# Breadth First Search and Beam Search over a Lattice of Hypothesis Classes

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**Algorithm 1** Breadth First Search.

```
Input : A lattice over hypotheses
Input : A Quality criterion
Output : Hypotheses which satisfies the given quality criterion
Initialize a Queue
// Null Set
Answer = φ
// Null Hypothesis
Enqueue(Φ)
while Queue is not empty do
    h = Dequeue()
    // Check whether h statisfies the quality criterion
    if qualifies(h) then
        // Add h to the Answer set; Possible alongwith a score
        Answer = Answer ∪ h
        // Enqueue all the immediate unvisited descendents,
        // Which is essentially the set of immediate refinements
        // or specializations of h
        Enqueue(ρ(h))
        Mark h as visited
    else
        // Assuming Antimonotonic Quality Criteria
        // Option1 : Do nothing
        // Option2 : Mark all the descendants of h as Visited, to speed up
        searching.
    end if
end while
```

**Algorithm 2** Beam Search.

```
1: Input : A lattice over hypotheses
2: Input : A Quality criterion
3: Input : "Utility" function to compute locally best path
4: Output : Hypotheses which satisfies the given quality criterion
5: Answer = φ
6: h = Φ
7: Mark h as visited
8: repeat
9:    if qualifies(h) then
10:      Answer = Answer ∪ h
11:      Mark all the immediate unvisited descendants of h as visited
12:      h = The hypotheses among the immediate unvisited descendants of h
13:      ,which maximizes the given "Utility" Function; NULL if no such node
         exits.
14:   end if
15: until h is not NULL
```