function crosspop=crossover(crosspop,pop,nvar,ncross)

f=[pop.cost];

f=1./f;

f=f./sum(f);

f=cumsum(f);

for n=1:2:ncross

i1=find(rand<=f,1,'first');

i2=find(rand<=f,1,'first');

p1=pop(i1).pos;

p2=pop(i2).pos;

j=randi([1 nvar-1]);

o1=[p1(1:j) p2(j+1:end)];

o2=[p2(1:j) p1(j+1:end)];

o1=unique([o1 randperm(nvar)],'stable');

o2=unique([o2 randperm(nvar)],'stable');

crosspop(n).pos=o1;

crosspop(n).cost=fitness(o1,nvar);

crosspop(n+1).pos=o2;

crosspop(n+1).cost=fitness(o2,nvar);

end

end