

return 0;

}

int count = 0;

for(int i = 2; i <= sqrt(n); i++){

if(n % i == 0){

count++;

}

}

if(count == 0){

printf("\n\t%d la so nguyen to", n);

}else{

printf("\n\t%d khong phai so nguyen to", n);

}

break;

}

case 6:{

long long i;

printf("\tNhap n: ");

scanf("%d" , &i);

printf("\tGia tri giai thua cua %d la %lld\n", i, tinhgiaithua(i));

break;

}

case 7:{

int i, n;

printf("\tNhap n = ");

scanf("%d", &n);

printf("\tTat ca cac so nguyen to nho hon %d la: \n", n);

if (n >= 2) {

printf("%d ", 2);}

for (i = 3; i < n; i+=2) {

printf("%d ", i);}

break;

}

case 4:{

int n;

printf("\tNhap n: ");

scanf("%d",&n);

if((n) )

printf("\t%d la so hoan hao.",n);

else

printf("\t%d khong phai la so hoan hao.",n);

break;

}

case 9 :{

char a='A', b='B', c='C';

int n;

printf("Nhap n:",n);

scanf("%d", &n);

chuyendia(n,a,b,c);

break;

}

}}while (chon!=0);

return 0;

}

int nhapN(int n){ //Nhap vao so N> 0

scanf("%d" , &n);

if(n > 0){

printf("\tSo N ban vua nhap la: %d" , n);

}else printf("Vui long nhap N > 0 ");

return n;

}

int Fibonacci(int n); //Tim so Fibonancci thu n Fn = Fn-1 + Fn-2

int Fibonacci(int n){

if(n==1||n==0||n==2||n==3) return n;//fb la fibonacci

return Fibonacci(n-2)+Fibonacci(n-1);

}

int kiemtraFibonacci(int n){ //Kiem tra so n có thuoc day Fibonacci hay khong Neu dung thi no thuoc phan tu thu may

if (n == 1 || n == 2)

return 1;

return kiemtraFibonacci(n - 1) + kiemtraFibonacci(n - 2);

}

int tinhgiaithua(unsigned long long i){ //tinh giai thua N (su dung de quy)

if(i <= 1){

return 1;

}

return i \* tinhgiaithua(i - 1);

}

int check(int n){ //kiem tra so n co la nguyen to hay khong

int sum = 0;

for(int i=1;i<=n/2;i++){

if(n%i==0)

sum+=i;

}

if(sum==n) return 1;

return 0;

}

void chuyendia(int n , char a, char b, char c){ //Bai toan thap Ha Noi

if(n==1){

printf("\t%c ====== %c \n", a , c);

return;

}

chuyendia(n-1,a,c,b);

chuyendia(1,a,b,c);

chuyendia(n-1,b,a,c);

}

void allNguyenTo(int n) { // in tat ca cac so nguyen to < n

if (n < 2) {

}

int i;

int can = (int) sqrt(n);

for (i = 2; i <= can; i++) {

if (n % i == 0) {

}

}

}

int tongN(int num) { //tong cac so tu 1 - N dung de quy

int res;

if (num == 1) {

return (1);

} else {

res = num + tongN(num - 1);

}

return (res);

}