ASSIGNMENT 4

(rtawde@iu.edu)

Q. 3)

Wumpus world is designed using the propositional logic. It builds the knowledge base about the whole grid beforehand and uses this knowledge base to entail statements such as wumpus at location (x,y).

Knowledge base is constructed in the following way:

- For each grid in the world, information is stored for both breeze and stench to identify pits and wumpus respectively alongside the current grid location.
  E.g. At location (2,2) information stored in knowledge base is :
  B22⇔P21|P23|P32|P12 &
  S22⇔W21|W23|W32|W12
- Then assume there is at least one wumpus in the world. Hence, build the information accordingly.

  e.g. W11|W12|W13…….|Wnm where (n is the number of rows and m being no of columns)

- Next there is at most one wumpus. Hence, fill in the knowledge base with the same information.
  For this we assume, that wumpus is in either of the adjacent squares.
  e.g. (-W11|-W21) & (-W21|-W31)……..

All the above knowledge is built dynamically as and when grids are visited.

Once the knowledge base is constructed, agent starts at position (1,1)

This location is safe as there is no pit, stench, wumpus or breeze at this location

So, accordingly put the information In knowledge base

e.g. –P11, -W11, -B11, -S11

Then, take one of the directions and check the safety of the next possible move by entailing possible occurrence of wumpus / pit

If it returns good move then take that move. If it doesn't then backtrack from the current position until there is not move to explore at which point 'Quit'

If move is good move then take that move and repeat the above process until gold is found or Quit.

Q4)

If no gold is present or gold is surrounded by pits then finding gold is unachievable or if there is high chance of pit in gold grid.

Advantages:

- Using knowledge base to entail things works best for finding out truth about grids of wumpus world.
- DPLL works best for satisfiability when entailing.
- Tries its best for finding the gold until surrounded by pits or cornered by pit and wumpus.
- Builds the knowledge base dynamically without requiring the complete knowledge base at hand.
- Program is tested with maximum (20*20) grid and it finds the gold under 40 seconds if present and if achievable.

Drawbacks:

- If the grid size crosses (20x20), time might increase as the program is tested with maximum (20x20) grid .