

```
/* Bestof CPAS 2009:
- Só foram analisadas as soluções dos 3 primeiros classificados;
- Para o CPAS2009-5 e CPAS2009-10 não são apresentadas soluções
por não se considerar que são suficientemente claras;
- CPAS2009-8 é uma solução do autor do problema
*/

//CPAS2009-1
//Autores: Pythonists
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <string.h>

int main() {

    int nr;
    int i=0;

    scanf("%d",&nr);

    while (nr!=1) {
        i++;
        if (nr%2==0)
            nr/=2;
        else
            nr=nr*3+1;
        printf("%d\n",nr);
    }
    printf("#%d\n",i);

    return 0;
}

//CPAS2009-1
//Autores: Os Engenheiros
#include <iostream>

using namespace std;

int main(int argc, char *argv[])
{
    int x,i,y;
    y=0;
    cin>>x;
    i=x;
    while (i!=1)
    {
        if (i%2==0) {cout << i/2<<"\n";i=i/2;}
        else {cout << i*3+1<<"\n";i=i*3+1;}
        y++;
    }
    cout << "#"<<y<<"\n";
    //system("PAUSE");
    return (0);
}

//CPAS2009-1
//Autores:Swordfish
#include <iostream>

using namespace std;

int main()
```

```
{
    int num,no=0;
    cin >> num;
    while (num!=1)
    {
        no++;
        if ((num%2)==0)
        {
            num=num/2;
            cout << num << endl;
        }
        else
        {
            num=num*3+1;
            cout << num << endl;
        }
    }
    cout << "#" << no << endl;
    return 0;
}
```

```
//CPAS2009-2
```

```
//Autores: Pythonists
```

```
#include <stdio.h>
```

```
#include <stdlib.h>
```

```
#include <math.h>
```

```
#include <string.h>
```

```
int main() {
```

```
    int a,b,t=0;
```

```
    scanf("%d",&a);
```

```
    while (1) {
```

```
        scanf("%d",&b);
```

```
        if (b==0) break;
```

```
        if (a<b) t++;
```

```
        else if (a>b) t--;
```

```
        a=b;
```

```
    }
```

```
    printf("%d\n",t);
```

```
    return 0;
```

```
}
```

```
//CPAS2009-2
```

```
//Autores: Swordfish
```

```
#include <iostream>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
    int num,ant,count=0;
```

```
    cin>>ant;
```

```
    if (ant==0)
```

```
    {
```

```
        cout<<count<<endl;
```

```
        return (0);
```

```
    }
```

```
    cin>>num;
```

```
    while (num!=0)
```

```
{
    if (num>ant) count++;
    else if (num<ant) count--;
    ant=num;
    cin>>num;
}
cout<<count<<endl;
return 0;
}

//CPAS2009-3
//Autores: Pythonists
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <string.h>

void insensitive(char * ptr){
    int i=0;
    while(ptr[i] != '\0'){
        if(ptr[i] <= 'Z' && ptr[i] >= 'A'){
            ptr[i] += 'a'-'A';
        }
        i++;
    }
}

int ctr[25];

int main() {

    char chaves[25][111], c;

    char texto[6105], buff[100];

    int n, m, i, j,k;
    int e=1;
    scanf("%d\n", &n);
    for(j=0;j<n; j++){
        scanf("%s", chaves[j]);
        insensitive(chaves[j]);
    }

    scanf("%d\n", &m);
    j=0;
    c=getchar();
    while(c!=EOF){
        texto[j++]=c;
        c=getchar();
    }
    texto[j] = '\0';

    insensitive(texto);

    for(i=0;i<strlen(texto);i++) {
        for (j=0;j<n;j++) {
            e=1;
            for (k=0;k<strlen(chaves[j]);k++) {

                if (chaves[j][k] != texto[i+k]) {
                    e=0;
                    break;
                }
            }
            if (e){
                ctr[j]++;
            }
        }
    }
}
```

```
    }
}

for(i=0; i<n; i++){
    printf("%s-%d\n", chaves[i], ctr[i]);
}

return 0;
}

//CPAS2009-3
//Autores: Os Engenheiros
#include <iostream>
#include <string.h>
#include <stdlib.h>
#include <stdio.h>
using namespace std;

int main(int argc, char *argv[])
{
    int x,x2,y,k,z;
    char s[52][52],s2[52][1000],*s3[200],*a;
    int v[52];
    cin>>x;
    k=0;
    for (y=0;y<x;y++)
    {
        cin>>s[y];
    }
    cin>>x2;
    for (y=0;y<=x2;y++)
    {
        fgets(s2[y],sizeof(s2[y]),stdin);
        s2[y][strlen(s2[y])-1]='\0';
        a=strtok(s2[y], " ;,.\n");
        while (a)
        {
            s3[k]=a;
            a=strtok(NULL, " ;,.");
            k++;
        }
    }
    for (y=0;y<x;y++)
    {
        v[y]=0;
        for (x2=0;x2<k;x2++)
        {
            if (strcmpi(s[y],s3[x2])==0) v[y]++;
        }
        for (z=0;z<strlen(s[y]);z++)
        {
            if (s[y][z]>='A'&&s[y][z]<='Z') s[y][z]-='A'-'a';
        }
        cout<<s[y]<<"-"<<v[y]<<"\n";
    }
    //system("PAUSE");
    return (0);
}

//CPAS2009-3
//Autores: Swordfish
#include <iostream>
#include <stdio.h>
#include <string.h>
using namespace std;
```

```

void descer(char s[], int n)
{
    int i;
    for (i=0;i<n;i++)
        if (s[i]>='A' && s[i]<='Z') s[i]=s[i]+32;
}
int main()
{
    int np,nl,i,j,no[20];
    char pc[20][110],texto[110],*pal,a[2];
    cin>>np;
    cin.getline(a,2);
    for (i=0;i<np;i++)
    {
        cin.getline(pc[i],sizeof(pc[i]));
        descer(pc[i],strlen(pc[i]));
        no[i]=0;
    }
    cin>>nl;
    cin.getline(a,2);
    for (i=0;i<nl;i++)
    {
        cin.getline(texto,sizeof(texto));
        descer(texto,strlen(texto));
        pal=strtok(texto," ");
        while (pal!=NULL)
        {
            for (j=0;j<np;j++)
            {
                if (strcmp(pal,pc[j])==0)
                {
                    no[j]++;
                }
            }
            pal=strtok(NULL," ");
        }
    }
    for (i=0;i<np;i++) cout<<pc[i]<<"-"<<no[i]<<endl;
    return 0;
}

//CPAS2009-4
//Autores: Pythonists
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <string.h>

int main() {

    int fatias[] = {10,20,40,20,10, 10,20,40,20,10, 10,20,40,20,10, 10,20,40,20,
10};

    int f, q, ft, i;

    scanf("%d %d %d", &f, &q, &ft);

    ft+=(q-1)*5;

    ft-=2;
    for(; f>0; f--){
        ft++;
        if(ft>19) ft = 0;
        printf("%d %d\n", (ft/5)+1, fatias[ft]);
    }
}

```

```
    }
    printf("PREMIO=%d\n", fatias[ft]);

    return 0;
}

//CPAS2009-4
//Autores: Os Engenheiros
#include <iostream>

using namespace std;

int main(int argc, char *argv[])
{
    int x,y,z,k;
    int v[5]={10,20,40,20,10};
    cin>>x;
    cin>>y>>z;
    z-=2;
    for (k=0;k<x;k++)
    {
        z++;
        if (z>=5){z=0;y++;}
        if (y>=5){y=1;}
        cout<<y<<" "<<v[z]<<"\n";
    }
    cout<<"PREMIO="<<v[z]<<"\n";
    //system("PAUSE");
    return (0);
}

//CPAS2009-4
//Autores: Swordfish
#include <iostream>

using namespace std;

int main()
{
    int fr,i;
    int dn[6]={10,20,40,20,10};
    int qd,pi;
    cin >> fr;
    cin >> qd >> pi;
    pi-=2;
    for (i=0;i<fr;i++)
    {
        if ((pi+1)<5)
        {
            pi++;
        }
        else
        {
            pi=0;
            if ((qd+1)<5)
            {
                qd++;
            }
            else
            {
                qd=1;
            }
        }
        cout << qd << " " << dn[pi] << endl;
    }
}
```

```

    cout << "PREMIO=" << dn[pi] << endl;
    return 0;
}

//CPAS2009-6
//Autores: Os Engenheiros
#include <iostream>

using namespace std;

int main(int argc, char *argv[])
{
    int x;
    char md[22][50]={"um", "dois", "tres", "quatro", "cinco", "seis", "sete", "oito",
"nove", "dez", "onze", "doze", "treze", "catorze", "quinze", "dezasseis", "dezassete",
"dezoito", "dezanove", "vinte"};
    char mc[12][50]={"vinte", "trinta", "quarenta", "cinquenta", "sessenta",
"setenta", "oitenta", "noventa"};
    char mf[12][50]={"cento", "duzentos", "trezentos", "quatrocentos", "quinhentos",
"seiscentos", "setecentos", "oitocentos", "novecentos"};
    cin>>x;
    if (x==0){ cout<<"zero\n";return(0);}
    if (x==100){cout<<"cem\n";return(0);}
    if (x<=20)
    {
        cout<<md[x-1]<<"\n";
    }
    else
    {
        while (x>=10)
        {
            if (x/100>=1)
            {
                cout<<mf[(int)(x/100)-1];
                x=x-((int)(x/100.0)*100);
                if (x!=0) cout<<" e ";
            }
            else if (x/10>=1)
            {
                cout<<mc[(int)(x/10)-2];
                x=x-((int)(x/10.0)*10);
                if (x!=0) cout<<" e ";
            }
        }
        if (x!=0) {cout<<md[x-1]<<"\n";return(0);}
    }
    cout<<"\n";
    return(0);
}

//CPAS2009-7
//Autores: Pythonists
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <string.h>

#define FOR(i,a,b) for (i = a ; i< b ; i++)

int h, w;
char vis[110][110], vals[110][110];

void dfs(int x, int y) {
    if (x<0 || x >= w || y < 0 || y >= h)
        return;
    if (vals[y][x]=='*' || vis[y][x])

```

```
        return;

    vis[y][x]=1;

    if (vals[y][x]!='0')
        return;

    dfs(x-1,y-1);
    dfs(x+1,y-1);
    dfs(x-1,y+1);
    dfs(x+1,y+1);

    dfs(x,y+1);
    dfs(x,y-1);
    dfs(x-1,y);
    dfs(x+1,y);
}

int main() {
    int i, j, x, y;

    scanf("%d %d",&h,&w);

    FOR(i,0,h)
        scanf("%s",vals[i]);

    scanf("%d %d",&x,&y);
    x--;y--;

    if (vals[x][y] == '*') {
        printf("MORREU\n");
        return 0;
    }

    dfs(y,x);
    FOR(i,0,h) {
        FOR(j,0,w) {
            if (vis[i][j])
                putchar(vals[i][j]);
            else
                putchar('-');
        }
        putchar('\n');
    }

    return 0;
}

/* CPAS2009-8: MonteCarlo - Autor: Miguel Oliveira */
#include <stdio.h>
#include <stdlib.h>
typedef struct {
    double a,b,c ; /* ax + by <= c */
} Restricao;

Restricao r[35];
int nr;

int valida( double px , double py ) {
    int i;
    for (i = 0 ; i < nr ; i++) {
        if ( r[i].a * px + r[i].b * py > r[i].c )
            return 0;
    }
    return 1;
}
```

```

}

int main() {
    char var , op[4] , sinal , vall[20] , linha[50];
    double x1 , y1 , x2 , y2 , area_rectangulo;
    int n , i , j , pontos_dentro ;

    scanf("%lf %lf %lf %lf" , & x1 , & y1 , & x2 , & y2 );
    area_rectangulo = (x2-x1) * (y2-y1);

    scanf("%d\n" , &nr);
    for ( i = 0 ; i < nr ; i++) {
        fgets( linha , 50 , stdin );
        j = sscanf(linha , "%c %s %s %c %lf" , &var , op , vall , & sinal , & r[i].c
        );

        r[i].b = 1; /* by , b = 1 */
        if ( j == 3 ) {
            if ( var == 'y' ) /* y op c */
                r[i].a = 0;
            else { /* x op c */
                r[i].a = 1;
                r[i].b = 0;
            }
            r[i].c = atof(vall);
        }
        else { /* ax + by <= c */
            r[i].b = 1;
            r[i].a = -atof( vall ); /* 'x' e' ignorado. '-' para passar para o outro
            lado da desigualdade */
            if (sinal == '-')
                r[i].c = - r[i].c;
        }
        if (op[0] == '>') { /* transforma em restricao em <= */
            r[i].a *= -1.0; /* assim basta testar um tipo de restricao */
            r[i].b *= -1.0;
            r[i].c *= -1.0;
        }
    }
    pontos_dentro = 0 ;
    scanf("%d\n" , &n);
    for ( i = 0 ; i < n ; i++) {
        scanf("%lf %lf" , &x1 , &y1 );
        pontos_dentro += valida(x1,y1);
    }
    printf("%.2f\n" , area_rectangulo/n * pontos_dentro );
    return 0;
}

```