```
Java version used for this program is 12.0.2
GraphTest.java starts

50.txt
Num Vertices = 6
Num Edges    = 16
Work done    = 22
BFS order = 0 5 1 2 3 4
BFS path  = 0 0 0 0 5 2
0
0->5
0->1
0->2
0->5->3
0->2->4

1.txt
Num Vertices = 5
Num Edges    = 8
Work done    = 13
BFS order = 1 2 3 4 5
BFS path  = 1 1 1 3 3
1
1->2
1->3
1->3->4
1->3->5

2.txt
Num Vertices = 5
Num Edges    = 5
Work done    = 10
BFS order = 1 2 3 4 5
BFS path  = 1 1 1 2 4
1
1->2
1->3
1->2->4
1->2->4->5
```

```
3.txt
Num Vertices = 5
Num Edges    = 6
Work done    = 11
BFS order = 0 1 2 3 4
BFS path  = 0 0 0 1 3
0
0->1
0->2
0->1->3
0->1->3->4

4.txt
Num Vertices = 3
Num Edges    = 3
Work done    = 6
BFS order = A B C
BFS path  = A A A
A
A->B
A->C

5.txt
Num Vertices = 8
Num Edges    = 20
Work done    = 28
BFS order = 0 1 3 2 4 7 5 6
BFS path  = 1 0 0 1 3 3 4 4
0
0->1
0->3
0->1->2
0->3->4
0->3->7
0->3->4->5
0->3->4->6

6.txt
```

```
Num Vertices = 5
Num Edges    = 8
Work done    = 13
BFS order =  1   2   5   9  10
BFS path  =  1   1   1   5   5
1
1->2
1->5
1->5->9
1->5->10

7.txt
Num Vertices = 7
Num Edges    = 12
Work done    = 19
BFS order = 0 2 3 1 5 4 6
BFS path  = 0 0 0 0 2 2 1
0
0->2
0->3
0->1
0->2->5
0->2->4
0->1->6
------------ Board36 --------------------
DIRECTED GRAPH
Num Vertices = 36
Num Edges    = 195
1 Fanouts: 2,16,4,5,6,7
1 FanIns: NONE
2 Fanouts: 16,4,5,6,7,8
2 FanIns: 1,6,7,8,9,10,11
16 Fanouts: 17,18,19,20,32,22
16 FanIns: 1,2,10,11,12,13,14,15
4 Fanouts: 5,6,7,8,9,10
4 FanIns: 1,2,3,24,25,26,27,28,29
5 Fanouts: 6,7,8,9,10,11
5 FanIns: 1,2,3,4
6 Fanouts: 7,8,9,10,11,2
```

```
6 FanIns: 1,2,3,4,5
7 Fanouts: 8,9,10,11,2,13
7 FanIns: 1,2,3,4,5,6
8 Fanouts: 9,10,11,2,13,14
8 FanIns: 2,3,4,5,6,7
3 Fanouts: 4,5,6,7,8,9
3 FanIns: NONE
9 Fanouts: 10,11,2,13,14,25
9 FanIns: 3,4,5,6,7,8
10 Fanouts: 11,2,13,14,25,16
10 FanIns: 4,5,6,7,8,9
11 Fanouts: 2,13,14,25,16,17
11 FanIns: 5,6,7,8,9,10
13 Fanouts: 14,25,16,17,18,19
13 FanIns: 7,8,9,10,11,12
14 Fanouts: 25,16,17,18,19,20
14 FanIns: 8,9,10,11,12,13
25 Fanouts: 26,27,28,29,4,31
25 FanIns: 9,10,11,12,13,14,19,20,21,22,23,24
17 Fanouts: 18,19,20,32,22,23
17 FanIns: 11,12,13,14,15,16
12 Fanouts: 13,14,25,16,17,18
12 FanIns: NONE
18 Fanouts: 19,20,32,22,23,24
18 FanIns: 12,13,14,15,16,17
19 Fanouts: 20,32,22,23,24,25
19 FanIns: 13,14,15,16,17,18
20 Fanouts: 32,22,23,24,25,26
20 FanIns: 14,15,16,17,18,19
15 Fanouts: 16,17,18,19,20,32
15 FanIns: NONE
32 Fanouts: 33,34,22,36
32 FanIns: 15,16,17,18,19,20,26,27,28,29,30,31
22 Fanouts: 23,24,25,26,27,28
22 FanIns: 16,17,18,19,20,21,29,30,31,32,33,34
23 Fanouts: 24,25,26,27,28,29
23 FanIns: 17,18,19,20,21,22
24 Fanouts: 25,26,27,28,29,4
24 FanIns: 18,19,20,21,22,23
```

```
26 Fanouts: 27,28,29,4,31,32
26 FanIns: 20,21,22,23,24,25
21 Fanouts: 22,23,24,25,26,27
21 FanIns: NONE
27 Fanouts: 28,29,4,31,32,33
27 FanIns: 21,22,23,24,25,26
28 Fanouts: 29,4,31,32,33,34
28 FanIns: 22,23,24,25,26,27
29 Fanouts: 4,31,32,33,34,22
29 FanIns: 23,24,25,26,27,28
31 Fanouts: 32,33,34,22,36
31 FanIns: 25,26,27,28,29,30
33 Fanouts: 34,22,36
33 FanIns: 27,28,29,30,31,32
34 Fanouts: 22,36
34 FanIns: 28,29,30,31,32,33
30 Fanouts: 31,32,33,34,22,36
30 FanIns: NONE
36 Fanouts: NONE
36 FanIns: 30,31,32,33,34,35
35 Fanouts: 36
35 FanIns: NONE

Board36.txt
Num Vertices = 36
Num Edges    = 195
Work done    = 194
BFS order =  1  2 16  4  5  6  7  8 17 18 19 20 32 22  9 10 11 13 14 23 24 25 26 33 34 36 27 28 29 31
BFS path  =  1  1  1  1  1  1  1  2 16 16 16 16 16 16  4  4  5  7  8 17 18 19 20 32 32 32 22 22 23 25
1
1->2
1->16
1->4
1->5
1->6
1->7
1->2->8
1->16->17
1->16->18
```

```
26 Fanouts: 27,28,29,4,31,32
26 FanIns: 20,21,22,23,24,25
21 Fanouts: 22,23,24,25,26,27
21 FanIns: NONE
27 Fanouts: 28,29,4,31,32,33
27 FanIns: 21,22,23,24,25,26
28 Fanouts: 29,4,31,32,33,34
28 FanIns: 22,23,24,25,26,27
29 Fanouts: 4,31,32,33,34,22
29 FanIns: 23,24,25,26,27,28
31 Fanouts: 32,33,34,22,36
31 FanIns: 25,26,27,28,29,30
33 Fanouts: 34,22,36
33 FanIns: 27,28,29,30,31,32
34 Fanouts: 22,36
34 FanIns: 28,29,30,31,32,33
30 Fanouts: 31,32,33,34,22,36
30 FanIns: NONE
36 Fanouts: NONE
36 FanIns: 30,31,32,33,34,35
35 Fanouts: 36
35 FanIns: NONE

Board36.txt
Num Vertices = 36
Num Edges    = 195
Work done    = 194
BFS order =  1  2 16  4  5  6  7  8 17 18 19 20 32 22  9 10 11 13 14 23 24 25 26 33 34 36 27 28 29 31
BFS path  =  1  1  1  1  1  1  1  2 16 16 16 16 16 16  4  4  5  7  8 17 18 19 20 32 32 32 22 22 23 25
1
1->2
1->16
1->4
1->5
1->6
1->7
1->2->8
1->16->17
1->16->18
```

```
1->16->19
1->16->20
1->16->32
1->16->22
1->4->9
1->4->10
1->5->11
1->7->13
1->2->8->14
1->16->17->23
1->16->18->24
1->16->19->25
1->16->20->26
1->16->32->33
1->16->32->34
1->16->32->36
1->16->22->27
1->16->22->28
1->16->17->23->29
1->16->19->25->31
------------ Board100case1 --------------------
DIRECTED GRAPH
Num Vertices = 100
Num Edges    = 579
1 Fanouts: 2,3,4,5,6,7
1 FanIns: NONE
2 Fanouts: 3,4,5,6,7,8
2 FanIns: 1
3 Fanouts: 4,5,6,7,8,9
3 FanIns: 1,2
4 Fanouts: 5,6,7,8,9,10
4 FanIns: 1,2,3
5 Fanouts: 6,7,8,9,10,11
5 FanIns: 1,2,3,4
6 Fanouts: 7,8,9,10,11,98
6 FanIns: 1,2,3,4,5
7 Fanouts: 8,9,10,11,98,13
7 FanIns: 1,2,3,4,5,6
8 Fanouts: 9,10,11,98,13,14
```

```
8 FanIns: 2,3,4,5,6,7
9 Fanouts: 10,11,98,13,14,15
9 FanIns: 3,4,5,6,7,8
10 Fanouts: 11,98,13,14,15,16
10 FanIns: 4,5,6,7,8,9
11 Fanouts: 98,13,14,15,16,17
11 FanIns: 5,6,7,8,9,10
98 Fanouts: 99,100
98 FanIns: 6,7,8,9,10,11,92,93,94,95,96,97
13 Fanouts: 14,15,16,17,18,19
13 FanIns: 7,8,9,10,11,12,89,90,91,92,93,94
14 Fanouts: 15,16,17,18,19,20
14 FanIns: 8,9,10,11,12,13
15 Fanouts: 16,17,18,19,20,21
15 FanIns: 9,10,11,12,13,14
16 Fanouts: 17,18,19,20,21,22
16 FanIns: 10,11,12,13,14,15
17 Fanouts: 18,19,20,21,22,23
17 FanIns: 11,12,13,14,15,16,61,62,63,64,65,66
12 Fanouts: 13,14,15,16,17,18
12 FanIns: NONE
18 Fanouts: 19,20,21,22,23,24
18 FanIns: 12,13,14,15,16,17
19 Fanouts: 20,21,22,23,24,25
19 FanIns: 13,14,15,16,17,18,69,70,71,72,73,74
20 Fanouts: 21,22,23,24,25,26
20 FanIns: 14,15,16,17,18,19
21 Fanouts: 22,23,24,25,26,27
21 FanIns: 15,16,17,18,19,20
22 Fanouts: 23,24,25,26,27,28
22 FanIns: 16,17,18,19,20,21
23 Fanouts: 24,25,26,27,28,29
23 FanIns: 17,18,19,20,21,22
24 Fanouts: 25,26,27,28,29,30
24 FanIns: 18,19,20,21,22,23
25 Fanouts: 26,27,28,29,30,31
25 FanIns: 19,20,21,22,23,24,91,92,93,94,95,96
26 Fanouts: 27,28,29,30,31,62
26 FanIns: 20,21,22,23,24,25
```

```
27 Fanouts: 28,29,30,31,62,33
27 FanIns: 21,22,23,24,25,26,73,74,75,76,77,78
28 Fanouts: 29,30,31,62,33,34
28 FanIns: 22,23,24,25,26,27
29 Fanouts: 30,31,62,33,34,35
29 FanIns: 23,24,25,26,27,28
30 Fanouts: 31,62,33,34,35,36
30 FanIns: 24,25,26,27,28,29
31 Fanouts: 62,33,34,35,36,37
31 FanIns: 25,26,27,28,29,30
62 Fanouts: 63,64,65,66,17,68
62 FanIns: 26,27,28,29,30,31,56,57,58,59,60,61
33 Fanouts: 34,35,36,37,38,39
33 FanIns: 27,28,29,30,31,32
34 Fanouts: 35,36,37,38,39,40
34 FanIns: 28,29,30,31,32,33
35 Fanouts: 36,37,38,39,40,41
35 FanIns: 29,30,31,32,33,34
36 Fanouts: 37,38,39,40,41,68
36 FanIns: 30,31,32,33,34,35
37 Fanouts: 38,39,40,41,68,43
37 FanIns: 31,32,33,34,35,36,87,88,89,90,91,92
32 Fanouts: 33,34,35,36,37,38
32 FanIns: NONE
38 Fanouts: 39,40,41,68,43,44
38 FanIns: 32,33,34,35,36,37
39 Fanouts: 40,41,68,43,44,45
39 FanIns: 33,34,35,36,37,38
40 Fanouts: 41,68,43,44,45,46
40 FanIns: 34,35,36,37,38,39
41 Fanouts: 68,43,44,45,46,47
41 FanIns: 35,36,37,38,39,40
68 Fanouts: 69,70,71,72,73,74
68 FanIns: 36,37,38,39,40,41,62,63,64,65,66,67
43 Fanouts: 44,45,46,47,48,47
43 FanIns: 37,38,39,40,41,42
44 Fanouts: 45,46,47,48,47,50
44 FanIns: 38,39,40,41,42,43
45 Fanouts: 46,47,48,47,50,51
```

```
45 FanIns: 39,40,41,42,43,44
46 Fanouts: 47,48,47,50,51,52
46 FanIns: 40,41,42,43,44,45
47 Fanouts: 48,47,50,51,52,53
47 FanIns: 41,42,43,43,44,44,45,45,46,46,47,48
42 Fanouts: 43,44,45,46,47,48
42 FanIns: NONE
48 Fanouts: 47,50,51,52,53,54
48 FanIns: 42,43,44,45,46,47
50 Fanouts: 51,52,53,54,55,56
50 FanIns: 44,45,46,47,48,49
51 Fanouts: 52,53,54,55,56,57
51 FanIns: 45,46,47,48,49,50
52 Fanouts: 53,54,55,56,57,58
52 FanIns: 46,47,48,49,50,51
53 Fanouts: 54,55,56,57,58,59
53 FanIns: 47,48,49,50,51,52
54 Fanouts: 55,56,57,58,59,60
54 FanIns: 48,49,50,51,52,53
49 Fanouts: 50,51,52,53,54,55
49 FanIns: NONE
55 Fanouts: 56,57,58,59,60,61
55 FanIns: 49,50,51,52,53,54
56 Fanouts: 57,58,59,60,61,62
56 FanIns: 50,51,52,53,54,55
57 Fanouts: 58,59,60,61,62,63
57 FanIns: 51,52,53,54,55,56
58 Fanouts: 59,60,61,62,63,64
58 FanIns: 52,53,54,55,56,57
59 Fanouts: 60,61,62,63,64,65
59 FanIns: 53,54,55,56,57,58
60 Fanouts: 61,62,63,64,65,66
60 FanIns: 54,55,56,57,58,59
61 Fanouts: 62,63,64,65,66,17
61 FanIns: 55,56,57,58,59,60
63 Fanouts: 64,65,66,17,68,69
63 FanIns: 57,58,59,60,61,62
64 Fanouts: 65,66,17,68,69,70
64 FanIns: 58,59,60,61,62,63
```

```
65 Fanouts: 66,17,68,69,70,71
65 FanIns: 59,60,61,62,63,64
66 Fanouts: 17,68,69,70,71,72
66 FanIns: 60,61,62,63,64,65
69 Fanouts: 70,71,72,73,74,19
69 FanIns: 63,64,65,66,67,68
70 Fanouts: 71,72,73,74,19,76
70 FanIns: 64,65,66,67,68,69
71 Fanouts: 72,73,74,19,76,77
71 FanIns: 65,66,67,68,69,70
72 Fanouts: 73,74,19,76,77,78
72 FanIns: 66,67,68,69,70,71
67 Fanouts: 68,69,70,71,72,73
67 FanIns: NONE
73 Fanouts: 74,19,76,77,78,27
73 FanIns: 67,68,69,70,71,72
74 Fanouts: 19,76,77,78,27,80
74 FanIns: 68,69,70,71,72,73
76 Fanouts: 77,78,27,80,81,82
76 FanIns: 70,71,72,73,74,75
77 Fanouts: 78,27,80,81,82,83
77 FanIns: 71,72,73,74,75,76
78 Fanouts: 27,80,81,82,83,84
78 FanIns: 72,73,74,75,76,77
80 Fanouts: 81,82,83,84,85,86
80 FanIns: 74,75,76,77,78,79
75 Fanouts: 76,77,78,27,80,81
75 FanIns: NONE
81 Fanouts: 82,83,84,85,86,87
81 FanIns: 75,76,77,78,79,80
82 Fanouts: 83,84,85,86,87,88
82 FanIns: 76,77,78,79,80,81
83 Fanouts: 84,85,86,87,88,89
83 FanIns: 77,78,79,80,81,82
84 Fanouts: 85,86,87,88,89,90
84 FanIns: 78,79,80,81,82,83
79 Fanouts: 80,81,82,83,84,85
79 FanIns: NONE
85 Fanouts: 86,87,88,89,90,91
```

```
85 FanIns: 79,80,81,82,83,84
86 Fanouts: 87,88,89,90,91,92
86 FanIns: 80,81,82,83,84,85
87 Fanouts: 88,89,90,91,92,37
87 FanIns: 81,82,83,84,85,86
88 Fanouts: 89,90,91,92,37,94
88 FanIns: 82,83,84,85,86,87
89 Fanouts: 90,91,92,37,94,13
89 FanIns: 83,84,85,86,87,88
90 Fanouts: 91,92,37,94,13,96
90 FanIns: 84,85,86,87,88,89
91 Fanouts: 92,37,94,13,96,25
91 FanIns: 85,86,87,88,89,90
92 Fanouts: 37,94,13,96,25,98
92 FanIns: 86,87,88,89,90,91
94 Fanouts: 13,96,25,98,99,100
94 FanIns: 88,89,90,91,92,93
96 Fanouts: 25,98,99,100
96 FanIns: 90,91,92,93,94,95
93 Fanouts: 94,13,96,25,98,99
93 FanIns: NONE
99 Fanouts: 100
99 FanIns: 93,94,95,96,97,98
100 Fanouts: NONE
100 FanIns: 94,95,96,97,98,99
95 Fanouts: 96,25,98,99,100
95 FanIns: NONE
97 Fanouts: 98,99,100
97 FanIns: NONE

Board100case1.txt
Num Vertices = 100
Num Edges    = 579
Work done    = 613
BFS order =   1   2   3   4   5   6   7   8   9  10  11  98  13  14  15  16  17  99 100  18  19  20  21  22
23  24  25  26  27  28  29  30  31  62  33  34  35  36  37  63  64  65  66  68  38  39  40  41  43  69  70
71  72  73  74  44  45  46  47  48  76  77  78  80  50  51  52  53  54  81  82  83  84  85  86  55  56  57
58  59  60  87  88  89  90  91  92  61  94  96
```

```
BFS path  =   1   1   1   1   1   1   1   2   3   4   5   6   7   8   9  10  11  98  98  13  13  14  15  16
17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  62  62  62  62  62  33  33  34  35  37  63  64
65  66  68  68  38  39  40  41  43  70  71  72  74  44  45  46  47  48  76  76  77  78  80  80  50  50  51
52  53  54  81  82  83  84  85  86  55  88  90
1
1->2
1->3
1->4
1->5
1->6
1->7
1->2->8
1->3->9
1->4->10
1->5->11
1->6->98
1->7->13
1->2->8->14
1->3->9->15
1->4->10->16
1->5->11->17
1->6->98->99
1->6->98->100
1->7->13->18
1->7->13->19
1->2->8->14->20
1->3->9->15->21
1->4->10->16->22
1->5->11->17->23
1->7->13->18->24
1->7->13->19->25
1->2->8->14->20->26
1->3->9->15->21->27
1->4->10->16->22->28
1->5->11->17->23->29
1->7->13->18->24->30
1->7->13->19->25->31
1->2->8->14->20->26->62
1->3->9->15->21->27->33
```

```
1->4->10->16->22->28->34
1->5->11->17->23->29->35
1->7->13->18->24->30->36
1->7->13->19->25->31->37
1->2->8->14->20->26->62->63
1->2->8->14->20->26->62->64
1->2->8->14->20->26->62->65
1->2->8->14->20->26->62->66
1->2->8->14->20->26->62->68
1->3->9->15->21->27->33->38
1->3->9->15->21->27->33->39
1->4->10->16->22->28->34->40
1->5->11->17->23->29->35->41
1->7->13->19->25->31->37->43
1->2->8->14->20->26->62->63->69
1->2->8->14->20->26->62->64->70
1->2->8->14->20->26->62->65->71
1->2->8->14->20->26->62->66->72
1->2->8->14->20->26->62->68->73
1->2->8->14->20->26->62->68->74
1->3->9->15->21->27->33->38->44
1->3->9->15->21->27->33->39->45
1->4->10->16->22->28->34->40->46
1->5->11->17->23->29->35->41->47
1->7->13->19->25->31->37->43->48
1->2->8->14->20->26->62->64->70->76
1->2->8->14->20->26->62->65->71->77
1->2->8->14->20->26->62->66->72->78
1->2->8->14->20->26->62->68->74->80
1->3->9->15->21->27->33->38->44->50
1->3->9->15->21->27->33->39->45->51
1->4->10->16->22->28->34->40->46->52
1->5->11->17->23->29->35->41->47->53
1->7->13->19->25->31->37->43->48->54
1->2->8->14->20->26->62->64->70->76->81
1->2->8->14->20->26->62->64->70->76->82
1->2->8->14->20->26->62->65->71->77->83
1->2->8->14->20->26->62->66->72->78->84
1->2->8->14->20->26->62->68->74->80->85
```

```
1->2->8->14->20->26->62->68->74->80->86
1->3->9->15->21->27->33->38->44->50->55
1->3->9->15->21->27->33->38->44->50->56
1->3->9->15->21->27->33->39->45->51->57
1->4->10->16->22->28->34->40->46->52->58
1->5->11->17->23->29->35->41->47->53->59
1->7->13->19->25->31->37->43->48->54->60
1->2->8->14->20->26->62->64->70->76->81->87
1->2->8->14->20->26->62->64->70->76->82->88
1->2->8->14->20->26->62->65->71->77->83->89
1->2->8->14->20->26->62->66->72->78->84->90
1->2->8->14->20->26->62->68->74->80->85->91
1->2->8->14->20->26->62->68->74->80->86->92
1->3->9->15->21->27->33->38->44->50->55->61
1->2->8->14->20->26->62->64->70->76->82->88->94
1->2->8->14->20->26->62->66->72->78->84->90->96
------------ Board100case2 -------------------
DIRECTED GRAPH
Num Vertices = 100
Num Edges    = 579
1 Fanouts: 72,3,4,5,80,7
1 FanIns: NONE
72 Fanouts: 73,74,75,76,21,78
72 FanIns: 1,66,67,68,69,70,71
3 Fanouts: 4,5,80,7,52,9
3 FanIns: 1,2,75,76,77,78,79,80
4 Fanouts: 5,80,7,52,9,10
4 FanIns: 1,2,3
5 Fanouts: 80,7,52,9,10,11
5 FanIns: 1,2,3,4,53,54,55,56,57,58
80 Fanouts: 3,82,83,84,85,86
80 FanIns: 1,2,3,4,5,74,75,76,77,78,79
7 Fanouts: 52,9,10,11,12,13
7 FanIns: 1,2,3,4,5,6,47,48,49,50,51,52
2 Fanouts: 3,4,5,80,7,52
2 FanIns: NONE
52 Fanouts: 7,54,55,56,57,58
52 FanIns: 2,3,4,5,6,7,46,47,48,49,50,51
9 Fanouts: 10,11,12,13,14,15
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9 FanIns: 3,4,5,6,7,8
10 Fanouts: 11,12,13,14,15,16
10 FanIns: 4,5,6,7,8,9
11 Fanouts: 12,13,14,15,16,17
11 FanIns: 5,6,7,8,9,10,33,34,35,36,37,38
6 Fanouts: 7,52,9,10,11,12
6 FanIns: NONE
12 Fanouts: 13,14,15,16,17,18
12 FanIns: 6,7,8,9,10,11
13 Fanouts: 14,15,16,17,18,19
13 FanIns: 7,8,9,10,11,12
8 Fanouts: 9,10,11,12,13,14
8 FanIns: NONE
14 Fanouts: 15,16,17,18,19,20
14 FanIns: 8,9,10,11,12,13
15 Fanouts: 16,17,18,19,20,21
15 FanIns: 9,10,11,12,13,14
16 Fanouts: 17,18,19,20,21,22
16 FanIns: 10,11,12,13,14,15
17 Fanouts: 18,19,20,21,22,23
17 FanIns: 11,12,13,14,15,16
18 Fanouts: 19,20,21,22,23,24
18 FanIns: 12,13,14,15,16,17
19 Fanouts: 20,21,22,23,24,25
19 FanIns: 13,14,15,16,17,18,45,46,47,48,49,50
20 Fanouts: 21,22,23,24,25,42
20 FanIns: 14,15,16,17,18,19
21 Fanouts: 22,23,24,25,42,27
21 FanIns: 15,16,17,18,19,20,71,72,73,74,75,76
22 Fanouts: 23,24,25,42,27,28
22 FanIns: 16,17,18,19,20,21
23 Fanouts: 24,25,42,27,28,29
23 FanIns: 17,18,19,20,21,22,73,74,75,76,77,78
24 Fanouts: 25,42,27,28,29,30
24 FanIns: 18,19,20,21,22,23
25 Fanouts: 42,27,28,29,30,31
25 FanIns: 19,20,21,22,23,24
42 Fanouts: 33,44,45,46,47,48
42 FanIns: 20,21,22,23,24,25,36,37,38,39,40,41
```

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27 Fanouts: 28,29,30,31,32,33
27 FanIns: 21,22,23,24,25,26
28 Fanouts: 29,30,31,32,33,34
28 FanIns: 22,23,24,25,26,27
29 Fanouts: 30,31,32,33,34,35
29 FanIns: 23,24,25,26,27,28,31,32,33,34,35,36
30 Fanouts: 31,32,33,34,35,36
30 FanIns: 24,25,26,27,28,29
31 Fanouts: 32,33,34,35,36,29
31 FanIns: 25,26,27,28,29,30
26 Fanouts: 27,28,29,30,31,32
26 FanIns: NONE
32 Fanouts: 33,34,35,36,29,38
32 FanIns: 26,27,28,29,30,31
33 Fanouts: 34,35,36,29,38,11
33 FanIns: 27,28,29,30,31,32,37,38,39,40,41,42
34 Fanouts: 35,36,29,38,11,40
34 FanIns: 28,29,30,31,32,33
35 Fanouts: 36,29,38,11,40,41
35 FanIns: 29,30,31,32,33,34
36 Fanouts: 29,38,11,40,41,42
36 FanIns: 30,31,32,33,34,35
38 Fanouts: 11,40,41,42,33,44
38 FanIns: 32,33,34,35,36,37
40 Fanouts: 41,42,33,44,45,46
40 FanIns: 34,35,36,37,38,39
41 Fanouts: 42,33,44,45,46,47
41 FanIns: 35,36,37,38,39,40
37 Fanouts: 38,11,40,41,42,33
37 FanIns: NONE
44 Fanouts: 45,46,47,48,49,50
44 FanIns: 38,39,40,41,42,43
39 Fanouts: 40,41,42,33,44,45
39 FanIns: NONE
45 Fanouts: 46,47,48,49,50,19
45 FanIns: 39,40,41,42,43,44
46 Fanouts: 47,48,49,50,19,52
46 FanIns: 40,41,42,43,44,45
47 Fanouts: 48,49,50,19,52,7
```

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47 FanIns: 41,42,43,44,45,46
48 Fanouts: 49,50,19,52,7,54
48 FanIns: 42,43,44,45,46,47
43 Fanouts: 44,45,46,47,48,49
43 FanIns: NONE
49 Fanouts: 50,19,52,7,54,55
49 FanIns: 43,44,45,46,47,48
50 Fanouts: 19,52,7,54,55,56
50 FanIns: 44,45,46,47,48,49
54 Fanouts: 55,56,57,58,5,60
54 FanIns: 48,49,50,51,52,53
55 Fanouts: 56,57,58,5,60,61
55 FanIns: 49,50,51,52,53,54
56 Fanouts: 57,58,5,60,61,62
56 FanIns: 50,51,52,53,54,55
51 Fanouts: 52,7,54,55,56,57
51 FanIns: NONE
57 Fanouts: 58,5,60,61,62,63
57 FanIns: 51,52,53,54,55,56
58 Fanouts: 5,60,61,62,63,64
58 FanIns: 52,53,54,55,56,57
53 Fanouts: 54,55,56,57,58,5
53 FanIns: NONE
60 Fanouts: 61,62,63,64,65,66
60 FanIns: 54,55,56,57,58,59
61 Fanouts: 62,63,64,65,66,67
61 FanIns: 55,56,57,58,59,60
62 Fanouts: 63,64,65,66,67,68
62 FanIns: 56,57,58,59,60,61
63 Fanouts: 64,65,66,67,68,69
63 FanIns: 57,58,59,60,61,62
64 Fanouts: 65,66,67,68,69,70
64 FanIns: 58,59,60,61,62,63
59 Fanouts: 60,61,62,63,64,65
59 FanIns: NONE
65 Fanouts: 66,67,68,69,70,71
65 FanIns: 59,60,61,62,63,64
66 Fanouts: 67,68,69,70,71,72
66 FanIns: 60,61,62,63,64,65
```

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67 Fanouts: 68,69,70,71,72,73
67 FanIns: 61,62,63,64,65,66
68 Fanouts: 69,70,71,72,73,74
68 FanIns: 62,63,64,65,66,67
69 Fanouts: 70,71,72,73,74,75
69 FanIns: 63,64,65,66,67,68
70 Fanouts: 71,72,73,74,75,76
70 FanIns: 64,65,66,67,68,69
71 Fanouts: 72,73,74,75,76,21
71 FanIns: 65,66,67,68,69,70
73 Fanouts: 74,75,76,21,78,23
73 FanIns: 67,68,69,70,71,72
74 Fanouts: 75,76,21,78,23,80
74 FanIns: 68,69,70,71,72,73
75 Fanouts: 76,21,78,23,80,3
75 FanIns: 69,70,71,72,73,74
76 Fanouts: 21,78,23,80,3,82
76 FanIns: 70,71,72,73,74,75
78 Fanouts: 23,80,3,82,83,84
78 FanIns: 72,73,74,75,76,77
82 Fanouts: 83,84,85,86,87,88
82 FanIns: 76,77,78,79,80,81
77 Fanouts: 78,23,80,3,82,83
77 FanIns: NONE
83 Fanouts: 84,85,86,87,88,89
83 FanIns: 77,78,79,80,81,82
84 Fanouts: 85,86,87,88,89,90
84 FanIns: 78,79,80,81,82,83
79 Fanouts: 80,3,82,83,84,85
79 FanIns: NONE
85 Fanouts: 86,87,88,89,90,91
85 FanIns: 79,80,81,82,83,84
86 Fanouts: 87,88,89,90,91,92
86 FanIns: 80,81,82,83,84,85
81 Fanouts: 82,83,84,85,86,87
81 FanIns: NONE
87 Fanouts: 88,89,90,91,92,93
87 FanIns: 81,82,83,84,85,86
88 Fanouts: 89,90,91,92,93,94
```

```
88 FanIns: 82,83,84,85,86,87
89 Fanouts: 90,91,92,93,94,95
89 FanIns: 83,84,85,86,87,88
90 Fanouts: 91,92,93,94,95,96
90 FanIns: 84,85,86,87,88,89
91 Fanouts: 92,93,94,95,96,97
91 FanIns: 85,86,87,88,89,90
92 Fanouts: 93,94,95,96,97,98
92 FanIns: 86,87,88,89,90,91
93 Fanouts: 94,95,96,97,98,99
93 FanIns: 87,88,89,90,91,92
94 Fanouts: 95,96,97,98,99,100
94 FanIns: 88,89,90,91,92,93
95 Fanouts: 96,97,98,99,100
95 FanIns: 89,90,91,92,93,94
96 Fanouts: 97,98,99,100
96 FanIns: 90,91,92,93,94,95
97 Fanouts: 98,99,100
97 FanIns: 91,92,93,94,95,96
98 Fanouts: 99,100
98 FanIns: 92,93,94,95,96,97
99 Fanouts: 100
99 FanIns: 93,94,95,96,97,98
100 Fanouts: NONE
100 FanIns: 94,95,96,97,98,99

Board100case2.txt
Num Vertices = 100
Num Edges    = 579
Work done    = 588
BFS order =    1   72    3    4    5   80    7   73   74   75   76   21   78   52    9   10   11   82   83   84   85   86   12   13
23   22   24   25   42   27   54   55   56   57   58   14   15   16   17   87   88   89   90   91   92   18   19   28   29   30   31
33   44   45   46   47   48   32   60   61   62   63   64   20   93   94   95   96   97   98   34   35   36   38   49   50   65   66
67   68   69   70   99  100   40   41   71
BFS path  =    1    1    1    1    1    1    1   72   72   72   72   72   72    3    3    4    5   80   80   80   80   80    7    7
73   21   21   21   21   21   52   52   52   52   52    9    9   10   11   82   82   83   84   85   86   12   13   23   23   24   25
42   42   42   42   42   42   27   54   55   56   57   58   14   87   88   89   90   91   92   28   29   30   33   44   44   60   60
61   62   63   64   93   94   34   35   65
1
```

```
1->72
1->3
1->4
1->5
1->80
1->7
1->72->73
1->72->74
1->72->75
1->72->76
1->72->21
1->72->78
1->3->52
1->3->9
1->4->10
1->5->11
1->80->82
1->80->83
1->80->84
1->80->85
1->80->86
1->7->12
1->7->13
1->72->73->23
1->72->21->22
1->72->21->24
1->72->21->25
1->72->21->42
1->72->21->27
1->3->52->54
1->3->52->55
1->3->52->56
1->3->52->57
1->3->52->58
1->3->9->14
1->3->9->15
1->4->10->16
1->5->11->17
1->80->82->87
```

```
1->80->82->88
1->80->83->89
1->80->84->90
1->80->85->91
1->80->86->92
1->7->12->18
1->7->13->19
1->72->73->23->28
1->72->73->23->29
1->72->21->24->30
1->72->21->25->31
1->72->21->42->33
1->72->21->42->44
1->72->21->42->45
1->72->21->42->46
1->72->21->42->47
1->72->21->42->48
1->72->21->27->32
1->3->52->54->60
1->3->52->55->61
1->3->52->56->62
1->3->52->57->63
1->3->52->58->64
1->3->9->14->20
1->80->82->87->93
1->80->82->88->94
1->80->83->89->95
1->80->84->90->96
1->80->85->91->97
1->80->86->92->98
1->72->73->23->28->34
1->72->73->23->29->35
1->72->21->24->30->36
1->72->21->42->33->38
1->72->21->42->44->49
1->72->21->42->44->50
1->3->52->54->60->65
1->3->52->54->60->66
1->3->52->55->61->67
```

```
1->3->52->56->62->68
1->3->52->57->63->69
1->3->52->58->64->70
1->80->82->87->93->99
1->80->82->88->94->100
1->72->73->23->28->34->40
1->72->73->23->29->35->41
1->3->52->54->60->65->71
----------- SnakeisNotBad --------------------
DIRECTED GRAPH
Num Vertices = 99
Num Edges     = 573
1 Fanouts: 82,3,4,5,6,7
1 FanIns: NONE
82 Fanouts: 83,63,85,86,87,88
82 FanIns: 1,76,77,78,79,80,81
3 Fanouts: 4,5,6,7,8,9
3 FanIns: 1,2
4 Fanouts: 5,6,7,8,9,10
4 FanIns: 1,2,3
5 Fanouts: 6,7,8,9,10,11
5 FanIns: 1,2,3,4
6 Fanouts: 7,8,9,10,11,12
6 FanIns: 1,2,3,4,5
7 Fanouts: 8,9,10,11,12,13
7 FanIns: 1,2,3,4,5,6
2 Fanouts: 3,4,5,6,7,8
2 FanIns: NONE
8 Fanouts: 9,10,11,12,13,14
8 FanIns: 2,3,4,5,6,7
9 Fanouts: 10,11,12,13,14,15
9 FanIns: 3,4,5,6,7,8
10 Fanouts: 11,12,13,14,15,16
10 FanIns: 4,5,6,7,8,9
11 Fanouts: 12,13,14,15,16,17
11 FanIns: 5,6,7,8,9,10
12 Fanouts: 13,14,15,16,17,18
12 FanIns: 6,7,8,9,10,11
13 Fanouts: 14,15,16,17,18,19
```

```
13 FanIns: 7,8,9,10,11,12
14 Fanouts: 15,16,17,18,19,20
14 FanIns: 8,9,10,11,12,13
15 Fanouts: 16,17,18,19,20,21
15 FanIns: 9,10,11,12,13,14
16 Fanouts: 17,18,19,20,21,22
16 FanIns: 10,11,12,13,14,15
17 Fanouts: 18,19,20,21,22,23
17 FanIns: 11,12,13,14,15,16
18 Fanouts: 19,20,21,22,23,24
18 FanIns: 12,13,14,15,16,17
19 Fanouts: 20,21,22,23,24,25
19 FanIns: 13,14,15,16,17,18
20 Fanouts: 21,22,23,24,25,26
20 FanIns: 14,15,16,17,18,19
21 Fanouts: 22,23,24,25,26,27
21 FanIns: 15,16,17,18,19,20
22 Fanouts: 23,24,25,26,27,28
22 FanIns: 16,17,18,19,20,21
23 Fanouts: 24,25,26,27,28,29
23 FanIns: 17,18,19,20,21,22
24 Fanouts: 25,26,27,28,29,30
24 FanIns: 18,19,20,21,22,23
25 Fanouts: 26,27,28,29,30,31
25 FanIns: 19,20,21,22,23,24
26 Fanouts: 27,28,29,30,31,32
26 FanIns: 20,21,22,23,24,25
27 Fanouts: 28,29,30,31,32,33
27 FanIns: 21,22,23,24,25,26
28 Fanouts: 29,30,31,32,33,34
28 FanIns: 22,23,24,25,26,27
29 Fanouts: 30,31,32,33,34,35
29 FanIns: 23,24,25,26,27,28
30 Fanouts: 31,32,33,34,35,36
30 FanIns: 24,25,26,27,28,29
31 Fanouts: 32,33,34,35,36,37
31 FanIns: 25,26,27,28,29,30
32 Fanouts: 33,34,35,36,37,38
32 FanIns: 26,27,28,29,30,31
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33 Fanouts: 34,35,36,37,38,39
33 FanIns: 27,28,29,30,31,32
34 Fanouts: 35,36,37,38,39,40
34 FanIns: 28,29,30,31,32,33
35 Fanouts: 36,37,38,39,40,41
35 FanIns: 29,30,31,32,33,34
36 Fanouts: 37,38,39,40,41,42
36 FanIns: 30,31,32,33,34,35
37 Fanouts: 38,39,40,41,42,43
37 FanIns: 31,32,33,34,35,36
38 Fanouts: 39,40,41,42,43,44
38 FanIns: 32,33,34,35,36,37
39 Fanouts: 40,41,42,43,44,45
39 FanIns: 33,34,35,36,37,38
40 Fanouts: 41,42,43,44,45,46
40 FanIns: 34,35,36,37,38,39
41 Fanouts: 42,43,44,45,46,47
41 FanIns: 35,36,37,38,39,40
42 Fanouts: 43,44,45,46,47,48
42 FanIns: 36,37,38,39,40,41
43 Fanouts: 44,45,46,47,48,49
43 FanIns: 37,38,39,40,41,42
44 Fanouts: 45,46,47,48,49,50
44 FanIns: 38,39,40,41,42,43
45 Fanouts: 46,47,48,49,50,51
45 FanIns: 39,40,41,42,43,44
46 Fanouts: 47,48,49,50,51,52
46 FanIns: 40,41,42,43,44,45
47 Fanouts: 48,49,50,51,52,53
47 FanIns: 41,42,43,44,45,46
48 Fanouts: 49,50,51,52,53,54
48 FanIns: 42,43,44,45,46,47
49 Fanouts: 50,51,52,53,54,55
49 FanIns: 43,44,45,46,47,48
50 Fanouts: 51,52,53,54,55,56
50 FanIns: 44,45,46,47,48,49
51 Fanouts: 52,53,54,55,56,57
51 FanIns: 45,46,47,48,49,50
52 Fanouts: 53,54,55,56,57,58
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52 FanIns: 46,47,48,49,50,51
53 Fanouts: 54,55,56,57,58,59
53 FanIns: 47,48,49,50,51,52
54 Fanouts: 55,56,57,58,59,60
54 FanIns: 48,49,50,51,52,53
55 Fanouts: 56,57,58,59,60,61
55 FanIns: 49,50,51,52,53,54
56 Fanouts: 57,58,59,60,61,62
56 FanIns: 50,51,52,53,54,55
57 Fanouts: 58,59,60,61,62,63
57 FanIns: 51,52,53,54,55,56
58 Fanouts: 59,60,61,62,63,99
58 FanIns: 52,53,54,55,56,57
59 Fanouts: 60,61,62,63,99,65
59 FanIns: 53,54,55,56,57,58
60 Fanouts: 61,62,63,99,65,66
60 FanIns: 54,55,56,57,58,59
61 Fanouts: 62,63,99,65,66,67
61 FanIns: 55,56,57,58,59,60
62 Fanouts: 63,99,65,66,67,68
62 FanIns: 56,57,58,59,60,61
63 Fanouts: 99,65,66,67,68,69
63 FanIns: 57,58,59,60,61,62,78,79,80,81,82,83
99 Fanouts: NONE
99 FanIns: 58,59,60,61,62,63,93,94,95,96,97,98
65 Fanouts: 66,67,68,69,70,71
65 FanIns: 59,60,61,62,63,64
66 Fanouts: 67,68,69,70,71,72
66 FanIns: 60,61,62,63,64,65
67 Fanouts: 68,69,70,71,72,73
67 FanIns: 61,62,63,64,65,66
68 Fanouts: 69,70,71,72,73,74
68 FanIns: 62,63,64,65,66,67
69 Fanouts: 70,71,72,73,74,75
69 FanIns: 63,64,65,66,67,68
64 Fanouts: 65,66,67,68,69,70
64 FanIns: NONE
70 Fanouts: 71,72,73,74,75,76
70 FanIns: 64,65,66,67,68,69
```

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71 Fanouts: 72,73,74,75,76,77
71 FanIns: 65,66,67,68,69,70
72 Fanouts: 73,74,75,76,77,78
72 FanIns: 66,67,68,69,70,71
73 Fanouts: 74,75,76,77,78,79
73 FanIns: 67,68,69,70,71,72
74 Fanouts: 75,76,77,78,79,80
74 FanIns: 68,69,70,71,72,73
75 Fanouts: 76,77,78,79,80,81
75 FanIns: 69,70,71,72,73,74
76 Fanouts: 77,78,79,80,81,82
76 FanIns: 70,71,72,73,74,75
77 Fanouts: 78,79,80,81,82,83
77 FanIns: 71,72,73,74,75,76
78 Fanouts: 79,80,81,82,83,63
78 FanIns: 72,73,74,75,76,77
79 Fanouts: 80,81,82,83,63,85
79 FanIns: 73,74,75,76,77,78
80 Fanouts: 81,82,83,63,85,86
80 FanIns: 74,75,76,77,78,79
81 Fanouts: 82,83,63,85,86,87
81 FanIns: 75,76,77,78,79,80
83 Fanouts: 63,85,86,87,88,89
83 FanIns: 77,78,79,80,81,82
85 Fanouts: 86,87,88,89,90,91
85 FanIns: 79,80,81,82,83,84
86 Fanouts: 87,88,89,90,91,92
86 FanIns: 80,81,82,83,84,85
87 Fanouts: 88,89,90,91,92,93
87 FanIns: 81,82,83,84,85,86
88 Fanouts: 89,90,91,92,93,94
88 FanIns: 82,83,84,85,86,87
89 Fanouts: 90,91,92,93,94,95
89 FanIns: 83,84,85,86,87,88
84 Fanouts: 85,86,87,88,89,90
84 FanIns: NONE
90 Fanouts: 91,92,93,94,95,96
90 FanIns: 84,85,86,87,88,89
91 Fanouts: 92,93,94,95,96,97
```

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91 FanIns: 85,86,87,88,89,90
92 Fanouts: 93,94,95,96,97,98
92 FanIns: 86,87,88,89,90,91
93 Fanouts: 94,95,96,97,98,99
93 FanIns: 87,88,89,90,91,92
94 Fanouts: 95,96,97,98,99
94 FanIns: 88,89,90,91,92,93
95 Fanouts: 96,97,98,99
95 FanIns: 89,90,91,92,93,94
96 Fanouts: 97,98,99
96 FanIns: 90,91,92,93,94,95
97 Fanouts: 98,99
97 FanIns: 91,92,93,94,95,96
98 Fanouts: 99
98 FanIns: 92,93,94,95,96,97

SnakeisNotBad.txt
Num Vertices = 99
Num Edges   = 573
Work done   = 651
BFS order =  1 82  3  4  5  6  7 83 63 85 86 87 88  8  9 10 11 12 13 89 99 65 66 67 68 69 90 91 92 93 94 14
15 16 17 18 19 95 70 71 72 73 74 75 96 97 98 20 21 22 23 24 25 76 77 78 79 80 81 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
BFS path  =  1  1  1  1  1  1  1 82 82 82 82 82 82  3  3  4  5  6  7 83 63 63 63 63 63 63 85 85 86 87 88  8
9 10 11 12 13 89 65 65 66 67 68 69 90 91 92 14 15 16 17 18 19 70 71 72 73 74 75 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
1
1->82
1->3
1->4
1->5
1->6
1->7
1->82->83
1->82->63
1->82->85
1->82->86
1->82->87
1->82->88
```

```
1->3->8
1->3->9
1->4->10
1->5->11
1->6->12
1->7->13
1->82->83->89
1->82->63->99
1->82->63->65
1->82->63->66
1->82->63->67
1->82->63->68
1->82->63->69
1->82->85->90
1->82->85->91
1->82->86->92
1->82->87->93
1->82->88->94
1->3->8->14
1->3->9->15
1->4->10->16
1->5->11->17
1->6->12->18
1->7->13->19
1->82->83->89->95
1->82->63->65->70
1->82->63->65->71
1->82->63->66->72
1->82->63->67->73
1->82->63->68->74
1->82->63->69->75
1->82->85->90->96
1->82->85->91->97
1->82->86->92->98
1->3->8->14->20
1->3->9->15->21
1->4->10->16->22
1->5->11->17->23
1->6->12->18->24
```

```
1->7->13->19->25
1->82->63->65->70->76
1->82->63->65->71->77
1->82->63->66->72->78
1->82->63->67->73->79
1->82->63->68->74->80
1->82->63->69->75->81
1->3->8->14->20->26
1->3->9->15->21->27
1->4->10->16->22->28
1->5->11->17->23->29
1->6->12->18->24->30
1->7->13->19->25->31
1->3->8->14->20->26->32
1->3->9->15->21->27->33
1->4->10->16->22->28->34
1->5->11->17->23->29->35
1->6->12->18->24->30->36
1->7->13->19->25->31->37
1->3->8->14->20->26->32->38
1->3->9->15->21->27->33->39
1->4->10->16->22->28->34->40
1->5->11->17->23->29->35->41
1->6->12->18->24->30->36->42
1->7->13->19->25->31->37->43
1->3->8->14->20->26->32->38->44
1->3->9->15->21->27->33->39->45
1->4->10->16->22->28->34->40->46
1->5->11->17->23->29->35->41->47
1->6->12->18->24->30->36->42->48
1->7->13->19->25->31->37->43->49
1->3->8->14->20->26->32->38->44->50
1->3->9->15->21->27->33->39->45->51
1->4->10->16->22->28->34->40->46->52
1->5->11->17->23->29->35->41->47->53
1->6->12->18->24->30->36->42->48->54
1->7->13->19->25->31->37->43->49->55
1->3->8->14->20->26->32->38->44->50->56
1->3->9->15->21->27->33->39->45->51->57
```

```
1->4->10->16->22->28->34->40->46->52->58
1->5->11->17->23->29->35->41->47->53->59
1->6->12->18->24->30->36->42->48->54->60
1->7->13->19->25->31->37->43->49->55->61
1->3->8->14->20->26->32->38->44->50->56->62
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```