The following shows the sample output of a complete run of the program. The **bold blue** text is user input and the other text is the program output.

```
Where is the Atom #1 ? Row: [1-8] Column: [1-8] ? 2 84
Where is the Atom #2 ? Row: [1-8] Column: [1-8] ? 5 34
Where is the Atom #3 ? Row: [1-8] Column: [1-8] ? 7 34
Where is the Atom #4 ? Row: [1-8] Column: [1-8] ? 7
              *TOP*
             3
                4 5
                      6
                         7
    1
                                1
                             @
L
                                   R
 E
             @
 т
    6
                                  Н
                               6
    7
                         @
                                7
                                   Т
             a
    8
          2
               4
                   5
                         7
             3
                      6
                            8
       1
             *BOTTOM*
What is the ray position ? [1=TOP, 2=BOTTOM, 3=LEFT, 4=RIGHT, -1=EXIT] ? 4\downarrow
Where should the ray start ? [1-8] ? 5↓
Staring Position: RIGHT 5
Ray at Row:5,Col:8
Ray at Row:5,Col:7
Ray at Row:5,Col:6
Ray at Row:5,Col:5
Ray at Row:5,Col:4
--> Ray Absorbed
Terminating Position: Not Available
Outcome = Hit
              *TOP*
       1
          2 3 4 5 6
                         7
    1
                                1
                      .
                                2
L
                                3
                                  R
 E
    4
                                  I
 F
    5
                                5
             a
 Т
    6
                                6 н
    7
             a
                         a
                                7
                                   т
    R
                4 5 6 7
       1 2 3
                            8
             *BOTTOM*
What is the ray position ? [1=TOP, 2=BOTTOM, 3=LEFT, 4=RIGHT, -1=EXIT] ? 4\downarrow
Where should the ray start ? [1-8] ? 3↓
Staring Position: RIGHT 3
Ray at Row:3,Col:8
--> Ray Reflected
Ray at Row:3,Col:8
Terminating Position: RIGHT 3
Outcome = Reflection
              *TOP*
         2
             3
               4 5 6
                         7
    1
                                1
    2
                             (a
                                2
L
    3
                                3
                                   R
 Е
    4
                                4
 F
    5
             (a
                                5
                                   G
 т
    6
                                6
                                   н
    7
             @
                          @
                                7
                                   т
```

```
*BOTTOM*
What is the ray position ? [1=TOP, 2=BOTTOM, 3=LEFT, 4=RIGHT, -1=EXIT] ? 3 \rightarrow
Where should the ray start ? [1-8] ? 6↓
Staring Position: LEFT 6
Ray at Row:6,Col:1
Ray at Row: 6, Col: 2
--> Ray Reflected
Ray at Row: 6, Col: 2
Ray at Row: 6, Col:1
Terminating Position: LEFT 6
Outcome = Reflection
              *TOP*
      1 2 3 4 5 6 7 8
                              1
                              3 R
E
                              4 I
            e .
F
   5
                              5 G
Т
   6
                              6 H
            a .
                    . @ .
                              7
                                 Т
   8
      1 2 3 4 5 6 7
            *BOTTOM*
What is the ray position ? [1=TOP, 2=BOTTOM, 3=LEFT, 4=RIGHT, -1=EXIT] ? 1\downarrow
Where should the ray start ? [1-8] ? 44
Staring Position: TOP 4
Ray at Row:1,Col:4
Ray at Row: 2, Col: 4
Ray at Row: 3, Col: 4
Ray at Row: 4, Col: 4
--> Ray Deflected
Ray at Row: 4, Col: 5
Ray at Row: 4, Col: 6
Ray at Row: 4, Col: 7
Ray at Row: 4, Col: 8
Terminating Position: RIGHT 4
Outcome = Detour
             *TOP*
      1 2 3 4 5 6 7 8
   1
                              1
   2
                           @ 2
   3
                    . . . 3 R
L
E
   4
                              4 I
  5
F
      . . @ .
                              5 G
т 6
                  . . . . 6 н
   7
      . . @ .
                  . . @ .
                             7
                                 Т
   8
                              8
      1 2 3 4 5
                     6 7 8
            *BOTTOM*
What is the ray position ? [1=TOP, 2=BOTTOM, 3=LEFT, 4=RIGHT, -1=EXIT] ? 2 \rightarrow
Where should the ray start ? [1-8] ? 4↓
Staring Position: BOTTOM 4
Ray at Row:8,Col:4
--> Ray Deflected
Ray at Row:8,Col:5
Ray at Row:8,Col:6
--> Ray Deflected
Terminating Position: BOTTOM 6
```

```
Outcome = Detour
             *TOP*
      1 2 3 4 5 6 7
                          8
    1
                             1
   2
                           9
                             2
   3
                             3 R
L
E
   4
                              4 I
   5
 F
            a .
                             5 G
 т
  6
                             6 н
   7
                             7
            a .
                  . . @ .
                                Т
   8
                              8 *
        2 3 4 5
                       7
      1
                     6
                          8
            *BOTTOM*
What is the ray position ? [1=TOP, 2=BOTTOM, 3=LEFT, 4=RIGHT, -1=EXIT] ? 4 \rightarrow
Where should the ray start ? [1-8] ? 6↓
Staring Position: RIGHT 6
Ray at Row: 6, Col: 8
--> Ray Deflected
Ray at Row:5,Col:8
Ray at Row: 4, Col: 8
Ray at Row:3,Col:8
--> Ray Absorbed
Terminating Position: Not Available
Outcome = Hit
             *TOP*
      1 2 3 4 5 6 7
                          8
    1
                             1
                             2
L
   3
                             3 R
E
   4
                             4 I
  5
 F
            @ . . . . .
                             5 G
 т
  6
                           . 6 н
   7
      . . @ . . . @ .
                             7 т
   8
                              8 *
      1 2 3 4 5 6 7 8
            *BOTTOM*
What is the ray position ? [1=TOP, 2=BOTTOM, 3=LEFT, 4=RIGHT, -1=EXIT] ? 1 \downarrow 1
Where should the ray start ? [1-8] ? 5↓
Staring Position: TOP 5
Ray at Row:1,Col:5
Ray at Row:2,Col:5
Ray at Row:3,Col:5
Ray at Row:4,Col:5
Ray at Row:5,Col:5
Ray at Row: 6, Col: 5
Ray at Row:7,Col:5
Ray at Row:8,Col:5
Terminating Position: BOTTOM 5
Outcome = Miss
             *TOP*
      1 2 3 4 5 6 7 8
    1
                             1
   2
                           @
                             2
L
   3
                             3 R
E
   4
                             4 I
   5
 F
            a .
                             5 G
 Т
   6
                             6 H
   7
                             7 Т
            @ . . .
                        9
    8
                              8
         2 3 4 5 6 7 8
```

```
*BOTTOM*
What is the ray position ? [1=TOP, 2=BOTTOM, 3=LEFT, 4=RIGHT, -1=EXIT] ? 1\downarrow
Where should the ray start ? [1-8] ? 6↓
Staring Position: TOP 6
Ray at Row:1,Col:6
Ray at Row:2,Col:6
Ray at Row: 3, Col: 6
Ray at Row: 4, Col: 6
Ray at Row:5, Col:6
Ray at Row: 6, Col: 6
--> Ray Deflected
Ray at Row: 6, Col: 5
Ray at Row: 6, Col: 4
--> Ray Reflected
Ray at Row: 6, Col: 4
Ray at Row: 6, Col: 5
Ray at Row: 6, Col: 6
--> Ray Deflected
Ray at Row:5,Col:6
Ray at Row: 4, Col: 6
Ray at Row: 3, Col: 6
Ray at Row:2,Col:6
Ray at Row:1,Col:6
Terminating Position: TOP 6
Outcome = Reflection
              *TOP*
       1 2 3 4 5 6 7 8
                               1
                            @ 2 *
   3 . . .
L
                               3 R
E
  4
                              4 I
 F 5 . . @ . . . . .
                              5 G
т 6
                           . 6 н
   7
      . . @ . . . @ . 7 т
   8
       1 2 3 4 5 6 7 8
             *BOTTOM*
What is the ray position ? [1=TOP, 2=BOTTOM, 3=LEFT, 4=RIGHT, -1=EXIT] ? -1 \downarrow
Bye!
```