```
function [Fbest,Lbest,BestChart]=JANA(N,max_it,testsistem,Case,K1,K2)
%get allowable range and dimension of the test function.
[low,up,dim]=ogranicenja(testsistem);

%random initialization for agents.
X=initialagents(dim,N,up,low);

%create the best so far chart and average fitnesses chart.
BestChart=[];

for iteration=1:max_it

    %Checking allowable range.
    X=spacebound(X,up,low);
    %Evaluation of agents.
    ObjVal=evaluation(X,testsistem,Case);

%------------------------------------------------------------------------
    [best best_X]=min(ObjVal); %minimization.
    %[worst worst_X]=max(ObjVal); %max.

%------------------------------------------------------------------------
    Fbest=best;
    Lbest=X(best_X,:);
    LBEST=ones(N,dim);
    for k=1:N
        LBEST(k,:)=Lbest;
    end

%========================================================================
====
    if rand>0.5
        znak2=1;
    else
        znak2=-1;
    end

X=X+K1*rand(N,dim).*(X-LBEST)+znak2*K2*rand(N,dim).*(X.^2-LBEST.^2);
%DEFAULT

%========================================================================
====

    BestChart=[BestChart Fbest];

%------------------------------------------------------------------------
    %fprintf('JANA| Iter:%3d -->  Fbest: %9.10f\n',iteration,Fbest);
```

```
%---------------------------------------------------------------------
end

%=====================================================================
====
function [X]=initialagents(dim,N,up,down)
if size(up,2)==1
    X=rand(N,dim).*(up-down)+down;
end
if size(up,2)>1
    for i=1:dim
        high=up(i);low=down(i);
        X(:,i)=rand(N,1).*(high-low)+low;
    end
end
%---------------------------------------------------------------------
----
function ObjVal=evaluation(X,testsistem,Case)
[N,dim]=size(X);
for i=1:N
    L=X(i,:);
    ObjVal(i)=Fobj(L,testsistem,Case);
end
%---------------------------------------------------------------------
----
function  X=spacebound(X,up,low)
[N,dim]=size(X);
for i=1:N

Tp=X(i,:)>up;Tm=X(i,:)<low;X(i,:)=(X(i,:).*(~(Tp+Tm)))+((rand(1,dim).*(
up-low)+low).*(Tp+Tm));
end
%=====================================================================
====
```