Map: Let the size of map be mxn

Variables:

Variables Xij to represent the state of each tile on the grid, where i denotes the row number and j denotes the column number. [i in range(m), j in range(n)]

Xij = False: represents a (revealed) tile with a gem.

Xij = True: represents a (revealed) trap.

Xij = k: represents a **beginning tile** with k is the number.of trap within its surroundings

Xij = None: represents an unreavel tile (can be True or False only after being revealed)

Rules and infered subrules:

1. Beginning tile is not appled by the rule of reavel or unreavel.
2. Each unreavel tile can either be a trap or gem.
3. The revealed tiles with traps should not be safe.
4. The revealed tiles with gems are safe.
5. Beginning tiles at corner have k in range(3)
6. Beginning tiles beside boulder but not corner have k in range(5)
7. Beginning tiles not beside any boulder have k in range(8)
8. Each beginning tile with a number represents the number of traps (k) adjacent to it
   1. If number of unrevealed tiles surrounding is equal to k then k unrevealed tiles surrounding are traps (and are revealed).
   2. If k is equal to 0 then all surrounding tiles are not trap (which mean it is revealed as gem if it is an unrevealed tile)
   3. If there are enough k surrounding traps being revealed then all remaining surrounding unrevealed tiles are gems.
   4. If there are not enough k surrounding traps being revealed (n trap tiles, n < k) then the remaining surrounding unreavel tiles can be either traps or gems. And the probability of trap each tile is (k – n) / (number of unrevealed tiles)
9. A unrevealed tiles with 100% be traps or gems must be revealed first

Advanced rules

1. Conflicted probability with no 100% options (after reveal all 100% unrevealed tile) might lead to multiple possible outcomes.
2. An area of x unreavel tiles can be determined to have y (x < y) trapped tiles but no surefire option yet.
3. If an area of x is within surronding tiles of a beginning tile, (k – y) is the number of remain traps.

Advanced rules 2 and 3 examples:

A screenshot of a game

Description automatically generated