

CPSC 322: Introduction to Artificial Intelligence (Section 2)

CSP: Stochastic Local Search

Do this exercise in pairs. If there's an odd number, do it in a group of 3.

Submit the sheet before leaving.

Name of Student (last, first)	Student Number

In this activity, you'll be giving us the description of stopping criteria and variable and value selection methods for the following algorithms.

1. Random sampling
2. Random walk
3. Greedy descent
4. Greedy descent with random walk
5. Greedy descent with random restart

Read the algorithm on the next page carefully and fill in the table.

Procedure Local-Search(V, dom, C)

Inputs

V : a set of variables

dom : a function such that $\text{dom}(X)$ is the domain of variable X

C : set of constraints to be satisfied

Output

complete assignment that satisfies the constraints

Local

$A[V]$ an array of values indexed by V

```
1:  repeat
2:    for each variable  $X$  do
3:       $A[X] \leftarrow$  a random value in  $\text{dom}(X)$ ;
4:
5:      while (stopping criterion not met &  $A$  is not a satisfying assignment):
6:        select a variable  $Y$  and a value  $V \in \text{dom}(Y)$ 
7:        set  $A[Y] \leftarrow V$ 
8:      if ( $A$  is a satisfying assignment) then
9:        return  $A$ 
10:
11:  until termination
```

Local search algorithm	Stopping criteria condition (line 5)	Variable and value selection (line 6)
Random sampling		
Random walk		
Greedy descent		
Greedy descent with random walk		
Greedy descent with random restart		