

Programming Assignment 1: Angry Birds: Part Deux (Smarter Pigs Edition)

TESTCASES DOCUMENT

Submitted by: - Rahul Raj and Olenka Dey

We inspected our program for different conditions few of the conditions are:

1. When the bird goes, and lands out of the grid space.
2. Changing the network architecture of how peers are connected.
3. Analyzing performance when the hop delay changes.
4. Proper detection of status and score when bird lands on:
 - Empty space
 - On a stone - how it ripples out to its neighbors
 - On a pig - how it relocates to the available location in its vicinity, how it signals other to take shelter and how it informs others if it dies or evades.
5. By increasing number of peers in the network.

We basically tested our code by inspection these scenarios. We let the program to generate random assignments to the peers and stones, based on our input of heavily dense or sparse network. We have used random generation because it becomes cumbersome to allocate so many locations manually for around 40-50 stone and 20 pigs.

Few of the above cases are shown below:

1. Bird falls into an empty location:

```
Will create 12 new peers...

      0 1 2 3 4 5 6 7 8 9 10 11
0 B - - - - - - P - S P
1 S S - P S S S - - S P S
2 - - - - S - - - - P
3 S - - S S - - - S - -
4 - S - - - S S S S - - S
5 - - - P - S - - - - -
6 - - - - - - - - P S
7 S - - - S - - - S - -
8 - - S S S - - S S - P -
9 S S P P S - S - P S - -
10 - - S - - - S - - - -
11 S - - - P S S - - - -

Bird launch coordinates are: (0, 0)
Bird will travel 4.0 steps..
Target coordinates of the birds are: (4, 4)

Bird falling in open location
Score: 0
Bird Died..
Press 1 to restart or 2 to change config file and press Enter... █
```

- Pig evaded the bird and how the status message propagated till the last peer, i.e from Pig4 to pig12.

```
Will create 12 new peers...

      0 1 2 3 4 5 6 7 8 9 10 11
0 B - S - - S S - - - S -
1 - - - S - - - S - S - P
2 P P - - P - - - - P - -
3 S - - - - S - - P - P -
4 - - S - P - S S - P S S
5 - S S - - - S - - P S S
6 S - S - S - - S - S - S
7 P - - - S - - - - - - -
8 - - - - S - - - S - - -
9 S - - S P - S - - - - -
10 - - S S S - - - - - -
11 - - S - S - S - - - S S

Bird launch coordinates are: (0, 0)
Bird will travel 4.0 steps..
Target coordinates of the birds are: (4, 4)

Client - 4 Connected to its own server..
Target Coordinate is [4, 4]
Time left before Bird's Landing is 1.97
Hopcount at location (4, 4) is 1

Location of peer-4 with port number 8004 is [4, 4]
Need to move to nearest available location
Asking neighbors to take shelter..
No pig is nearby this pig !!
Pig at location (4, 4) moved to (3, 3) in order to avoid bird!!
Pig moved to safe location. Bird Dies!!
Score: 0
Sending status of the game
Peer 8004 sending status to peer 8001
Bird at location [4, 4] landed and Pig evaded !!

Client - 11 Connected to its own server..
Target Coordinate is [4, 4]
Time left before Bird's Landing is 1.96
Hopcount at location (3, 10) is 0

Location of peer-11 with port number 8011 is [3, 10]
Hopcount is 0.. No further Flooding possible..
Score: unknown
Sending status of the game
Peer 8011 sending status to peer 8001
Bird at location [4, 4] landed and Pig evaded !!

Client - 12 Connected to its own server..
Target Coordinate is [4, 4]
Time left before Bird's Landing is 1.96
Hopcount at location (1, 11) is 0

Location of peer-12 with port number 8012 is [1, 11]
Hopcount is 0.. No further Flooding possible..
Score: unknown
Sending status of the game
Peer 8012 sending status to peer 8001
Bird at location [4, 4] landed and Pig evaded !!
```

- When the grid is densely populated, how falling stone affects its neighbors.

```
Will create 12 new peers...

      0 1 2 3 4 5 6 7 8 9 10 11
0 B - - S - - S - - - S S
1 - P - - - S - - S - S
2 - S P S S - S S S - - S
3 - - - - S - - - - S S S
4 - S P - S - - P S - P -
5 - S - - S S - S S S S S
6 - S S - S - - - S S P -
7 - - - S - S - - - - S
8 - S - P S S - P - S S -
9 S - S S S S S - - P - P
10 - S S S S - - - S - S P
11 - - S S S S - S - P - -

Bird launch coordinates are: (0, 0)
Bird will travel 4.0 steps..
Target coordinates of the birds are: (4, 4)

Bird is falling on a stone (4, 4)
Stone at (4, 4) rolled over another stone at (3, 4)
Second stone fell in the empty location
Score: 0
Bird Died..
Press 1 to restart or 2 to change config file and press Enter.: 
```

- When the direction of launch changed and time in the air is increased in the config file. The bird is supposed to go out of the grid. The result that we got shows that our implementation is correct.

```
Will create 12 new peers...

      0 1 2 3 4 5 6 7 8 9 10 11
0 B - - S - - S S - - S S
1 S - - S S P S S S S S
2 - - - P S S - S - S S
3 - S - - - S S P - S - -
4 - - S - S S S - S - S S
5 - - - S - S - P - P S S
6 S - - S - P S S - - - -
7 - S - - - P - - S S - -
8 - - - - S - - S - - S -
9 - - S - S - S P P S S S
10 S - - S - P - S - P S S
11 - - - P S - - S S - S -

Bird launch coordinates are: (0, 0)
Bird will travel 2.0 steps..
Bird landed outside the grid and Died !!!
Target coordinates of the birds are: (0, -2)

Bird falling in open location
Score: 0
Bird Died..
Press 1 to restart or 2 to change config file and press Enter... █
```

- When Pig could not save itself. This happens when the flight time of the bird is very less (means the bird lands very fast) and the pigs network is not able to reach to a target pig during that time.

Following configuration is used for it:

```
Bird launch coordinate = (0,0)
Bird Speed = 1000
Bird Direction = SE
##Birds time it takes to make
Bird Time in the air = 0.01

### Max hopcount is calculated
##P2P hop delay from one peer

## Hop delay is the delay in
Hop delay = 10
```

It is being tested using 15 pigs and 100 stones. The pigs relation used was:

```
## Kindly take care that the pig numbers are within number_of_pigs attribute
Pigs Neighbors = {1:[2,4,5,6],2:[3,4,6],3:[4,5,8],6:[1,2,5],5:[1,2,3,4,5,6],9:[2,4,6],7:[4,5,6],8:[1,9,10,11,12],10:[13,14,15]}
```

We can see from below output that the status message propagated throughout the network about the bird killed a particular pig. (Hopcount=-1 is just to indicate the user that it's a status message)

```
olenka@olenka-VirtualBox:~/DOS$ =====
Client - 1 Connected to its own server..
Target Coordinate is (8, 9)
Time left before bird's landing is 0.01
Hopcount at location (3, 2) is 10.0

Location of peer-1 with port number 8001 is [3, 2]
sending location to my next peer
Client 8001 Established connection with the server 8002
Client 8001 Established connection with the server 8004
Client 8001 Established connection with the server 8005
Client 8001 Established connection with the server 8006
=====
Client - 2 Connected to its own server..
Target Coordinate is [8, 9]
Time left before Bird's Landing is 0.0
Hopcount at location (4, 4) is 9

Location of peer-2 with port number 8002 is [4, 4]
pig at location [8, 9] died !!
Score: 1
Sending status of the game
Peer 8002 sending status to peer 8003
Bird killed pig at location [8, 9]
Peer 8002 sending status to peer 8004
Bird killed pig at location [8, 9]
Peer 8002 sending status to peer 8006
Bird killed pig at location [8, 9]
=====
Client - 3 Connected to its own server..
Target Coordinate is [8, 9]
Time left before Bird's Landing is 0
Hopcount at location (5, 3) is -1

Location of peer-3 with port number 8003 is [5, 3]
Sending status of the game
Peer 8003 sending status to peer 8004
Bird killed pig at location [8, 9]
Peer 8003 sending status to peer 8005
Bird killed pig at location [8, 9]
Peer 8003 sending status to peer 8008
Bird killed pig at location [8, 9]
=====
Client - 4 Connected to its own server..
Target Coordinate is [8, 9]
Time left before Bird's Landing is 0
Hopcount at location (0, 4) is -1
```