



25^{ος} ΠΑΝΕΛΛΗΝΙΟΣ ΔΙΑΓΩΝΙΣΜΟΣ ΠΛΗΡΟΦΟΡΙΚΗΣ

ΘΕΜΑ Β΄ ΦΑΣΗΣ ΛΥΚΕΙΟΥ

Ενδεικτικές Λύσεις

PASCAL

Πλάτων Ευάγγελος (92%)

5^ο ΓΕΛ Μυτιλήνης

```
program diagwnismos_b_fasi;
var max,i,d,proswrino,n,m,a,b,temp,z,top:integer;
    pin:array[1..999999]of integer;
    k,stack,plith:array[1..1000000]of integer;
    filein,filex:text;
    t:boolean;
begin

    assign(filein,'scidinner.in');
    reset(filein);

    readln(filein,n,m);
    for i:=1 to n do k[i]:=0;

    for i:=1 to m do
        begin
            readln (filein,a,b);
            pin[i]:=b;
            k[b]:=a;
        end;
    close(filein);

    max:=-1;

    for i:=1 to m do

        begin
            plith[pin[i]]:=1;
            proswrino:=pin[i];
            t:=false;
            top:=0;
            while (k[proswrino]<>0) and (t=false) do
                begin
                    if plith[k[proswrino]]=0 then
                        begin
                            plith[pin[i]]:=plith[pin[i]]+1;
                            proswrino:=k[proswrino];
                            top:=top+1;
                        end;
                end;
        end;
```

Σελίδα 1 από 5



```
        stack[top]:=proswrino;
        if plith[pin[i]]>max then
max:=plith[pin[i]];
        end
        else
        begin
        plith[pin[i]]:=plith[pin[i]]
+plith[k[proswrino]];
        t:=true;
        if plith[pin[i]]>max then
max:=plith[pin[i]];
        end;
        end;
        temp:=plith[pin[i]];
        for z:=1 to top do plith[stack[z]]:=temp-z;
        //   for z:=1 to n do write(z:2,' '); writeln;
        //   for z:=1 to n do write(plith[z]:2,' ');
writeln;
        //   for z:=1 to n do write(k[z]:2,' ');
writeln;readln;
        end;
        assign(filex,'scidinner.out');
        rewrite(filex);
        writeln(filex,max);
        close(filex);
end.
```

C

Διαμαντίδης Δημήτριος **Λύκειο Αμερικανικού Κολεγίου Ελλάδος**

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

#define F_IN "scidinner.in"
#define F_OUT "scidinner.out"

typedef struct {
    int *data;
    int size;
    int top;
} stack;

int Max(int *list, int size)
{
    register int i, max;
    max = list[1];
    for (i=2; i<=size; i++) {
```

Σελίδα 2 από 5



```
        if (list[i] > max)
            max = list[i];
    }
    return max;
}

int main()
{
    int N, M, j, k, d=0;
    register int i;
    int *list, *count;
    int **sec;
    stack st;
    FILE *in, *out;
    in = fopen(F_IN, "r");
    fscanf(in, "%d %d", &N, &M);

    list = (int *) calloc(N + 1, sizeof(int));
    count = (int *) calloc(N + 1, sizeof(int));
    st.data = (int *) malloc(N * sizeof(int));
    st.size = N;
    st.top = 0;
    sec = (int **) calloc(2, sizeof(int *));
    sec[0] = (int *) calloc(N + 1, sizeof(int));
    sec[1] = (int *) calloc(N + 1, sizeof(int));

    for (i=1; i<=M; i++) {
        fscanf(in, "%d %d", &k, &j);
        if (k == j)
            continue;
        list[j] = k;
    }
    fclose(in);

    for (i=1; i<=N; i++) {
        if (count[i] != 0)
            continue;
        if (list[i] == 0) {
            count[i] = 1;
            continue;
        }
        j = list[i];
        st.data[st.top++] = i;
        sec[0][i] = i;
        sec[1][i] = 0;
        while (st.top < st.size) {
            if (list[j] == 0) {
                count[j] = 1;
                k = count[j];
                break;
            }
        }
    }
}
```



```
    }
    if (count[j] != 0) {
        k = count[j];
        break;
    }
    if (sec[0][j] == i) {
        k = st.top - sec[1][j];
        d = k;
        count[j] = k;
        break;
    }
    sec[0][j] = i;
    sec[1][j] = st.top;
    st.data[st.top++] = j;
    j = list[j];
}
while (st.top > 0)
    count[st.data[--st.top]] = (--d >= 0) ? k : +
+k;

    st.top = 0;
    d = 0;
}

out = fopen(F_OUT, "w+");
fprintf(out, "%d\n", Max(count, N));
fclose(out);
free(list);
free(count);
free(st.data);
free(sec[0]);
free(sec[1]);
free(sec);
return 0;
}
```

C++

Παπαμιχαήλ Λάμπης

Ιδ. ΓΕΛ Εκπ/ρίων Δούκα

```
#include <stdio.h>

int N, M, sci[1000010], count[1000010];

int main() {
```

Σελίδα 4 από 5



```
freopen("scidinner.in","r",stdin);
freopen("scidinner.out","w",stdout);

int i, j, a, b, mx;
scanf("%d %d", &N, &M);
for(i=0;i<M;i++) {
    scanf("%d %d", &a, &b);
    sci[b] = a;
}
mx = 0;
for(i=1;i<=N;i++) {
    count[i] = 1;

    j = i;
    while(sci[j] > 0) {
        j = sci[j];
        if( count[j] > 0 ) {
            count[i] += count[j];
            break;
        }
        count[i]++;
    }

    j = i;
    while(sci[j] > 0 && count[ sci[j] ] == 0) {
        count[ sci[j] ] = count[j] - 1;
        j = sci[j];
    }

    if(count[i] > mx) mx = count[i];
}
printf("%d\n",mx);
return 0;
}
```