COMS 4701 Artificial Intelligence

Homework 2

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Question 1:

Advantages:

1) local search keep only one current state of memory, it use little memory.
2) It is easy to get an acceptable answer
3) It can continuously modify its solution according to the changing environment as they run.

Disadvantages:

1) It can not guarantee to find the optimal solution
2) It does not have well defined stopping criteria
3) It often has problems with highly constrained problems where feasible areas of the solution space are disconnected.

Question 2:

(a) 6^6

(b) 6*2=12

(c) 6

(d) The successor is only one queen differ from the origin state, so we use mutation to describe it.

Question 3:

(a)

For itemset 1

itemset	Support_count
1	4
2	6
3	2
4	4
5	6

For itemset 2

itemset	Support_count
1,2	4
1,3	1
1,4	3
1,5	4
2,3	1
2,4	3
2,5	5
3,4	2
3,5	2

4,5	4

For itemset 3

itemset	Support_count
1,2,3	1
1,2,4	3
1,2,5	4
1,3,4	1
1,3,5	1
1,4,5	3
2,3,4	1
2,3,5	1
2,4,5	3
3,4,5	2

For itemset 4

itemset	Support_count
1,2,3,4	1
1,2,3,5	1
1,2,4,5	3
1,3,4,5	1
2,3,4,5	1

For itemset 4

itemset	Support_count
1,2,3,4,5	1

So the frequent itemsets are: (1)(2)(4)(5)(1,2)(1,4)(1,5)(2,4)(2,5)(4,5)
(1,2,4)(1,2,5)(1,4,5)(2,4,5)(1,2,4,5)

(b)
1->2(2/3, 1)
1->5(2/3, 1)
2->5(5/6, 5/6)
3->4(1/3, 1)
3->5(1/3, 1)
5->2(5/6, 5/6)

Question 4:

1) 4^{12}
2) A$\neq$ 4,2 $B \neq$3,4 $C \neq 4$ $D \neq 4$ $E \neq$ 2,4 $F \neq$ 3,4 $G \neq$ 2,4 $H \neq$ 2,3 $I \neq$ 2,3,4 $J \neq$ 2,3,4 $K \neq$ 2,3 $L \neq$ 3,4
3) I, J
4) First, we can be sure that I and J must be 1, then G have to be 3, K must be 4, l must be 2, H must be 4, C must be 3, D must be 2, A must be 1, B must be 2, E must be 3, F must be 1.