*Input:*

  15 12 8 6 p

*Output:*

1    up

2    right

3    up

4    left

5    up

6    wall-square

7    up

8    forbid

9    up

10    up

11    up

12    goal

13    right

14    right

15    goal

16    up

If the input contains “q” following a number n, the program has to print the four Q-values associated with each of the four possible actions in the state that has an index n. Here is an example:

*Input:*

  15 12 8 6 q 11

*Output:*

 up    100.0

right    100.0

down    0.89

left    0.89

**Tie-Breaking**

In some situations, there might be similar q-values for different actions in the final stage when we want to print the final policy. For example:

Input: 15 12 8 6 q 11

Output:

up 100.0

right 100.0

down 0.89

left 0.89

**Additional examples**

Input:10 8 9 6 p

output:

1 right

2 right

3 up

4 up

5 down

6 wall-square

7 right

8 goal

9 forbid

10 goal

11 left

12 down

13 right

14 down

15 down

16 down

input:10 8 9 6 q 2

output:

up    -0.01

right    0.89

down    -0.01

left    -0.1

         input:12 7 5 6 p

         output:

                     1 right

2 right

3 up

4 up

5 forbid

6 wall-square

7 goal

8 up

9 up

10 up

11 up

12 goal

13 up

14 up

15 up

16 up

         input:12 7 5 6 q 3

         output:

up    100.0

right    0.89

down    9.9

left    0.89

Input: 13 11 16 5 p

Output:

1  right

2  up

3  up

4  up

5  wall-square

6  up

7  up

8  up

9  up

10  right

11  goal

12  left

13  goal

14  left

15  down

16  forbid

Input:

13 11 7 15 p

Output:

1 up

2 up

3 right

4 up

5 up

6 up

7 forbid

8 up

9 up

10 right

11 goal

12 left

13 goal

14 left

15 wall-square

16 down