/////Hard Grid World Analysis/////

This is your grid world:

[0,0,0,0,1,0,0,1,0,0,0]

[0,0,0,0,1,0,0,0,0,0,0]

[0,0,1,0,0,0,1,0,0,0,1]

[0,0,0,1,1,0,1,1,0,0,1]

[0,0,1,1,0,0,0,1,0,1,0]

[0,0,0,0,0,0,0,0,0,1,0]

[0,0,0,1,0,0,0,1,0,0,0]

[0,0,0,0,1,0,1,1,1,0,1]

[0,1,0,0,0,0,1,0,0,0,0]

[0,0,1,0,0,0,1,0,0,0,0]

[0,0,1,0,0,0,0,0,0,0,0]

//Value Iteration Analysis//

Passes: 1

Passes: 2

Passes: 3

Passes: 4

Passes: 5

Passes: 6

Passes: 7

Passes: 8

Passes: 9

Passes: 10

Passes: 11

Passes: 12

Passes: 13

Passes: 14

Passes: 15

Passes: 16

Passes: 17

Passes: 18

Passes: 19

Passes: 20

Passes: 21

Passes: 22

Passes: 23

Passes: 24

Passes: 25

Passes: 26

Passes: 27

Passes: 28

Passes: 29

Passes: 30

Passes: 31

Passes: 32

Passes: 33

Passes: 34

Passes: 35

Passes: 36

Passes: 37

Passes: 38

Passes: 39

Passes: 40

Passes: 41

Passes: 42

Passes: 43

Passes: 44

Passes: 45

Passes: 46

Passes: 47

Passes: 48

Passes: 49

Passes: 50

Passes: 51

Passes: 52

Passes: 53

Passes: 54

Passes: 55

Passes: 56

Passes: 57

Passes: 58

Passes: 59

Passes: 60

Passes: 61

Passes: 62

Passes: 63

Passes: 64

Passes: 65

Passes: 66

Passes: 67

Passes: 68

Passes: 69

Passes: 70

Passes: 71

Passes: 72

Passes: 73

Passes: 74

Passes: 75

Passes: 76

Passes: 77

Passes: 78

Passes: 79

Passes: 80

Passes: 81

Passes: 82

Passes: 83

Passes: 84

Passes: 85

Passes: 86

Passes: 87

Passes: 88

Passes: 89

Passes: 90

Passes: 91

Passes: 92

Passes: 93

Passes: 94

Passes: 95

Passes: 96

Passes: 97

Passes: 98

Passes: 99

Passes: 100

Value Iteration,8632,4125,2999,7717,740,703,46,23,21,34,35,35,30,34,34,27,32,45,26,36,29,35,25,29,32,24,29,32,33,25,31,35,26,36,33,36,33,30,26,22,32,22,30,32,27,25,26,31,23,26,26,24,36,29,31,28,27,31,35,24,33,43,23,28,31,39,26,23,26,21,21,22,26,23,25,24,25,24,28,32,25,28,22,42,37,30,24,34,26,28,40,31,27,28,39,49,35,26,32,26

This is your optimal policy:

num of rows in policy is 11

[>,>,>,v,\*,>,v,\*,>,>,<]

[>,>,>,v,\*,>,>,>,>,>,^]

[^,^,\*,>,>,^,\*,>,^,^,\*]

[^,^,<,\*,\*,^,\*,\*,^,^,\*]

[>,v,\*,\*,>,^,v,\*,^,\*,v]

[>,>,>,>,>,>,>,>,^,\*,v]

[>,>,^,\*,>,>,^,\*,^,<,<]

[^,^,^,v,\*,^,\*,\*,\*,^,\*]

[^,\*,>,>,>,^,\*,>,>,^,<]

[^,<,\*,>,>,^,\*,>,^,^,^]

[^,<,\*,>,^,^,>,^,^,^,^]

Num generated: 1332; num unique: 93

//Policy Iteration Analysis//

Total policy iterations: 1

Total policy iterations: 2

Total policy iterations: 3

Total policy iterations: 4

Total policy iterations: 5

Total policy iterations: 6

Total policy iterations: 7

Total policy iterations: 8

Total policy iterations: 9

Total policy iterations: 10

Total policy iterations: 11

Total policy iterations: 12

Total policy iterations: 13

Total policy iterations: 14

Total policy iterations: 15

Total policy iterations: 16

Total policy iterations: 17

Total policy iterations: 18

Total policy iterations: 19

Total policy iterations: 20

Total policy iterations: 21

Total policy iterations: 22

Total policy iterations: 23

Total policy iterations: 24

Total policy iterations: 25

Total policy iterations: 26

Total policy iterations: 27

Total policy iterations: 28

Total policy iterations: 29

Total policy iterations: 30

Total policy iterations: 31

Total policy iterations: 32

Total policy iterations: 33

Total policy iterations: 34

Total policy iterations: 35

Total policy iterations: 36

Total policy iterations: 37

Total policy iterations: 38

Total policy iterations: 39

Total policy iterations: 40

Total policy iterations: 41

Total policy iterations: 42

Total policy iterations: 43

Total policy iterations: 44

Total policy iterations: 45

Total policy iterations: 46

Total policy iterations: 47

Total policy iterations: 48

Total policy iterations: 49

Total policy iterations: 50

Total policy iterations: 51

Total policy iterations: 52

Total policy iterations: 53

Total policy iterations: 54

Total policy iterations: 55

Total policy iterations: 56

Total policy iterations: 57

Total policy iterations: 58

Total policy iterations: 59

Total policy iterations: 60

Total policy iterations: 61

Total policy iterations: 62

Total policy iterations: 63

Total policy iterations: 64

Total policy iterations: 65

Total policy iterations: 66

Total policy iterations: 67

Total policy iterations: 68

Total policy iterations: 69

Total policy iterations: 70

Total policy iterations: 71

Total policy iterations: 72

Total policy iterations: 73

Total policy iterations: 74

Total policy iterations: 75

Total policy iterations: 76

Total policy iterations: 77

Total policy iterations: 78

Total policy iterations: 79

Total policy iterations: 80

Total policy iterations: 81

Total policy iterations: 82

Total policy iterations: 83

Total policy iterations: 84

Total policy iterations: 85

Total policy iterations: 86

Total policy iterations: 87

Total policy iterations: 88

Total policy iterations: 89

Total policy iterations: 90

Total policy iterations: 91

Total policy iterations: 92

Total policy iterations: 93

Total policy iterations: 94

Total policy iterations: 95

Total policy iterations: 96

Total policy iterations: 97

Total policy iterations: 98

Total policy iterations: 99

Total policy iterations: 100

Policy Iteration,4078,2388,5736,19632,12458,3369,8753,4111,143,43,35,27,26,26,28,26,28,26,25,34,27,26,28,26,38,28,29,27,30,25,26,31,35,22,32,30,25,29,27,33,23,29,33,29,31,39,27,33,32,29,34,24,34,25,37,27,26,30,39,22,21,23,29,24,30,21,26,33,30,28,34,36,24,37,23,29,35,45,36,36,23,27,27,22,33,32,27,30,34,31,29,24,29,23,28,29,27,38,22,29

Passes: 21

This is your optimal policy:

num of rows in policy is 11

[>,>,>,v,\*,>,v,\*,>,>,<]

[>,>,>,v,\*,>,>,>,>,>,^]

[^,^,\*,>,>,^,\*,>,^,^,\*]

[^,^,<,\*,\*,^,\*,\*,^,^,\*]

[>,v,\*,\*,>,^,v,\*,^,\*,v]

[>,>,>,>,>,>,>,>,^,\*,v]

[>,>,^,\*,>,>,^,\*,^,<,<]

[^,^,^,v,\*,^,\*,\*,\*,^,\*]

[^,\*,>,>,>,^,\*,>,>,^,<]

[^,<,\*,>,>,^,\*,>,^,^,^]

[^,<,\*,>,^,^,>,^,^,^,^]

//Q Learning Analysis//

Q Learning,801,629,350,139,469,355,167,240,138,44,204,269,209,370,47,247,253,67,91,133,55,287,68,119,40,78,120,187,42,52,84,58,159,43,187,41,73,58,57,98,57,94,72,46,101,60,160,204,74,118,61,36,60,101,79,66,81,30,66,74,62,122,65,43,106,64,153,49,33,88,71,62,125,28,32,29,31,29,99,180,30,45,44,53,58,104,63,45,37,68,42,34,42,58,289,51,70,65,33,31

Passes: 21

This is your optimal policy:

num of rows in policy is 11

[^,<,>,v,\*,v,<,\*,v,>,<]

[<,>,>,v,\*,<,>,v,<,>,^]

[v,v,\*,v,>,^,\*,>,>,^,\*]

[v,<,<,\*,\*,^,\*,\*,>,^,\*]

[v,v,\*,\*,<,>,v,\*,^,\*,v]

[v,v,>,>,>,>,>,>,^,\*,>]

[>,>,^,\*,^,v,^,\*,^,<,>]

[>,>,^,<,\*,^,\*,\*,\*,^,\*]

[^,\*,^,v,>,^,\*,v,v,^,v]

[^,<,\*,<,>,^,\*,^,^,>,<]

[>,^,\*,^,>,v,v,>,^,>,>]

//Aggregate Analysis//

The data below shows the number of steps/actions the agent required to reach

the terminal state given the number of iterations the algorithm was run.

Iterations,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100

Value Iteration,8632,4125,2999,7717,740,703,46,23,21,34,35,35,30,34,34,27,32,45,26,36,29,35,25,29,32,24,29,32,33,25,31,35,26,36,33,36,33,30,26,22,32,22,30,32,27,25,26,31,23,26,26,24,36,29,31,28,27,31,35,24,33,43,23,28,31,39,26,23,26,21,21,22,26,23,25,24,25,24,28,32,25,28,22,42,37,30,24,34,26,28,40,31,27,28,39,49,35,26,32,26

Policy Iteration,4078,2388,5736,19632,12458,3369,8753,4111,143,43,35,27,26,26,28,26,28,26,25,34,27,26,28,26,38,28,29,27,30,25,26,31,35,22,32,30,25,29,27,33,23,29,33,29,31,39,27,33,32,29,34,24,34,25,37,27,26,30,39,22,21,23,29,24,30,21,26,33,30,28,34,36,24,37,23,29,35,45,36,36,23,27,27,22,33,32,27,30,34,31,29,24,29,23,28,29,27,38,22,29

Q Learning,801,629,350,139,469,355,167,240,138,44,204,269,209,370,47,247,253,67,91,133,55,287,68,119,40,78,120,187,42,52,84,58,159,43,187,41,73,58,57,98,57,94,72,46,101,60,160,204,74,118,61,36,60,101,79,66,81,30,66,74,62,122,65,43,106,64,153,49,33,88,71,62,125,28,32,29,31,29,99,180,30,45,44,53,58,104,63,45,37,68,42,34,42,58,289,51,70,65,33,31

The data below shows the number of milliseconds the algorithm required to generate

the optimal policy given the number of iterations the algorithm was run.

Iterations,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100

Value Iteration,95,7,27,19,15,22,18,19,23,26,27,31,32,40,61,78,119,92,75,43,46,47,51,58,60,66,91,67,73,48,40,49,46,92,77,110,102,46,67,109,56,61,93,105,64,91,91,77,67,63,73,165,213,183,119,92,79,70,105,86,92,81,83,78,79,112,90,89,94,94,92,96,98,98,96,136,139,96,104,97,112,105,93,102,147,173,96,111,97,117,114,117,137,196,126,107,112,127,117,115

Policy Iteration,12,10,14,16,21,27,17,23,27,26,26,25,28,29,35,38,39,37,39,44,64,87,67,51,57,58,63,63,65,63,67,70,72,78,82,132,94,79,83,86,90,94,92,92,97,143,166,103,107,104,107,110,128,144,188,127,162,122,125,128,176,168,134,143,140,141,141,236,148,161,161,153,153,228,158,167,168,169,212,230,175,174,211,210,178,179,190,192,229,234,194,185,194,271,209,205,217,236,268,224

Q Learning,15,9,11,20,14,16,11,19,11,14,19,14,18,15,18,21,15,17,15,15,17,16,14,16,19,20,29,31,34,32,36,28,37,29,28,18,20,25,19,20,22,24,27,21,22,23,20,28,24,25,25,20,21,27,25,27,32,27,26,29,24,34,21,27,45,49,52,41,41,35,27,51,26,34,27,28,30,34,26,36,41,36,32,32,44,34,39,31,43,40,40,58,55,61,54,30,32,43,36,32